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1.0 Project Description

1.0 PROJECT DESCRIPTION

1.1 Introduction and ENF Certificate

Twenty Wayland, LLC (the Proponent) has proposed the creation of the "Wayland Town Center" project, a mixed use development on property formerly occupied by Raytheon Company, Polaroid, and other tenants on Boston Post Road in Wayland, Massachusetts. The project as proposed includes a mix of commercial, residential, town green open space, municipal amenities, and dedication of property for a future municipal building.

On July 17, 2006 the Proponent filed an Environmental Notification Form (ENF) with the Executive Office of Environmental Affairs initiating review under the Massachusetts Environmental Policy Act (MEPA, G.L. ch. 30, secs. 61-62H). Public and agency comments were received, and on August 25, 2006 the Secretary of Environmental Affairs issued a Certificate on the ENF, or "Scope," stating that the project requires the preparation of an Environmental Impact Report (EIR), and defining the issues to be addressed in the EIR.

This Draft EIR (DEIR) has been prepared in response to the Scope. A copy of the ENF Certificate is presented at the end of this Section.

1.2 Project Description

The Wayland Town Center project (the project) includes a mix of commercial, residential, town green open space, municipal amenities, and the designation of a site for a future municipal building. In May 2006, Wayland Town Meeting demonstrated its support for the project by approving a Mixed Use Overlay District, thereby paving the way for the project to proceed with design and permitting review.

1.2.1 Wayland Town Center Project

The Wayland Town Center project is proposed for an approximately 56.5-acre parcel of land situated north of Route 20 and west of Route 27 in Wayland (see Figure 1-1, USGS Locus Map). The site is currently occupied by a vacant 400,000 gross square-foot commercial building, which previously housed the Raytheon Company, the Polaroid Corporation, and several other business operations. Also located on the site are a second smaller (approximately 10,500 gross square-foot) vacant office building and a large paved parking lot. To the northwest of the larger commercial building is a municipal wastewater treatment plant owned and operated by the Town of Wayland. While the majority of the eastern portion of the site is occupied by the larger building and parking lot, a significant area in the western portion of the site remains largely undisturbed. This undisturbed area abuts the Sudbury River (see Figure 1-2, Existing Conditions Plan).

Basemap: 1987 USGS Quadrangles, MassGIS

Scale 1:24,000
1 inch = 2,000 feet

0 2,000 4,000 Feet

Figure 1-1
USGS Locus Map

Wayland Town Center
Wayland, Massachusetts

Epsilon Associates Inc.

Basemap: 2005 Orthophotography, MassGIS

Scale 1:4,800
1 inch = 400 feet

0 400 800 Feet

Figure 1-2
Existing Conditions

Wayland Town Center
Wayland, Massachusetts

Epsilon Associates Inc.

G:\Projects2\MA\Wayland\1921\DEIR\1-2ExistCondit.mxd

11/8/06

The design of the proposed Wayland Town Center project is shown on Figure 1-3, Schematic Site Layout. The design continues to evolve, but has been approved by Town Meeting for a maximum of 167,500 square feet of residential use (100 units and 200 bedrooms), 155,000 square feet of commercial use (retail space and restaurants) and 10,000 square feet of office space. Additionally, the Town of Wayland will be deeded a parcel within the development for construction of a 40,000 square-foot municipal building.

The layout and scale of the Wayland Town Center project has been driven by the desire to create a village-like environment with a "Main Street" bordered by wide sidewalks and store fronts, a Town Green fronting a municipal facility, and residences all within walking distance to the above amenities.

Figure 1-4 shows an oblique angle view of the proposed project as seen from the northeast looking toward the southwest, with the MBTA railroad right-of way marking the edge in the distance. This view highlights the ambiance of village storefronts located along a tree-lined Main Street. Larger, stand-alone retail structures can be seen in the foreground, marking the perimeter, rather than the center, of the village. Meanwhile, Figure 1-5 shows a somewhat higher angle view of the Wayland Town Center project looking west to east across the site. The prominence of the future municipal building and the proposed "Village Green" is readily apparent, with the residential structures looking out over the green to the south, or over the open space of the site and the distant Sudbury River off to the north and west.

To maintain the undisturbed nature of the northern and western portions of the site, the project is being designed to largely overlay the previously disturbed area of the site. Figure 1-6, Proposed Layout Superimposed on Existing Conditions, highlights where the project will overlay the disturbed areas of the site. This development proposal (excluding Wayland's future municipal building) is 20 percent smaller than the development that currently occupies the site.

Finally, wastewater disposal service will be provided for the project through connection to the existing Town of Wayland municipal wastewater treatment plant and construction of an on-site septic system. It is anticipated that the project, including the proposed municipal parcel, will generate up to 54,900 gallons per day (gpd) of wastewater based on Massachusetts Department of Environmental Protection (DEP) Title V wastewater generation rates. The Proponent has the contractual right to discharge 45,000 gpd into the Wayland municipal wastewater treatment plant. This right has been confirmed in the project's Development Agreement with the Town of Wayland. In addition, the Proponent anticipates using sections of the project site to construct an on-site septic system to discharge 9,900 gpd of wastewater. The leaching field has been sized based on general site soil conditions and percolation tests that were conducted in the spring of 2006. Additional soil testing will be performed in the spring of 2007 to confirm the suitability of soil conditions in the area of the proposed leaching field. If there is variability in the soil conditions, the leaching fields will be redesigned as necessary.

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617.623.5555 FAX 625.4646

Twenty Wayland, LLC

Wayland Town Center

November 1, 2006

Figure 1 - 3
Schematic Site Layout

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Architecture Urban Design Planning Graphics and Interiors

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Wayland Town Center

Wayland, Massachusetts

Twenty Wayland, LLC

45 Broad Street, 4th Floor, Boston, Massachusetts

DEIR Renderings (4 of 6)

01 November 2006 - Project No. 06065

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Wayland Town Center

Wayland, Massachusetts

Twenty Wayland, LLC

45 Broad Street, 4th Floor, Boston, Massachusetts

DEIR Renderings (1 of 6)

01 November 2006 - Project No. 06065

Basemap: 2001 Orthophotography, MassGIS

Scale 1:2,400
1 inch = 200 feet

0 100 200 400 Feet

Figure 1-6
Proposed Layout Superimposed on Existing Conditions

Wayland Town Center
Wayland, Massachusetts

Epsilon ASSOCIATES INC.

1.2.2 Sustainable Design and Low Impact Development

Sustainable design building elements, energy efficient building systems, and recycling efforts are examples of sustainable design measures that will be evaluated for inclusion as the project proceeds. During the final design of the project, the Proponent will evaluate sustainable construction and operation measures, including sustainable design measures identified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. A detailed discussion of Sustainable Design measures proposed for this project is included in Section 9.0.

Low Impact Development (LID) is a stormwater management approach with the goal of mimicking the site's pre-development hydrology. This is done by using design techniques that infiltrate, filter, store, and detain water throughout the site using decentralized micro-scale controls. LID includes structural and non-structural strategies such as retention areas, reduction of impervious surfaces, lengthening of flow paths, and the preservation of existing vegetation and landscape features. Redevelopment and improving stormwater quality of existing sites, and energy and water conservation are also examples of LID techniques.

The proposed project is a redevelopment of an existing Raytheon building, and will provide significant improvements to the stormwater management system and water quality of stormwater runoff leaving the site from what exists today. The existing development consists primarily of impervious building and pavement areas which drain to wetlands through catch basins without treatment. The proposed development program was designed to minimize impervious areas and preserve existing vegetation to the maximum extent feasible.

LID techniques proposed for the project include the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. The water quality swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. The rain gardens and bioretention basins will be planted with a combination of grasses, shrubs, and small trees. The clean stormwater runoff from the building rooftops will be directed to the water quality swales and bioretention basins to provide additional groundwater recharge.

1.2.3 Other Area Enhancements and Benefits

The Proponent is providing $4.2 million to the Town of Wayland to address a number of community mitigation requirements for the project. Anticipated mitigation includes the widening of Route 20 through the intersection with Route 27. Specifically, Route 20 will be widened to a four lane section starting approximately 700 feet east of Route 27 to a point approximately 550 feet west of Route 27. At the intersection with Route 27, both Route 20 approaches will consist of two lanes permitting both left and right turns. These improvements will require some road widening, but will also take advantage of existing roadway widths. The road work will result in some wetland encroachment and buffer zone

work, and hence an Order of Conditions from the Wayland Conservation Commission will be required.

The Proponent is providing $250,000 to the Town of Wayland for the potential creation of a bike path and possibly a historic interpretative railroad site along the MBTA right-of-way that abuts the southeastern edge of the site. This effort is to be undertaken separately by the Town and, if the Town chooses not to proceed with the bike path and interpretative railroad site project, the agreement stipulates that the Town may use the $250,000 for other purposes of its choosing.

The project is being designed with an emphasis on pedestrian and bicycle connections. All interior roads include sidewalks, including the entranceways at Routes 27 and 20. As noted above, funding is being provided in the hope that the Town will proceed with plans to build a bike path that would border the Wayland Town Center site and extend eastward through the Town of Wayland. Presumably, foot trails will lead from the project site, through dedicated site Conservation Restriction lands and into nearby municipal conservation lands. As the design proceeds and tenants are identified, the Proponent will identify locations for and supply bicycle racks to encourage the use of bicycles by Wayland Town Center residents and off-site neighbors.

The Proponent is granting a Conservation Restriction and Easement to a ten acre portion of the property to be held for the public by either the Sudbury Valley Trustees, Inc. or another non-profit corporation. The exact location of this Conservation Restriction is to be determined in consultation with the Town, but will likely encompass a corridor along the western portion of the site that allows for direct connection to the Town of Wayland "Cow Common" conservation land and that encompasses portions of the upland boundary along and above the Sudbury River floodplain.

Per the Development Agreement, 25 percent of the housing units shall be affordable. This will result in a contribution of as many as 25 units to the Town of Wayland's affordable housing stock.

Finally, the Wayland Town Center project results in the enactment of a number of measures that will improve the overall character and quality of this site. Key among these is the improvement of stormwater management in terms of both quality and quantity. As a redevelopment project, stormwater control measures will be required to meet the DEP Stormwater Management Policy standards to the degree practicable. This will be accomplished through the addition of recharge areas, water quality swales and deep sump catch basins. Similarly, the Proponent will introduce a program of snow management that includes low salt and sand use consistent with the above stormwater management policy standards and good safety practices. The location of snow storage areas will be coordinated with the Town, and in particular with the Conservation Commission, as the project proceeds to the permitting phase.

1.2.4 Existing and Proposed Grading

Approximately 22 acres of the 56.5 acre site is currently developed with structures and paved parking lots. In addition, much of the "undeveloped" portion of the site has been disturbed by previous grading activities. The existing site structures are shown on Figure 1-2 and include the former Raytheon facility at the east-central side of the site and a small structure at the southwestern corner of the site that was originally proposed for use as a daycare center. The footprints of these building are approximately 272,700 square and 10,500 square feet, respectively. Existing on-site structures also include the municipal wastewater treatment facility which is owned and operated by the Town of Wayland.

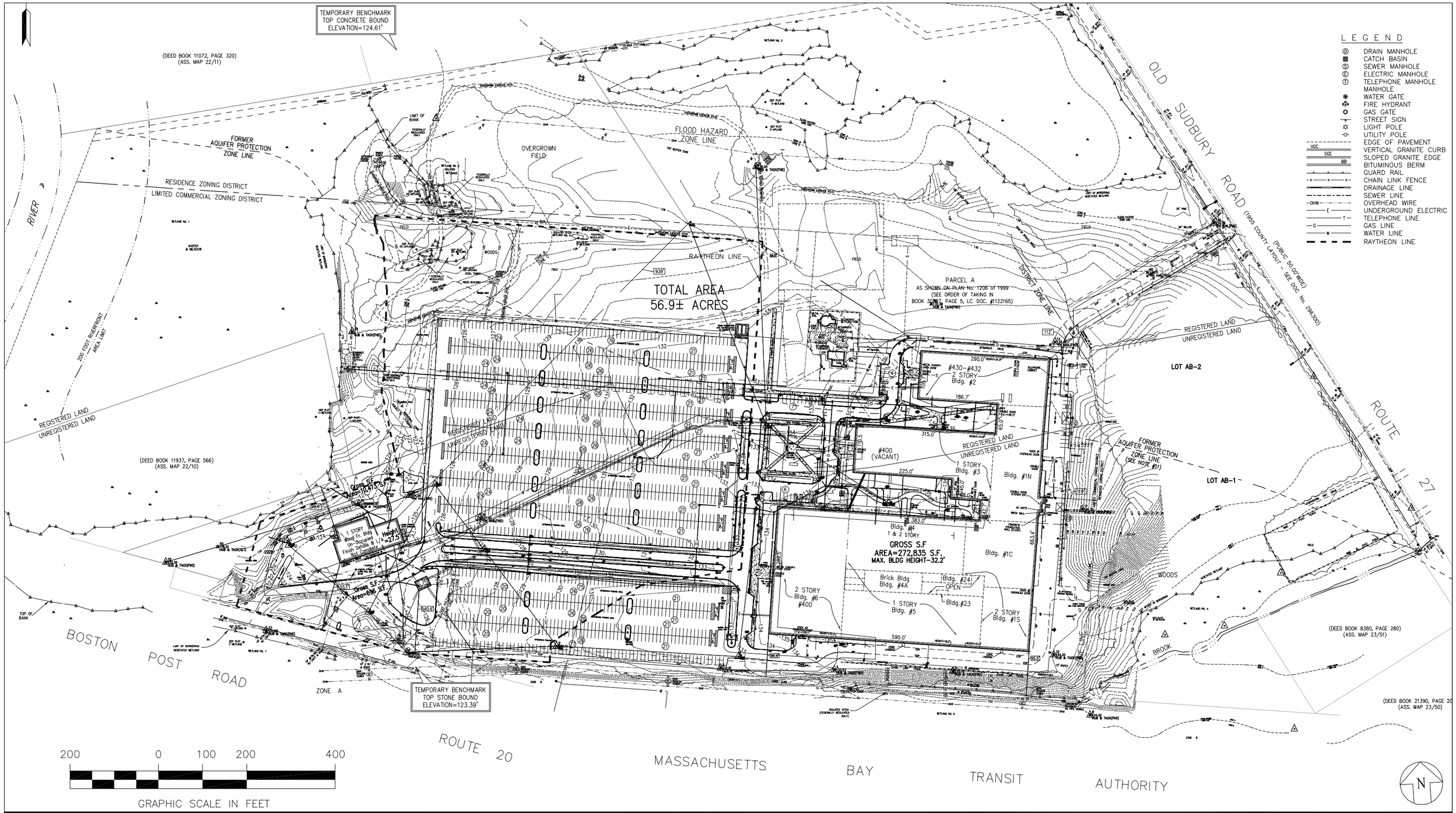
The existing topography and grading of the site is shown on Figure 1-7. Generally, the project site slopes east to west and ranges from elevation ±146 at the eastern property line adjacent to the Wayland Meadows Property to elevation ±116 at the western side of the site in the large wetland area adjacent to Sudbury River. As noted above, much of the site, including areas beyond the western end of the existing parking lot, has undergone some degree of grading in the past, and existing conditions plans likely do not reflect the original topographic condition. The abrupt bank at the edge of the wetlands at the far western side of the property appears to reflect these past grading activities.

Figure 1-8 shows the grading proposed for the Wayland Town Center project. The proposed site grading has been designed to follow the existing contours of the land as much as possible and to minimize impacts to surrounding vegetated areas. The grading plan and stormwater management system have been designed to mimic pre-development hydrology by promoting groundwater recharge and directing runoff in the same direction that it travels under existing conditions.

1.3 Adjacent Land Uses and Ownership

Land uses adjacent to the Wayland Town Center project site are identified in the Town of Wayland publication *Wayland Town Master Plan, Final Report – August 2004,* and are noted on Figure 1-2.

The *Wayland Town Master Plan, Final Report – August 2004* report classifies the Wayland Town Center project site as an industrial property, reflecting its former use by the Raytheon Company. This industrial designation includes all lands of the site up to the wetland edge on the western side of the site. In extending beyond the limit of the existing parking lot and into the scrub vegetation landward of the wetlands, this use characterization appears to recognize the former disturbance and grading of this area of the site. Beyond this limit both the on-site and off-site lands of the far western border of the site are identified as wetlands associated with the Sudbury River. Portions of the land west of the site are owned by the federal government. The Raytheon Company owns the undeveloped land that indents the southwestern corner of the project site.



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Project No:	RJOC 06032
Drawn By:	
Checked By:	
Issue Date:	15 NOVEMBER 2006

Project:

Wayland Town Center

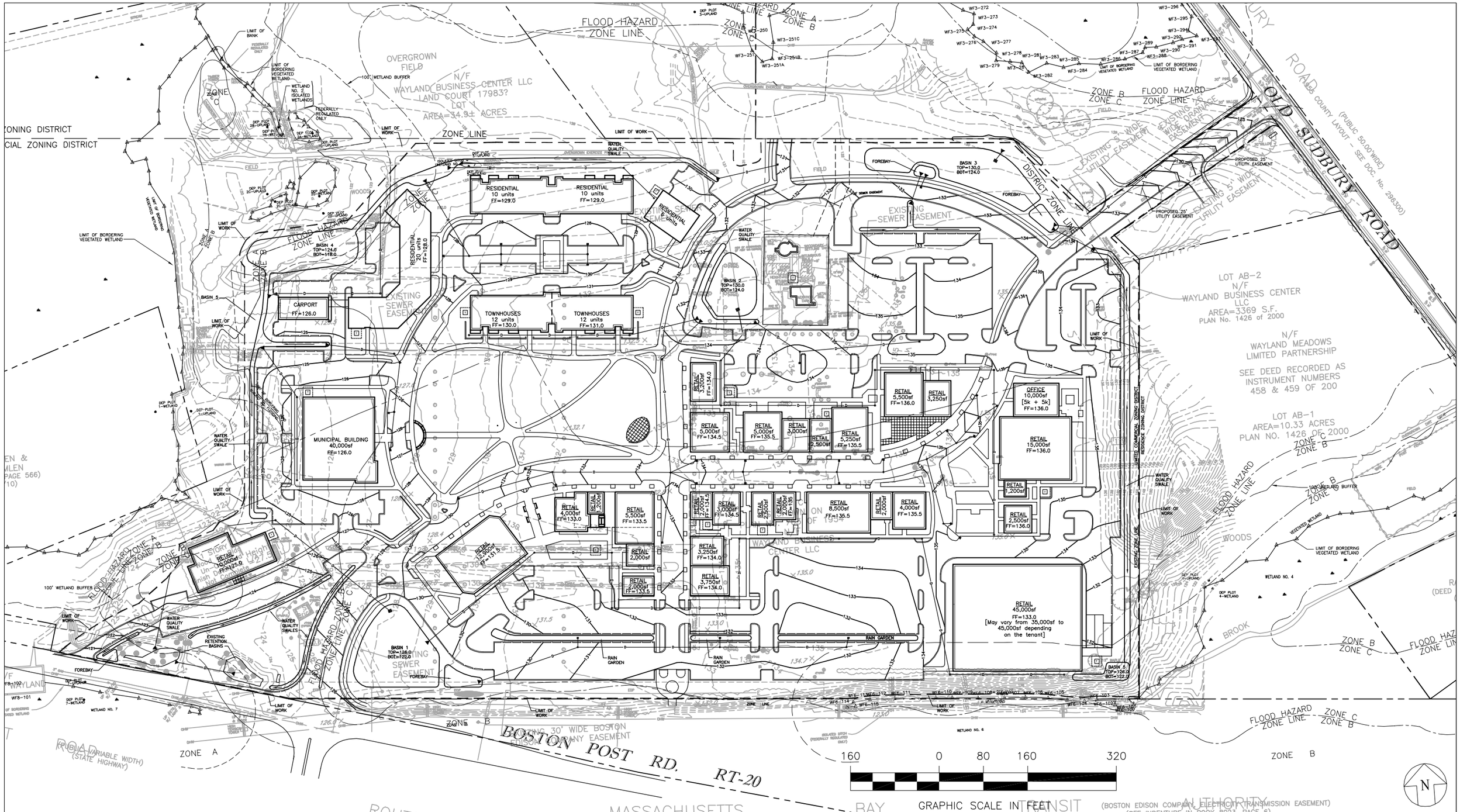
400 Boston Post Road
Wayland, Massachusetts

Draft Environmental Impact Report Submission

Figure 1-7
Existing Grading Plan

SCALE 1" = 200'

Drawing name: Q:\All Projects\Great Island\Town Center\Permits\DEIR\06032_C-1.dwg
Nov 08, 2006 - 15:02am



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Drawn By:
Checked By:
Issue Date: 15 NOVEMBER 2006

Project:
Wayland Town Center
400 Boston Post Road
Wayland, Massachusetts

Draft Environmental Impact Report Submission

Drawing Title:
PROPOSED GRADING PLAN

Drawing Number
SCALE 1" = 160'
C-3

Figures 1-2 and 1-6 show the abutting lands to the north of the site as undeveloped forested or open lands, although the portion of these lands along the northeastern border are characterized by the *Wayland Town Master Plan, Final Report – August 2004* as industrial lands, again, likely reflecting past disturbance and grading activities. The forested and open lands include the undeveloped Town-owned land known as Cow Common. Uses on the Cow Common land include community garden plots, hay fields and walking trails.

The lands of the eastern border of the site on either side of the Route 27 entrance way are shown in Figures 1-2 and 1-6 as open fields and scrub/forest lands. However, the lands on both sides of this roadway have recently been cleared as part of the Wayland Meadows housing development, which is under construction.

The southern border of the site is marked by an MBTA right-of-way. The land use opposite the MBTA right-of-way includes commercial business and a few residences associated with the Route 20 corridor. Land use along this entire stretch of Route 20 from the MBTA crossing eastward to the intersection of Route 27 is identified in the *Wayland Town Master Plan, Final Report – August 2004* as commercial.

1.4 Project Phasing

The Wayland Town Center project may be constructed in two phases. Off-site improvements, site development, and construction of retail buildings and a portion of the residential units will occur in the first phase. The remaining residential units will be constructed in a second phase, depending on market conditions. Should the market support it, all of the residential units will be constructed in the initial phase.

Site development activities that will occur during the first phase include the following:

- installation of protection materials for adjacent dwellings, roads, storm drainage and areas to remain undisturbed;
- installation of temporary utilities for the wastewater treatment plant and for construction operations (mainly power poles);
- demolition of existing buildings;
- removal of existing trees, granite curbing and asphalt;
- removal or relocation of existing buried utilities (electrical, water, sewer);
- installation of new utilities below ground;
- excavation and backfill for foundations,
- earth preparation for new paving;

- installation of site lighting conduit and bases; site paving, and
- installation of light poles and landscaping.

Roadway improvements at the entranceways of the site will occur simultaneously with the on-site work in anticipation that such improvements will be complete prior to site occupancy. In that the site is isolated from local roadways, no public traffic control measures will be required in association with on-site construction activities. Similarly, the off-site roadway improvements will be completed during the first phase of the project and prior to occupancy. Again, given the isolation of the site, the implementation of off-site roadway improvements will not be effected by on-site construction activities.

1.5 Required State Permits

The state and local permits required for this project are listed in Table 1-1, below. The project's compliance with performance standards for each of the state permits is discussed in the topically appropriate section within this DEIR.

1.6 Consistency with Executive Order 385

Executive Order 385, Planning for Growth, requires that EOEA's MEPA review evaluate the consistency of proposed projects with local or regional management plans that have been formally accepted by the affected municipality.

1.6.1 Wayland Town Master Plan, Final Report –August 2004

The Town of Wayland's *Wayland Town Master Plan, Final Report – August 2004* includes a Plan for the future that incorporates seven topic areas: 1) land use and growth management, 2) housing, 3) economic development, 4) natural and historic resources, 5) open space and recreation, 6) public facilities and services and 7) transportation. As stated in the Master Plan, "The Land Use and Growth Management Plan is the centerpiece of Wayland's Plan for the Future. The Town's future use of land will affect almost every topic that is addressed in the Master Plan; housing supply, economic development opportunities, transportation demand, the need for public facilities and infrastructure, etc." The Wayland Town Center project site is specifically called out in Chapter 10 of the Master Plan (Land Use and Growth Management Plan) as a "keystone" site for the Town. The Master Plan identifies the site as the "Wayland Business Center" and suggests that this site is "the only location in Town where there is the potential for large-scale business activities, significant commercial tax revenue generation, and large-scale redevelopment."

Table 1-1 Required State and Local Permits

Permit/Approval	Agency	Comments/Status
Highway Access Permit	Massachusetts Highway Department	Required for access to State Route 20.
Minor Sewer Connection Permit	Department of Environmental Protection	Required for the proposed wastewater discharges to the municipal system.
Order of Conditions	Wayland Conservation Commission	Required for work within wetland buffer zones on-site and near the intersection of Routes 27 and 20. An ANRAD was filed on October 5 and the public hearing was closed on November 2.
Master Special Permit	Wayland Planning Board	Required by zoning.
Site Plan Approval	Wayland Planning Board	Required by zoning.
Title V Permits	Wayland Board of Health	Required for proposed septic system.
Roadway Modification Permit	Wayland Highway Department	Required for modification of non-MHD roadways.
Utility Connection Permit	Wayland Water Department Wayland Wastewater Management District	Required for construction.
Building Permits	Wayland Building Department	Required for construction.

At the time of the adoption of the Master Plan, zoning at the project site did not match the Town's goals for the site, which included the development of small scale retail including restaurants and personal services as well as connecting the site to the rest of Wayland Center. To overcome these issues, the Master Plan suggested a new zoning classification for the site that would allow "a wider range of land uses, greater flexibility for site planning, and a higher overall density in exchange for developing the site according to a comprehensive, consensus-based site plan and adhering to specified design standards."

In May 2006 Wayland Town Meeting approved by a greater than two-thirds majority a Mixed Use Overlay District for the Wayland Town Center project site, thereby allowing the

project to proceed with design and permitting review. The Mixed Use Overlay District allows for a maximum of 167,500 square feet of residential use (100 units and 200 bedrooms), 155,000 square feet of commercial use (retail space and restaurants) and 10,000 square feet of office space. Additionally, the Town of Wayland will be deeded a parcel within the development for construction of a 40,000 square foot municipal building.

1.6.2 Town of Wayland Open Space and Recreation Plan

Wayland's 1994 *Open Space and Recreation Plan* lists twelve objectives that support the Town's broad goals of 1) preserving the semi-rural character of the Town, 2) preserving the Town's natural resources, including water bodies, wetlands, municipal water supply, wildlife habitat, farmland, and 3) providing opportunities for passive and active outdoor recreation within the Town.

The first of the twelve objectives listed in the *Open Space and Recreation Plan* is to preserve the Sudbury River Valley in undeveloped condition. The proposed project does not disturb the river's floodplain and has been designed to largely overlie areas that were previously disturbed by the Raytheon development. As a result the project does not encroach into the wetlands associated with the Sudbury River, nor the buffer zone of the River as defined by the Massachusetts Wetlands Protection Act. These areas will be left in their natural state, thereby creating a visual screen as viewed from the water. In addition, the buildings on-site will be limited to 35 feet in height, thereby of only limited visibility from the River or other off-site locations.

Objectives #2 and #3 of the Plan address the expansion of conservation areas and the protection of municipal water supplies. As part of the Wayland Town Center project, ten acres of land will be protected by a Conservation Restriction and Easement to be granted to the Sudbury Valley Trustees, Inc., or another non-profit corporation. In that the entire project site overlies the aquifer than contributes to the Town's Baldwin Pond wells, doing so will obviously be of benefit to both of the above interests. To protect the water quality and quantity of the underling aquifer the on-site stormwater management system will be designed to meet DEP stormwater quality standards for Zone II Wellhead Protection Areas. This will represent a significant improvement over the existing condition. In addition, the project will incorporate Low Impact Development (LID) techniques including the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. Finally, the on-site septic system for the project will incorporate the use of a Fixed Activated Sludge Treatment (FAST) system or equivalent technology approved by MA DEP. FAST wastewater treatment systems have been proven to consistently reduce nitrogen levels – including nitrates and all other nitrogen species - at exceptionally high percentage rates.

Objective #4 is to secure wetland resource areas and natural buffers adjacent to them, while Objective #5 is to protect steep slopes, especially those abutting water-bodies or wetlands. In that the project has been designed to largely overlie areas that were previously

disturbed by the Raytheon development primarily, wetland encroachments are minimal and, for the most part, confined to buffer zones. The proposed roadway improvements along Route 20 at Route 27 will likely include some encroachment into bordering vegetated wetlands, but any such encroachment will be minimized through construction techniques and the wetlands fully replicated in accordance with the Massachusetts Wetlands Protection Act and the Town of Wayland wetland protection bylaw. The site does not include steep slopes, and no work is proposed on the banks of any wetland resources areas.

Land use issues are the principal focus of Objectives #6 through #9 of the Town of Wayland *Open Space and Recreation Plan.* Objective #6 is directed at securing open-space buffers between residential land and non-residential zoning districts. The proposed project, which includes housing, is a redevelopment of an already disturbed site and, therefore, no open-space buffers will be lost. The lands north and west of the site are essentially undeveloped, as are the lands of the site along these borders. To the south the site is bordered by the MBTA right-of-way, on the far side of which are commercially zoned lands. The land to the east of the site is currently being developed as a dense residential facility, the roadways of which will likely be incorporated into the driveways of the Wayland Town Center project. Objective #7 relates to agricultural land and also does not apply to the proposed project. Objectives #8 and #9 deal with the preservation of sites of special value for wildlife or of "unique" interest. The Proponent is coordinating with the Natural Heritage and Endangered Species Program (NHESP) to ensure that the proposed project does not adversely affect rare or endangered plants or wildlife.

Objectives #10, #11 and #12 relate to the creation and maintenance of facilities and programs to encourage outdoor recreation. The Proponent is providing $250,000 to the Town of Wayland for the creation of a bike path and possibly a historic interpretive railroad site along the current MBTA right-of-way that abuts the southeastern edge of the site. As noted above, the Proponent is also committing to the protection of ten acres of land by a Conservation Restriction and Easement to be granted to the Sudbury Valley Trustees, Inc., or another non-profit corporation.

1.6.3 Metropolitan Area Planning Council's MetroPlan 2000

MetroPlan 2000 is the Metropolitan Area Planning Council's (MAPC) regional development plan for greater Boston. It is geared towards shifting development from a mode of uncoordinated, scattered growth -- known as sprawl -- to a mode of concentrated economic development. Concentrated development is favored from both economic and environmental standpoints because it encourages transit use, ride sharing, and pedestrian traffic, with corresponding reductions in traffic congestion, air pollution, and pressure to develop open space. The proposed Wayland Town Center project is a cluster-style, mixed use development, and is consistent with the goals of the MetroPlan.

MetroPlan 2000 is broken down into five elements: the Housing Element, the Land Resources Element, the Transportation Element, the Economic Development Element, and

the Water Resources Element. Each of these is reviewed below in relation to the Wayland Town Center project.

1.6.3.1 Housing Element

The goals of the Housing Element are to preserve affordable housing, protect people from displacement, ensure equal access to housing opportunities, adapt existing buildings to meet household changes, produce new housing where necessary, and to link job growth and housing. The project is consistent with this aspect of MetroPlan 2000 in that the development will not entail tenant displacement and will create up to 100 units of new housing. Per the Development Agreement between the Proponent and the Town of Wayland, 25 percent of these units will be designated as affordable.

1.6.3.2 Land Resources Element

The goals of the Land Resources Element are to preserve and protect critical land resources, shape the growth of the region, preserve and enhance a "sense of place" for the region, fulfill the recreational needs of the region's population, and provide appropriate access to open areas. The project is consistent with this aspect of MetroPlan. The site plan has been designed to preserve undisturbed open space on the project site by largely overlying the previously disturbed portions of the site. This project design leaves a significant area in the western portion of the site undisturbed. This undisturbed area abuts the Sudbury River. In addition, the Proponent will grant a Conservation Restriction and Easement for a portion of the property consisting of ten acres to either the Sudbury Valley Trustees, Inc. or another non-profit corporation.

1.6.3.3 Transportation Element

The goals of the Transportation Element are to achieve the Clean Air Act mandate, place a high priority on maintaining the existing transportation system, increase programs that are designed to discourage single occupant vehicle travel, and base transportation system expansions upon a benefit/cost analysis. As a mixed-use development, the project is designed to minimize automobile dependency. The Proponent has undertaken a traffic impact analysis to determine the impact of traffic generated by the project. An analysis of traffic operations at the study area intersections indicates that the proposed project, in general, is projected to be no worse with the proposed mitigation than future conditions with the existing office space re-occupied (without any mitigation) (see Section 3.0 of this DEIR). In addition, a comprehensive traffic mitigation program has been developed for the project that is designed to mitigate the impacts of the project and encourage the use of alternative modes of travel over the use of single occupant vehicles. This program will include elements of a transportation demand management program, including potential shuttle service to mass transit for employees and residents. The shuttle service would be solely for the residents and employees of Wayland Town Center. Service will largely be determined by the expressed demands of residents and employees.

1.6.3.4 Economic Development Element

MetroPlan 2000 encourages economic development throughout the region and particularly within Concentrated Development Centers (CDC). While the project is not located in a CDC, it will bring both temporary construction jobs and permanent jobs to the area.

1.6.3.5 Water Resources Element

The goal of the Water Resources Element is the protection of water resource natural systems and the management of water resource infrastructure systems. The project will implement a stormwater management system to mitigate project impacts and to significantly improve existing stormwater conditions. The stormwater management system complies with state and local performance standards and incorporates LID techniques including the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. Issues related to stormwater are detailed in Section 4.2 of this DEIR.

1.7 Summary of Impacts and Mitigation Measures

Table 1-2, below, describes the project's potential environmental impacts, measures that the Proponent is taking to avoid or minimize damage to the environment, and mitigation measures that the Proponent will implement to compensate for adverse impacts it is unable to avoid. A more detailed description of mitigation measures and proposed Section 61 Findings are found in Section 10.0 of this DEIR.

Table 1-2 Summary of Impacts and Mitigation Measures

Subject Matter	Impact	Mitigation	Schedule
Traffic	Generation of 9,404 new vehicle trips per day	Traffic mitigation commitments are detailed in Section 3.5.6 and include: Replacing the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section; signalizing the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20; modifying the existing intersection geometry at the site driveway; and widening the Route 27 northbound approach to accommodate an exclusive left-turn lane and a through travel lane. In addition, a Traffic Demand Management program will be put in place, a shuttle service will be promoted, bike racks will be installed and pedestrian access will be enhanced.	During construction
Air Quality	Slight decrease in daily VOC and NOx emissions in AM peak period of the build condition versus the no-build condition. Increases in emissions in PM peak period and weekend peak periods.	Traffic mitigation commitments are detailed in Section 3.5.6 and include: Replacing the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section; signalizing the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20; modifying the existing intersection geometry at the site driveway; and widening the Route 27 northbound approach to accommodate an exclusive left-turn lane and a through travel lane. In addition, a Traffic Demand Management program will be put in place, a shuttle service will be promoted, bike racks will be installed and pedestrian access will be enhanced.	During construction
Wetlands	Impacts to bordering vegetated wetlands (off-site roadway improvements only). Work in Riverfront Area (off-site and on-site).	Replication of bordering vegetated wetlands at a 1.5:1 ratio, as required by the Town of Wayland Wetlands and Water Resources Bylaw. Riverfront Area development confined to upland and previously disturbed areas.	Prior to occupancy
Stormwater	0.4 net new acres of impervious area	The proposed stormwater management system will significantly improve the quality of the stormwater runoff and will include new catch basins with deep sumps and hoods, and low impact development (LID) techniques such as water quality swales, rain gardens, and bioretention basins.	During construction and occupancy

Table 1-2 Summary of Impacts and Mitigation Measures (continued)

Wastewater	Generation of 54,900 gallons per day of wastewater	Water conservation fixtures will be installed in the residences and businesses.	During construction and occupancy
Water Supply	Consumption of 80,000 gallons per day of water	Water conservation fixtures will be installed in the residences and businesses. Landscape design will use native and drought-resistant species to minimize irrigation requirements.	During construction and occupancy
Hazardous Waste Cleanup	None	None required. Section 6.0 discusses Raytheon's ongoing cleanup activities at the site.	
Rare Species	None identified	The project is in the process of consulting with the NHESP to determine whether the project as designed would include a taking as defined by MESA. The results of this consultation and any further assessment will be presented in the FEIR.	Prior to construction
Sustainable Design	The full range of potential impacts associated with development and occupancy of the site.	Sustainable design building elements, energy efficient building systems, and recycling efforts are just some of the measures that will be evaluated for inclusion as the project proceeds. During the final design of the project, the Proponent will evaluate sustainable construction and operation measures, including sustainable design measures identified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.	During construction and occupancy
Construction	Temporary impacts on traffic, air quality, erosion control, noise and vibration, dust and wildlife and rare species.	Careful planning of construction. Planning to minimize water quality impacts. Maintenance of a comprehensive SWPPP. Requiring contractor compliance with air quality, noise, vibration, dust and construction traffic requirements.	During construction

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August 25, 2006

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Wayland Town Center
PROJECT MUNICIPALITY	: Wayland
PROJECT WATERSHED	: Sudbury Assabet Concord (SuAsCo)
EOEA NUMBER	: 13844
PROJECT PROPONENT	: Twenty Wayland, LLC
DATE NOTICED IN MONITOR	: July 25, 2006

Pursuant to the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and Section 11.03 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project **requires** the preparation of a mandatory Environmental Impact Report (EIR).

As described in the Environmental Notification Form (ENF), the project entails the construction of a mixed use development project on a site formerly occupied by the Raytheon Company on Boston Post Road (Route 20) in Wayland. The zoning to enable the project has been approved at Wayland Town Meeting for a maximum of 167,500 square feet (sf) of residential use (100 units), 156,750 sf of retail space, and 8,250 sf of office space. Additionally, a portion of the redevelopment site will be deeded to the Town of Wayland for the construction of a 40,000 square foot municipal building.

The project site is approximately 56.5 acres in area and located north of Route 20 and west of Route 27, abutting the Sudbury River. Adjacent uses include commercial properties along Route 20, residential uses along Route 27, and open space associated with the Sudbury River and local conservation land. Route 20 adjacent to the project site is a State highway, whereas Route 27 is owned by the Town of Wayland. The project will result in the creation of 1.8 acres of new impervious area (for a total of 23.4 acres) and reduce the number of existing on-site parking spaces by 340 (for a total of 1,296 spaces). The project entails the alteration of approximately 5,000 sf of Bordering Vegetated Wetlands (BVWs) and may impact inland bank

or riverfront area. The ENF states that the project is anticipated to generate an additional 7,834 vehicle trips per day (for a total of 11,792 trips). The project will generate an additional 9,900 gallons per day (GPD) of wastewater, with a total generation on site of 54,900 GPD at full capacity.

The proponent has outlined mitigation measures within the ENF that are further clarified within a Development Agreement with the Town of Wayland. The proponent is providing $4.2 million to the Town of Wayland to address a number of community mitigation requirements for the project. Anticipated traffic mitigation includes the widening of the westbound lanes of Route 20 at the intersection of Route 27. The proponent is also proposing to grant a conservation restriction of at least ten acres within the project site to a non-profit corporation specified by the Town. Finally, the applicant is proposing to provide $250,000 for the creation of a bicycle path and possibly a historic interpretive railroad site along a Massachusetts Bay Transportation Authority (MBTA) right-of-way that abuts the southeastern edge of the site.

The project site has been reviewed previously under the MEPA regulations (EOEA No. 12984) for on-site hazardous waste remediation. The Secretary issued a Certificate on the Single EIR on July 17, 2003 finding that no further review was required. This project consisted of the remediation of 3,700 cubic yards of wetland soil and sediment contaminated with polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB) and heavy metals from a 74,000 sf area of BVWs.

This project is subject to a mandatory EIR pursuant to Sections 11.03(6)(a)(6) of the MEPA regulations because it will generate 3,000 or more new vehicle trips. The project may also alter more than 500 linear feet of Bank and/or 5,000 sf of BVWs both of which are ENF thresholds under the MEPA regulations. The project will require a Massachusetts Highway Department (MHD) State Highway Access Permit for access to Route 20 and a Minor Sewer Connection Permit (BRP WP 18) from the Department of Environmental Protection (DEP) for wastewater discharges. The project must comply with the National Pollutant Discharge Elimination System (NPDES) General Permit from the U.S. Environmental Protection Agency (U.S. EPA) for stormwater discharges from a construction site of over one acre. Additional wetlands related permits may be necessary from the DEP or the U.S. Army Corps of Engineers (USACOE) based upon the final design of roadway mitigation measures. A Conservation and Management Permit may be required from the Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP) under the Massachusetts Endangered Species Act (MESA). The project will require an Order of Conditions from the Wayland Conservation Commission (or a Superseding Order of Conditions from the DEP if the local Order is appealed) for work within wetland resource areas. A Master Special Permit, Site Plan Approval, Title V permits, Roadway Modification Permit, Utility Connection Permit and Building Permits will also be required from the Town of Wayland.

Because the proponent is not seeking financial assistance from the Commonwealth for the project, MEPA jurisdiction extends to those aspects of the project that may have significant environmental impacts and that are within the subject matter of required or *potentially* required state permits. In this case, MEPA jurisdiction exists over traffic/air quality, wetlands, wastewater, rare species and stormwater.

The proponent must prepare a Draft and a Final EIR in fulfillment of the requirements of Section 11.03 of the MEPA regulations.

SCOPE

General

The EIR should follow the general guidance for outline and content contained in section 11.07 of the MEPA regulations, as modified by this Certificate.

Project Description and Permitting

The EIR should include a detailed description of the proposed project. The EIR should also include existing and conceptual proposed grading plans. The EIR should identify other adjacent landholdings under the ownership of Raytheon or an affiliated entity, and those areas under Federal or State management. The EIR should identify and describe any project phasing. The EIR should characterize adjacent uses (commercial, residential and open space) and their relationship to the proposed project.

The EIR should briefly describe each state permit required for the project, and should demonstrate that the project meets any applicable performance standards.

Alternatives

The EIR should analyze the following alternatives:

- No-Build Alternative;
- Preferred Alternative (maximum build out under zoning) as proposed by the proponent; and
- A Low-Impact Design (LID) Alternative, incorporating the use of low-impact design development techniques to reduce stormwater runoff and wetland impacts.

The EIR should identify the impacts for each of the alternatives on land alteration (impervious area), traffic, parking, drainage, wastewater, rare species, and wetlands in a tabular format. Wetland impacts should include direct alteration, flood storage impacts and location and feasibility of proposed compensation areas (wetlands and/or flood storage). This table, along with a supporting narrative, should provide a comparative analysis that clearly shows the

differences between the environmental impacts associated with each of the alternatives.

The EIR should identify and explain any project phasing, including potential impacts on construction sequencing and traffic patterns. It should discuss how this project is compatible with Executive Order 385 – Planning for Growth, by discussing its consistency with local land use plans, including the updated Master Plan and Open Space and Recreation Plan, and applicable regional plans.

Traffic and Transportation

The ENF states that the project is expected to generate 7,834 new vehicle trips on an average weekday for a total of 11,792 trips. A State Highway Access Permit is required from MHD for access to Route 20 from the project site.

The EIR should include a transportation study prepared in conformance with EOEA/EOT Guidelines for EIR/EIS Traffic Impact Assessments. The EIR should present capacity analyses and a summary of average and 95th percentile vehicle queues for each intersection within the study area. In the ENF, the proponent has taken a vehicle trip generation credit of approximately 4,000 trips for existing land uses on the site. The EIR should include documentation to demonstrate that the site activity has not exceeded the three-year time limitation allowed for trip credit. If this time limitation has been exceeded, the Traffic Impact Assessment must include revised trip generation estimates. The traffic study should include a signal warrant analysis for the Route 20/Site Drive Intersection and the Route 27/Site Drive Intersection. Sight distance analyses should be performed for each proposed site drive intersection alternative discussed within the EIR. The EIR should present detail regarding peak hour traffic impacts, with consideration for the mixed uses proposed for the project site, weekend retail traffic, and commuter traffic along Route 20. The EIR should consider a maximum buildout scenario under the approved zoning, and assume a high trip generating use for the 40,000 sf municipal building (such as a community center with an indoor pool as suggested at the site consultation meeting).

To ensure that site drainage can be adequately accommodated on the site, the EIR should contain a comprehensive drainage analysis of the state highway culverts. The proponent should make every effort possible to redirect, retain and infiltrate all stormwater discharge on-site.

Traffic Study Area

The traffic study should analyze the following state highway and local roadway locations:

In Wayland

- the Route 20 (Boston Post Road)/south site drive intersection;
- the Route 20/Old Country Road intersection;
- the Route 20/Route 27/Route 126 (Cochituate Road) intersection;
- the Route 20/Pelham Island Road intersection;

- the Route 27(Old Sudbury Road)/Route 126 (Cochituate Road)/Millbrook Road/Pelham Island Road intersection;
- the Route 27/Route 126 (Concord Road) intersection;
- the Route 27/north site drive intersection; and
- the Route 27/River Road intersection.

In Sudbury

- the Route 20/Union Avenue intersection; and
- the Route 20/Nobscot Road intersection.

Additionally, the proponent has agreed to analyze the following local neighborhood roadways, as outlined in the Development Agreement: Bow Road, Glezen Lane, Moore Road, Training Field Road, Claypit Hill Road, Plain Road, Millbrook Road, Glen Road and Pelham Island Road.

MHD has requested that the proponent study the feasibility of constructing a modern roundabout at the intersection of Route 20 and the proposed site drive. The traffic study should present alternative designs for the location of the Route 20/site drive intersection including a scenario in which the site drive remains in its present location and another in which the site drive is realigned opposite the Russell's Garden Center site drive. The EIR should provide an update on discussions with adjacent property owners regarding the realignment or elimination of curb cuts along Route 20 to accommodate the Route 20 site drive. The EIR should present an alternatives analysis with various site drive access scenarios including:

- only one site access point (i.e., along Route 20);
- two site drives (i.e., one along Route 20 and the other along Route 27); and
- any other possible scenarios.

Each alternative must provide a summary of traffic flow patterns, environmental impacts (including wetlands, drainage, flood storage, etc.), provisions for pedestrian and bicycle use, a discussion of easements required, and relationship to the MBTA right of way.

The EIR should include conceptual plans for the proposed roadway improvements that should be of sufficient detail to verify the feasibility of constructing such improvements. The conceptual plans should clearly show proposed lane widths and offsets, layout lines and jurisdictions, and the land uses (including access drives) adjacent to areas where improvements are proposed. Any mitigation within the state highway layout must conform to MassHighway standards, including but not limited to, provisions for land, median and shoulder widths, and bicycle lanes and sidewalks. Environmental impacts associated with each improvement location should be identified and quantified within the EIR (i.e. stormwater, wetlands, flood storage and compensation areas, etc.). The EIR should discuss the right-of-way (ROW) implications of widening and describe how such ROWs would be acquired, if applicable.

Parking

The EIR should describe opportunities for shared parking, structured parking or low-volume parking areas as a means of reducing impervious area and stormwater runoff. The EIR should discuss the feasibility of an alternative with either fewer spaces or reserve parking on-site that may be used only if demand warrants, and could be left in an unimproved (i.e. non-altered or landscaped) condition, in lieu of pavement. The EIR should identify reserve parking areas for employee ridesharing or other comparable Transportation Demand Management (TDM) measures.

Pedestrian and Bicycle Movement

This project provides a unique opportunity to establish pedestrian and bicycle connections to existing businesses and municipal uses along the Route 20 and Route 27 corridors. The EIR should present potential locations for pedestrian and bicycle connections to the surrounding area including existing businesses along Route 20 near the project site, adjacent historic districts, residential uses, and municipal uses within the Wayland Center area. The EIR should provide a history of the proponent's involvement with funding a portion of the Wayside Rail Trail and the feasibility for a connection to the project site. The EIR should demonstrate that the project and its mitigation will not preclude the creation of the Wayside Rail Trail or the historic railroad interpretive site as outlined in the Development Agreement. Bicycle parking/storage areas on the project site should be identified on a plan.

Transportation Demand Management/Air Quality

The EIR should include a comprehensive Transportation Demand Management (TDM) plan that investigates all feasible measures aimed at reducing site trip generation. The TDM plan should included specific measures that have been successful in reducing trip generation for retail and/or residential projects. The TDM plan should also identify the existing modes along the corridor such as public transportation, walking, and bicycling; analyze their existing and future conditions based on the project's impacts; and propose improvements to encourage increased mode usage. The proponent should work with the Town of Wayland to provide local transportation services for elderly residents. The proponent should develop transportation and parking demand management measures to reduce single passenger automobile trips to the project and encourage ridesharing by employees to the site through the use of preferential parking. DEP implements the Rideshare Regulation (310 CMR 7.16), a clean air program that applies to employers with 250 or more daily employees. The EIR should indicate if this program is applicable to the development project and if so, outline incentives to be implemented to reduce the number of trips made by employees who drive alone to work. The proponent should provide a clear commitment to implement and continuously fund any evaluated TDM measures deemed feasible to sustain and increase mode usage.

The EIR should identify appropriate mitigation measures for areas where the project will have an impact on traffic operations, especially where delay and queue length increases at

intersections. The EIR must demonstrate that the proposed mitigation measures are feasible and will effectively mitigate the impacts of each alternative. The proponent should provide a clear commitment to implement mitigation measures and should describe the timing of their implementation based on the phases of the project.

The EIR should examine consistencies of the proposed traffic mitigation improvements with the proposed Route 20 bridge improvements by MHD and provide information on design and construction. The EIR should also discuss the status of the Route 20/Route 27/Route 126 intersection improvements by MHD and the relationship of any proposed improvements for the Wayland Town Center project to restrictions (procedural, geometrically, environmental) associated with this intersection. The EIR should reflect the most current information on the construction schedule for any roadway improvements in the area.

The EIR should include an air quality mesoscale analysis of Build and No Build condition conducted in accordance with DEP's mesoscale analysis requirements as outlined its comment letter. Emission increases due to the project must be mitigated and the EIR should include the proponent's commitment to implement these mitigation measures. When discussing such measures, the proponent may reference the TDM section to the extent that the TDM program and mesoscale air quality mitigation overlap.

The EIR should discuss measures the proponent will implement to restrict truck deliveries during peak hours to minimize traffic impacts on the project area. The EIR should discuss how the project will comply with DEP's anti-idling regulations (310 CMR 7.11), which prohibits unnecessary idling over five minutes.

Wetlands

The Commonwealth has endorsed a "No Net Loss Policy" that requires that all feasible means to avoid and reduce the extent of wetland alteration be considered and implemented. The EIR should conform to this approach by first examining options that avoid impacts to wetland resource areas, their associated buffer zones, riverfront protection areas and 100-year flood plain areas. Where it has been demonstrated that impacts are unavoidable, the EIR should demonstrate that the impacts have been minimized, and that the project will be accomplished in a manner that is consistent with the performance standards of the Wetlands Regulations (310 CMR 10.00).

The EIR should identify the wetland resource areas (including any Bordering Vegetated Wetlands, banks, intermittent streams, perennial streams, riverfront area, land under water, bordering land subject to flooding, and isolated land subject to flooding) and buffer zones present on the project site and immediately adjacent on a reasonably scaled plan. I strongly urge that the delineation of these wetland resource areas be approved by the Wayland Conservation Commission prior to the submission of the EIR so that impacts can adequately be assessed during the MEPA process. Wetland areas identified should include those immediately on the project

site and those that may be impacted as a result of potential roadway improvements associated with the project. The EIR should identify the significance of all the wetland resources present, including value to public and private water supply, flood control, storm damage prevention, prevention of pollution, and fisheries and wildlife habitat. The EIR should analyze both direct and indirect impacts (i.e., changes in drainage patterns) on wetlands and habitat resulting from the project.

Low-lying portions of the project site are susceptible to flooding during moderate to extreme storm events. The EIR should provide graphical and numerical data outlining the limits of floodplain areas, the frequency of flooding events, and development impacts on flood storage within the project site and areas of roadway improvements, if applicable, under existing and proposed conditions.

The project, as presented within the Expanded ENF, will impact approximately 5,000 square feet of BVWs. The Expanded ENF states that wetland impacts associated with proposed roadway improvements have not been confirmed. If additional wetland areas are identified in association with off-site improvement areas, additional DEP permits may be necessary that were not identified in the Expanded ENF. If applicable, the EIR should describe these permits and consistency with any related performance standards. The EIR should demonstrate that the proponent has minimized impacts (to both on-site and adjacent off-site wetlands) to the maximum feasible extent. If compensatory wetlands are required to mitigate wetland impacts, the EIR should identify the location of proposed compensatory wetlands and compliance with the *Massachusetts Inland Wetland Replication Guidelines*. The EIR should explain any local wetland requirements, and how compliance with these requirements affects project design.

The Sudbury River adjacent to the project site is designated a Wild and Scenic River and is located within the Great Meadows National Wildlife Refuge. The EIR should discuss the visual impact of the proposed buildings and parking structures (if proposed) on the recreational and aesthetic values of the Sudbury River. Information on buffer zones, site elevations and viewsheds may aid in determination of overall impact. The EIR should outline consistency of the proposed project with any performance standards for a designated Wild and Scenic River.

Stormwater

The proposed redevelopment project presents opportunities to improve and upgrade stormwater management systems on the project site. The project contains considerable areas of impervious surface within a Zone II Wellhead Protection Area. As part of the alternatives analysis, the EIR should investigate the feasibility of reducing impervious surfaces and implementing Low Impact Development (LID) techniques within the project site. The drainage calculations provided in the EIR should reflect the use of feasible LID measures and quantify their ability to manage and treat stormwater to meet DEP Stormwater Management Policy standards.

The EIR should present drainage calculations and conceptual plans for the management of stormwater from the proposed project. It should include a description of the proposed drainage system design, including a discussion of the alternatives considered along with their impacts. The EIR should discuss the feasibility of maximizing stormwater infiltration and identify the quantity and quality of flows. The EIR should include stormwater design plans at a readable scale and conceptual best management practice (BMP) designs. The EIR should consider the impacts of stormwater runoff to the adjacent Sudbury River (an Outstanding Resource Water and Wild and Scenic River) and wetlands areas, as well as impacts to the Zone II aquifer recharge area to drinking water supply wells. The EIR should demonstrate that stormwater discharges are consistent with standards set for Zone II aquifer recharge areas and should provide a graphic illustrating the relationship of the development area to Zone I and Zone II regulatory areas.

The EIR should demonstrate that source controls, pollution prevention measures, erosion and sediment controls during construction, and the post-development drainage system will be designed to comply with the Massachusetts Stormwater Policy and standards for water quality and quantity impacts, and with the Town of Wayland's Storm Water Program required for compliance with its NPDES Phase II Stormwater General Permit issued by the U.S. EPA. The EIR should provide information demonstrating that the proposed drainage system is consistent with the Town of Wayland's NPDES Phase II Stormwater General Permit requirements relating to Category 5 impaired waterbodies as classified by the Massachusetts 2002 303(d) List of Impaired Waterbodies. A Total Maximum Daily Load (TMDL) is required for this class of impaired waterbodies and the EIR should outline controls to be implemented to meet water quality standards associated with stormwater runoff from the project site.

The EIR should present an operation and maintenance plan for the drainage system to ensure its effectiveness. This plan should be consistent with the Stormwater Pollution Prevention Plan required under the NPDES Construction General Permit and should outline the actual maintenance operations, sweeping schedule, responsible parties, and back-up systems.

The EIR should address impacts of salt and sand associated with parking lot snow removal on the quality and quantity of stormwater runoff, functionality of BMPs, and viability of wetland areas for each alternative. Snow disposal areas should be graphically depicted on a site plan showing relationship to catch basins, wetland areas, or other sensitive receptors.

Wastewater and Water

The project will require a Minor Sewer Connection permit from the DEP. The owner of the existing development on-site (and per the Development Agreement, the owner of the proposed project) has a contractual right to discharge up to 45,000 gallons per day (GPD) into the Wayland Municipal Wastewater Treatment Plant (WMWTP). The WMWTP is located on the

project site, but is owned and operated by the Town of Wayland. The WMWTP is presently permitted for up to 52,000 GPD on average, with a maximum flow of 65,000 GPD. The EIR should confirm the discharge volumes allocated to the proponent under their contractual agreement with the WMWTP operator. This facility also treats wastewater from several nearby commercial properties on Route 20.and is slated for use by an adjacent housing development (Wayland Commons) presently under construction. The WMWTP discharges to the Sudbury River under a NPDES Permit that is presently under review for renewal by the U.S. EPA.

The EIR should characterize the wastewater quality and quantity to be conveyed to this facility from this project and assess the capacity of the treatment plant to treat wastewaster in compliance with the current and proposed NPDES discharge permit limitations. The EIR should include a detailed history and summary of the permitting and treatment capabilities of the WMWTP, including flow sources and the relationship of discharge areas to the Sudbury River. The EIR should provide an update on the NPDES permitting process for the WMWTP and how potential limitations on discharges may affect site development.

The proponent has indicated that it is preparing an analysis of the WMWTP's viability and recommendations for upgrades. The proponent should coordinate the review of the treatment facility with the Town of Wayland and operators at the plant. This information should be included in the EIR, along with a discussion of the possibility of expansion of the WMWTP to accept additional wastewater flows from the project or properties in the Route 20 vicinity.

The proponent will also be conducting subsurface testing on-site and anticipates constructing a subsurface disposal septic system to discharge 9,900 GPD of wastewater. The proponent has indicated that if subsurface capacity cannot be achieved on-site, the development program will be revised to provide uses with lower wastewater generation rates. The EIR should provide the results of this subsurface soil testing. If groundwater discharge is proposed, the EIR should identify the average and peak wastewater flows from the project, which should be described in terms of the amount of square feet in each use category that would be discharging to the proposed septic system. Information provided in the EIR should demonstrate that the flow to each of the two proposed treatment systems (septic and the WMWTP) would be separate and distinct. The EIR should provide information regarding treatment areas, conformance with Title V discharges within Zone II wellhead protection areas, and areas adjacent to Outstanding Resource Waters (ORW), as well as feasibility for groundwater discharge given anticipated Activity and Use Limitations (AULs) and deed restrictions on the project site.

The proposed project does not require a State agency permit associated with water usage (estimated at 45,000GPD in the ENF), nor does it exceed a threshold under the MEPA regulations. However, because the project site is located within a Zone II wellhead protection area and adjacent to the Sudbury River, I strongly encourage the proponent to address certain elements of the project as they relate to water resources.

These elements include:

- demonstration that stormwater runoff, wetland alteration and construction period impacts associated with ongoing remediation efforts meet appropriate performance standards related to protection of Zone II areas;
- confirmation that the breakdown of uses within the development area will not exceed estimated water usage in excess of 45,000 GPD; and
- confirmation of sufficient water capacity to serve the estimated demands generated by the project from the Wayland municipal water system. The EIR should outline any anticipated impacts to the distribution system, including the potential need for any upgrades.

Additionally, given the stressed nature of the Sudbury-Assabet-Concord (SuAsCo) watershed and DEPs Administrative Consent Order (ACO) in place due to the Town's exceedance of its authorized volume under the Water Management Act, I strongly encourage the proponent to consider xeriscaping opportunities associated with on-site landscaping to reduce water consumption. The EIR should outline any water use reduction measures to be implemented within the building and exterior garden center in association with sustainable design principles.

Hazardous Waste

The EIR should provide a summary of the history of hazardous material releases on the project site, including the nature of the releases, location within the project site, status of remediation efforts, and any deed restrictions or AULs that have been imposed upon the project site. Locations of remediation areas or areas encumbered by AULs should be represented graphically in the EIR and show the relationship to proposed development or mitigation areas. The EIR should demonstrate that the infrastructure, stormwater system, and construction work for the proposed development are compatible with the remedial activities planned under the Massachusetts Contingency Plan (MCP). The EIR should describe how the removal of soil, pumping of groundwater or work in contaminated media as part of the demolition and construction process will comply with the provisions of MGLc.21E/21C and Occupational Safety and Health Administration (OSHA). The EIR should outline how the proposed project will not impede the ongoing data collection from monitoring wells or preclude remediation efforts through the demolition or construction or the proposed project. The EIR should detail how project phasing will affect remediation efforts on the project site.

Rare Species

The project site is presently mapped by NHESP as containing Estimated and Priority Habitat of Rare Species. NHESP has indicated that their database lists the American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), Pied-billed Grebe (*Podilymbus*

podiceps) and Common Moorhen (*Gallinula chloropus*) as occurring on the project site. The 12th edition of the Massachusetts Natural Heritage Atlas, due out in October 2006, indicates that a portion of the project will remain in Priority Habitat. Proposed activities located in Priority Habitat require a direct filing with the NHESP in compliance with the Massachusetts Endangered Species Act (MESA) (321 CMR 10.18).

The EIR should provide a project history of correspondence and studies, if any, conducted regarding the presence of rare species on the property. The EIR should provide a summary of the rare species identified on-site by NHESP, characterize preferred species habitat and potential impacts due to the proposed project, and outline mitigation measures, if any. The EIR should provide an update on consultation with NHESP and, if possible, a determination as to whether a Conservation and Management Permit will be required under MESA.

The proponent has indicated that a Conservation Restriction (CR) will be placed on no less than ten acres of the project site. The EIR should conceptually idenitfy the location of this CR, and provide draft language outlining reserved rights, prohibited uses and opportunities for public access to the CR area. The EIR should discuss the relationship of potential public access to the CR area with any AULs or ongoing site remediation that may limit access. The Sudbury Valley Trustees (SVT) have indicated a positive interest in receiving the CR grant contingent on agreements satisfactory to its Board of Directors. The EIR should provide an update on negotiations with SVT or another non-profit organization related to the granting of this CR.

Construction Period

The EIR should discuss potential construction period impacts (including but not limited to noise, vibration, dust, and traffic flow disruptions) and analyze and outline feasible measures that can be implemented to eliminate or minimize these impacts. The EIR should outline the proposed methodology for demolition on-site and removal of demolition debris. DEP encourages the proponent to incorporate construction and demolition waste recycling activities as a sustainable measure for the project. The EIR should describe how demolition activities will performed in compliance with both Solid Waste and Air Pollution Control regulations, pursuant to M.G. L. Chapter 40, Section 54.

I encourage the proponent to consider participating in DEP's Clean Construction Equipment Initiative / Diesel Retrofit Program consisting of an engine retrofit program and/or use of low sulfur fuel to reduce exposure to diesel exhaust fumes and particulate emissions during construction. The EIR should identify traffic routes to be used during construction of the project and provide recommendations on restrictions for construction-related traffic to ensure that nearby residential neighborhoods are not adversely affected.

Sustainable Design

To the maximum feasible extent, the proponent should incorporate sustainable design elements into the project design. The EIR should summarize the proponents' efforts to obtain a Leadership in Energy and Environmental Design (LEED) Certification for the buildings. The basic elements of a sustainable design program may include, but not be limited to, the following measures:

- Optimization of natural day lighting, passive solar gain, and natural cooling;
- Use of energy efficient HVAC and lighting systems, appliances and other equipment, and use of solar preheating of makeup air;
- Favoring building supplies and materials that are non-toxic, made from recycled materials, and made with low embodied energy;
- Provision of easily accessible and user-friendly recycling system infrastructure into building design;
- Development of a solid waste reduction plan;
- Development of an annual audit program for energy consumption, waste streams, and use of renewable resources;
- LEED certification;
- Feasibility of "green roofs" to reduce stormwater runoff; and
- Water conservation and reuse of wastewater and stormwater.

The EIR should include a narrative describing policies regarding waste reduction, water use, and other sustainable design initiatives that may be implemented on site.

Mitigation

The EIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each state agency that will issue permits for the project. The draft Section 61 Findings should contain clear commitments to implement mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and a schedule for implementation. The mitigation summary should compare anticipated mitigation costs to the funds promised by the proponent within the Development Agreement.

Comments/Circulation

The EIR should contain a copy of this Certificate and a copy of each comment letter received. The EIR should respond fully to each substantive comment received to the extent that it is within MEPA jurisdiction. The EIR should present additional technical analyses and/or narrative as necessary to respond to the concerns raised.

The proponent should circulate the EIR to those parties who commented on the ENF, to any state agencies from which the proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. A copy of the EIR should be made available for review at the Wayland Public Library.

August 25, 2006
Date

Robert W. Golledge, Jr.

Comments Received:

08/02/2006	Maurice Rockett
08/02/2006	Joy Viola
08/08/2006	Judith Canty Graves
08/08/2006	MA Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP)
08/09/2006	Department of Environmental Protection – Boston
08/10/2006	Mass Central Rail Trail
08/10/2006	Jean Ann Schulte
08/10/2006	Alan D. Mandl
08/10/2006	Susan Reed
08/11/2006	Spencer Shearer
08/11/2006	Molly Upton
08/13/2006	William J. Murphy, Jr.
08/13/2006	Frank Kennedy
08/13/2006	Richard Payne
08/14/2006	MetroWest Growth Management Committee
08/14/2006	Kim Reichelt
08/14/2006	Sherre Greenbaum
08/14/2006	Tom Sciacca
08/14/2006	Executive Office of Transportation (EOT)
08/15/2006	Wayland Highway Department
08/15/2006	Sudbury, Assabet and Concord Wild Scenic River Stewardship Council
08/15/2006	Wayland Conservation Commission
08/15/2006	Julia and Kevin Leney
08/15/2006	Phil Kling
08/15/2006	Sudbury Valley Trustees
08/15/2006	Molly Upton (2nd comment)
08/15/2006	Stan Robinson
08/15/2006	Linda Segal

08/15/2006	Department of Environmental Protection - NERO
08/16/2006	Wayland Planning Board
08/16/2006	Department of Environmental Protection – NERO (2nd comment)
08/18/2006	Metropolitan Area Planning Council (MAPC)

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RWG/HSJ/hsj

2.0 Alternatives Analysis

2.0 ALTERNATIVES ANALYSIS

2.1 Introduction

The Wayland Town Center project as presented in this DEIR represents the preferred alternative for the project. The project described herein is the project that was presented to the citizens of Wayland at annual Town Meeting in the Spring of 2006 and that the citizens voted to support. Design modifications and shifts in building or roadway location can be presumed for a project of this scale as it goes through the permitting and approval process, but the character, scale and purpose remain unchanged.

The following sections review the potential effects of the preferred alternative and a no-build alternative. A comparison of the preferred alternative to the project presented in the ENF is also discussed. Finally, a review of a traditional stormwater management plan in comparison to the low impact development plan proposed herein is presented.

Table 2-1, found at the end of this section, compares the impacts associated with the preferred alternative to those expected under a no-build alternative, the ENF alternative and a traditional stormwater management approach, as described below.

2.2 Wayland Town Center – Preferred Alternative

The proposed Wayland Town Center project includes a mix of commercial, residential, town green open space, municipal amenities, and the dedication of a site for a future municipal building. In May 2006, Wayland Town Meeting demonstrated its support for the project by approving a Mixed Use Overlay district, thereby paving the way for the project to proceed with design and permitting review.

The project is proposed for an approximately 56.5-acre parcel of land situated north of Route 20 and west of Route 27 in Wayland (see Figure 1-1, USGS Locus Map). The site is occupied by a vacant 400,000 gross square-foot commercial building, which previously housed the Raytheon Company, the Polaroid Corporation, and several other business operations. Also located on the site are a large paved parking lot and a second smaller (approximately 10,500 gross square-foot) vacant office building. To the northwest of the larger commercial building is a municipal wastewater treatment plant owned and operated by the Town of Wayland. While the majority of the eastern portion of the site is occupied by the larger building and parking lot, a significant area in the western portion of the site remains largely undisturbed. This undisturbed area abuts the Sudbury River (see Figure 1-2, Existing Conditions Plan).

The design of the proposed project is shown on Figure 1-3, Schematic Site Layout. The design continues to evolve, but has been approved by Town Meeting for a maximum of 167,500 square feet of residential use (100 units and 200 bedrooms), 155,000 square feet of commercial use (retail space and restaurants) and 10,000 square feet of office space.

Additionally, the Town of Wayland will be deeded a parcel within the development for construction of a 40,000 square-foot municipal building.

To maintain the undisturbed nature of the western portion of the site, the project is being designed to largely overlay the previously disturbed area of the site. Figure 1-6, Proposed Layout Superimposed on Existing Conditions, highlights where the project will overlay the disturbed areas of the site. This development proposal (excluding Wayland's future municipal building) is 20 percent smaller than the development that currently occupies the site.

Wastewater disposal service will be provided for the project through connection to the existing Town of Wayland municipal wastewater treatment plant and construction of an on-site septic system. It is anticipated that the project, including the proposed municipal parcel, will generate up to 54,900 gallons per day (gpd) of wastewater based on DEP Title V wastewater generation rates. The Proponent has the contractual right to discharge 45,000 gpd into the Wayland municipal wastewater treatment plant. This right has been confirmed in the Development Agreement with the Town of Wayland. In addition, the Proponent anticipates using sections of the project site to construct a septic system to discharge 9,900 gpd of wastewater. The leaching field has been sized based on general site soil conditions and percolation tests that were conducted in the spring of 2006. Additional soil testing will be performed in the spring of 2007 to confirm the suitability of soil conditions in the area of the proposed leaching field. If there is any variability in the soil conditions, the leaching fields will be redesigned as necessary.

The preferred alternative relies on low impact development (LID) techniques to reduce runoff by increasing infiltration and to improve water quality through the selection of appropriate treatment. Wherever feasible, LID techniques will include the use of water quality swales, rain gardens, and bioretention basins to reduce the impact of the proposed project and promote groundwater recharge. Runoff from the roofs of proposed structures will be infiltrated, to the extent practicable in areas where the existing soils are suitable, contributing to groundwater recharge. In such locations, pervious pavement may also be used to reduce surface runoff from the surrounding parking areas. Although the proposed project is still in the planning stage, the Proponent's intent is to take an environmentally progressive approach to stormwater management, and additional LID techniques may be incorporated into the project as design proceeds.

In addition to meeting the community's expressed preference for the development of a vital project generally contributing activity to the Town, the proposed project provides tangible benefits to Wayland. These benefits include the following:

- Providing $4.2 million to the Town of Wayland to address a number of community mitigation requirements for the project. Anticipated mitigation includes the widening of Route 20 at the intersection with Route 27.

- Providing $250,000 to the Town of Wayland for the creation of a bike path and possibly a historic interpretative railroad site along the current MBTA right-of-way that abuts the southeastern edge of the site. This project is being undertaken separately by the Town and, if the bike path and interpretative railroad site are not constructed, the Town may use the $250,000 for other purposes.

- Granting a Conservation Restriction and Easement for a ten acre portion of the property to either the Sudbury Valley Trustees, Inc. or another non-profit corporation.

2.3 ENF Alternative

Since the filing of the ENF, the project's site plan has been revised to reflect both comments submitted on the ENF and the more detailed project site information currently available. Key changes to the plan include:

- Reconfiguration of the main public green to a more amorphous form that will accommodate a variety of active and passive activities.

- Development of a north-south cross street, contributing to the making of a more pedestrian-friendly village streetscape.

- A reworking of the main street geometry and street section to accommodate a bike path, parallel parking and a better disposition of secondary public open spaces.

- Careful integration of landscaping into the public realm – the streetscapes, mews, areas behind stores and parking lots.

- Redesign of the residential component of the project, including the relocating of apartments to the second level of one of the retail blocks fronting the green.

- Reuse of an existing building at the southwest corner of the site, in conjunction with the refinement of the vehicular, bicycle and pedestrian access along the southern edge of the site.

2.4 No-Build Alternative

During the 3-year period from July 2003 through July 2006 the Wayland Business Center building at 400 - 440 Boston Post Road was occupied by a major tenant, Polaroid Corporation, which had a lease on 80 percent of the space, and two additional tenants, Hewlett-Packard and Moldflow Corporation that had leases on the remaining space totaling 400,000 square feet. The additional 10,500 square-foot building at the southwestern corner of the site was never occupied for its intended purpose due to constraints by Raytheon Company. Polaroid's lease expired on March 31, 2004. Hwlett-Packard's lease expired March 31, 2005 and Moldflow's lease expired August 31, 2005.

Under the no-build alternative, the existing 410,500 square feet of building space would be re-occupied as office space. In this scenario the existing stormwater management system would not be upgraded and pavement runoff would continue to drain, via catchbasins, directly to wetland resource areas without any water quality treatment. Roadway improvements would similarly be minor in nature, or would not occur. Importantly, under the no-build alternative, both the tangible and intangible benefits to the community described above or included in the Development Agreement, including more the $4 million in payments to the Town of Wayland, would be foregone.

2.5 Traditional Stormwater Management Approach

The preferred alternative incorporates a LID approach to stormwater management. Alternatively, the project could be advanced utilizing a more traditional approach to stormwater management that incorporates standard stormwater practices and utilizes portions of the existing on-site system.

Traditional construction and stormwater management practices would have a beneficial effect on both water quality and potential flooding, and traditional stormwater management infrastructure could be designed to meet the requirements of DEP's Stormwater Management Policy. Such an approach would not, however, involve the use of LID techniques (such as, bioswales or infiltration), so it would require larger detention basins or other stormwater management infrastructure components or both, and it would have less beneficial impact on off-site stormwater-related conditions in terms of both the volume and rate of runoff. As mentioned above, the Proponent intends to take an LID approach to project design wherever it is practicable to do so.

Table 2-1 Alternatives Analysis – Impact Comparison

	Impervious Area	Traffic	Parking	Drainage	Wastewater	Rare Species	Wetlands[1] (Square feet)
Preferred Alternative	22.2 acres	11,682 vehicle trips per day	1,256 spaces	Stormwater managed using LID techniques	54,900 gpd wastewater generation	None anticipated	Direct alteration to BVW[2]: 0 / 500 to 3,400 Floodplain Area: 2,000 / 2,700 to 6,700 BVW Compensation Areas: 0 / 750 to 5,100
ENF Alternative	23.4 acres	11,792 vehicle trips per day	1,296 spaces	Stormwater managed using LID techniques	54,900 gpd wastewater generation	None anticipated	Direct alteration to BVW: 0 / ~5,000 Floodplain Area: 2,000 / ~7,500 BVW Compensation Areas: 0 / ~7,500
No-Build Alternative	21.8 acres	3,958 vehicle trips per day	1,636 spaces	Stormwater managed via existing system, which drains directly to wetland resource areas without treatment	45,000 gpd wastewater generation	None	Direct alteration to BVW: 0 / 0 Floodplain Area: 0 / 0 BVW Compensation Areas: 0 / 0
Traditional Stormwater Approach	22.2 acres	11,682 vehicle trips per day	1,256 spaces	Stormwater management requiring large detention basins or other infrastructure	54,900 gpd wastewater generation	None anticipated	Direct alteration to BVW[2]: 0 / 500 to 3,400 Floodplain Area: 2,000 / 2,700 to 6,700 BVW Compensation Areas: 0 / 750 to 5,100

[1] Project site area / Route 20 roadway work area.

[2] BVW – Bordering Vegetated Wetlands

3.0 Transportation and Air Quality

3.0 TRANSPORTATION AND AIR QUALITY

This traffic study has been prepared to assess the traffic impacts and to evaluate the access requirements of the proposed Wayland Town Center project located on the north side of Route 20 (Boston Post Road) in Wayland, Massachusetts. This report identifies the existing traffic parameters and the impact of traffic generated by the proposed development, and evaluates it with regard to capacity and roadway requirements.

3.1 Project Description

The site is located on approximately 56.5 acres in Wayland on the north side of Route 20 (Boston Post Road). The site is generally bounded by areas of open and wooded space to the north, Route 20 to the south, Route 27 (Old Sudbury Road) to the east, and by the Sudbury River to the west. Currently, this site consists of approximately 410,500 square-foot of office space, which is vacant. Previously, the office space had been occupied by both Polaroid Corporation and Raytheon Company.

As proposed, the existing buildings on site will be razed and replaced with the following uses: up to 100 condominium units, 10,000 square feet of office space, a pad site for a 40,000 square-foot town facility, and approximately 155,000 square feet of retail/restaurant space[1]. For the pad site, a 40,000 square-foot library was chosen as a potential use. Based on available municipal land use data contained in the Institute of Transportation Engineers (ITE)[2] Trip Generation Manual, a library would be the most peak-hour intense generator of traffic, during the weekday evening and Saturday midday peak hours.

Access to and egress from the site are proposed to be provided by way of two full-access driveways: one on Route 27 and one on Route 20 (Access Alternative A). A second access scenario has also been reviewed where all access to the project will be from Route 20 (Access Alternative B). At this time, it is estimated that the project will include 1,256 parking spaces. A shared parking analysis has been performed to calculate the required parking for the project. Figure 3-1 shows the project's site location relative to the existing roadway network.

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[1] The original project (prior to the zone change) consisted of 100 apartment units, 40 ksf of office space, 40 ksf of municipal space and 308 ksf of retail space.

[2] *Trip Generation,* Sixth Edition; Institute of Transportation Engineers; Washington, DC; 1997.

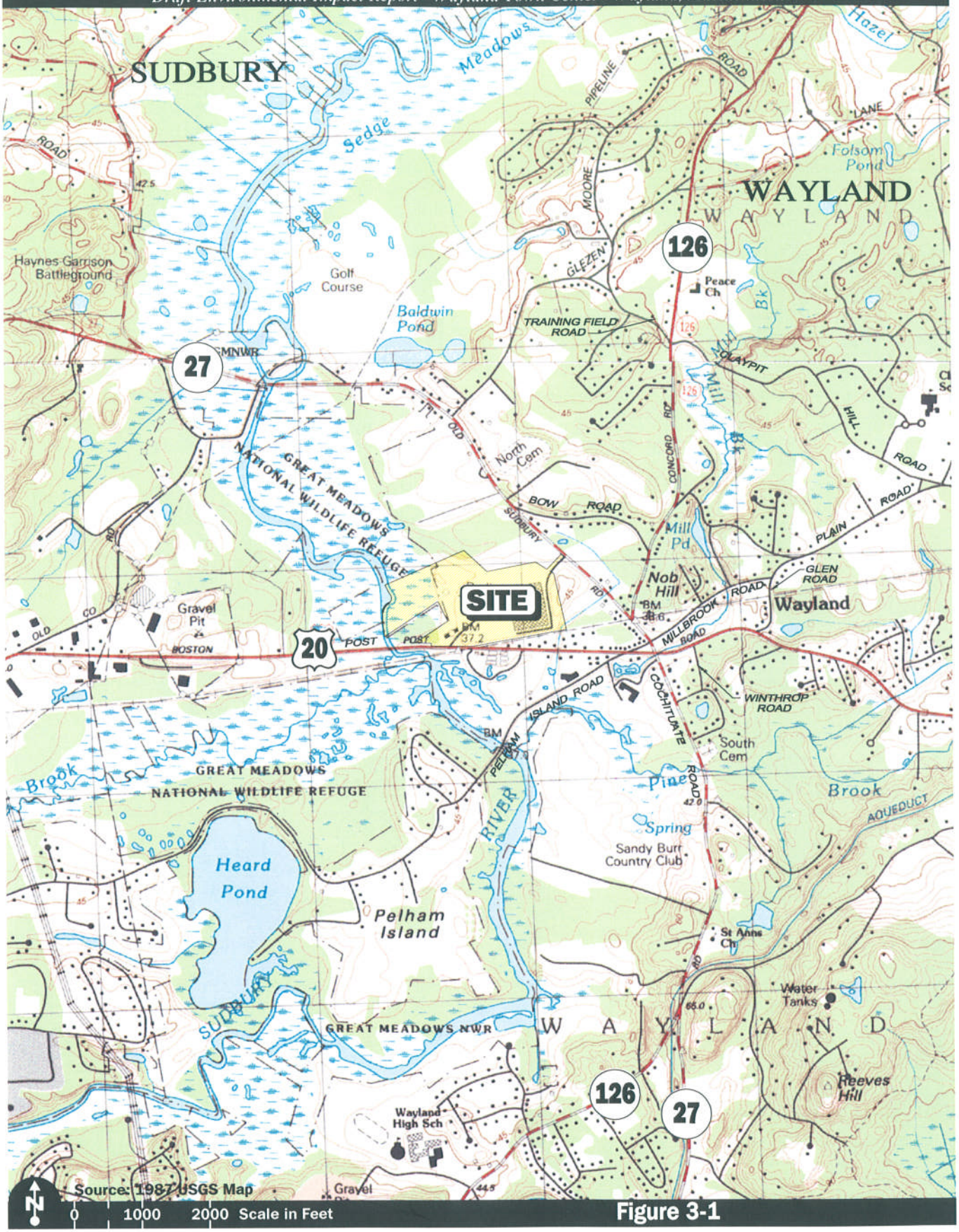

Figure 3-1

Site Location Map

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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3.1.1 Study Methodology

Vanasse & Associates, Inc. (VAI) has analyzed the proposed project and its impacts upon the study area intersections in the north section of the town of Wayland. This report represents a study of future traffic demand as well as an assessment of traffic operation within the study area. Existing roadways are evaluated and measures to mitigate incremental project traffic impacts are presented.

The primary conditions evaluated in the traffic operations analysis include 2006 Existing, 2011 No-Build, and 2011 Build. The planned time frame is for the project to be built and fully operational prior to 2011. The 2011 No-Build scenario includes annual background growth, as well as specific developments independent of the proposed project. The 2011 Build condition addresses the cumulative impacts of background growth, specific development by others, and impacts of the proposed project.

3.1.2 Alternatives Studied

For the purpose of this report, three alternatives were evaluated for average month conditions and include the following:

- Existing – The Existing scenario represents the traffic operating conditions presently on the roadway system.

- No-Build – The No-Build alternative was examined to establish the 2011 Baseline traffic conditions. The incremental impacts of the proposed project may be determined by making comparisons to the No-Build alternative. The No-Build alternative includes identified background developments, as well as the in-fill of the existing office building and assumes that the project is not built.

- Build – The Build alternative includes the development of Wayland Town Center project. It is anticipated that the project will be constructed and occupied prior to the year 2011. Two access alternatives were reviewed. Under Access Alternative A, access to and egress from the site will be provided by way of two full access driveways, one to Route 20 and one to Route 27. Under Access Alternative B, all access will be from Route 20.

3.2 Existing Conditions

3.2.1 Study Area

The study area for this project was originally developed in consultation with the Town of Wayland. In February 2005 roadway geometry and traffic control information was collected for the following locations:

- Route 20 at Route 27/126
- Route 27 at Route 126
- Route 27/126 at Pelham Island Road and Millbrook Road
- Route 20 at Pelham Island Road
- Route 20 at Old County Road
- Route 20 at the Site Driveway
- Route 27 at the Site Driveway

In May and June 2006, roadway geometry and traffic volume data were collected at the following north Wayland neighborhood locations:

- Route 27 at River Road
- Route 27 at Glezen Lane
- Route 27 at Bow Road
- Route 27 at Route 126
- Route 27/Route 126 at Pelham Island Road and Millbrook Road
- Route 20 at Route 27/Route 126
- Route 27 at Winthrop Road
- Route 126 at Bow Road
- Route 126 at Plain Road
- Route 126 at Claypit Hill Road and Training Field Road
- Route 126 at Glezen Lane
- Route 126 at Moore Road
- Glezen Lane at Moore Road
- Glezen Lane at Training Field Road
- Plain Road at Claypit Hill Road

- Plain Road at Glen Road
- Route 20 at Winthrop Road
- Route 20 at Pelham Island Road
- Route 20 at Old County Road (River Road in Wayland)

Two additional intersections in Sudbury were added to the study area as a result of the ENF filing:

- Route 20 and Union Avenue
- Route 20 and Nobscot Road

3.2.2 Field Survey

A comprehensive field inventory of the project site was originally conducted in February 2005 and then again in May and June 2006 for the north Wayland neighborhood intersections. The inventory included collection of existing roadway geometrics, traffic volumes, and safety data for the existing study area intersections and proposed site access roadways. Traffic volumes were measured by means of ATR counts and substantiated by turning movement counts (TMC) conducted at the study area roadways and intersections.

In September 2006, additional data relative to intersection operations were collected for the Route 27 intersections with Bow Road and Glezen Lane, as well as for the intersection of Route 126 and Glezen Lane. Gap and delay data were collected at these three locations to quantify existing and projected intersection operations.

Lastly, to quantify trips that are local in nature and are destined to the Whole Foods supermarket in Wayland or to one of the two supermarkets on Route 20 in Sudbury, origin/destination data were also collected in October 2006, as well as TMCs at the two additional Sudbury study area intersections.

3.2.3 Geometrics

Primary study area roadways are described below. Other study area routes that provide connections with these roadways are examined at specific study area intersections.

3.2.3.1 Roadways

Route 20

Route 20 (Boston Post Road) is a two-lane arterial roadway, under state jurisdiction, which runs in a general east/west direction through eastern Massachusetts. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 11 to 12 feet. Additional turn lanes are provided at major signalized intersections. Land use along Route 20 in the vicinity of the site is primarily commercial. Within the study area, the speed limit is posted at 35 miles per hour (mph). West of the site, the posted speed limit for westbound traffic is 45 mph. East of the site, the posted speed limit for eastbound traffic is reduced to 25 mph.

Route 27 (Old Sudbury Road)

Route 27 (Old Sudbury Road) is a locally maintained collector roadway, which runs in a general north/south direction through the town of Wayland. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 12 feet. Additional turn lanes are provided at major signalized intersections. Land use along Route 27 in the vicinity of the site is primarily residential. Within the study area, the speed limit varies between 25 and 40 mph. In the vicinity of the site driveway, the posted speed limit is 40 mph.

Route 126 (Concord Road)

Route 126 (Concord Road) is a locally maintained collector roadway, which runs in a general north/south direction through the town of Wayland. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 12 feet. Land use along Route 126 in Wayland is primarily residential. The speed limit varies between 25 and 40 mph. Immediately north of Route 27, the speed limit on Route 126 is 25 mph in both directions. North of Plain Road, the speed limit is 40 mph.

Glezen Lane

Glezen Lane is a two-lane locally maintained street which runs in a general east/west direction from its western terminus at Route 27 to its eastern terminus at the Weston town line where the name changes to Sudbury Road (which eventually intersects Concord Road to Route 20). The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 12 feet. Land use along Glezen Lane is residential. The posted speed limit ranges from 25 to 30 mph.

Bow Road

Bow Road is a two-lane locally maintained street which runs in a general east/west direction from its western terminus at Route 27 to its eastern terminus at Route 126. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 8.5 to 11 feet. Land use along Bow Road is residential. The posted speed limit is 25 mph.

Training Field Road

Training Field Road is a two-lane locally maintained street which runs in a general north/south direction from its southern terminus at Route 27 to its northern terminus at Glezen Lane. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 8.5 to 11 feet. Land use along Training Field Road is residential. The posted speed limit is 25 mph.

Moore Road

Moore Road is a two-lane locally maintained street which runs in a general north/south direction from its southern terminus at Glezen Lane to its northern terminus at Route 126. The roadway provides one travel lane per direction, and travel lanes are approximately 11 to 11.5 feet wide. Land use along Training Field Road is residential. The posted speed limit is 30 mph.

Claypit Hill Road

Claypit Hill Road is a two-lane locally maintained street which runs in a general east/west direction from its western terminus at Route 126 to its eastern terminus at Plain Road. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 9.5 to 10 feet. Land use along Claypit Hill Road is residential. The posted speed limit is 25 mph.

Plain Road

Plain Road is a two-lane locally maintained street which runs in a general east/west direction from its western terminus at Route 126 to its eastern terminus at Route 20. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 11 feet. Land use along Plain Road is residential. The posted speed limit is 20 mph immediately east of Route 126. East of Glen Road, the posted speed limit is 25 mph.

Winthrop Road

Winthrop Road is a two-lane locally maintained street which runs in a general east/west direction from its eastern terminus at Route 20 to its western terminus at Route 27. At Route 20, Winthrop Road is one-way southbound (away from Route 20). The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 11 feet. Land use along Winthrop Road is residential.

Millbrook Road

Millbrook Road is a two-lane locally maintained street which runs in a general east/west direction from its western terminus at Route 27/Route126 to its eastern terminus at Glen Road. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 11 feet. Land use along Millbrook Road is primarily residential.

Glen Road

Glen Road is a two-lane locally maintained street which runs in a general north/south direction from its southern terminus at Route 20 to its northern terminus at Plain Road. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 11 feet. Land use along Glen Road is primarily residential.

Pelham Island Road

Pelham Island Road is a two-lane locally maintained street which runs in a general northeast/southwest direction from its northeastern terminus at Route 27/Route 126 to its southwestern terminus at Landham Road in Sudbury. The roadway provides one travel lane per direction, and travel lanes vary in width from approximately 10 to 11 feet. Land use along Pelham Island Road is primarily residential. The posted speed limit is 30 mph.

3.2.3.2 Intersections

Route 27 at River Road

River Road intersects Route 27 from the south to form this three-legged, unsignalized intersection. The Route 27 eastbound and westbound approaches each consist of single lanes, approximately 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 27 is separated by a double yellow centerline. River Road at Route 27 is 23.5 feet wide, allowing entering and exiting movements. The River Road approach is under STOP-like control. Land use in the vicinity of the intersection consists of wooded properties and the Sudbury River.

Route 27 at Glezen Lane

Glezen Lane intersects Route 27 from the east to form this three-legged, unsignalized intersection. The Route 27 northbound and southbound approaches each consist of single lanes, approximately 12.5 feet wide, permitting both left- and right-turn movements. Directional travel along Route 27 is separated by a double yellow centerline. Glezen Lane is 19.5-feet wide approaching Route 27 and widens to permit entering and exiting movements. A small island separates entering and exiting movements. The Glezen Lane approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties.

Route 27 at Bow Road

Bow Road intersects Route 27 from the east at a 60° angle to form this three-legged, unsignalized intersection. The Route 27 northbound and southbound approaches each consist of single lanes, approximately 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 27 is separated by a double yellow centerline. Bow Road is approximately 17 feet wide approaching Route 27. The Bow Road approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties and wooded land.

Route 27 at Existing Site Driveway

The existing site driveway intersects Route 27 from the west to form this three-legged, unsignalized intersection. The Route 27 northbound and southbound approaches each consist of single lanes, approximately 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 27 is separated by a double yellow centerline. The site driveway at Route 27 is 23 feet wide, allowing entering and exiting movements. The driveway approach is under STOP-like control. Land use in the vicinity of the intersection consists of wooded properties.

Route 27 at Route 126

Route 126 intersects Route 27 from the northeast to form this three-legged, unsignalized intersection. The Route 27 southbound approach consists of a single lane, approximately 12 feet wide, permitting both though and left-turn movements. The Route 27 northbound approach consists of a single though lane, approximately 9.5 feet wide, and a 10-foot wide right-turn lane. Directional travel along Route 27 is separated by a double yellow centerline. The Route 126 approach to Route 27 is 11 feet wide, permitting both left- and right-turns. Bituminous concrete sidewalks exist along the south side of Route 126 and the east and west sides of Route 27 (south of Route 126). The Route 126 approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties and the Wayland Depot.

Route 27/ Route 126 at Pelham Island Road and Millbrook Road

Route 27/Route 126 forms the north and south legs of this four-legged, unsignalized intersection with Pelham Island Road (west leg) and Millbrook Road (east leg). The Route 27 southbound approach consists of a single wide lane, approximately 18 feet wide, permitting all movements. The Route 27 northbound and southbound approaches each consist of a single though lane, approximately 9.5 feet wide, and a 10-foot wide right-turn lane. Directional travel along Route 27 is separated by a double yellow centerline. The Pelham Island Avenue approach is approximately 13 feet wide, permitting all movements. The Millbrook Road approach is approximately 13 feet wide, permitting all movements. Bituminous concrete sidewalks exist along the east and west sides of Route 27 (north of the intersection). The Pelham Island Road and Millbrook Road approaches are under STOP control. Land use in the vicinity of the intersection consists of residential properties, a park and commercial buildings.

Route 20 at Route 27/ Route 126

Route 27/Route 126 forms the north and south legs of this four-legged, signalized intersection with Route 20 (east and west legs). The Route 27/Route 126 approaches each consist of an exclusive left-turn lane and a shared through/right-turn lane, varying in width from 9.5 feet to 11 feet. Directional travel along Route 27/Route 126 and Route 20 is separated by a double yellow centerline. The Route 20 eastbound approach is approximately 12 feet wide, permitting all movements. The Route 20 westbound approach is approximately 21 feet wide, permitting all movements. Bituminous concrete sidewalks exist along the east side of Route 27 (north of the intersection) and along the south side of Route 20. The intersection is controlled by a two-phase traffic signal. Land use in the vicinity of the intersection consists of a park, commercial buildings and a church.

Route 27 at Winthrop Road

Winthrop Road intersects Route 27 from the east to form this three-legged, unsignalized intersection. The Route 27 northbound and southbound approaches each consist of single lanes, approximately 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 27 is separated by a double yellow centerline. Winthrop Road is approximately 22.5 feet wide approaching Route 27. The Winthrop Road approach is under STOP-like control. Land use in the vicinity of the intersection consists of residential properties and a church.

Route 126 at Bow Road

Bow Road intersects Route 126 from the west to form this three-legged, unsignalized intersection. The Route 126 northbound and southbound approaches each consist of single lanes, approximately 11 feet wide, permitting both left- and right-turn movements. Directional travel along Route 126 is separated by a double yellow centerline. Bow Road is

approximately 20.5 feet wide, permitting both entering and exiting movements. The Bow Road approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties and wooded land.

Route 126 at Plain Road

Plain Road intersects Route 126 from the east to form this three-legged, unsignalized intersection. The Route 126 northbound and southbound approaches each consist of single lanes, approximately 11 feet wide, permitting both left- and right-turn movements. Directional travel along Route 126 is separated by a double yellow centerline. Plain Road is approximately 18.5 feet wide approaching the intersection. At the intersection, the Plain Road approach splits with right turn movements going to the right side of a central island and left-turn movements going to the left side of the island. Directional travel along Plain Road is separated by a single-yellow centerline. The Plain Road approach is under STOP-sign control. Along the east side of Route 126, there is a 5- to 5.5-foot wide bituminous concrete sidewalk. Land use in the vicinity of the intersection consists of residential properties.

Route 126 at Claypit Hill Road and Training Field Road

Claypit Hill Road intersects Route 126 from the east and Training Field Road intersects from the west to form this four-legged, unsignalized intersection. The Route 126 northbound and southbound approaches each consist of single lanes, approximately 11 to 11.5 feet wide, permitting all movements. Directional travel along Route 126 is separated by a double-yellow centerline. The Claypit Hill Road approach consists of a 10-foot wide shared left-, through and right-turn lane. Directional travel along Claypit Hill Road is separated by a single-yellow centerline at the intersection. Training Field Road is approximately 22.5 feet wide and permits both entering and exiting movements. The Claypit Hill Road and Training Field Road approaches are both under STOP-sign control. Along the east side of Route 126, there is a 5-foot wide bituminous concrete sidewalk. Land use in the vicinity of the intersection consists of wooded properties.

Route 126 at Glezen Lane

Glezen Lane intersects Route 126 from the east and west to form this four-legged, unsignalized intersection. The Route 126 northbound and southbound approaches each consist of single lanes, approximately 11.5 to 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 126 is separated by a double-yellow centerline. The Glezen Lane westbound approach consists of a single lane, approximately 10 feet wide and permits all movements. Directional travel along Glezen Lane (east of Route 126) is separated by a single-yellow centerline. Glezen Lane approaching Route 126 from the west is approximately 20.5 feet wide. As it approaches Route 126, the roadway splits around a large triangular shaped island. Along the east side of Route 126, there is a 4- to 4.5-foot wide bituminous concrete sidewalk. The Glezen Lane approaches are under

STOP-sign control. Land use in the vicinity of the intersection consists of residential properties.

Route 126 at Moore Road

Moore Road intersects Route 126 from the west to form this three-legged, unsignalized intersection. The Route 126 northbound and southbound approaches each consist of single lanes, approximately 11 to 11.5 feet wide, permitting both left- and right-turn movements. Directional travel along Route 126 is separated by a double yellow centerline. Moore Road is approximately 23 feet wide approaching Route 126, permitting entering and exiting movements. The Moore Road approach is under STOP-sign control. Along the east side of Route 126, there is a 5- to 5.5-foot wide bituminous concrete sidewalk. Land use in the vicinity of the intersection consists of residential properties and wooded land.

Glezen Lane at Moore Road

Moore Road intersects Glezen Lane from the west to form this three-legged, unsignalized intersection. The primary flow of traffic is from Glezen Lane eastbound to Moore Road, with the westbound Glezen Lane approach under STOP-sign control. The Glezen Lane approaches each consists of single lanes, approximately 10 to 12 feet wide, permitting all movements. The Moore Road approach consists of an 11-foot wide lane permitting all movements. Land use in the vicinity of the intersection consists of residential properties and wooded land.

Glezen Lane at Training Field Road

Training Field Road intersects Glezen Lane from the southeast to form this unsignalized intersection. The intersection is comprised of three separate unsignalized intersections, laid out at the points of a triangle, channelizing various movements. The Training Field Road westbound approach to Glezen Lane consists of a free-flow lane (to Glezen Lane eastbound or westbound) and an exclusive left-turn lane for westbound Training Field Road movements. All approaches are generally 8.5 to 10 feet wide.

To the west is the second unsignalized intersection formed by the eastbound and westbound approaches from Glezen Lane. All approaches to this intersection consist of single lanes. The Glezen Lane westbound approach accommodates right-turn movements to Training Field Road westbound and is under a free-flow condition. Both the Glezen Lane westbound and Training Field Road approaches are under STOP-sign control. To the north is the third unsignalized intersection. The leg from Training Field Road consists of a single lane approach, as well as the legs to and from Glezen Lane. The Glezen Lane eastbound approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential homes.

Plain Road at Claypit Hill Road

Plain Road intersects Claypit Hill Road from the south to form this unsignalized intersection. The Claypit Hill Road approaches each consist of single lanes, approximately 10 feet wide, permitting both left- and right-turn movements. Directional travel along Claypit Hill Road is separated by a single-yellow centerline. Plain Road approaching the intersection splits with right-turn movements to the right side of a triangle shaped island and left-turns to the left side of the island. Three separate intersections are formed as a result, with the minor legs under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties.

Plain Road at Glen Road

Glen Road intersects Plain Road from the south to form this three-legged, unsignalized intersection. The Plain Road eastbound and westbound approaches each consist of single lanes, approximately 9 to 10.5 feet wide, permitting both left- and right-turn movements. Directional travel along Plain Road is separated by a single-yellow centerline. The Glen Road approach consists of a 10-foot wide shared left- and right-turn lane. Directional travel along Glen Road is separated by a single-yellow centerline. The Plain Road eastbound approach is under STOP-sign control. Land use in the vicinity of the intersection consists of residential properties.

Route 20 at Pelham Island Road

Route 20 forms the east and west legs of this four-legged, unsignalized intersection with Pelham Island Road (north and south legs). The Route 20 approaches consist of single wide lanes, approximately 12.5 to 16 feet wide, permitting all movements. The Pelham Island Avenue northbound approach is approximately 10-feet wide, permitting all movements. The Pelham Island Avenue southbound approach is approximately 13 feet wide, permitting all movements. Bituminous concrete sidewalks exist along the north and south sides of Route 20 and along the north side of Pelham Island Road (north of Route 20). The Pelham Island Road approaches operate under STOP control. Land use in the vicinity of the intersection consists primarily of commercial buildings.

Route 20 at Winthrop Road

Winthrop Road intersects Route 20 from the south to form this three-legged, unsignalized intersection. The Route 20 eastbound and westbound approaches each consist of single lanes, approximately 11 to 12.5 feet wide, permitting both left- and right-turn movements. Directional travel along Route 20 is separated by a double-yellow centerline. Winthrop Road is one-way away from Route 20 and is approximately 22 feet wide. Land use in the vicinity of the intersection consists of residential properties and wooded land.

Route 20 at Existing Site Driveway

The existing site driveway intersects Route 20 from the north to form this three-legged, unsignalized intersection. The Route 20 eastbound and westbound approaches each consist of single lanes, approximately 12 feet wide, permitting both left- and right-turn movements. Directional travel along Route 20 is separated by a double yellow centerline. The site driveway approach at Route 27 is approximately 21.5 feet wide, allowing left- and right-turn movements. Approximately 150 feet to the west is a second exit only driveway, approximately 21.5 feet wide. The driveway approach is under STOP-sign control. Land use in the vicinity of the intersection consists of wooded properties and the existing site.

Route 20 at Old County Road

Old County Road intersects Route 20 from the north to form this three-legged, unsignalized intersection. The Route 20 eastbound and westbound approaches each consist of single lanes, approximately 12 to 12.5 feet wide, permitting both left- and right-turn movements. Directional travel along Route 20 is separated by a double yellow centerline. The Old County Road approach consists of an 11.5-foot wide shared left- and right-turn lane. Directional travel along Old County Road is separated by a single-yellow centerline. The Old County Road approach is under STOP-sign control. Land use in the vicinity of the intersection consists of commercial properties.

Route 20 at Union Avenue and Sudbury Crossing Driveway

Route 20 forms the east and west legs of this four-legged signalized intersection with Union Avenue (north leg) and the Sudbury Crossing driveway (south leg). The Route 20 approaches each consist of an exclusive left-turn lane and a shared through/right-turn lane, varying in width from 10 feet to 14 feet. Directional travel along Route 20 is separated by a double yellow centerline. The Union Avenue southbound approach consists of a shared left-turn lane/through lane, approximately 10 feet wide, and a 10.5-foot wide exclusive right-turn lane. The Sudbury Crossing driveway approach consists of an exclusive left-turn lane and a shared through/right-turn lane. Bituminous concrete sidewalks exist along the north side of Route 20. The intersection is controlled by a two-phase traffic signal. Land use in the vicinity of the intersection consists of commercial properties.

Route 20 at Nobscot Road

Route 20 forms the east and west legs of this four-legged signalized intersection with Nobscot Road (south leg) and a driveway to Clappers House & Garden Shop (north leg). The Route 20 eastbound approach consists of an exclusive right-turn lane and a shared through/left-turn lane, varying in width from 11 feet to 15 feet. The Route 20 westbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane, approximately 12 feet wide. Directional travel along Route 20 is separated by a double yellow centerline. The Nobscot Road northbound approach consists of a shared left-turn

lane/through lane, approximately 13 feet wide, and a 14-foot wide exclusive right-turn lane. The Clappers driveway approach consists of a wide lane permitting all movements. Bituminous concrete sidewalks exist along the north side of Route 20 and the west side of Nobscot Road. The intersection is controlled by a two-phase traffic signal. Land use in the vicinity of the intersection consists of commercial properties.

3.2.4 Traffic Volumes

To establish base traffic conditions within the study area, manual turning movement and vehicle classification counts were obtained in February 2005 for the intersections immediately adjacent to the site and in May and June 2006 at the north Wayland neighborhood study area locations as shown on Figure 3-2. Daily traffic volumes were collected through use of automatic traffic recorders (ATR) at the following locations:

- Route 27, north of Bow Road
- Glezen Lane, east of Route 126
- Glezen Lane, west of Route 126
- Bow Road, east of Route 27
- Millbrook Road, east of Route 27
- Plain Road, west of Claypit Hill Road
- Claypit Hill Road, east of Route 126
- Training Field Road, west of Route 126
- Winthrop Road, east of Route 27
- Glen Road, north of Route 20
- Moore Road, west of Route 126

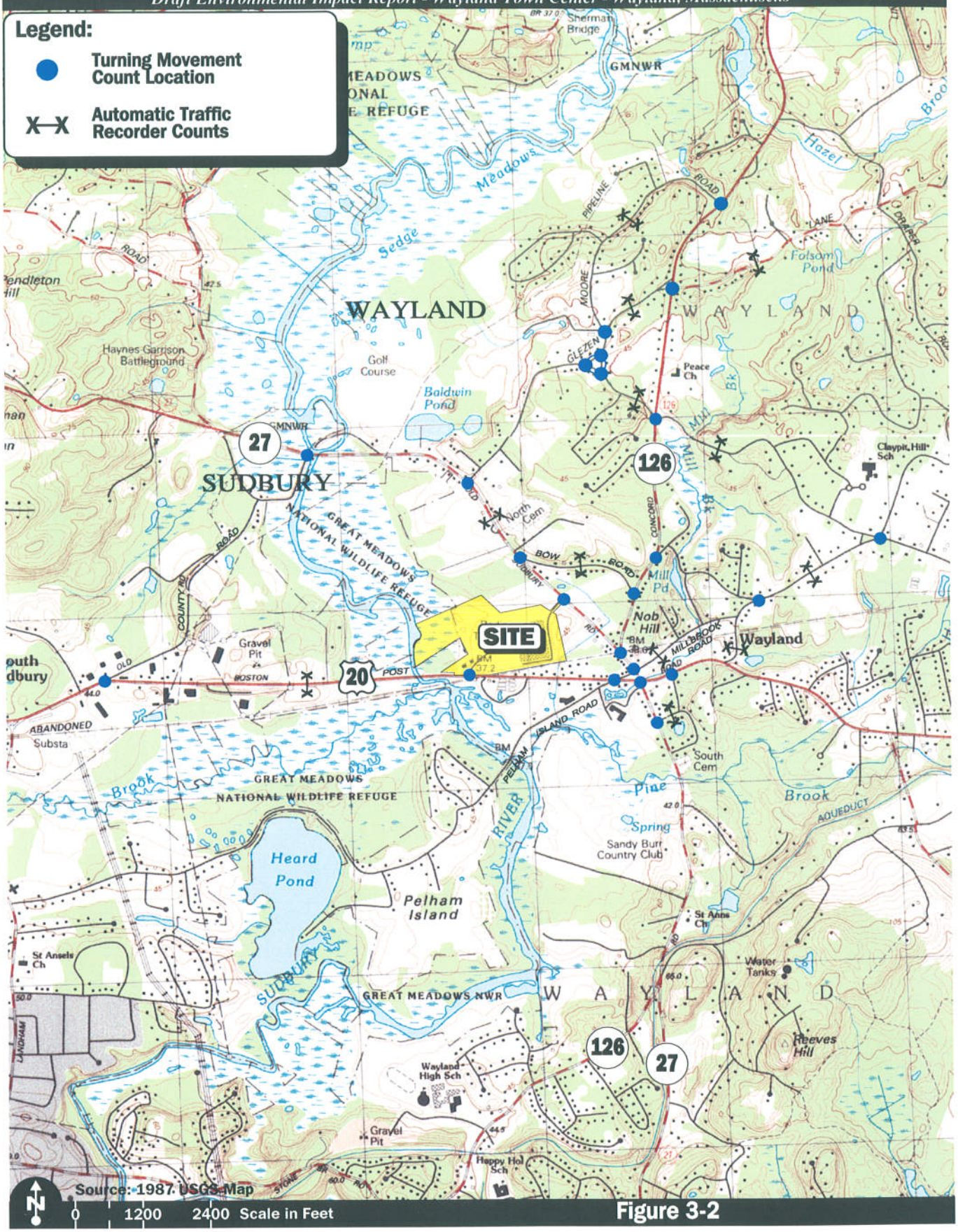

Figure 3-2

Traffic Count Locations

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Peak-period manual turning movement counts were conducted during the weekday morning peak period (6:00 to 9:00 AM), during the weekday evening peak period (3:00 to 7:00 PM), during the Saturday midday period (10:30 AM to 1:30 PM) and the Sunday midday period (10:30 AM to 1:30 PM) at the following intersections:

- Route 27 at River Road
- Route 27 at Glezen Lane
- Route 27 at Bow Road
- Route 27 at Route 126
- Route 27/Route 126 at Pelham Island Road and Millbrook Road
- Route 20 at Route 27/Route 126
- Route 27 at Winthrop Road
- Route 126 at Bow Road
- Route 126 at Plain Road
- Route 126 at Claypit Hill Road and Training Field Road
- Route 126 at Glezen Lane
- Route 126 at Moore Road
- Glezen Lane at Moore Road
- Glezen Lane at Training Field Road
- Plain Road at Claypit Hill Road
- Plain Road at Glen Road
- Route 20 at Winthrop Road
- Route 20 at Pelham Island Road
- Route 20 at Old County Road (River Road in Wayland)

The counts were done on Thursday, May 25, 2006, Saturday June 3, 2006 and Sunday, June 4, 2006, when schools were in session. The two new Sudbury locations were counted in October 2006. Analysis of the peak-period traffic counts indicated that the weekday morning peak hour generally occurs between 8:00 and 9:00 AM, and the weekday evening

peak hour occurs between 5:00 and 6:00 PM. The Saturday midday peak hour generally occurs between 12:30 and 1:30 PM, and the Sunday midday peak hour occurred between 12:30 and 1:30 PM.

It should be noted that during the preparation of the initial studies for this project, traffic counts were not conducted at the Route 20 intersections with Pelham Island Road, Routes 27/126 and Millbrook Road, as well as the Route 27 and Route 126 intersection during the Sunday peak hour. Traffic volume count data for these intersections were obtained for the Sunday peak hour and assessed in this report.

Of the neighborhood roadways studied, daily traffic volumes ranged from 200 to 2,300 vehicles per day (vpd). Route 20, east of the Sudbury Town Line experienced the largest daily weekday volume with approximately 19,500 vpd. Saturday volumes ranged from 150 to 1,200 vpd on the local neighborhood streets. Sunday volumes were similar, ranging from 150 to 1,100 vpd.

Route 20, east of the Sudbury town line experienced the highest peak hour volumes. During the weekday morning peak hour, 1,655 vehicles per hour (vph) were recorded, with 1,778 vph during the weekday evening peak hour, 1,469 vph during the Saturday midday peak hour and 1,123 vph during the Sunday midday peak hour.

A review of the count data indicates that during the weekday morning and evening peak hours, traffic is using several cut-through routes to avoid existing traffic on Route 20. These routes are the Old County Road/River Road corridor (between Route 20 in Sudbury and Route 126 in Wayland), Glezen Lane and Bow Road, as shown on Figure 3-3. During the weekday morning peak hour, approximately 90 to 100 vehicles are estimated to be cutting through from Route 20 in Sudbury to Route 27, approximately 400 vehicles are using Glezen Lane (from Route 27 to Route 126 and eventually back to Route 20 in Weston), and approximately 40 to 50 vehicles are using Bow Road (from Route 27 to Route 126). During the weekday evening peak hour, approximately 90 to 100 vehicles are estimated to be cutting through from Route 27 to Route 20, approximately 300 vehicles are using Glezen Lane (from Route 126 to Route 27), and approximately 40 vehicles are using Bow Road (from Route 126 to Route 27). During the Saturday midday peak hour, less traffic was observed using any of these corridors as a cut-through corridor.

Figure 3-3

Cut-Through Routes and Approximate Cut-Through Volumes

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3.2.4.1 Seasonal Adjustment

The traffic-volume data gathered as part of this study was collected during the months of February 2005 and May and June 2006. Data from a nearby permanent count station maintained by MassHighway were reviewed to determine the monthly variations of the traffic volumes. The traffic data showed February to be lower than average month volumes. The traffic data showed May and June to be higher than average month volumes. Therefore, the February volumes were seasonally adjusted and balanced with the May and June traffic volumes to represent the 2006 baseline traffic volume conditions.

The 2006 existing daily and peak-hour traffic volumes for average-month conditions are summarized below in Table 3-1.

The 2006 Existing weekday morning and weekday evening peak hour traffic flow networks are shown graphically on Figures 3-4 and 3-5, respectively. The 2006 Existing Saturday and Sunday midday peak hour traffic flow networks are shown graphically on Figures 3-6 and 3-7, respectively. The traffic count worksheets are provided in the Appendix.

3.2.4.2 Existing Site Generated Traffic Volumes

Routes 20 and 27 currently provide access to the site. During the weekday morning peak hour, 17 vph were recorded (10 vehicles entering and 7 vehicles exiting), and during the weekday evening peak hour, 28 vph were recorded (2 vehicles entering and 26 vehicles exiting). During the Saturday midday peak hour, 10 vph were recorded (5 vehicles entering and 5 vehicles exiting).

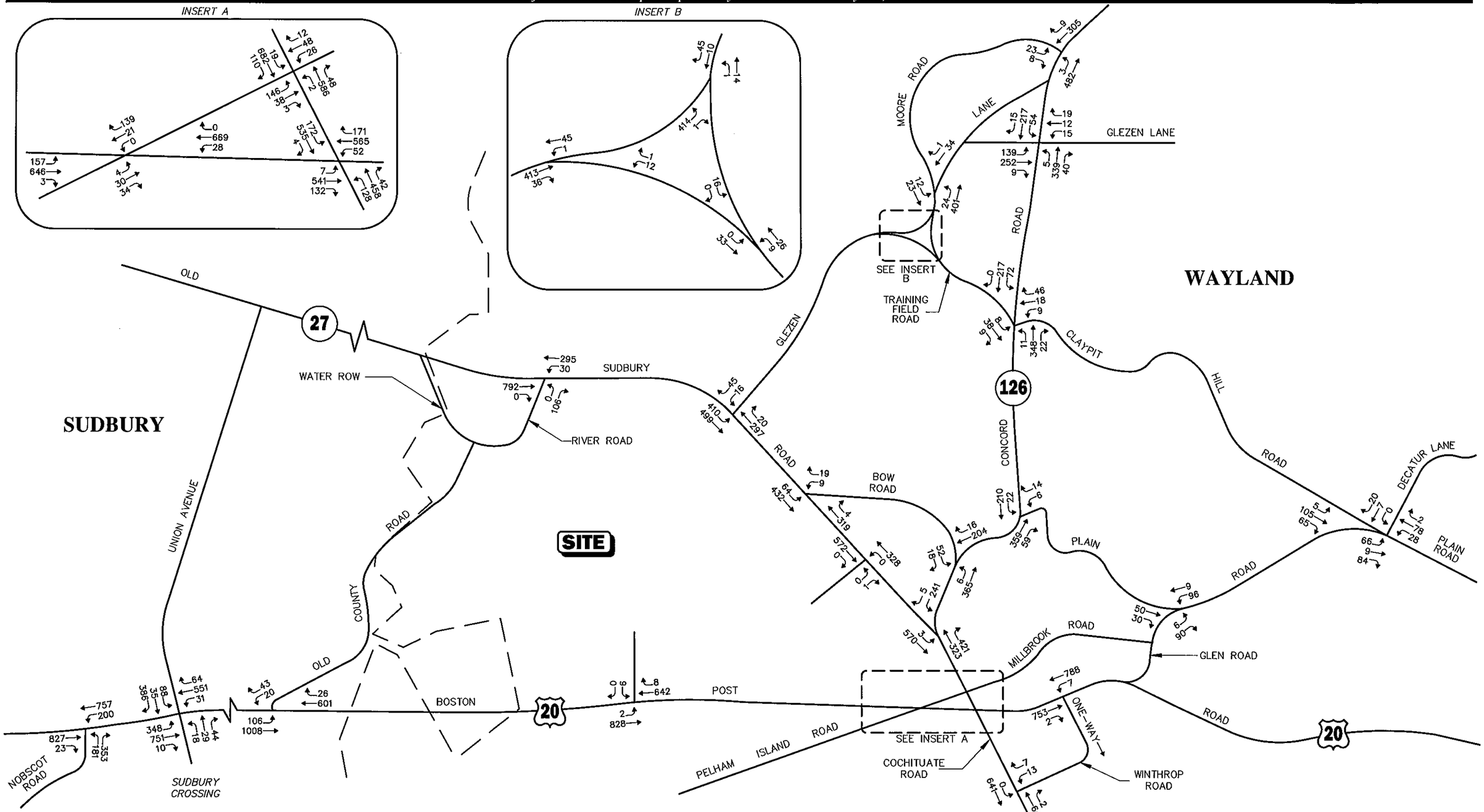
3.2.5 Gap Analysis

A gap analysis was requested along Route 27 in the vicinity of the Route 27 intersections with Bow Road and Glezen Lane, as well as the intersection of Route 126 and Glezen Lane. This analysis was performed to quantify existing intersection parameters with actual intersection operations. Concurrent with the gap analysis, actual delays for vehicles exiting the side streets (Bow Road and Glezen Lane) were recorded to also calibrate the capacity analysis model.

Table 3-1 Existing Roadway Traffic-Volume Summary

Location	Weekday Daily	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Saturday Daily	Saturday Midday Peak Hour			Sunday Daily	Sunday Midday Peak Hour		
	Volume (vpd)[a]	Volume (vph)[b]	Percent of Daily Traffic[c]	Predominant Flow[d]	Volume (vph)	Percent of Daily Traffic	Predominant Flow	Volume (vpd)	Volume (vph)	Percent of Daily Traffic	Predominant Flow	Volume (vpd)	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Route 27, north of Bow Road	12,300	834	6.8	59.5% SB	1,389	11.3	67.3% NB	8,400	632	7.5	50.2% NB	8,100	732	9.0	50.7% WB
Route 20, east of Sudbury Town Line	19,500	1,655	8.5	61.8% EB	1,778	9.1	54.0% WB	15,300	1,469	9.6	51.7% EB	10,650	1,123	10.5	52.2% WB
Glezen Road, east of Route 126	2,300	392	17.0	88.3% EB	287	12.5	80.5% WB	850	94	11.1	60.6% EB	750	81	10.8	54.3% WB
Glezen Road, west of Route 126	2,300	432	18.8	92.6% EB	380	16.5	87.9% WB	600	69	11.5	55.1% WB	450	57	12.7	56.1% WB
Bow Road, east of Route 27	900	96	10.7	70.8% EB	205	22.8	62.9% WB	200	15	7.5	53.3% WB	200	25	12.5	60.0% WB
Millbrook Road, east of Route 27	1,400	191	13.6	54.9% EB	103	7.4	57.3% EB	1,200	138	11.5	50.7% EB	1,100	205	18.6	58.5% WB
Plain Road, west of Claypit Hill Road	1,900	259	13.6	61.4% NB	204	10.7	50.0% NB/SB	1,100	99	9.0	52.5% NB	1,000	76	7.6	51.3% SB
Claypit Hill Road, east of Route 126	1,600	205	12.8	64.4% EB	201	12.6	56.2% EB	800	75	9.4	54.7% WB	800	75	9.4	53.3% EB
Training Field Road, west of Route 126	1,100	84	7.6	65.5% EB	88	8.0	57.9% EB	900	84	9.3	53.6% WB	800	73	9.1	58.9% WB
Winthrop Road, east of Route 27	200	22	11.0	90.9% WB	6	3.0	83.3% WB	150	14	9.3	71.4% WB	150	13	8.7	76.9% WB
Glen Road, north of Route 20	1,200	222	18.5	56.8% SB	183	15.3	68.9% SB	300	111	37.0	51.4% SB	300	96	32.0	58.3% NB
Moore Road, west of Route 126	500	44	8.8	72.3% EB	31	6.2	61.3% WB	350	19	5.4	68.4% WB	350	28	8.0	60.7% EB

Source: ATR Counts conducted in June 2006, rounded.
[a]Two-way daily traffic expressed in vehicles per day.
[b]Two-way peak-hour volume expressed in vehicles per hour.
[c]The percent of daily traffic that occurs during the peak hour.
[d]EB = eastbound; WB = westbound; NB = northbound; SB = southbound.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-4

2006 Existing Weekday Morning Peak Hour Traffic Volumes

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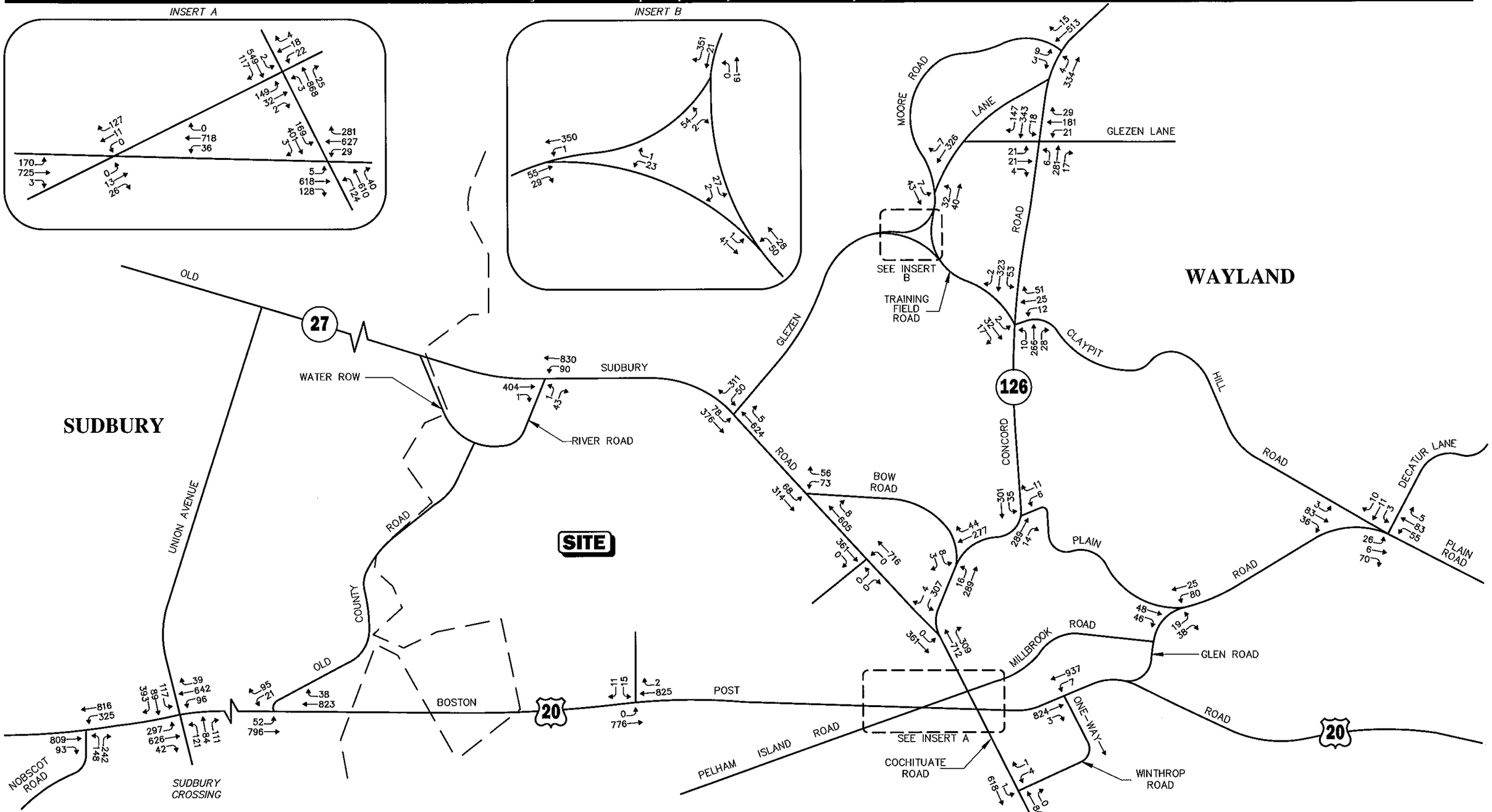

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

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Figure 3-5

2006 Existing Weekday Evening Peak Hour Traffic Volumes

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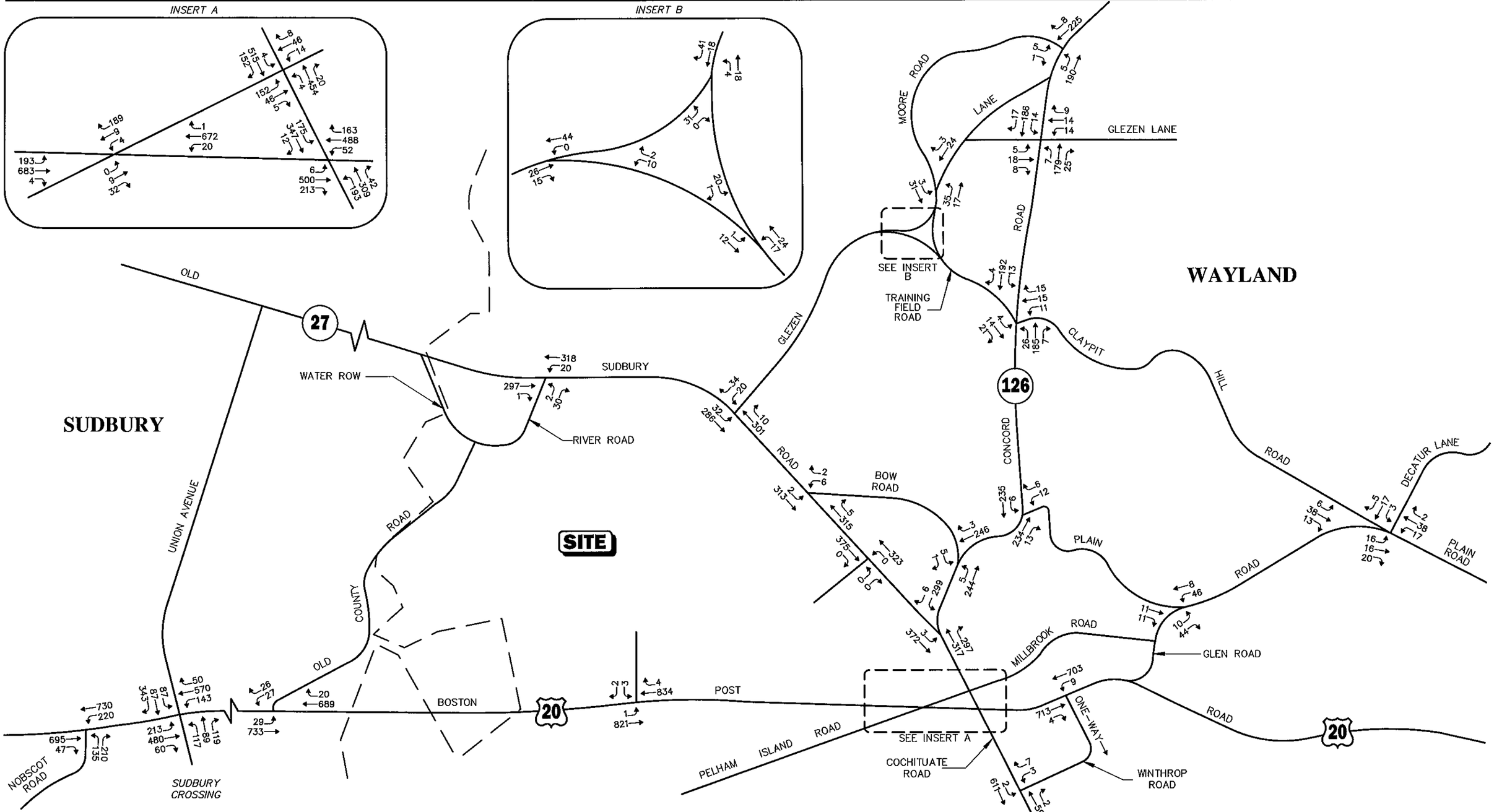

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-6

2006 Existing Saturday Midday Peak Hour Traffic Volumes

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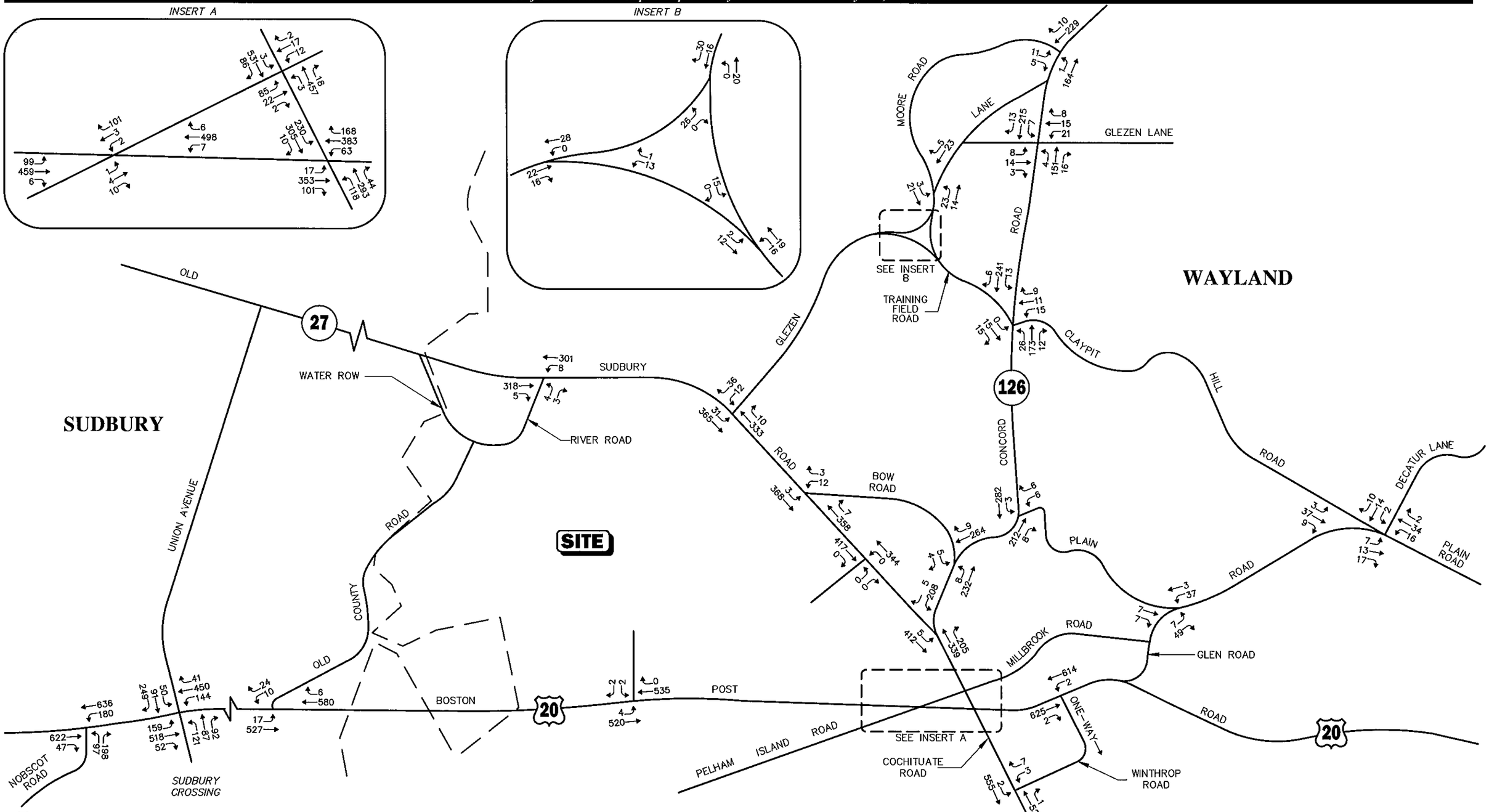

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-7

2006 Existing Sunday Midday Peak Hour Traffic Volumes

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At each of the locations, gaps in the traffic stream were measured electronically through the use of a computerized count board and was supplemented by field measurements of gaps used by vehicles exiting the side streets. These gap counts were done during the weekday morning (6:00 to 9:00 AM) and weekday evening (3:00 to 6:00 PM) peak periods. The data are contained in the Appendix. The results are tabulated in Table 3-2.

Table 3-2 Gap Analysis

	Number of Gaps[a]	
Location	Peak Hour	Gaps
Route 27 at Bow Road	Weekday Morning Peak Hour	127
	Weekday Evening Peak Hour	304
Route 27 at Glezen Lane	Weekday Morning Peak Hour	158
	Weekday Evening Peak Hour	322
Route 126 at Glezen Lane	Weekday Morning Peak Hour	287
	Weekday Evening Peak Hour	338

[a]An acceptable gap was defined as a 6.0 second or longer timed gap between successive vehicles (eastbound and westbound).

As shown in Table 3-2, during the peak hours, there are at least 127 gaps that are 6.0 seconds or longer during the weekday morning peak hour and 304 gaps that are 6.0 seconds or longer during the weekday evening peak hour on Route 27 at the Bow Road and Glezen Lane intersections. On Route 126 at Glezen Lane, during the peak hours, there are at least 287 gaps that are 6.0 seconds or longer during the weekday morning peak hour and 338 gaps that are 6.0 seconds or longer during the weekday evening peak hour. This gap analysis is important as it shows that there are adequate gaps in the Route 27 flow for the volume of traffic on Glezen Lane and Bow Road to enter the traffic stream.

3.2.6 Delay Analysis

The September 2006 gap counts were supplemented by peak hour delay measurements at the Route 27 intersections with Bow Road and Glezen Lane, as well as the intersection of Route 126 and Glezen Lane. At the same time the gaps were recorded, the amount of time required for vehicles exiting Bow Road and Glezen Lane were recorded. These delays were recorded to assess baseline intersection delays, which are used to evaluate an intersection's level-of-service. The June and September counts were found to be comparable. Summarized in Table 3-3 is the observed delay information.

Table 3-3 Summary of Observed Delays[a]

Delay[a]	Route 27 and Bow Road		Route 27 and Glezen Lane		Route 126 and Glezen Lane	
	Weekday Morning Peak Hour (8:00 to 9:00 AM)		Weekday Morning Peak Hour (8:00 to 9:00 AM)		Weekday Morning Peak Hour (8:00 to 9:00 AM)	
	All Movements from Bow Road		All Movements from Glezen Lane		All Movements from Glezen Lane	
	Observed Delay	LOS[c]	Observed Delay	LOS	Observed Delay	LOS
Average	23.1	C	16.1	C	24.9	C
Minimum	0	A	4	A	0	A
Maximum	131	F	135	F	107	F
	Weekday Evening Peak Hour (5:00 to 6:00 PM)		Weekday Evening Peak Hour (5:00 to 6:00 PM)		Weekday Evening Peak Hour (5:00 to 6:00 PM)	
	All Movements from Bow Road		All Movements from Glezen Lane		All Movements from Glezen Lane	
	Observed Delay	LOS	Observed Delay	LOS	Observed Delay	LOS
Average	15.8	C	14.9	B	40.0	E
Minimum	0	A	1	A	0	A
Maximum	180	F	73	F	125	F

[a]Delays in seconds.
[c]Level of Service.

As shown in Table 3-3, peak hour delays ranged from 0 to 180 seconds for vehicles exiting the side streets to Route 27 or Route 126 during the respective weekday morning and evening peak hours. Average delays ranged from 14.9 to 40.0 seconds. This data, along with the gap data was used to calibrate the level of service results later on in this report for these three intersections.

3.2.7 Motor Vehicle Crash Data

Motor vehicle crash data for the study area intersections and roadways were obtained from the MassHighway Department database and research periods 2002 through 2004, the most recent three-year period for which MassHighway data are available. Crash data was also requested and obtained from the Wayland Police Department. Motor vehicle crash data were reviewed to determine crash trends in the study area. A summary of the MassHighway data is provided in Table 3-4.

Table 3-4 Motor Vehicle Crash Summary[a]

Scenario	Location														
	Route 27 at River Road	Route 27 at Glezen Lane	Route 27 at Bow Road	Route 126 at Bow Road	Route 126 at Claypit Hill Road and Training Field Road	Route 126 at Glezen Lane	Glezen Lane at Training Field Road	Route 20 at Winthrop Road	Route 20 at Old County Road	Route 20 at Route 27 and Route 126	Route 27 at Route 126	Route 27 at Route 126 and Pelham Island Road	Route 20 at Pelham Island Road	Route 20 at Union Avenue	Route 20 at Nobscot Road
Year:															
2002	1	0	1	1	0	5	1	0	1	12	3	6	4	13	9
2003	4	1	1	0	0	3	0	0	3	9	5	8	6	9	3
2004	1	2	0	0	1	4	1	1	2	21	6	4	2	2	1
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13
Average[b]	2.00	1.00	0.67	0.33	0.33	4.00	0.67	0.33	2.00	14.00	4.67	6.00	4.00	8.00	4.33
Crash Rate[c]	0.36	0.17	0.15	0.13	0.10	0.91	NA	0.05	0.26	1.14	0.68	0.83	0.54	0.74	0.44
Significant[d]	No	No	No	No	No	Yes	NA	No	No	Yes	No	Yes	No	No	No
Type:															
Angle	1	1	1	0	0	10	0	0	4	20	4	12	5	15	3
Rear-End	4	2	1	0	1	1	0	1	1	17	5	4	7	5	10
Head-On	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Sideswipe	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Run off Road/Hit Fixed Object	0	0	0	1	0	0	2	0	0	2	2	1	0	0	0
Pedestrian	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	1	0	0	0	0	0	0	0	1	3	1	1	0	3	0
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13
Time of Day:															
Weekday (7:00 to 9:00 AM)	1	0	1	1	1	5	1	0	1	4	2	1	4	1	1
Weekday (4:00 to 6:00 PM)	0	2	0	0	0	3	0	0	1	4	2	4	0	4	2
Remainder of Day	5	1	1	0	0	4	1	1	4	34	10	13	8	19	10
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13
Pavement Conditions:															
Dry	4	3	2	0	0	7	1	0	4	31	8	13	9	12	8
Wet	2	0	0	1	1	3	0	0	2	8	5	5	1	9	5
Snow	0	0	0	0	0	0	1	1	0	1	0	0	1	2	0
Icy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	1	0	0	0	2	1	0	1	1	0
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13
Day of Week:															
Monday through Friday	5	3	2	1	1	11	1	1	5	32	13	15	10	20	10
Saturday and Sunday	1	0	0	0	0	1	1	0	1	10	1	3	2	4	3
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13
Severity:															
Property Damage Only	3	2	2	0	1	11	2	1	5	33	8	10	11	19	9
Personal Injury	2	1	0	1	0	1	0	0	1	7	5	7	1	4	4
Fatal Accident	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hit and Run	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	1	0	0	0	0	0	0	0	0	2	1	1	0	1	0
Total	6	3	2	1	1	12	2	1	6	42	14	18	12	24	13

[a]Source: MassHighway.
[b]Average crashes over three-year period.
[c]Crash rate per million entering vehicles (mev).
[d]Yes if rate > 0.84 for signalized intersections, > 0.79 for unsignalized intersections.
NA = Not available.

As shown in Table 3-4, a total of 120 motor vehicle crashes were recorded at the study area intersections within the three-year analysis period (77 in Wayland). No fatalities were reported during the three-year analysis period. Based on MassHighway standards, the calculated crash rates for the majority study area intersections are below the District 3 significant crash rates. Three intersections experienced crash rates higher than the significant crash rate: Route 126 and Glezen Lane, Routes 27/126 at Pelham Island Road/Millbrook Road (near the library) and Route 20 at Routes 27/126.

Motor vehicle crash data for the study area intersections and roadways were also obtained from the Wayland Police Department (WPD) database and research periods 2003 through 2005, the most recent three-year period for which crash data was available. A summary of the WPD data is provided in Table 3-5.

As shown in Table 3-5, a total of 83 motor vehicle crashes were recorded at the Wayland study area intersections within the three-year analysis period. No fatalities were reported during the three-year analysis period. Based on MassHighway standards, the calculated crash rates for the majority study area intersections are below the District 3 significant crash rates. Two intersections experienced crash rates higher than the significant crash rate: Route 126 and Glezen Lane and Routes 27/126 at Pelham Island Road/Millbrook Road (near the library). At the intersection of Route 20 at Routes 27/126, there were less reported crashes from 2004 to 2006 than from 2002 to 2004 and the crash rate dropped to below the significant rate.

3.2.8 Vehicle Speeds

Vehicle speeds were recorded along the study area roadways. These speed measurements were recorded by use of the automatic traffic recorder. The observations are summarized in Table 3-6.

The 85th percentile speeds (those which are normally used for establishing speed limits) for the local neighborhood streets were found to generally range between 19 and 36 mph. The official posed speed limits ranged from 25 to 40 mph.

3.2.9 Sight Distances

To identify potential safety concerns associated with site access and egress, stopping sight distance (SSD) measurements were conducted at the proposed site access/egress roadway intersections with Route 20 and Route 27. SSD is the minimum distance required for an approaching driver to perceive and react accordingly to an exiting vehicle. These values are based on a perception and reaction time of 2.5 seconds and a braking distance calculated for wet, level pavement. When the roadway is either on an upgrade or downgrade, grade correction factors are applied. Intersection Sight Distance (ISD) is the minimum distance required for drivers on the minor roadway approach to perceive oncoming traffic and make the turning maneuver.

Table 3-5 WPD Motor Vehicle Crash Summary[a]

Scenario	Location														
	Route 27 at River Road	Route 27 at Glezen Lane	Route 27 at Bow Road	Route 126 at Bow Road	Route 126 at Claypit Hill Road and Training Field Road	Route 126 at Glezen Lane	Glezen Lane at Training Field Road	Route 20 at Winthrop Road	Route 20 at Old County Road	Route 20 at Route 27 and Route 126	Route 27 at Route 126	Route 27 at Route 126 and Pelham Island Road	Route 20 at Pelham Island Road	Route 20 at Union Avenue	Route 20 at Nobscot Road
Year:															
2004	0	2	0	0	0	3	0	0	–[b]	9	1	3	1	–[b]	–[b]
2005	1	2	1	0	0	5	0	0	–	13	2	8	2	–	–
2006	1	1	1	1	1	5	0	0	–	7	3	10	0	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–
Average[c]	0.67	1.67	0.67	0.33	0.33	4.33	0.00	0.00	–	9.67	2.00	7.00	1.00	–	–
Crash Rate[d]	0.12	0.28	0.15	0.13	0.10	0.98	NA	NA	–	0.79	0.29	0.96	0.13	–	–
Significant[e]	No	No	No	No	No	Yes	NA	NA	–	No	No	Yes	No	–	–
Type:															
Angle	0	3	1	0	1	9	0	0	–	13	3	20	1	–	–
Rear-End	2	2	1	0	0	3	0	0	–	11	2	1	2	–	–
Head-On	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Sideswipe	0	0	0	0	0	1	0	0	–	4	0	0	0	–	–
Run off Road/Hit Fixed Object	0	0	0	1	0	0	0	0	–	1	1	0	0	–	–
Pedestrian	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Unknown	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–
Time of Day:															
Weekday (7:00 to 9:00 AM)	0	3	0	0	0	7	0	0	–	2	0	2	0	–	–
Weekday (4:00 to 6:00 PM)	1	2	1	0	0	2	0	0	–	4	1	6	0	–	–
Remainder of Day	1	0	1	1	1	4	0	0	–	23	5	13	3	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–
Pavement Conditions:															
Dry	1	4	2	1	0	9	0	0	–	23	4	19	3	–	–
Wet	1	0	0	0	1	4	0	0	–	3	2	2	0	–	–
Snow	0	1	0	0	0	0	0	0	–	2	0	0	0	–	–
Icy	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Other	0	0	0	0	0	0	0	0	–	1	0	0	0	–	–
Unknown	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–
Day of Week:															
Monday through Friday	1	5	2	1	1	13	0	0	–	22	6	16	2	–	–
Saturday and Sunday	1	0	0	0	0	0	0	0	–	7	0	5	1	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–
Severity:															
Property Damage Only	1	4	1	0	1	13	0	0	–	29	6	19	2	–	–
Personal Injury	1	1	1	1	0	0	0	0	–	0	0		1	–	–
Fatal Accident	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Hit and Run	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Other	0	0	0	0	0	0	0	0	–	0	0	0	0	–	–
Total	2	5	2	1	1	13	0	0	–	29	6	21	3	–	–

[a]Source: Wayland Police Department.
[b]Crash rate data for this location has been requested from the Sudbury Police Department, but not yet received.
[c]Average crashes over three-year period.
[d]Crash rate per million entering vehicles (mev).
[e]Yes if rate > 0.84 for signalized intersections, > 0.79 for unsignalized intersections.
NA = Not available.

Table 3-6 Observed Vehicle Speed Summary

Location/ Direction of Travel	Range of Observed Speeds (mph[a])	Average Observed Speed (mph)	85th Percentile Observed Speed (mph)	Speed Limit (mph)
Route 27, north of Bow Road:				
Traveling northbound	14 to 65	38	43	40
Traveling southbound	14 to 59	38	43	40
Glezen Lane, east of Route 126:				
Traveling eastbound	14 to 44	28	33	25
Traveling westbound	14 to 49	29	34	25
Glezen Lane, west of Route 126:				
Traveling eastbound	14 to 39	26	32	25
Traveling westbound	14 to 39	26	30	25
Bow Road, east of Route 27:				
Traveling eastbound	14 to 39	23	28	25
Traveling westbound	14 to 44	24	30	25
Claypit Hill Road, east of Route 126:				
Traveling eastbound	14 to 39	29	33	25
Traveling westbound	14 to 49	31	35	25
Millbrook Road, east of Route 27:				
Traveling eastbound	14 to 39	26	31	NP
Traveling westbound	14 to 39	27	32	NP
Plain Road, west of Claypit Hill Road:				
Traveling eastbound	14 to 54	31	36	25
Traveling westbound	14 to 49	32	36	25
Training Field Road, west of Route 126:				
Traveling eastbound	14 to 39	24	29	25
Traveling westbound	14 to 39	25	29	25
Winthrop Road, east of Route 27:				
Traveling eastbound	14 to 44	22	29	NP
Traveling westbound	14 to 24	15	19	NP
Glen Road, north of Route 20:				
Traveling northbound	14 to 39	24	29	NP
Traveling southbound	14 to 39	22	27	NP
Moore Road, west of Route 126:				
Traveling eastbound	14 to 39	23	31	30
Traveling westbound	14 to 54	28	35	30

[a]Miles per hour.
NP = Not posted.

The available sight distances at the locations of the site access intersections with Route 20 and Route 27 were compared to minimum requirements, as established by the American Association of State Highway and Transportation Officials (AASHTO)[3]. The available and required sight distances for the site access locations are summarized in Table 3-7.

As indicated in Table 3-6, the observed SSD exceeds the minimum requirement to safely allow vehicles on Route 20 to exit the site driveways, as well as for vehicles entering the site to see adequately when approaching the site driveways. Any vegetation or plantings at the proposed access roadway intersections with Route 20 and Route 27 should be set back and not exceed 3.0 feet so as not to inhibit sight distances.

Available sight distances at the existing study area intersections were also recorded and compared to minimum requirements, as established by the AASHTO[4]. The available and required sight distances for the site access locations are summarized in Table 3-8.

3.2.10 Origin/Destination Analysis

To determine if any of the new trips expected to be generated by the Wayland Town Center project were existing trips traveling to the existing Whole Foods market, Sudbury Farms or Shaw's supermarkets, an origin/destination analysis was performed. To perform this study, license plate data was recorded during the weekday morning, weekday evening and Saturday midday peak periods. License plates were recorded of vehicles entering and exiting the following roadways:

- Bow Road
- Glezen Lane
- River Road
- Old County Road
- Whole Foods driveway
- Sudbury Farms driveways
- Shaw's driveways

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[3] *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 1990.

[4] *Ibid.*

Table 3-7 Site Driveway Sight Distance Analysis Summary

	Required Minimum (Feet)[a]	Measured (Feet)
Route 20 at the Proposed Site Driveway		
Stopping Sight Distance:		
Route 20 approaching from the west	360	500+
Route 20 approaching from the east	360	500+
Intersection Sight Distance:		
Looking to the west from the site driveway	500[b]/430[c]	500+
Looking to the east from the site driveway	500[b]/430[c]	500+
Route 27 at the Proposed Site Driveway		
Stopping Sight Distance:		
Route 27 approaching from the north	305	500+
Route 27 approaching from the south	305	500+
Intersection Sight Distance:		
Looking to the north from the site driveway	445[b]/385[c]	500+
Looking to the south from the site driveway	445[b]/385[c]	500+

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2001, and based on a 45 speed on Route 20 and a 40 mph speed limit on Route 27.
[b]Recommended minimum value for vehicles turning right exiting a roadway under STOP-sign control.
[c]Recommended minimum value for vehicles turning left exiting a roadway under STOP-sign control.

Table 3-8 Study Area Intersection Sight Distance Analysis Summary

	Speed (mph)	Required Minimum (Feet)[a]	Measured (Feet)
River Road at Route 27			
Stopping Sight Distance:			
Route 27 approaching from the north	43	335	500+
Route 27 approaching from the south	43	335	500+
Intersection Sight Distance:			
Looking to the north from River Road	--	474[b]	500+
Looking to the south from River Road	--	411[c]	207
Glezen Lane at Route 27			
Stopping Sight Distance:			
Route 27 approaching from the north	43	335	500+
Route 27 approaching from the south	42	324	500+
Intersection Sight Distance:			
Looking to the north from Glezen Lane	--	463[b]	500+
Looking to the south from Glezen Lane	--	411[c]	500+
Bow Road at Route 27			
Stopping Sight Distance:			
Route 27 approaching from the north	44	348	500+
Route 27 approaching from the south	46	372	500+
Intersection Sight Distance:			
Looking to the north from Bow Road	--	485[b]	500+
Looking to the south from Bow Road	--	440[c]	344
Route 126 at Route 27			
Stopping Sight Distance:			
Route 27 approaching from the north	41	312	500+
Route 27 approaching from the south	40	301	500+
Intersection Sight Distance:			
Looking to the north from Route 126	--	452[b]	500+
Looking to the south from Route 126	--	382[c]	500+
Bow Road at Route 126			
Stopping Sight Distance:			
Route 126 approaching from the north	35	246	500+
Route 126 approaching from the south	31	206	253
Intersection Sight Distance:			
Looking to the south from Bow Road	--	386[b]	500+
Looking to the north from Bow Road	--	296[c]	233

Table 3-8 (Continued) Study Area Intersection Sight Distance Analysis Summary

	Speed (mph)	Required Minimum (Feet)[a]	Measured (Feet)
Plain Road at Route 126			
Stopping Sight Distance:			
Route 126 approaching from the north	39	289	500+
Route 126 approaching from the south	39	289	500+
Intersection Sight Distance:			
Looking to the south from Plain Road	--	386[b]	500+
Looking to the north from Plain Road	--	296[c]	500+
Training Field Road/Claypit Hill Road at Route 126			
Stopping Sight Distance:			
Route 126 approaching from the north	44	348	500+
Route 126 approaching from the south	40	301	500+
Intersection Sight Distance:			
Looking to the south from Training Field Road	--	485[b]	500+
Looking to the north from Training Field Road	--	382[c]	500+
Intersection Sight Distance:			
Looking to the north from Claypit Hill Road	--	485[b]	500+
Looking to the south from Claypit Hill Road	--	382[c]	500+
Glezen Lane at Route 126			
Stopping Sight Distance:			
Route 126 approaching from the north	41	312	500+
Route 126 approaching from the south	44	348	500+
Intersection Sight Distance:			
Looking to the south from Glezen Lane	--	485[b]	500+
Looking to the north from Glezen Lane	--	485[c]	500+
Moore Road at Route 126			
Stopping Sight Distance:			
Route 126 approaching from the north	40	301	500+
Route 126 approaching from the south	42	324	500+
Intersection Sight Distance:			
Looking to the south from Moore Road	--	463[b]	500+
Looking to the north from Moore Road	--	382[c]	363
Millbrook Road/Pelham Island Road at Route 27/Route 126			
Stopping Sight Distance:			
Route 27 approaching from the north	30	200	500+
Route 27 approaching from the south	30	200	500+
Intersection Sight Distance:			
Looking to the north from Millbrook Road	--	331[b]	500+
Looking to the south from Millbrook Road	--	287[c]	500+
Intersection Sight Distance:			
Looking to the south from Pelham Island Rd.	--	331[b]	500+
Looking to the north from Pelham Island Rd.	--	287[c]	500+

Table 3-8 (Continued) Study Area Intersection Sight Distance Analysis Summary

	Speed (mph)	Required Minimum (Feet)[a]	Measured (Feet)
Route 20 at Route 27/Route 126			
Stopping Sight Distance:			
Route 27 approaching from the north	30	200	500+
Route 27 approaching from the south	30	200	500+
Intersection Sight Distance:			
Looking to the north from Route 27	--	331[b]	500+
Looking to the south from Route 27	--	287[c]	500+
Winthrop Road at Route 27			
Stopping Sight Distance:			
Route 27 approaching from the north	35	246	500+
Route 27 approaching from the south	35	246	500+
Intersection Sight Distance:			
Looking to the north from Winthrop Road	--	386[b]	500+
Looking to the south from Winthrop Road	--	334[c]	241
Winthrop Road at Route 20			
Stopping Sight Distance:			
Route 20 approaching from the east	40	301	500+
Route 20 approaching from the west	40	301	500+
Intersection Sight Distance:			
Looking to the east from Winthrop Road	--	Not Applicable. Winthrop Road is one-way	
Looking to the west from Winthrop Road	--	southbound away from Route 20	
Training Field Road at Glezen Lane (North)			
Stopping Sight Distance:			
Training Field Rd. approaching from the north	31	206	232
Glezen Lane approaching from the south	31	206	314
Intersection Sight Distance:			
Looking to the south from Glezen Lane	--	342[b]	365
Looking to the north from Glezen Lane	--	296[c]	206
Training Field Road at Glezen Lane (Southwest)			
Stopping Sight Distance:			
Glezen Lane approaching from the east	33	226	417
Glezen Lane approaching from the west	33	226	500+
Intersection Sight Distance:			
Looking to the west from Glezen Lane	--	364[b]	419
Looking to the east from Glezen Lane	--	315[c]	500+
Training Field Road at Glezen Lane (Southeast)			
Stopping Sight Distance:			
Training Field Rd. approaching from the east	34	236	435
Glezen Lane approaching from the west	34	236	315
Intersection Sight Distance:			
Looking to the east from Plain Road	--	375[b]	447
Looking to the west from Plain Road	--	325[c]	366

Table 3-8 (Continued) Study Area Intersection Sight Distance Analysis Summary

	Speed (mph)	Required Minimum (Feet)[a]	Measured (Feet)
Glezen Lane at Moore Road			
Stopping Sight Distance:			
Glezen Lane approaching from the south	32	216	495
Moore Road approaching from the north	32	216	500+
Intersection Sight Distance:			
Looking to the south from Moore Road	--	353[b]	166
Looking to the north from Moore Road	--	306[c]	293
Glen Road at Plain Road			
Stopping Sight Distance:			
Plain Road approaching from the east	25	152	470
Glen Road approaching from the west	25	153	340
Intersection Sight Distance:			
Looking to the east from Plain Road	--	276[b]	166
Looking to the west from Plain Road	--	239[c]	293
Claypit Hill Road at Plain Road			
Stopping Sight Distance:			
Plain Road approaching from the east	35	246	492
Claypit Hill Road approaching from the west	35	246	460
Intersection Sight Distance:			
Looking to the east from Plain Road	--	386[b]	374
Looking to the west from Plain Road	--	334[c]	500+
Intersection Sight Distance:			
Looking to the east from Decatur Lane	--	386[b]	240
Looking to the west from Decatur Lane	--	334[c]	166

[a]Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*; American Association of State Highway and Transportation Officials (AASHTO); 2001, and based on the prevailing speed.
[b]Recommended minimum value for vehicles turning left exiting a roadway under STOP-sign control.
[c]Recommended minimum value for vehicles turning right exiting a roadway under STOP-sign control.

During the weekday morning peak period, 3,023 license plates were recorded, during the weekday evening peak hour, 6,993 license plates were recorded and during the Saturday midday peak period, 6,435 license plates were recorded. The license plate data is contained in the Appendix.

The license plate data was then sorted and matches analyzed to determine the purpose of the observed trips from Glezen Lane and Bow Road. The results of the analysis are summarized in Table 3-9.

Table 3-9 License Plate Summary

Time Period	Number of License Plates Recorded[a]	Identified Cut-Through Trips[b]	Identified Supermarket Trips[c]
Weekday Morning Peak Period	3,023	220	22
Weekday Evening Peak Period	6,993	301	17
Saturday Midday Peak Period	6,435	98	15

[a]All locations.
[b]Trips originating or terminating at Glezen Lane or Bow Road by way of Old County Road, River Road and Route 27.
[c]Trips originating or terminating at Glezen Lane or Bow Road utilizing Whole Foods, Sudbury Farms or Shaw's.

Based on the license plate data gathered, most of the trips traveling to and from Route 20 from Glezen Lane and Bow Road are cut-through trips. There were only 15 to 22 trips that were identified as originating or terminating at Glezen Lane or Bow Road that were related to a shopping or supermarket trip.

3.2.11 Planned Roadway Improvements

Officials for MassHighway and the Town of Wayland were contacted regarding roadway improvements planned for the study area intersections. One intersection improvement project was identified:

- ***Route 20 & Route 27/126*** – MassHighway, in conjunction with the Town of Wayland, is reconstructing the intersection of Route 20 (Boston Post Road) with Route 27/126 (Cochituate Road), and providing improvements to the traffic signal system. The Route 20 eastbound and westbound approaches will each provide an exclusive left-turn lane, a through travel lane, and an exclusive right-turn lane. The Route 27/126 northbound and southbound approaches will each provide an exclusive left-turn lane and a shared through/right-turn lane. Associated improvements also include a short section of work on Route 126 (Concord Road), east of Route 27, and modifications to the section of Pelham Island Road west of its intersection with Route 27/126 and north of its intersection with Route 20. As a result, traffic flow on Pelham Island Road between Route 27/126 and Route 20 will now be one-way in a southwesterly direction; vehicles now turning left from Route 20 onto Pelham Island Road will be forced to utilize the intersection of Route 20 at Route 27/126. It is anticipated that these roadway improvements will help to alleviate crash rates in the immediate study area, particularly at those locations that have experienced crash rates higher than the District 3 significant

rate (Route 27 at Route 27/126 and Route 27/126 at Pelham Island Road and Millbrook Road). This improvement is nearly complete.

It should be noted that if the existing 410,500+ square feet of office space on the site were to be re-occupied, this intersection would operate at level-of-service F, even with these improvements.

No additional intersection improvements have been identified for this area that will improve intersection capacity.

3.3 Probable Impacts of the Project

To determine the impact of site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to the year 2011. Traffic volumes on the roadway network at that time, in the absence of the project (that is, the No-Build condition), would include existing site traffic, new traffic due to general background traffic growth, and traffic related to specific development by others, expected to be completed by 2011. Consideration of these factors resulted in the development of 2011 No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop 2011 Build conditions. Roadway improvements independent of the project are also reviewed in this section.

3.3.1 No-Build Traffic Volumes

Traffic growth on area roadways is a function of the expected land development in the immediate area as well as the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This produces a more realistic estimate of growth for local traffic. However, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

To provide a conservative analysis framework, both procedures were used.

3.3.1.1 Specific Development by Others

Traffic volumes expected to be generated by specific local developments by others were included in the No-Build condition. The Towns of Wayland and Sudbury were contacted to identify specific planned developments. Based on these discussions, the following projects have been identified that would impact future traffic volumes beyond the general background traffic growth rate:

- ***Proposed Wayland Commons Condominiums, Wayland, Massachusetts*** – This 48 unit residential development will be located on the west side of Route 27, north of Route 126 and south of Bow Road. Trip generation estimates for this project were determined based on data published by the Institute of Transportation Engineers (ITE)[5]. Specifically, Land Use Code 230 (Residential Condominium/Town House) was utilized.

- ***Proposed Age-Restricted Condominiums, Sudbury, Massachusetts*** – This 23 unit age-restricted (55+) residential development will be located on Route 20 near its intersection with Edgell Road. Trip generation estimates for this project were determined based on data published by the ITE[6]. Specifically, Land Use Code 230 (Residential Condominium/Town House) was utilized.

- ***Proposed Condominiums, Sudbury, Massachusetts*** – This 37 unit residential development will be located on Old County Road. Trip generation estimates for this project were determined based on data published by the ITE[7]. Specifically, Land Use Code 230 (Residential Condominium/Town House) was utilized.

- ***Proposed BMW Dealership, Sudbury, Massachusetts*** – This 69,000 square foot automobile dealership will be located on Old County Road. Trip generation estimates for this project were determined based on data published by the ITE[8]. Specifically, Land Use Code 841 (New Car Sales) was utilized.

- ***Proposed Condominiums, Sudbury, Massachusetts*** – This 66 unit residential development will be located at 295 Boston Post Road. Trip generation estimates for this project were determined based on data published by the ITE[9]. Specifically, Land Use Code 230 (Residential Condominium/Town House) was utilized.

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[5] *Trip Generation,* Seventh Edition; Institute of Transportation Engineers; Washington, DC; 2003.

[6] Ibid 3.

[7] Ibid 3.

[8] Ibid 3.

[9] Ibid 3.

- ***Proposed Subdivision, Sudbury, Massachusetts*** – This 10-unit residential development will be located on Landham Road. Trip generation estimates for this project were determined based on data published by the ITE[10]. Specifically, Land Use Code 210 (Single-Family Homes) was utilized.

- ***Infill of Existing Office Building*** – If the project is not built, then the existing 410,500± square foot office building on the site could also be occupied. Trip generation estimates for the office infill were determined based on the ITE[11] data, Land Use Code 710, General Office. Based on the existing 410,500 square feet, it is anticipated that the site would generate 3,958 daily vehicle trips, with 581 vph (511 vehicles entering and 70 vehicles exiting) during the weekday morning peak hour and 539 vph (92 vehicles entering and 447 vehicles exiting) during the weekday evening peak hour. On a Saturday it is anticipated that the site would generate 974 vehicle trips, with 168 vph (91 vehicles entering and 77 vehicles exiting) during the Saturday midday peak hour. On a Sunday it is anticipated that the site would generate 404 vehicle trips, with 57 vph (33 vehicles entering and 24 vehicles exiting) during the Sunday midday peak hour.

3.3.1.2 Background Traffic Growth

Traffic-volume data compiled by MassHighway for the Town of Wayland and surrounding towns from permanent count stations and historic traffic counts in the area were reviewed to determine traffic growth trends. Based on a review of this data, it was determined that traffic volumes within the study area have generally increased by approximately one percent per year over the past several years. Accordingly, a one percent per year compounded annual background traffic growth rate was used to account for potential future traffic growth external to the study area and presently unforeseen development.

3.3.1.3 No-Build Condition Traffic Volumes

The 2011 No-Build weekday morning and evening peak-hour traffic volumes were developed by applying a compounded one percent annual growth rate to the 2006 Existing peak-hour through movement traffic volumes and by subsequently adding the traffic generated by the site-specific development. Figures 3-8 and 3-9 shows the projected 2011 No-Build peak-hour traffic for the weekday morning and weekday evening peak hour conditions. Figures 3-10 and 3-11 show the projected 2011 No-Build peak hour traffic for the Saturday and peak hour.

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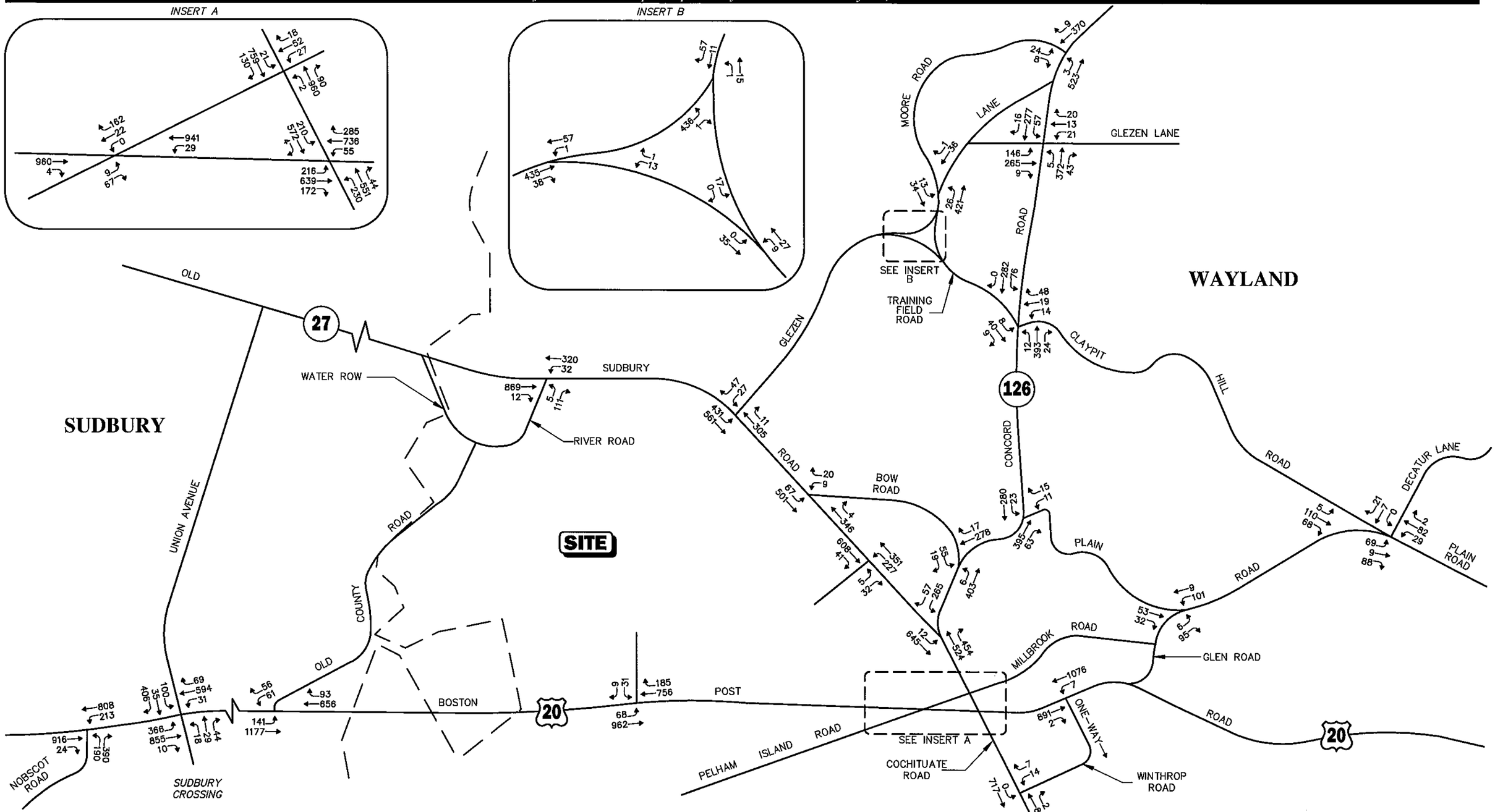
[10]Ibid 3.

[11]Ibid 3.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-8

2011 No-Build
Weekday Morning
Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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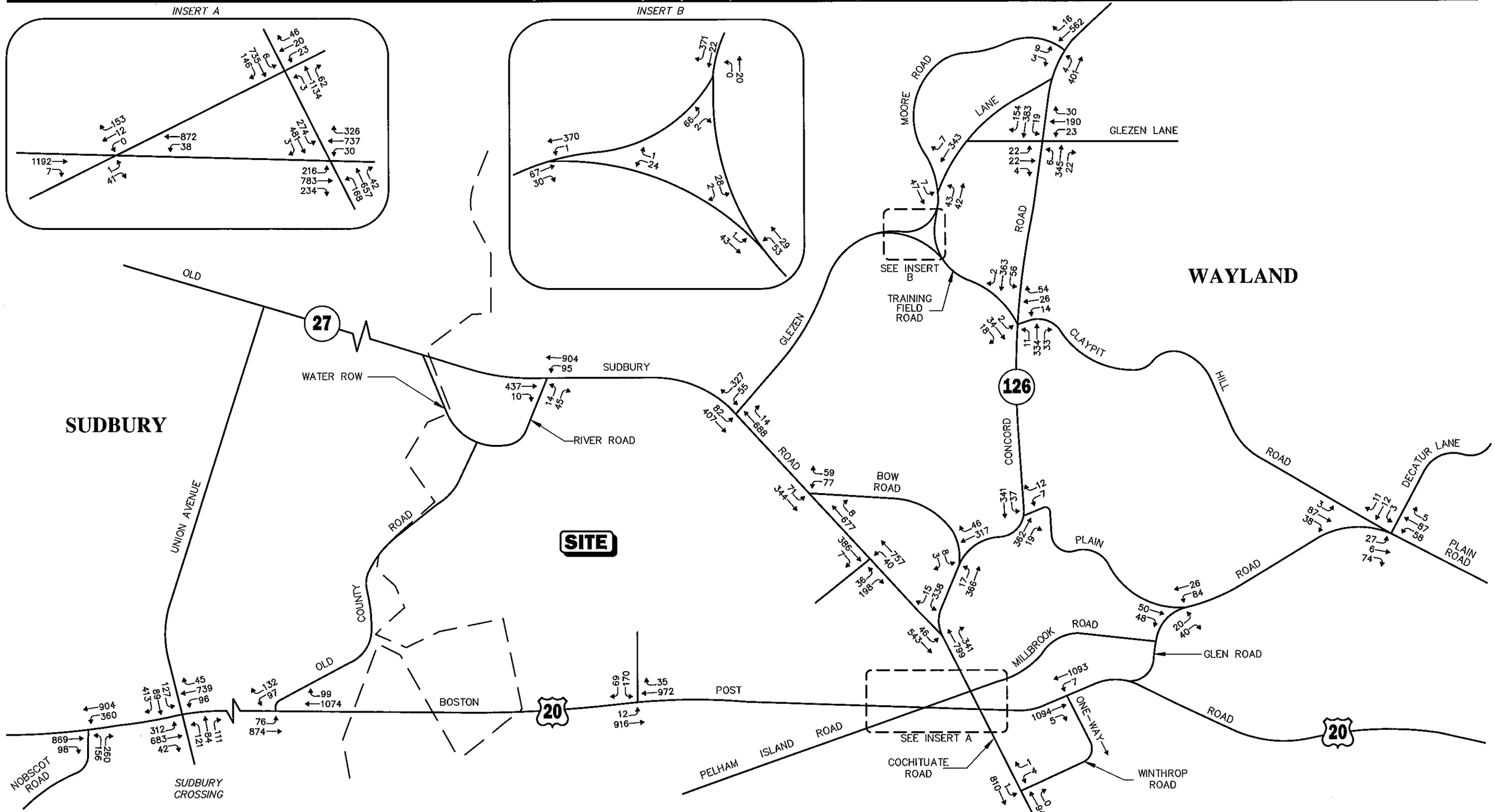

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-9

2011 No-Build Weekday Evening Peak Hour Traffic Volumes

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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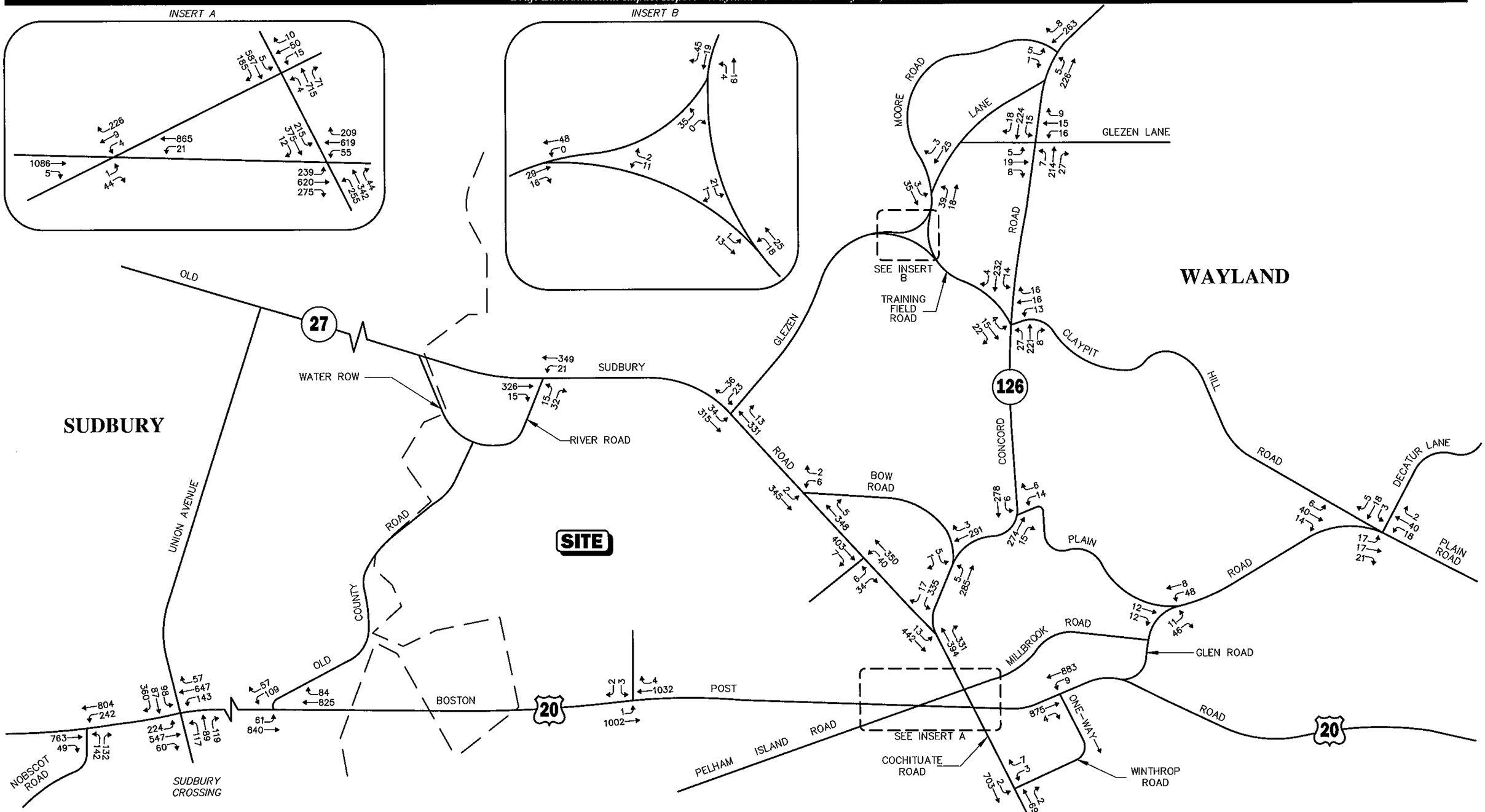

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-10

2011 No-Build
Saturday Midday
Peak Hour Traffic Volumes

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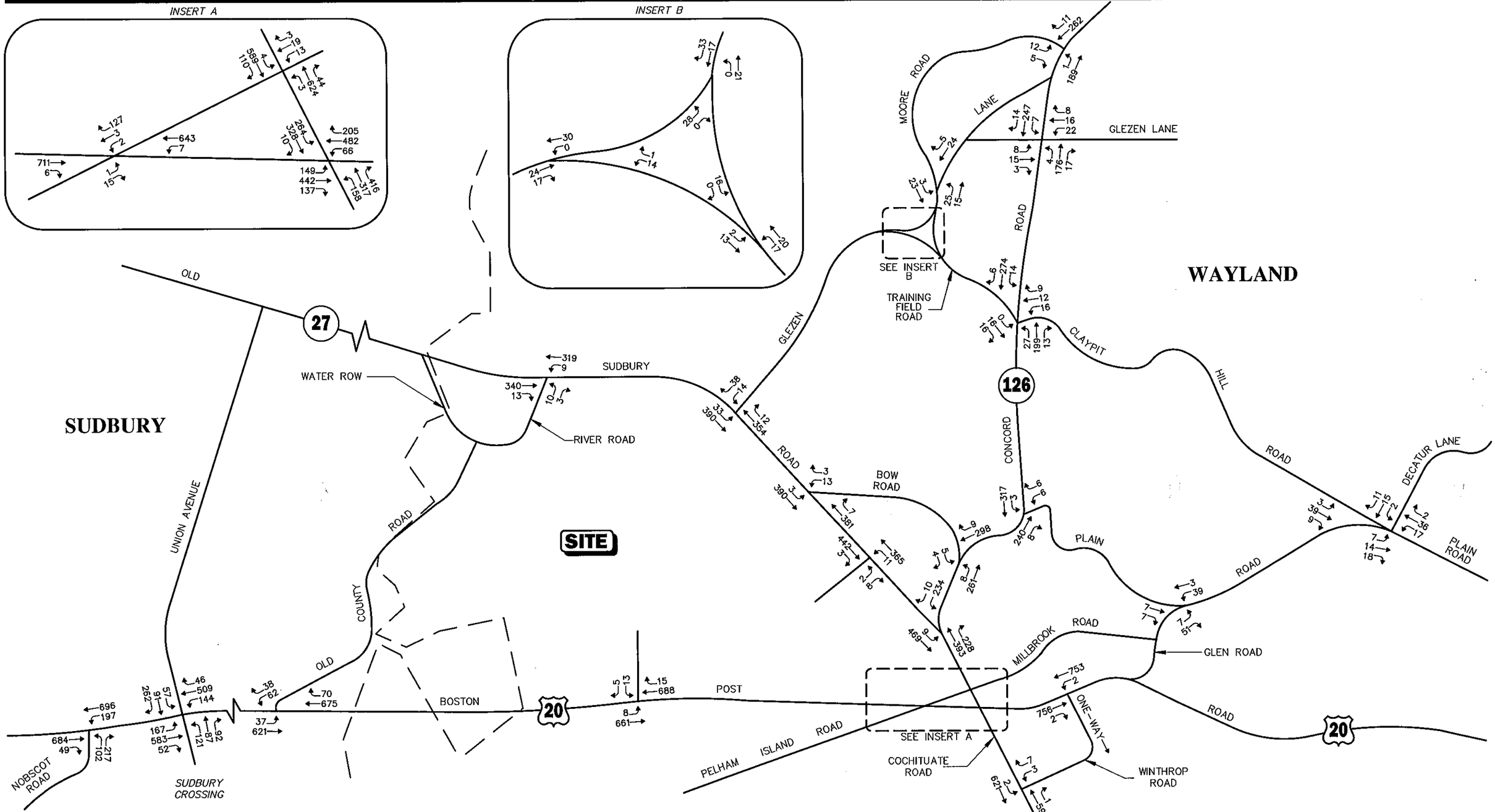

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-11

2011 No-Build Sunday Midday Peak Hour Traffic Volumes

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Transportation Engineers & Planners

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3.3.2 Future Build Conditions With The Project

3.3.2.1 Proposed Site Traffic Generation

Trip-generation data published by the Institute of Transportation Engineers (ITE) Trip Generation manual[12] was reviewed. Trip generation data for ITE Land Use Code (LUC) 230 (Residential Condominium/Townhouse), ITE LUC 710 (General Office), ITE LUC 590 (Library) and ITE LUC 820 (Shopping Center) were used to determine the expected trip generation for the proposed project. The expected trip generation for the proposed Wayland Town Center project is summarized Table 3-10.

Table 3-10 Trip Generation

Time Period/Direction	100 Condominiums[a] (Trips)	10,000 sf Office[b] (Trips)	40,000 sf Library[c] (Trips)	155,000 sf Retail[d] (Trips)	Total Trips
Average Weekday Daily Traffic	642	112	1,898	9,030	11,682
Weekday Morning Peak Hour:					
Entering	9	14	34	98	155
Exiting	43	2	13	62	120
Total	52	16	47	160	275
Weekday Evening Peak Hour:					
Entering	40	3	136	401	580
Exiting	20	12	148	435	615
Total	60	15	284	836	1,195
Saturday Daily Traffic	790	24	1,862	12,178	14,854
Saturday Midday Peak Hour:					
Entering	39	2	143	599	783
Exiting	33	2	127	552	714
Total	72	4	270	1,151	1,497
Sunday Daily Traffic	670	10	1,020	3,914	5,614
Sunday Midday Peak Hour:					
Entering	36	1	109	237	383
Exiting	37	0	97	247	381
Total	73	1	206	484	764

[a]Based on ITE LUC 230, Residential Condominium/Townhouse; 100 Units.
[b]Based on ITE LUC 710, General Office; 10,000 sf.
[c]Based on ITE LUC 590, Library; 40,000 sf.
[d]Based on ITE LUC 820, Shopping Center; 155,000 sf.

[12] *Trip Generation,* Seventh Edition; Institute of Transportation Engineers; Washington, DC; 2003.

For the municipal component, a library was chosen for trip generation purposes because it generated the highest peak hour traffic volumes among the ITE appropriate comparable municipal uses, as compared in Table 3-11.

Table 3-11 Municipal Trip Generation Comparison

Time Period/Direction	40,000 sf Library[c] (Trips)	40,000 sf Government Office[b] (Trips)	40,000 sf Government Office Complex[c] (Trips)
Average Weekday Daily Traffic	1,898	2,758	1,118
Weekday Morning Peak Hour:			
Entering	34	197	78
Exiting	13	38	10
Total	47	235[d]	88
Weekday Evening Peak Hour:			
Entering	136	15	35
Exiting	148	33	79
Total	284	48	114
Saturday Daily Traffic	1,862	ND	ND
Saturday Midday Peak Hour:			
Entering	143		
Exiting	127		
Total	270	ND	ND
Sunday Daily Traffic	1,020	ND	ND
Sunday Midday Peak Hour:			
Entering	109		
Exiting	97		
Total	206	ND	ND

[a]Based on ITE LUC 590, Library; 40,000 sf.
[b]Based on ITE LUC 730, Government Office Building; 40,000 sf.
[c]Based on ITE LUC 733, Government Office Complex; 40,000 sf.
[d]Based on only one study of an 18,000 square foot facility.
ND = No trip generation data available.

3.3.2.2 Pass-By Trips/Internal Trips

Not all of the vehicle trips expected to be generated by the project will consist of new trips on the adjacent roadway network. A significant portion of these trips will consist of impulse or pass-by trips. Statistics published by ITE[13] indicate that on average, up to 34 percent of the trips associated with retail uses (shopping center) consist of pass-by trips.

[13] *Trip Generation Handbook, An ITE Recommended Practice;* Institute of Transportation Engineers; Washington, DC; March 2001.

Pass-by trips consist of motorists already traveling on the adjacent roadway network for other purposes that will patronize the proposed project and then continue on to their original destination. Pass-by trips are not new trips on the roadway system as a result of the proposed project. To provide conservative (high) traffic volumes from which to assess the impacts of the planned development on the adjacent roadway network and in accordance with state standards for the preparation of Traffic Impact Assessments (TIAs), a 25 percent pass-by trip rate was applied to the project related traffic volumes.

Due to the multi-use nature of the development, the potential exists for overall vehicle-trip reductions from the basic trip-generation calculations for each land use category, as these calculations are intended for facilities on a stand-alone basis. The proximity of the on-site uses to each other as well as the respective component sizes result in reductions possible through on-site vehicle circulation or alternative transportation modes, such as pedestrian activity or shuttle bus usage. To account for this interaction, ITE data for determining mixed-use trip percentages were reviewed. Based on the analysis, a 3 percent internal trip capture rate was applied to non-retail/commercial components of the project.

The ITE Trip Generation Handbook[14] states several characteristics of multi-use development, at which internal trip-making behavior could be expected. Chief among these characteristics is the presence of two or more significantly sized land uses, each of which consists of a separate ITE land use that can be categorized into office, retail, or residential land use groups. Use of an internal capture rate is justified with development based upon this ITE methodology and the comparative sizes of respective land uses, since the potential and quantity of multi-use trip increase as the proportion of office/retail/residential land uses increase. Table 3-12 summarizes the anticipated traffic characteristics of the development program.

On a typical weekday, the proposed development is expected to generate 9,404 new vehicle trips (4,702 new vehicles entering and 4,702 new vehicles exiting). During the weekday morning peak hour, 233 new vehicle trips (134 new vehicles entering and 99 new vehicles exiting) are expected. During the weekday evening peak hour, 983 new vehicle trips (474 new vehicles entering and 509 new vehicles exiting) are expected. A graphical representation of the daily trips is shown on Figure 3-12.

On a Saturday, the proposed development is expected to generate 11,786 new vehicle trips (5,893 new vehicles entering and 5,893 new vehicles exiting). During the Saturday midday peak hour, 1,207 new vehicle trips (638 new vehicles entering and 569 new vehicles exiting) are expected. A graphical representation of the Saturday trips is shown on Figure 3-13.

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[14] *Trip Generation Handbook*; Institute of Transportation Engineers; Washington, DC; 2003.

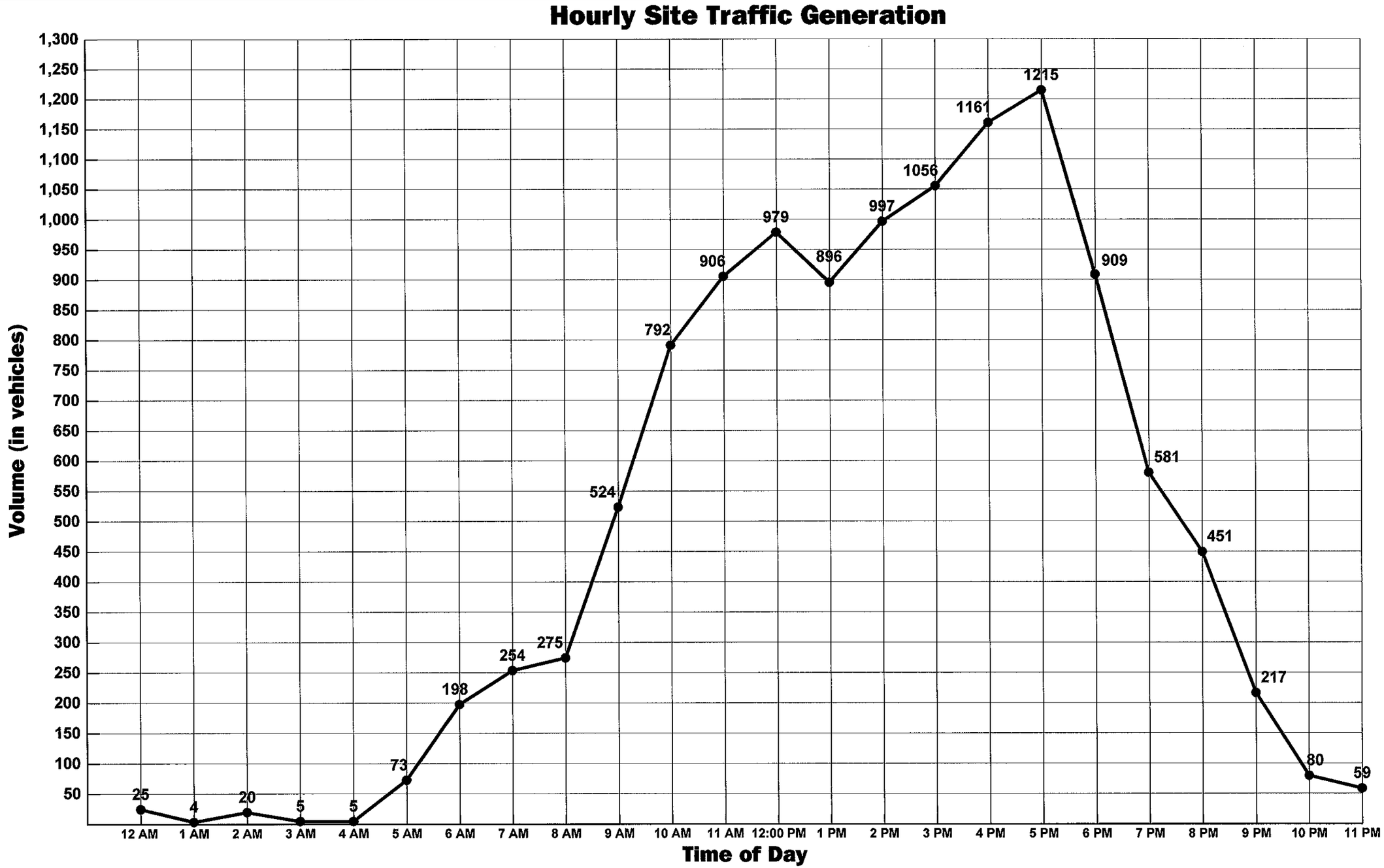

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Figure 3-12

Daily Trip Generation Distribution

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Hourly Site Traffic Generation

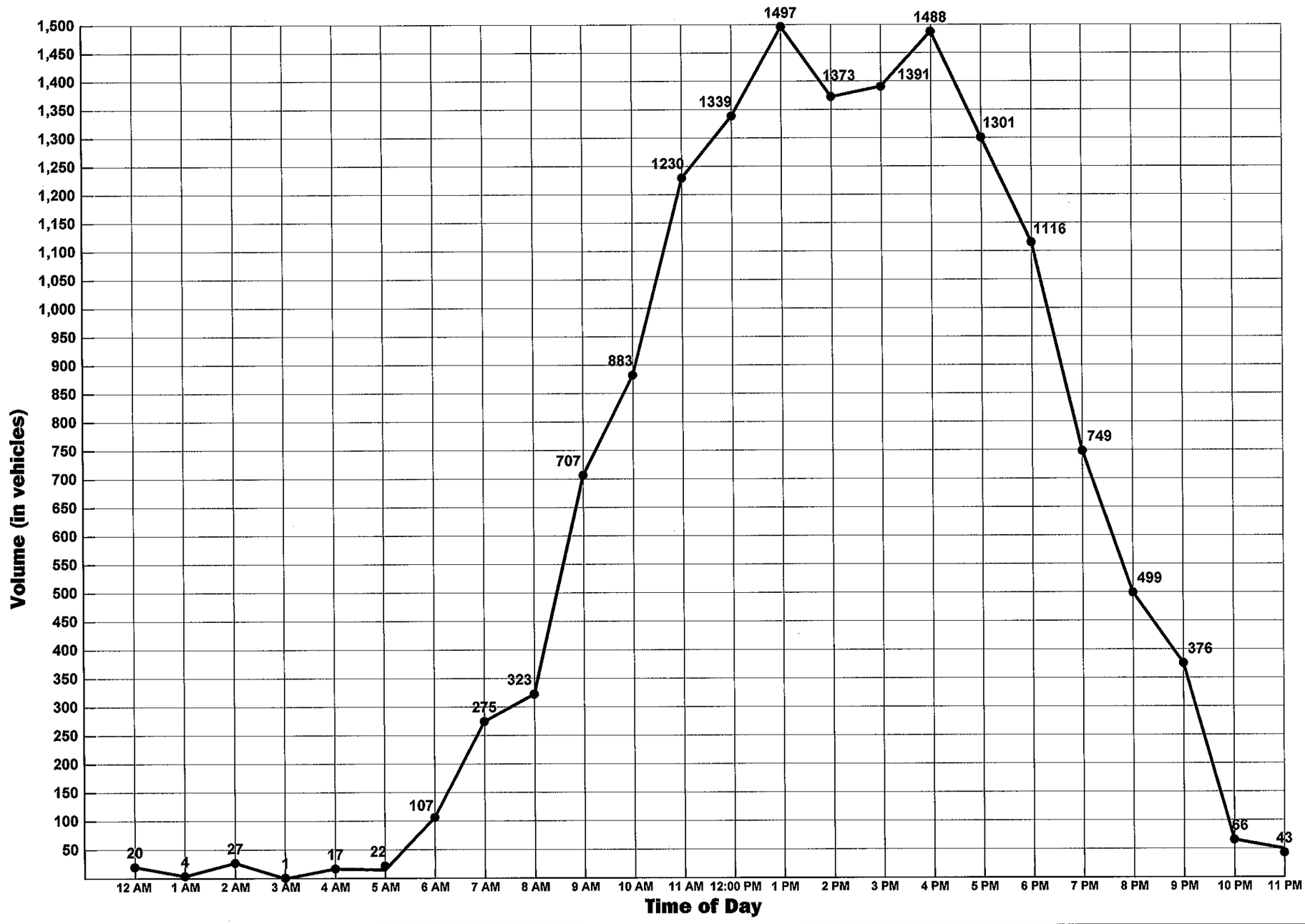

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Figure 3-13

Saturday Trip Generation Distribution

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Transportation Engineers & Planners

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Table 3-12 Trip Generation Summary

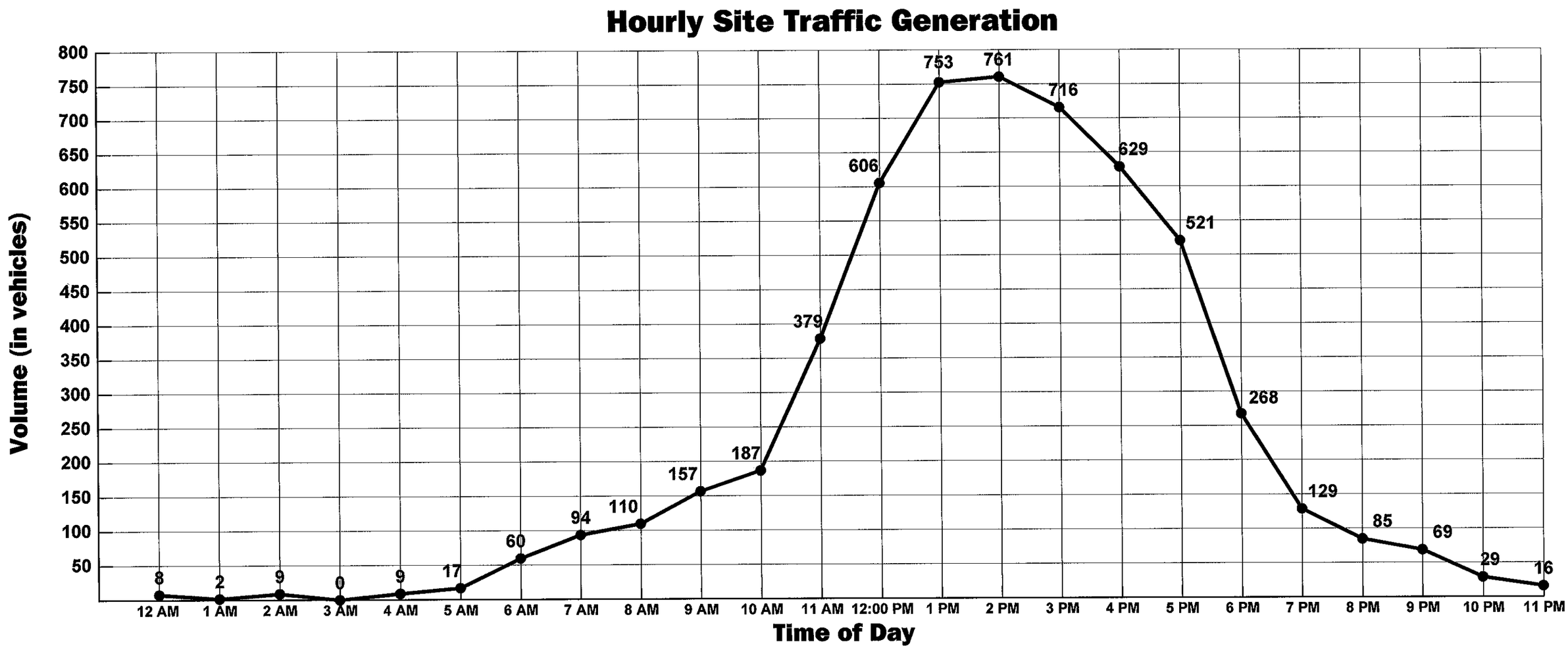
Time Period/Direction	100 Condominiums[a] (Trips)	10,000 sf Office[b] (Trips)	40,000 sf Library[c] (Trips)	155,000 sf Retail[d] (Trips)	Pass-by Trips[e]	Internal Trips[f]	New Trips
Average Weekday Daily Traffic	642	112	1,898	9,030	2,258	20	9,404
Weekday Morning Peak Hour:							
Entering	9	14	34	98	20	1	134
Exiting	43	2	13	62	20	1	99
Total	52	16	47	160	40	2	233
Weekday Evening Peak Hour:							
Entering	40	3	136	401	105	2	474
Exiting	20	12	148	435	105	2	509
Total	60	15	284	836	210	4	983
Saturday Daily Traffic	790	24	1,862	12,178	3,044	20	11,786
Saturday Midday Peak Hour:							
Entering	39	2	143	599	144	2	638
Exiting	33	2	127	552	144	2	569
Total	72	4	270	1,151	288	4	1,207
Sunday Daily Traffic	670	10	1,020	3,914	978	28	4,616
Sunday Midday Peak Hour:							
Entering	36	1	109	237	61	1	321
Exiting	37	0	97	237	61	1	309
Total	73	1	206	484	122	2	640

[a]*Based on ITE LUC 230, Residential Condominium/Townhouse; 100 Units.*
[c]*Based on ITE LUC 590, Library; 40,000 sf.*
[d]*Based on ITE LUC 820, Shopping Center; 155,000 sf.*
[e]*Based on 25% pass-by rate, applied to retail component only.*
[f]*Based on 3% internal capture rate, applied to residential component.*

On a Sunday, the proposed development is expected to generate 4,616 new vehicle trips (2,308 new vehicles entering and 2,308 new vehicles exiting). During the Sunday midday peak hour, 640 new vehicle trips (321 new vehicles entering and 309 new vehicles exiting) are expected. A graphical representation of the Saturday trips is shown on Figure 3-14.

3.3.2.3 By-Pass Trips

The internal site access roadway will connect the Route 20 and Route 27 driveways, which will provide an attractive alternative for vehicles traveling between Route 20 and Route 27. The project Proponent is committed to providing an internal connector road through the site that will provide a more direct route for travel between these locations. It is anticipated that this internal connection through the site will alleviate some of the congestion in the vicinity of the Route 20 at Route 27/126 intersection. Based on existing travel patterns and the potential for by-pass traffic between the two locations, it is anticipated that the site will accommodate an additional 316 vehicle trips (158 vehicles entering and 158 vehicles exiting) during the weekday morning peak hour, 320 vehicle trips (160 vehicles entering



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Transportation Engineers & Planners

Figure 3-14

Sunday Trip Generation Distribution

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and 160 vehicles exiting) during the weekday evening peak hour, and 378 vehicle trips (189 vehicles entering and 189 vehicles exiting) during the Saturday midday peak hour.

3.3.2.4 Additional Trips

It is important to note, that for planning purposes, it has been assumed that the site traffic associated with the 48-unit Wayland Commons condominium development (previously noted as background development) will use the proposed Wayland Town Center driveway on Route 27 under Build conditions. As currently proposed, the 48-unit development will have two curb-cuts onto Route 27; one north of the proposed Wayland Town Center driveway on Route 27, and one south of the proposed Wayland Town Center driveway on Route 27. Preliminary discussions with the Town have indicated that it is highly undesirable to have three curb cuts in such proximity on Route 27, and that some driveway consolidation in this area would be beneficial. Accordingly, under 2011 Build conditions, it has been assumed that the site traffic associated with the 48-unit development will use the proposed Wayland Town Center driveway on Route 27 (Access Alternative A). Under Access Alternative B, there would be no driveway consolidation.

3.3.2.5 Trip Generation Comparison

The new trips expected to be generated by the Wayland Town Center were also compared to traffic that would be generated by the re-occupancy of the existing office space on the site. This comparison is summarized in Table 3-13.

As shown in Table 3-13, there would be substantially fewer trips during the weekday morning peak hour with the proposed Wayland Town Center project. The largest differential in site generated traffic would occur on a Saturday (when reported daily volumes for Route 20 and Route 27 are approximately 8,100 vpd lower on a Saturday than on a weekday).

Table 3-13 Trip Generation Comparison

Time Period/Direction	Wayland Town Center New Trips	Re-Occupancy of Existing Office Space[a]	Difference
Average Weekday Daily Traffic	9,404	3,958	5,446
Weekday Morning Peak Hour:			
Entering	134	511	(377)
Exiting	99	70	29
Total	233	581	(348)
Weekday Evening Peak Hour:			
Entering	474	92	382
Exiting	509	447	62
Total	983	539	444
Saturday Daily Traffic	11,786	974	10,812
Saturday Midday Peak Hour:			
Entering	638	91	547
Exiting	569	77	492
Total	1,207	168	1,039
Sunday Daily Traffic	4,616	404	4,212
Sunday Midday Peak Hour:			
Entering	321	33	288
Exiting	309	24	285
Total	640	57	583

[a]*Based on ITE LUC 710, General Office; 410,500 sf.*

3.3.2.6 Trip Distribution and Assignment

The directional distribution of site-generated traffic on the study area roadways was based on the following: existing travel patterns within the study area, routes to major arterials and Journey to Work data published by the U.S. Census Bureau. Graphical representations of the anticipated trip distribution patterns for the retail, residential, and office/library components of the project are shown in Figure 3-15 Figure 3-16, and Figure 3-17, respectively, and are summarized in Table 3-14.

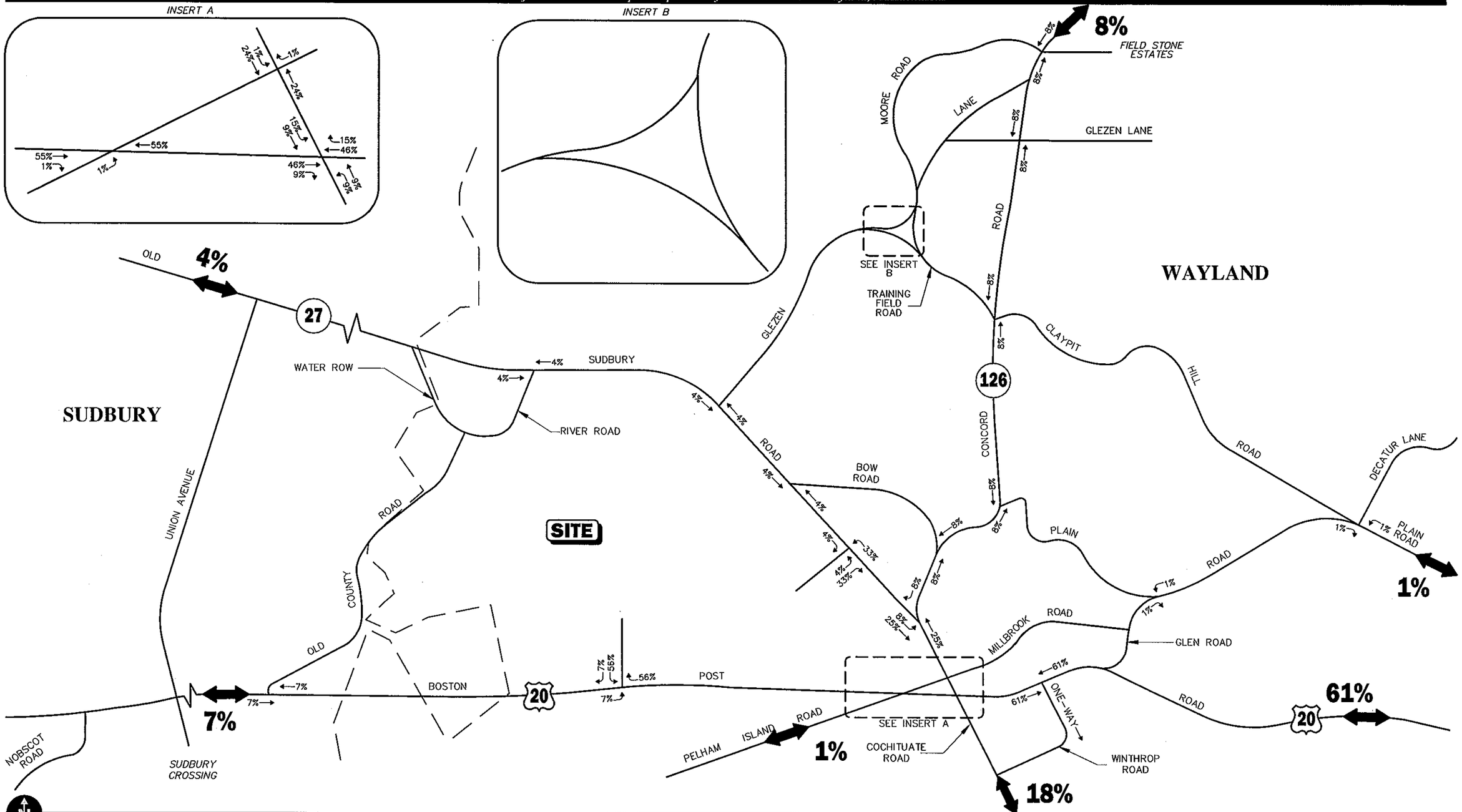

Figure 3-15

Residential Trip Distribution

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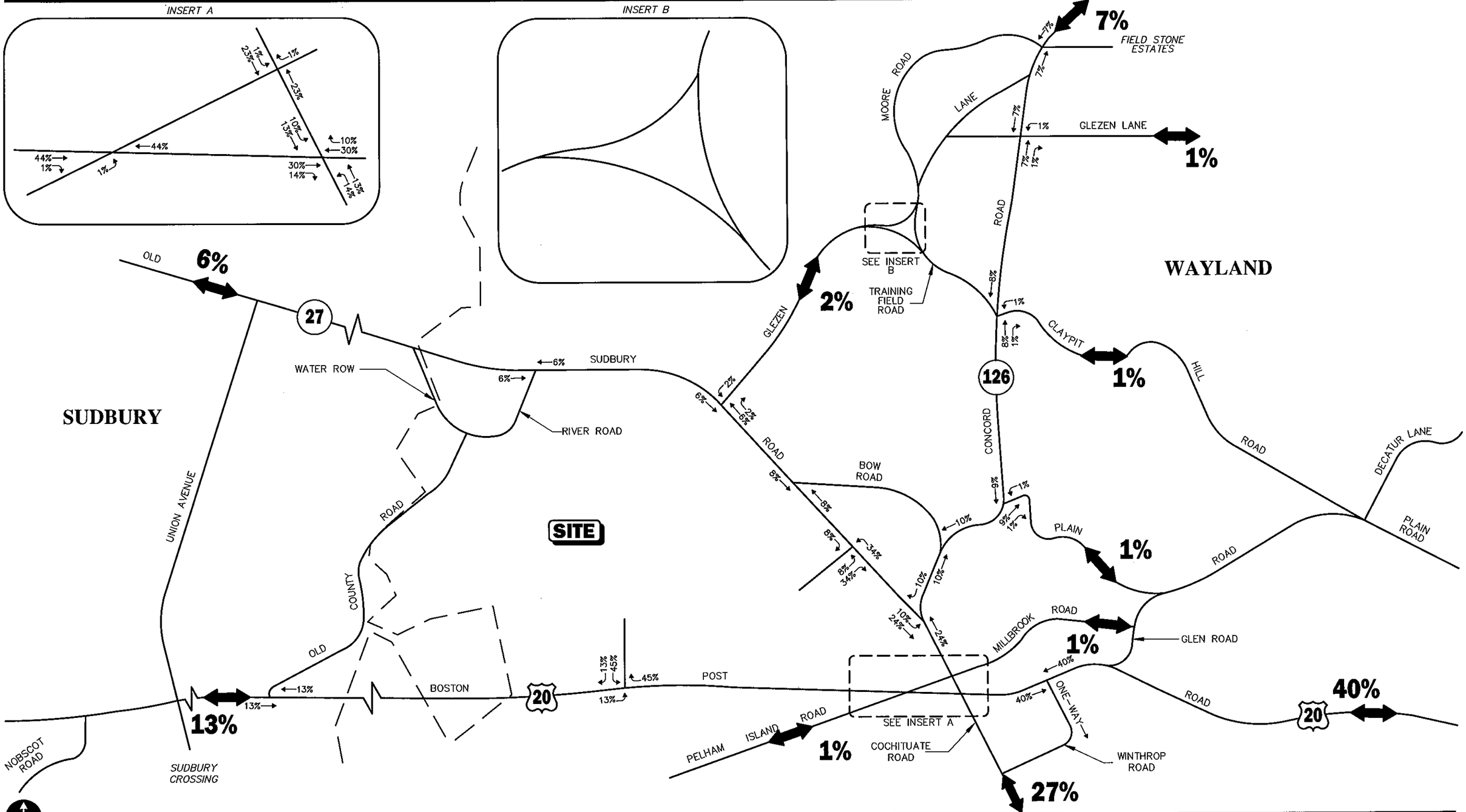

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Figure 3-16

Office/Library Trip Distribution

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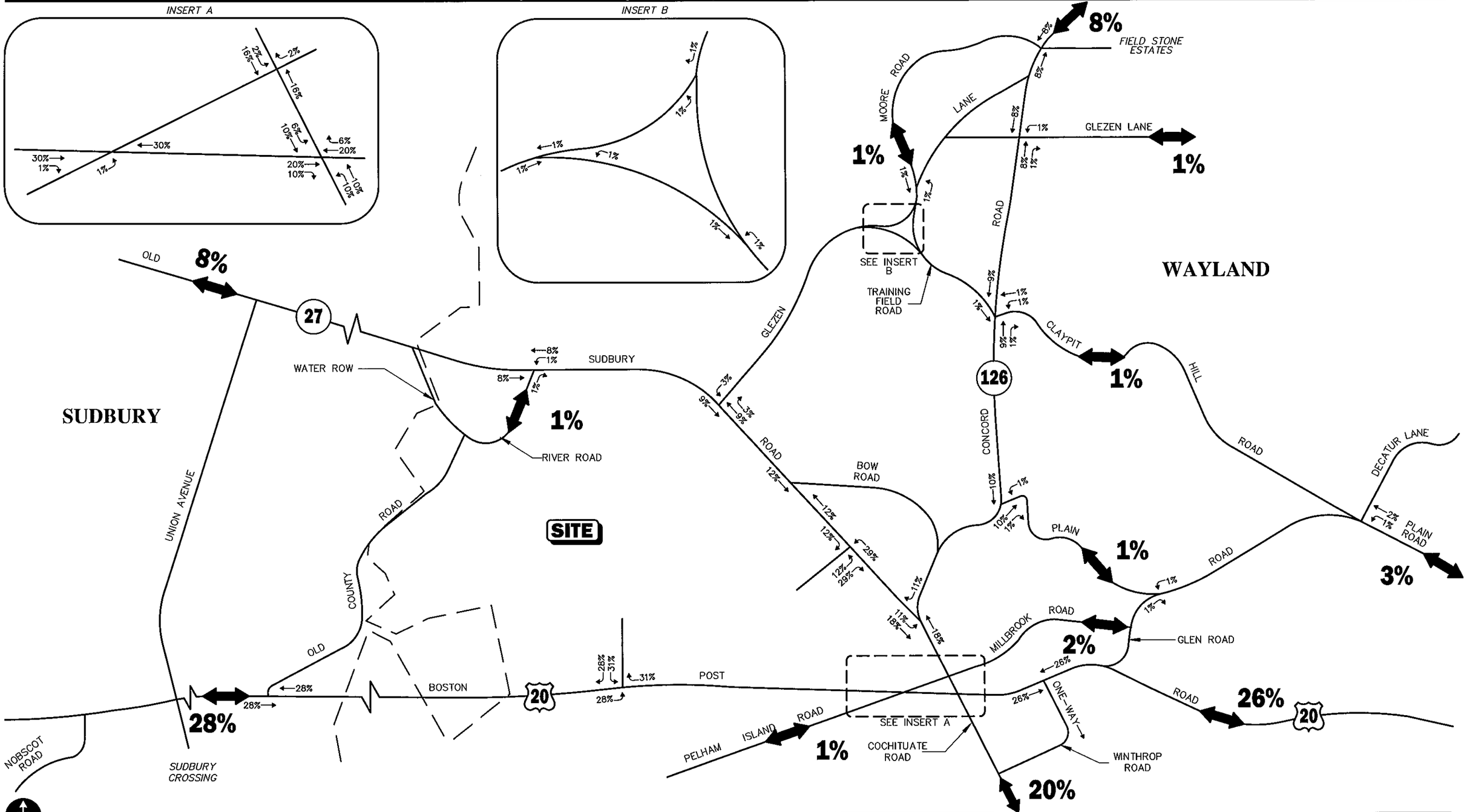

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Figure 3-17

Retail Trip Distribution

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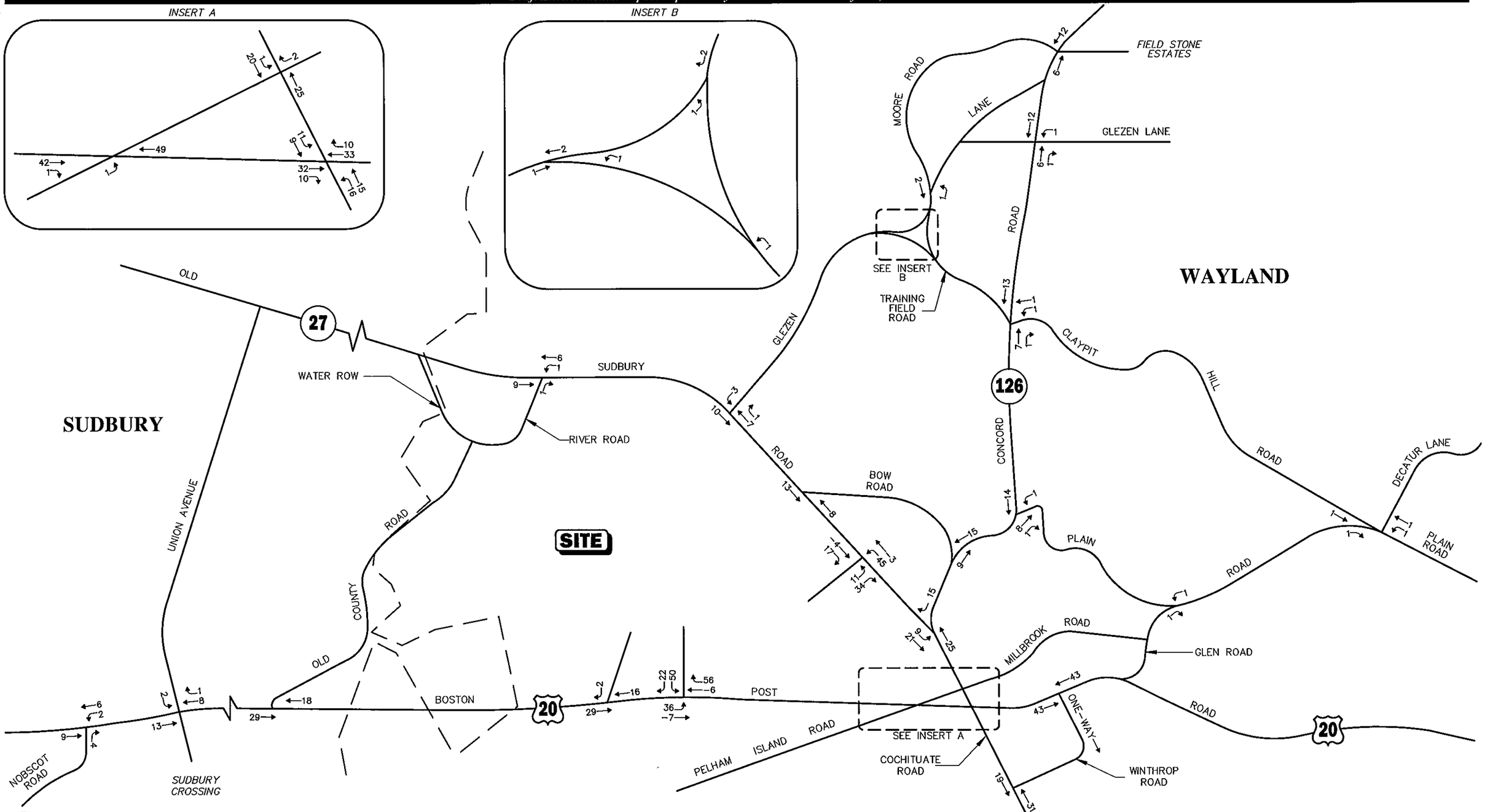
Table 3-14 Trip Distribution Summary

Route	Direction To or From	Percent of Retail Trips	Percent of Residential Trips	Percent of Office/ Library Trips
Route 20	West	28	7	13
Route 20	East	26	61	40
Route 27	South	20	18	27
Route 27	North	12[a]	4	8[d]
Route 126	East	11[b]	8	10[e]
Millbrook Road	East	2[c]	1	1
Pelham Island Road	South	1	1	1
TOTAL		100	100	100

[a]Three percent is expected to come from the north Wayland neighborhood by way of Glezen Lane and 1 percent is expected from River Road.
[b]Four percent is expected to come from the north Wayland neighborhood by way of Glezen Lane, Plain Road and Claypit Hill Road.
[c]One percent is expected to come from the north Wayland neighborhood by way of Mill Brook Road.
[d]Two percent is expected to come from the north Wayland neighborhood by way of Glezen Lane.
[e]Three percent is expected to come from the north Wayland neighborhood by way of Glezen Lane, Plain Road and Claypit Hill Road.

The resulting project-generated peak hour traffic flow networks for the weekday morning, weekday evening, Saturday midday, and Sunday midday conditions are shown on Figures 3-18 through 3-21, respectively for Access Alternative A. For Access Alternative B, the resulting project-generated peak hour traffic flow networks are shown on Figures 3-22 through 3-25 for the respective weekday morning, weekday evening, Saturday midday and Sunday midday peak hours. Shown on Figures 3-26 through 3-29 are the internal site flows for the respective weekday morning, weekday evening, Saturday midday and Sunday midday peak hours.



Source: 1987 USGS Map
Not To Scale

Figure 3-18

Site Generated Weekday Morning Peak Hour Traffic Volumes Access Alternative A

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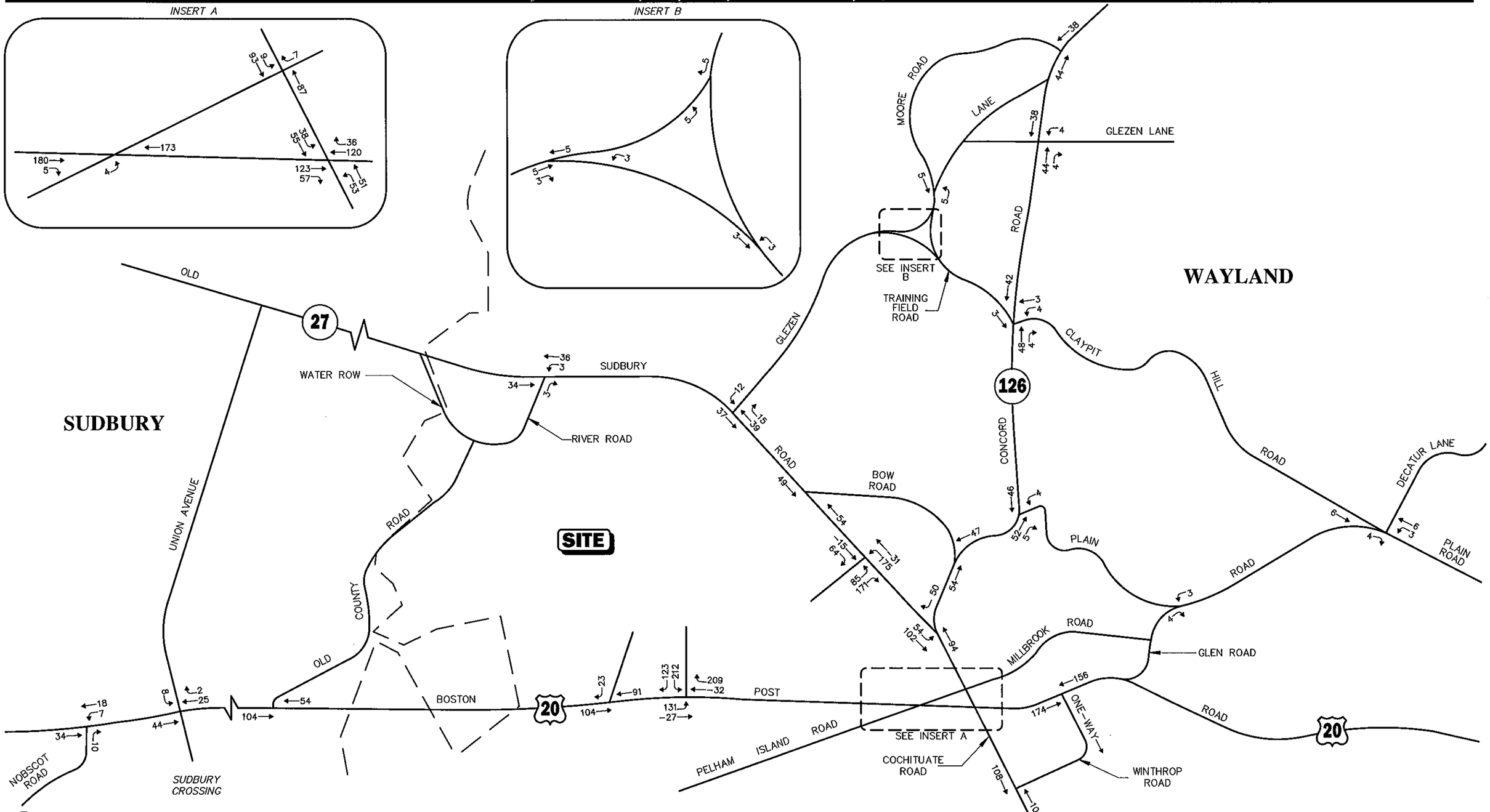

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-19

Site Generated
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative A

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Transportation Engineers & Planners

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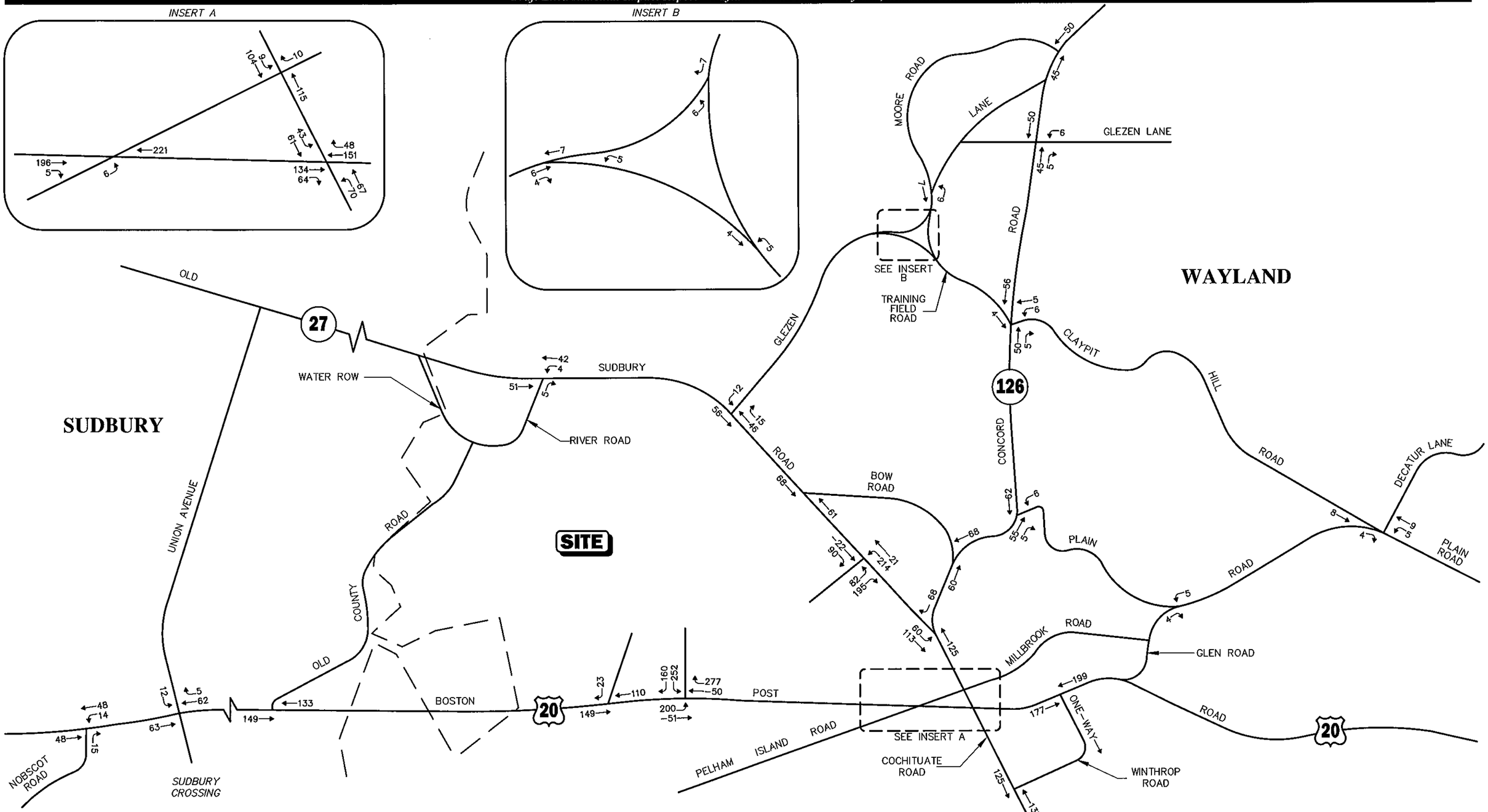

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-20

Site Generated
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative A

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Transportation Engineers & Planners

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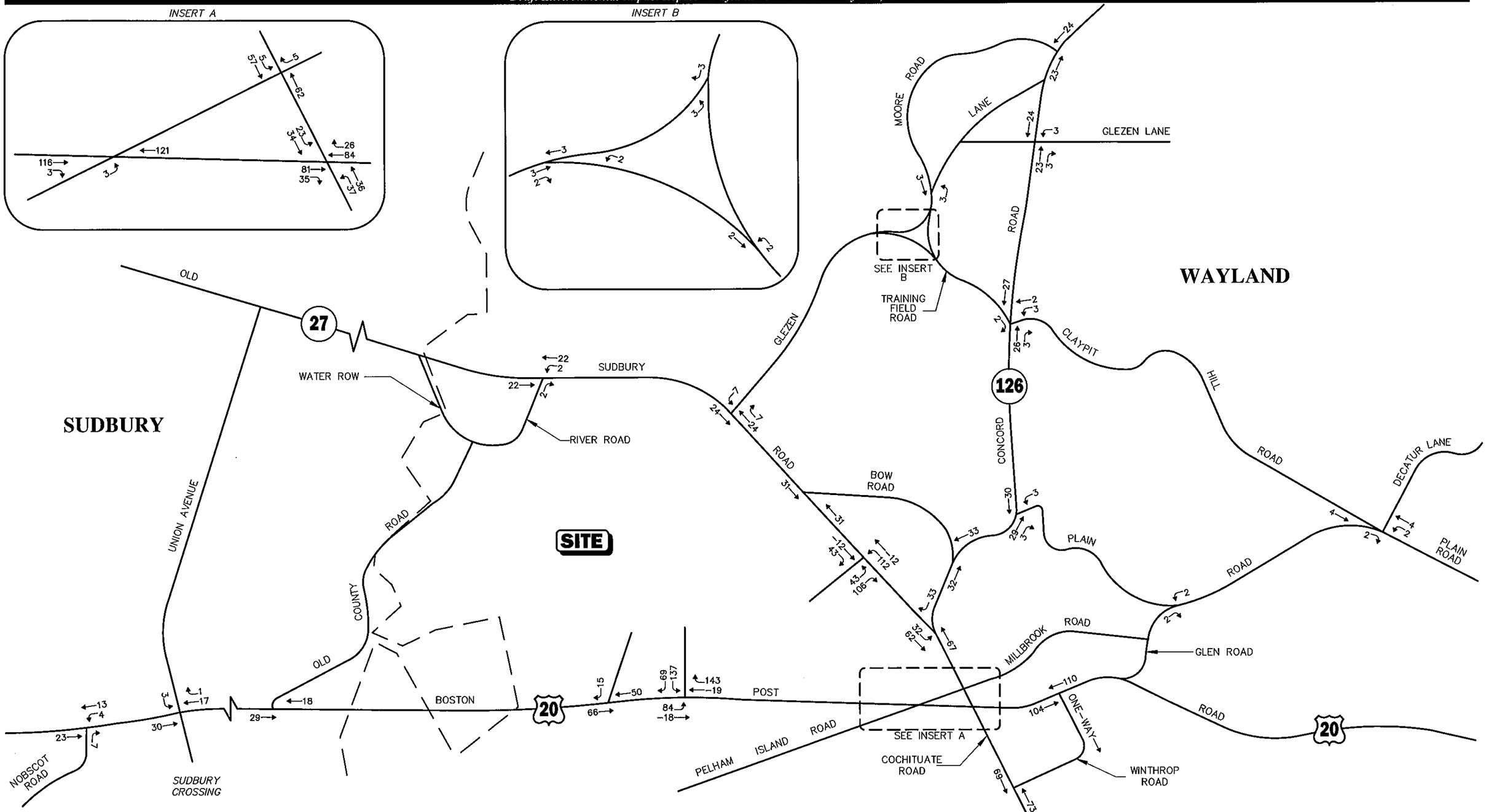

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Transportation Engineers & Planners

Figure 3-21

Site Generated
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative A

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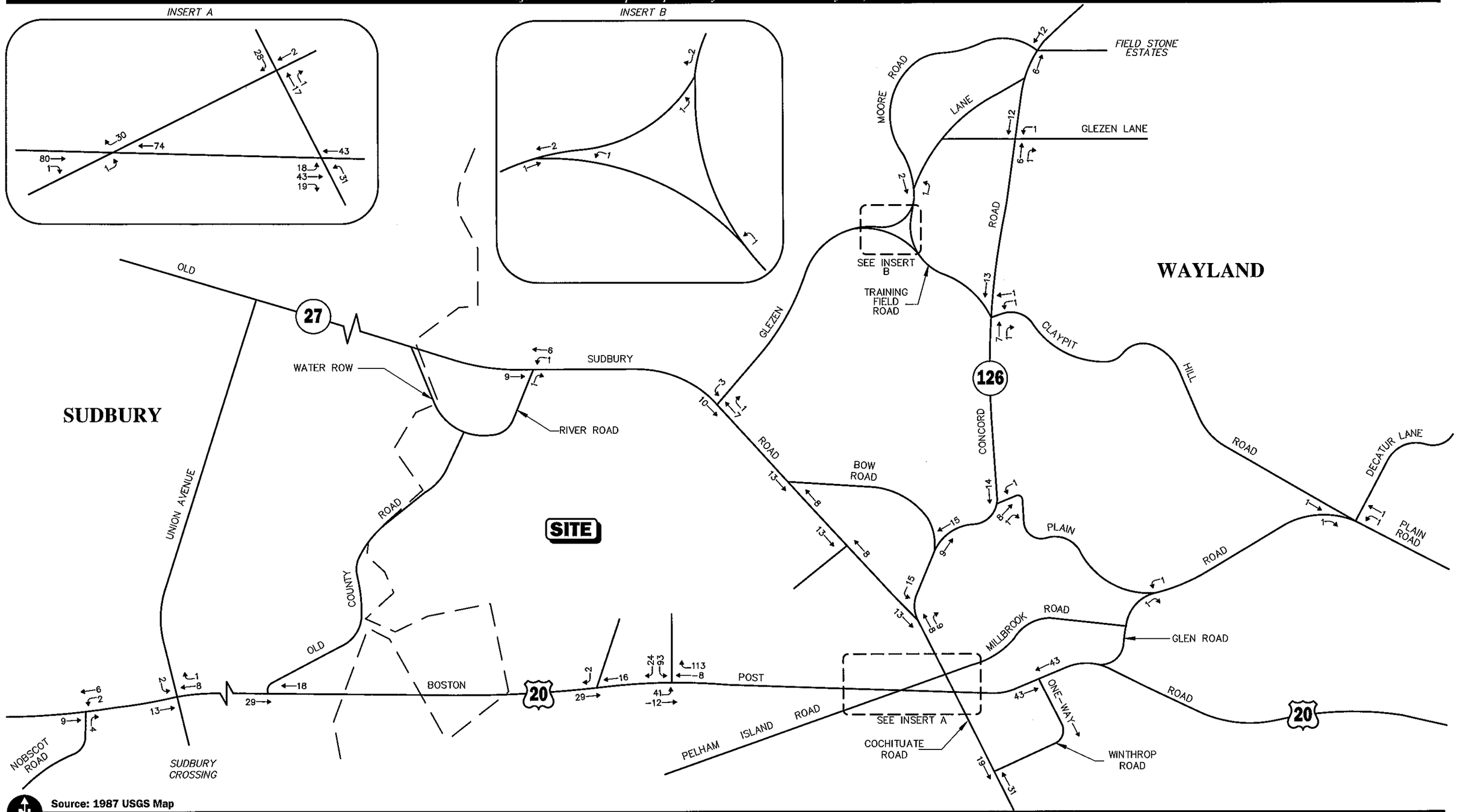

Source: 1987 USGS Map

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Figure 3-22

Site Generated Weekday Morning Peak Hour Traffic Volumes Access Alternative B

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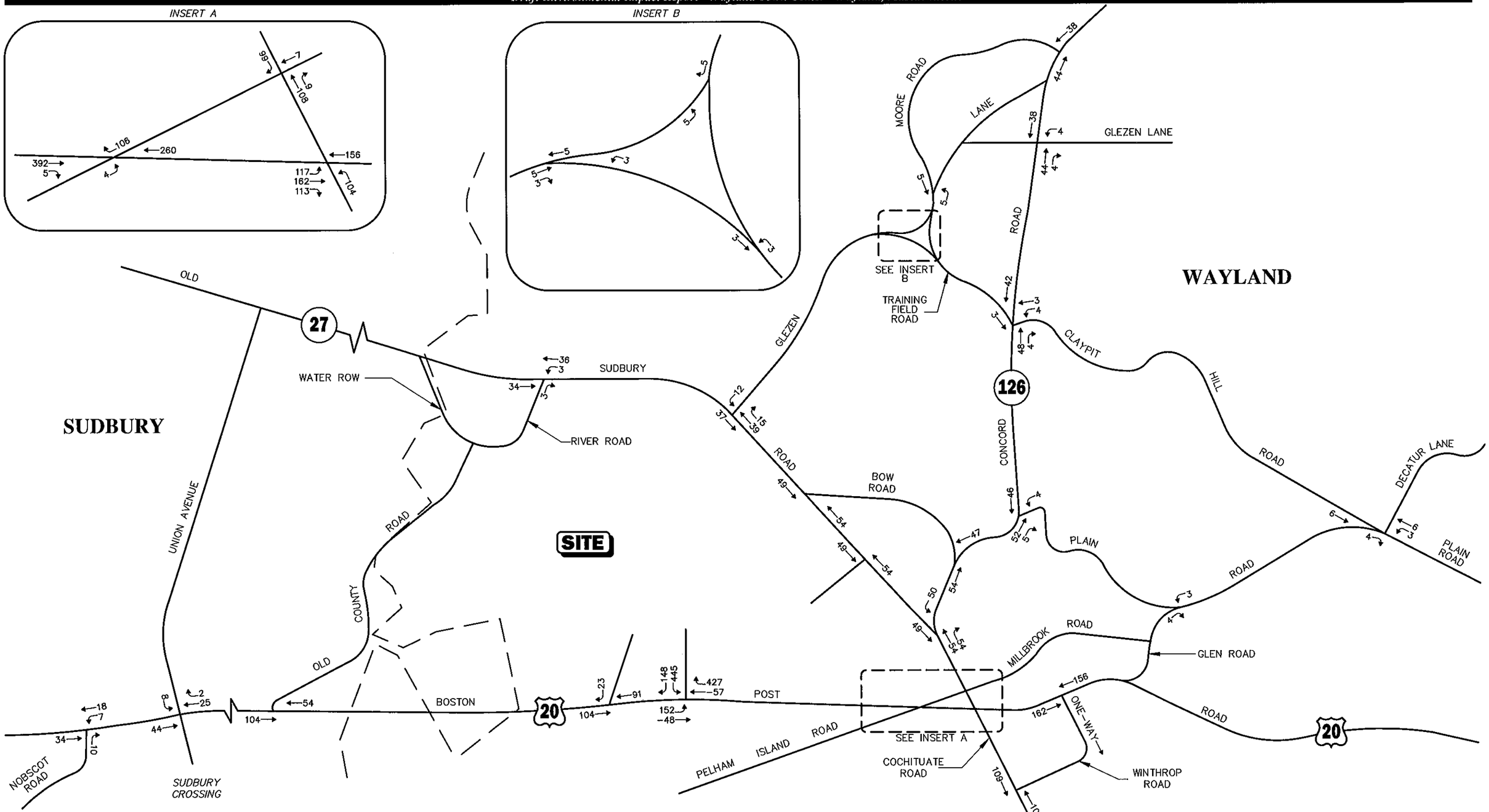
Transportation Engineers & Planners



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-23

Site Generated
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative B

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Transportation Engineers & Planners

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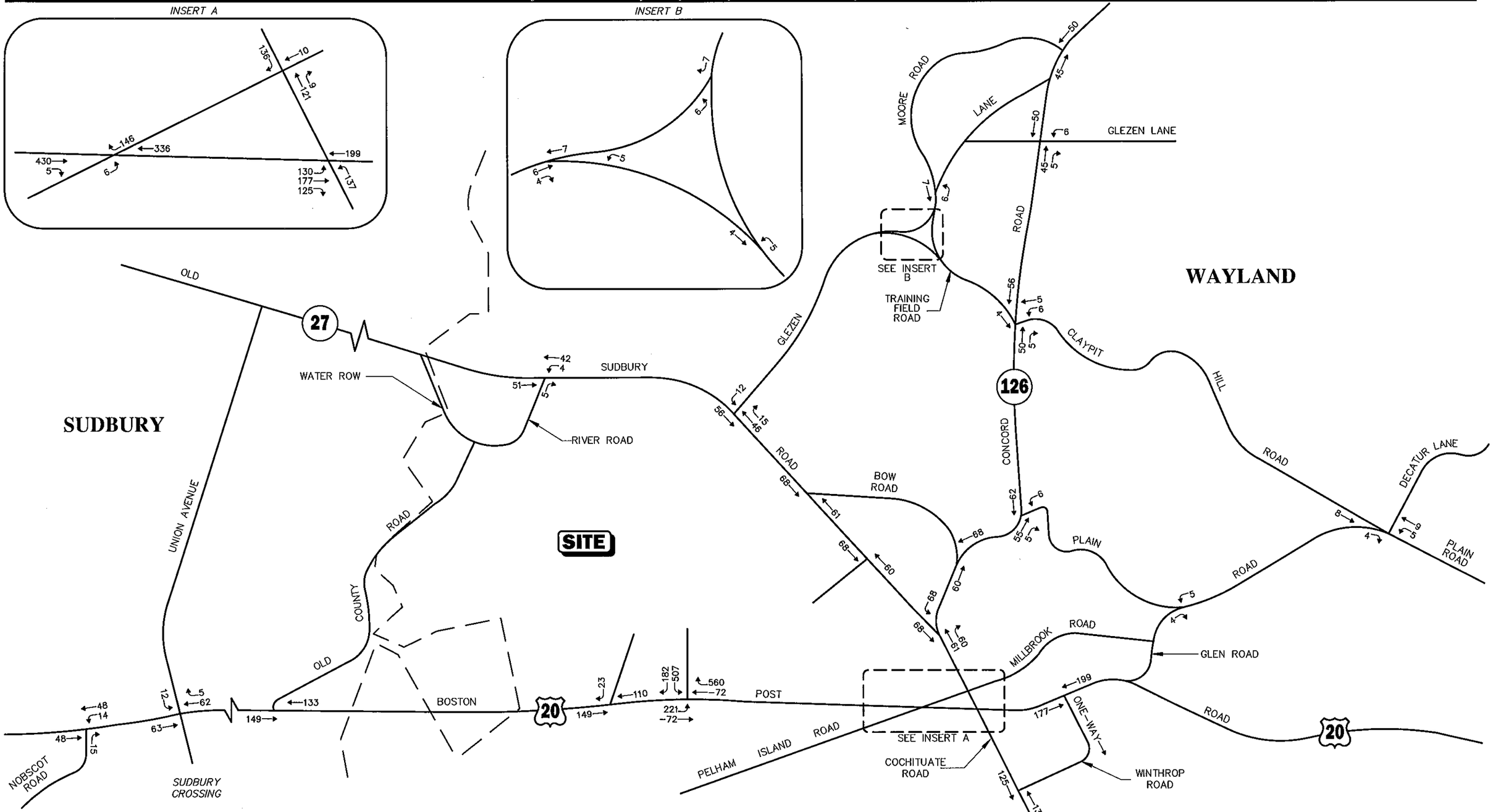

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
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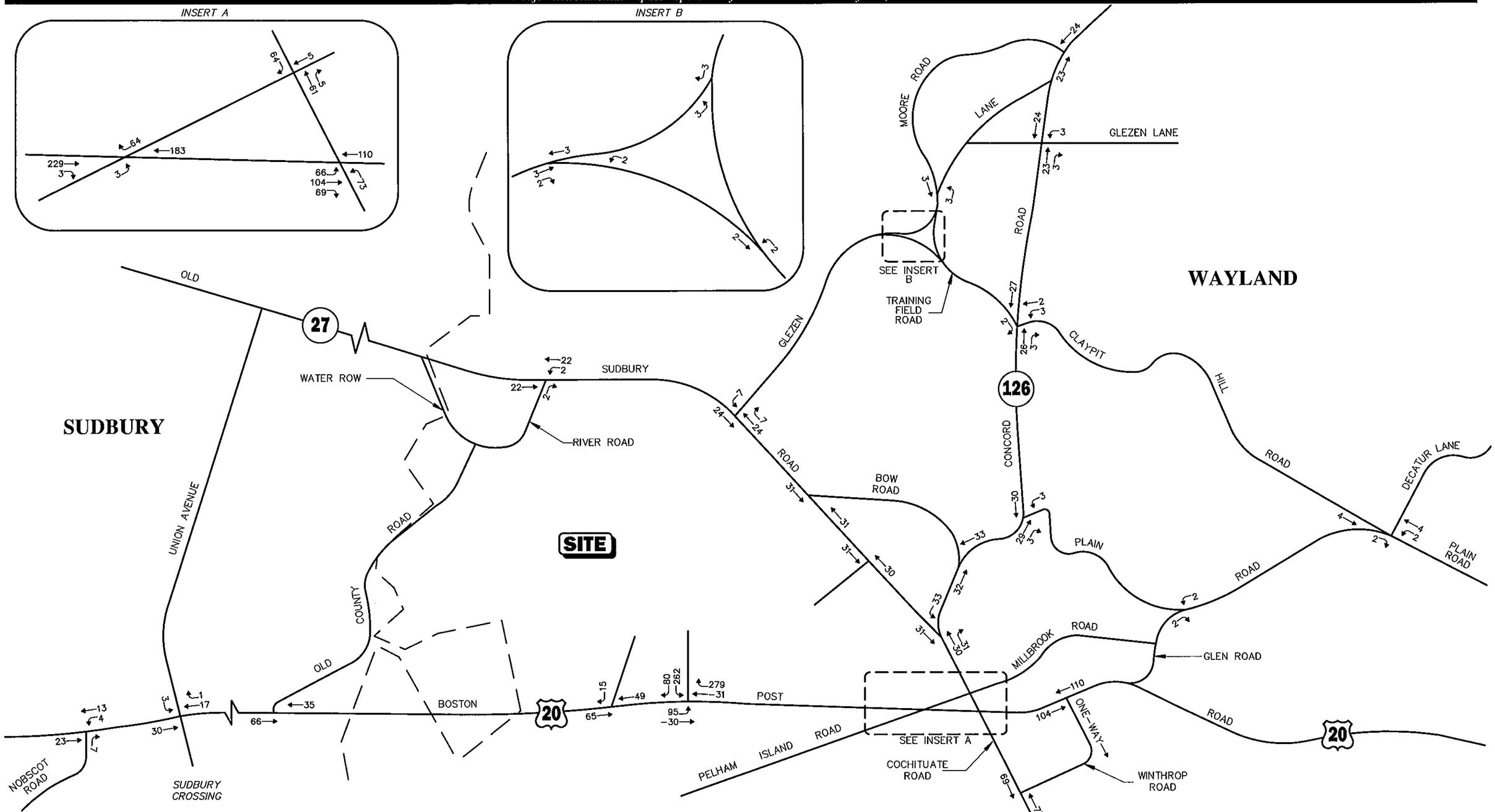
Figure 3-24

Site Generated
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative B

R:\4886\DEIR\4886nt15.dwg 11/27/2006 3:49:36 PM EST



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-25

Site Generated
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative B

Vanasse & Associates, Inc.
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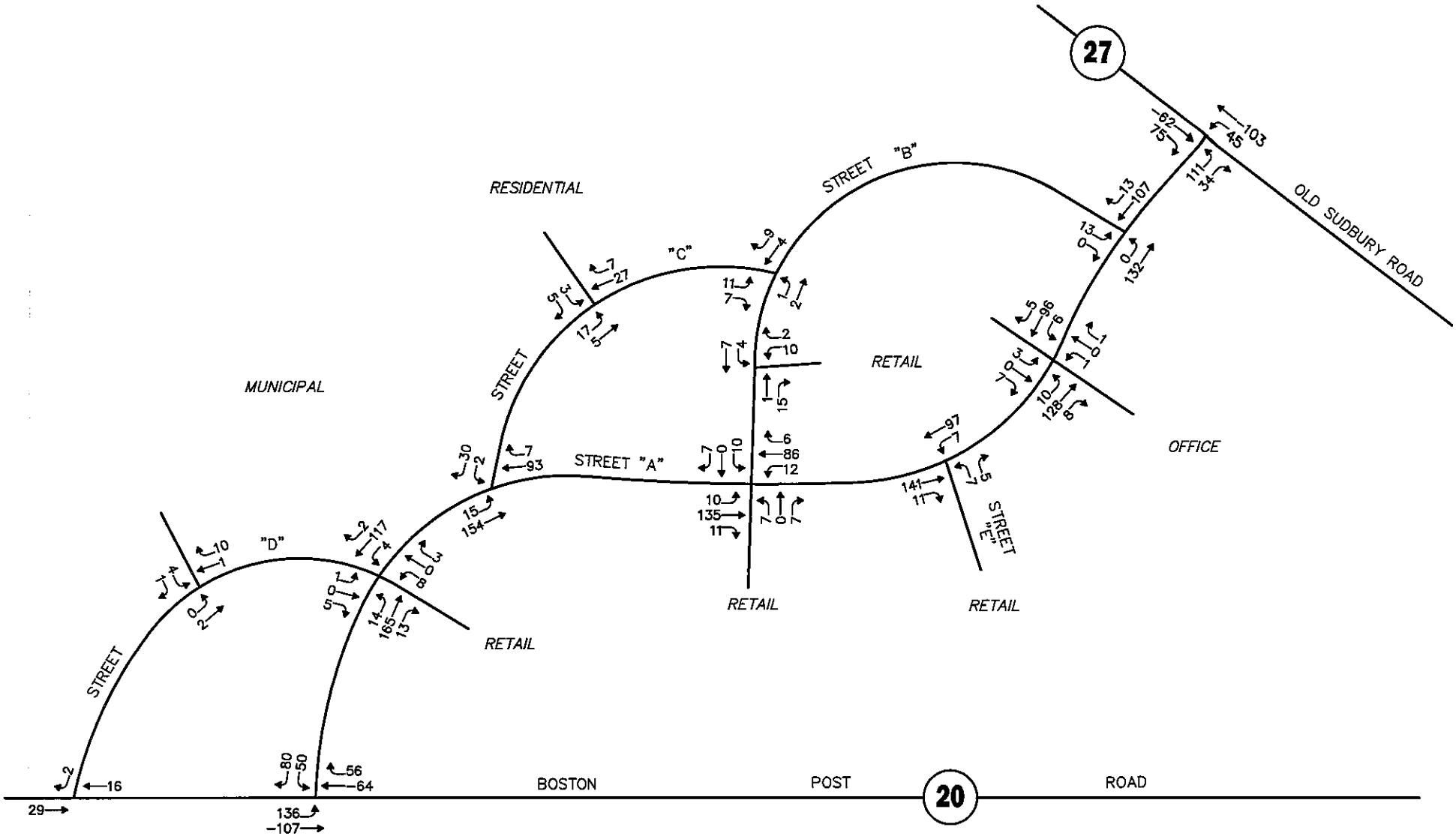

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-26

Internal Traffic Volumes
Weekday Morning
Peak Hour

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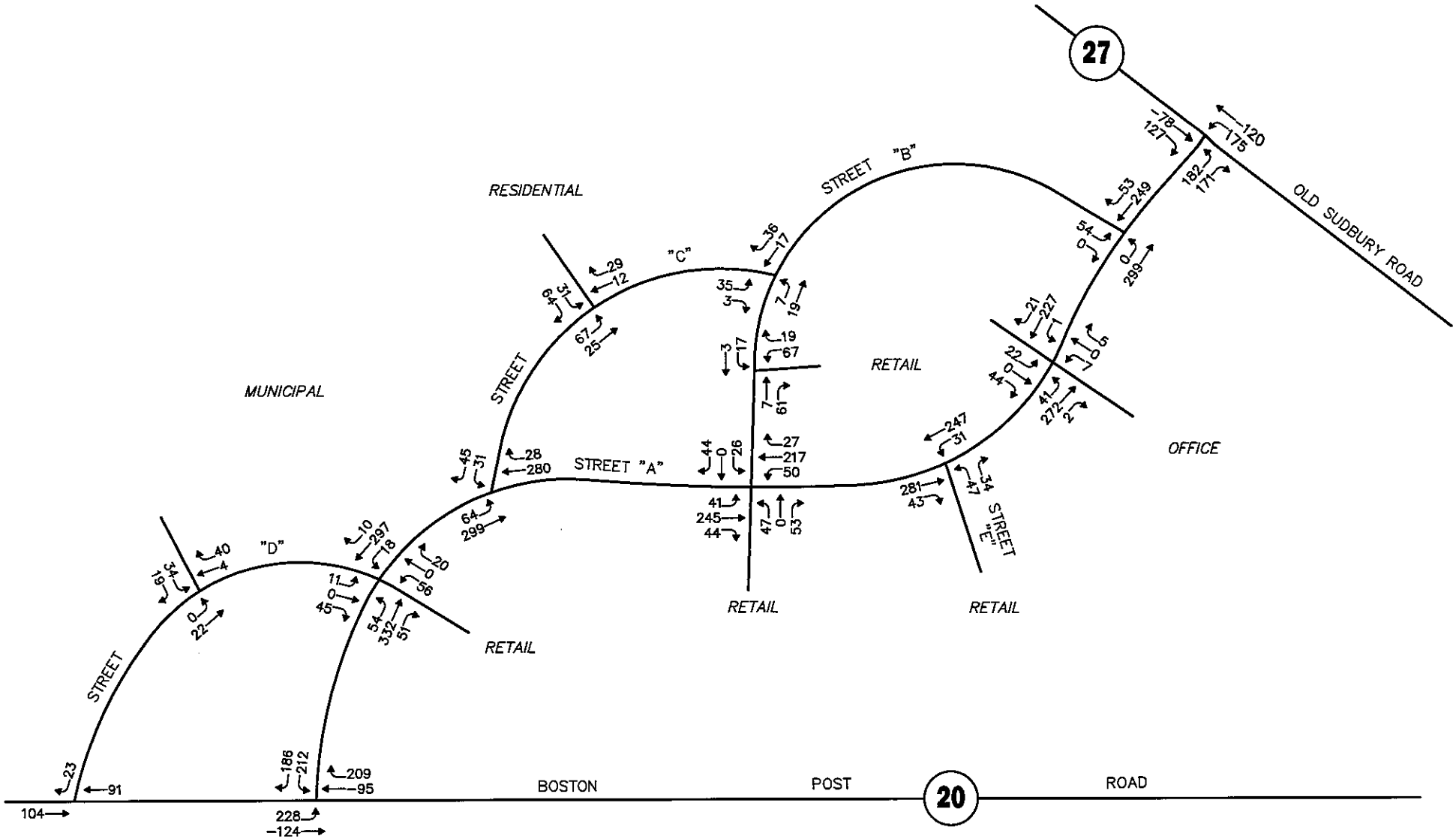

Not To Scale

Vanasse & Associates, Inc.
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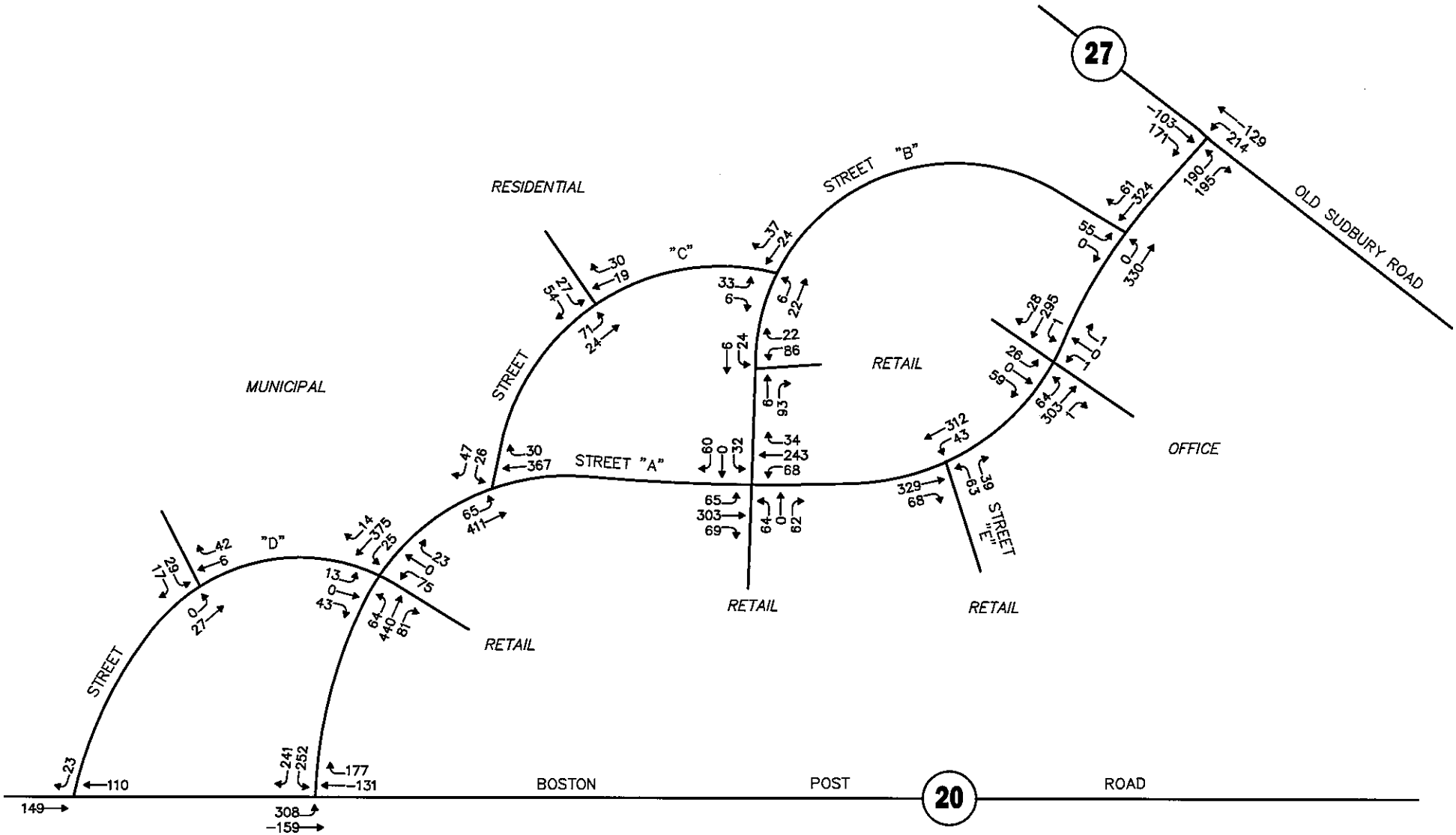
Figure 3-27

Internal Traffic Volumes
Weekday Evening
Peak Hour

R:\4886\MSP\4886nt2.dwg 11/28/2006 10:48:39 AM EST



Not To Scale

Figure 3-28

Internal Traffic Volumes
Saturday Midday
Peak Hour

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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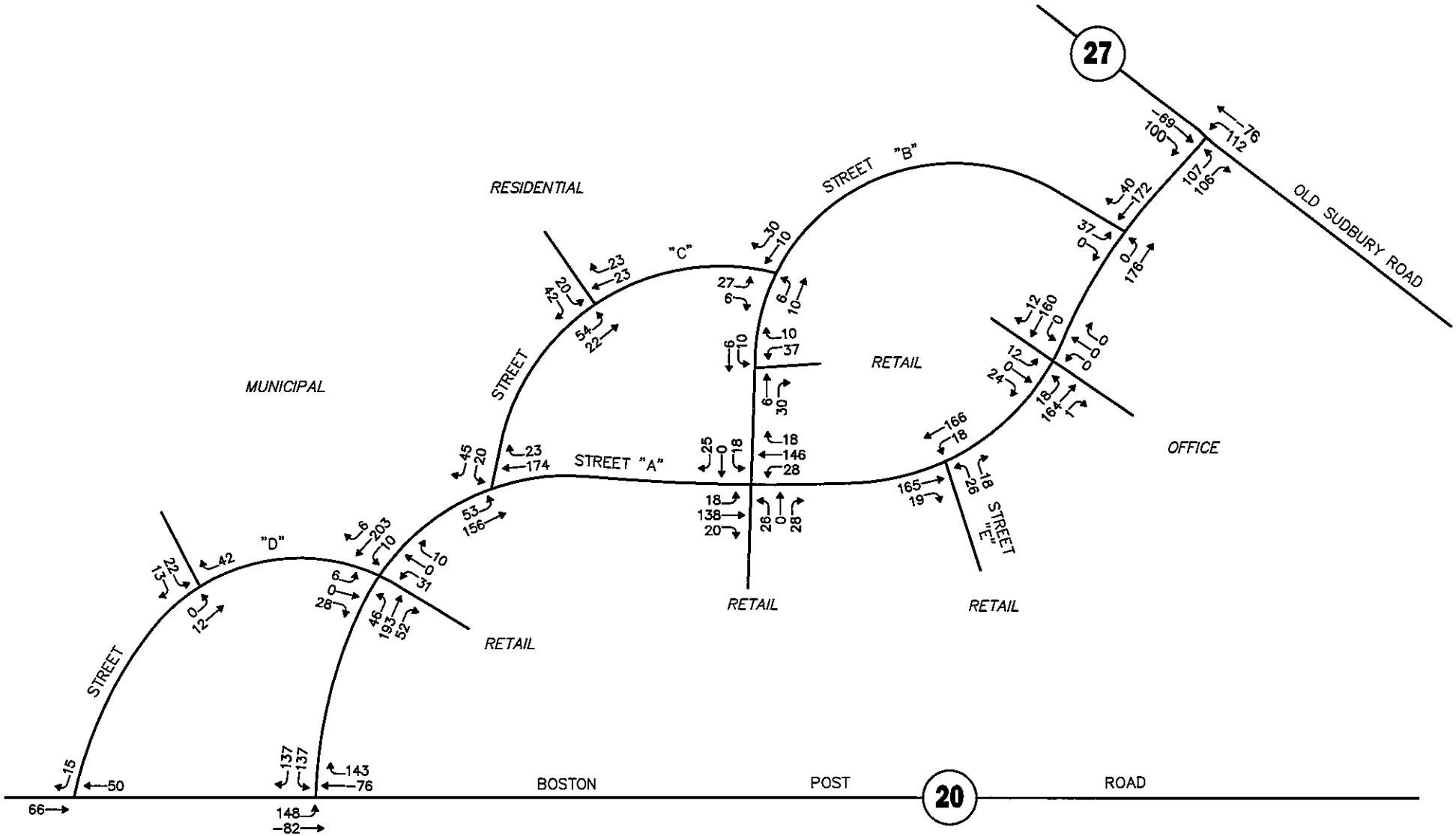

Not To Scale

Figure 3-29

Internal Traffic Volumes
Sunday Midday
Peak Hour

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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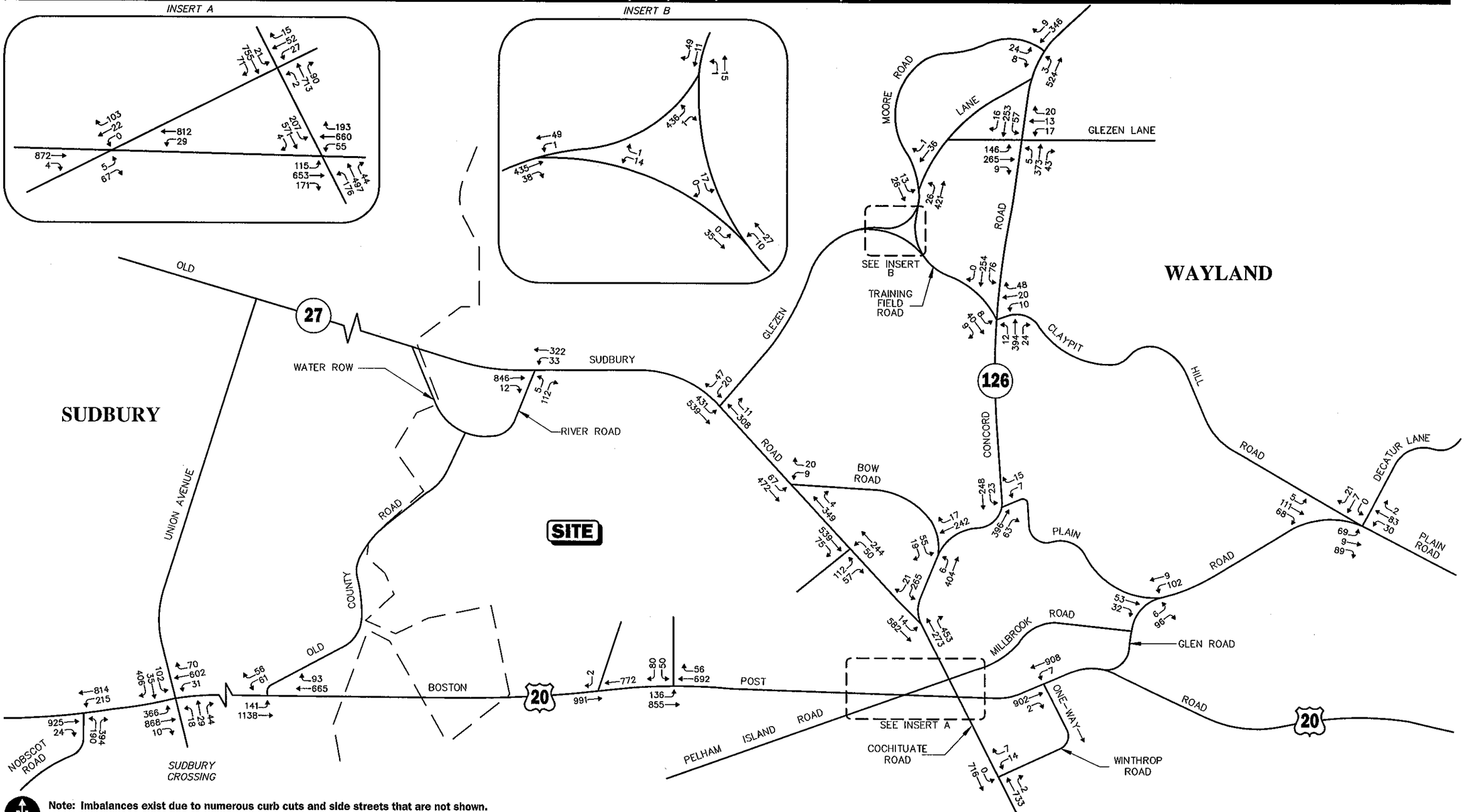
3.3.2.7 Future Traffic Volumes - Build Condition

The site-generated traffic presented in Table 3-9 has been distributed within the study area according to the percentages shown in Table 3-11. The site-generated weekday morning, weekday evening, Saturday midday and Sunday midday peak-hour traffic were then superimposed onto the 2011 No-Build traffic volumes to represent the 2011 Build traffic-volume conditions. The anticipated 2011 Build weekday morning, weekday evening, Saturday midday and Sunday midday peak-hour traffic-volume networks are graphically presented on Figures 3-30 through 3-33, respectively for Access Alternative A and on Figures 3-34 through 3-37 for Access Alternative B. These volumes were used as the basis for all analysis as well as to identify potential mitigation measures to ameliorate the project's impacts and/or anticipation of future operational deficiencies.

A summary of peak-hour projected traffic-volume changes in the site vicinity are shown in Table 3-15. These volumes are based on the expected increases from the site traffic generation.



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-30

Vanasse & Associates, Inc.
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2011 Build
Weekday Morning
Peak Hour Traffic Volumes
Access Alternative A

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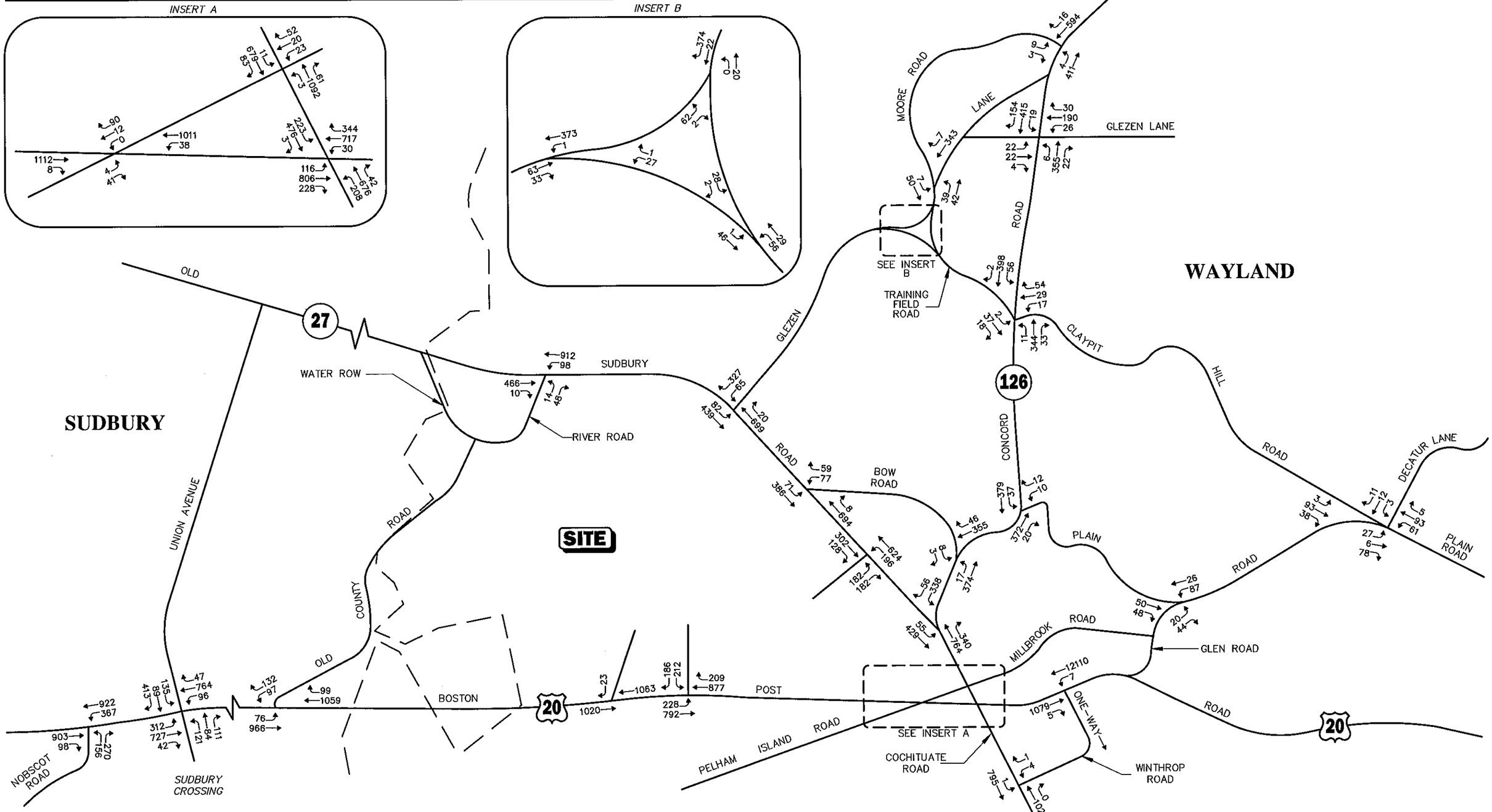

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
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Figure 3-31

2011 Build
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative A

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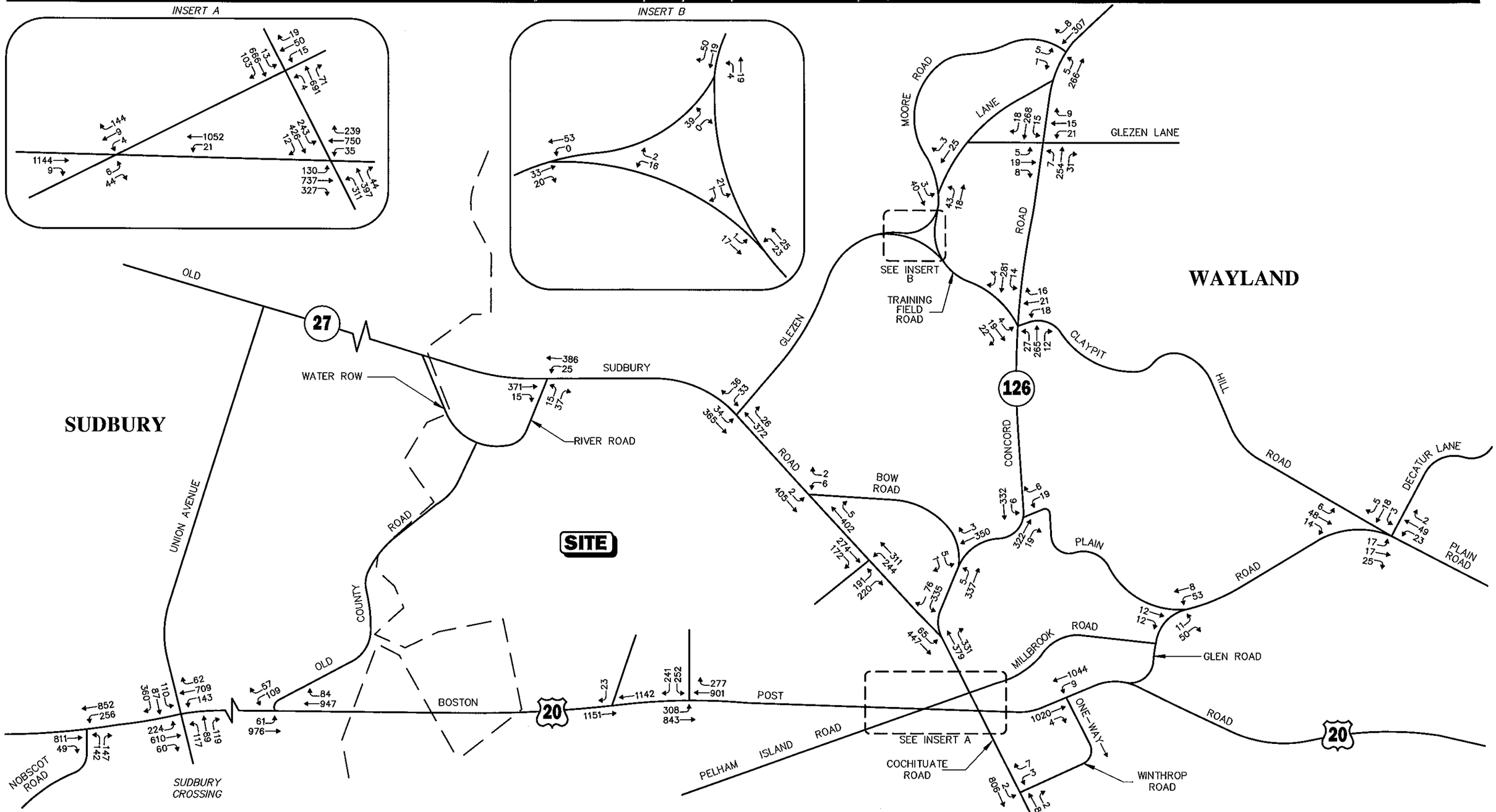

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-32

Vanasse & Associates, Inc.
Transportation Engineers & Planners

2011 Build
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative A

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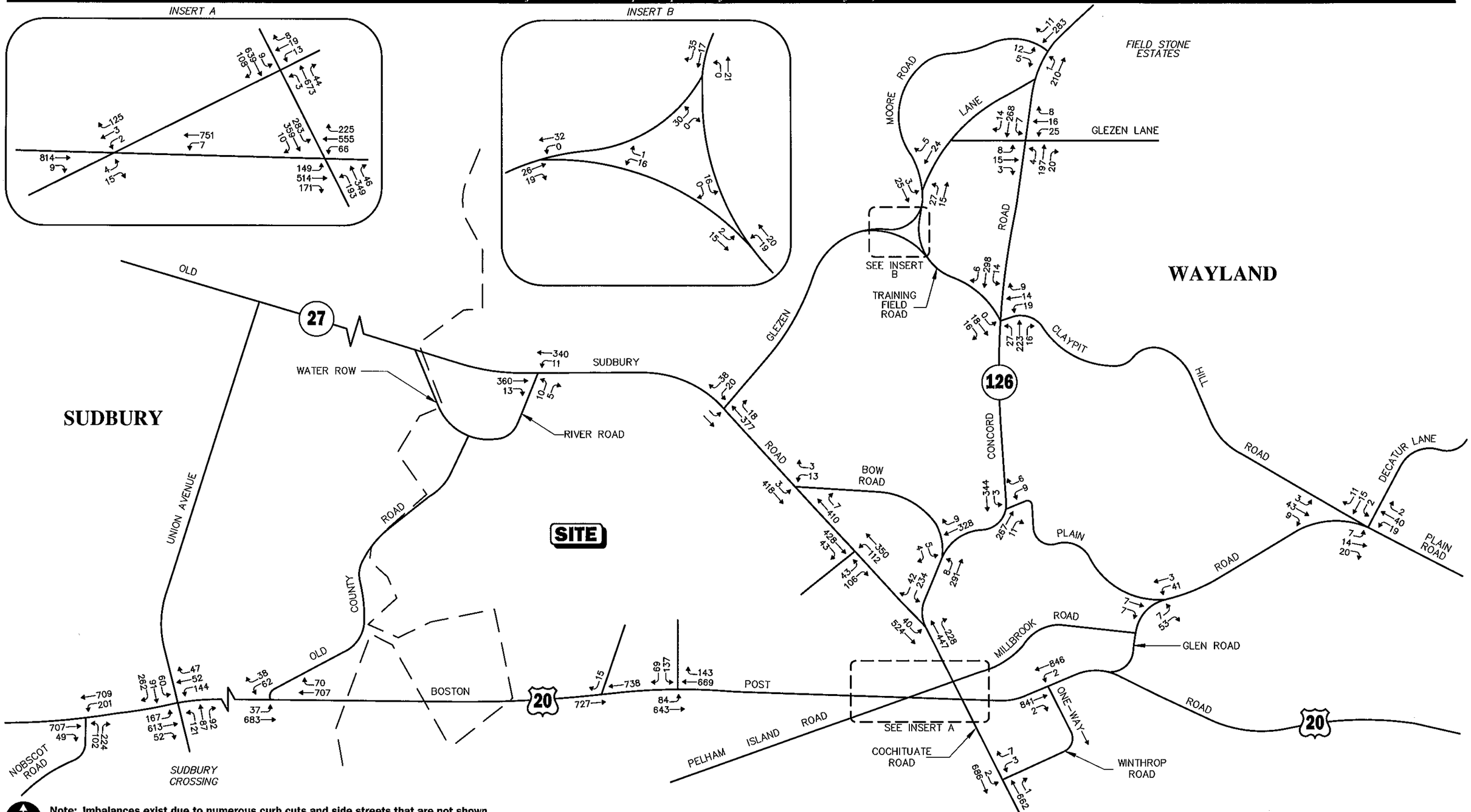

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-33

2011 Build
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative A

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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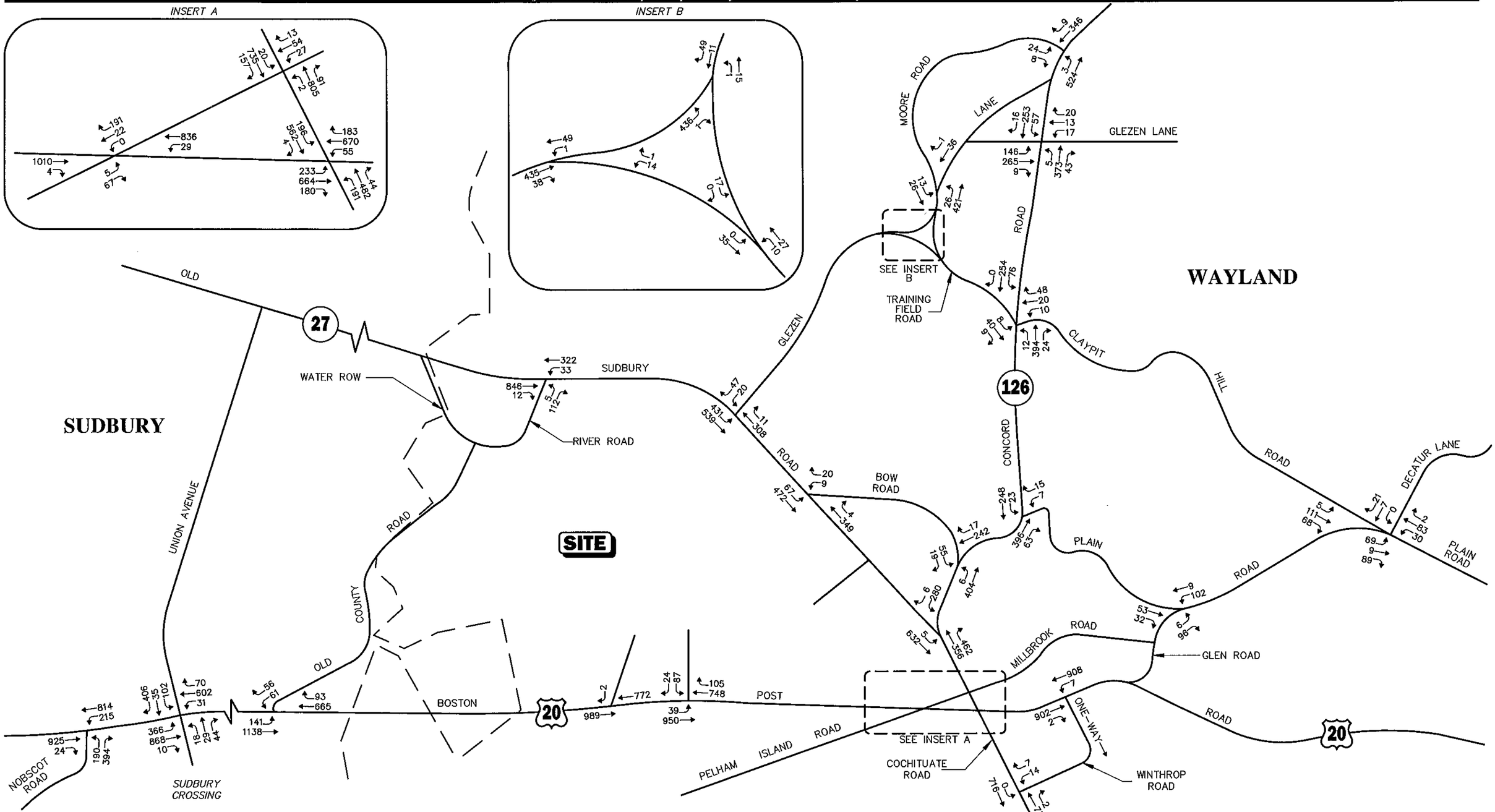

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Figure 3-34

2011 Build
Weekday Morning
Peak Hour Traffic Volumes
Access Alternative B

Vanasse & Associates, Inc.
Transportation Engineers & Planners

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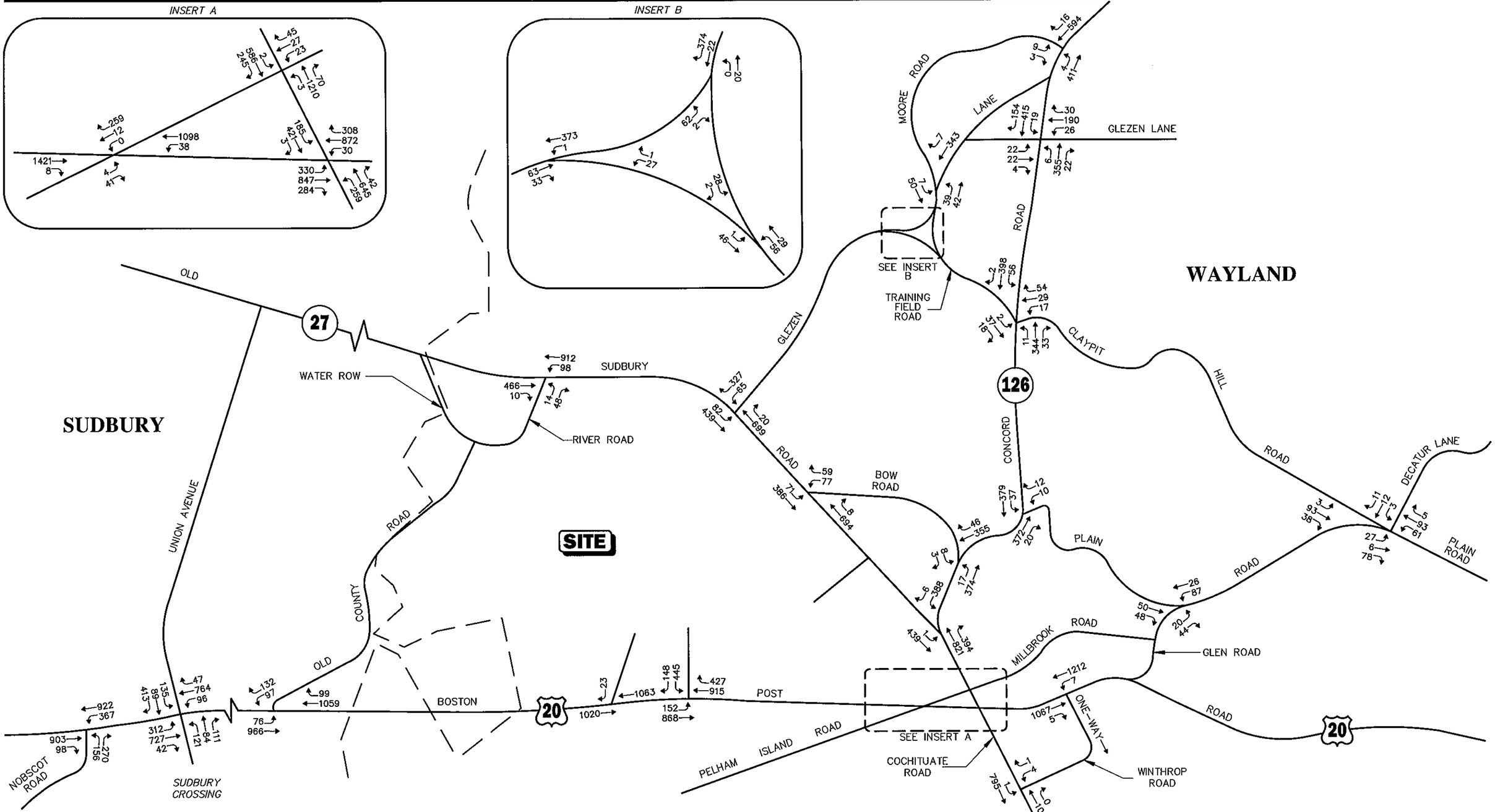

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-35

2011 Build
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative B

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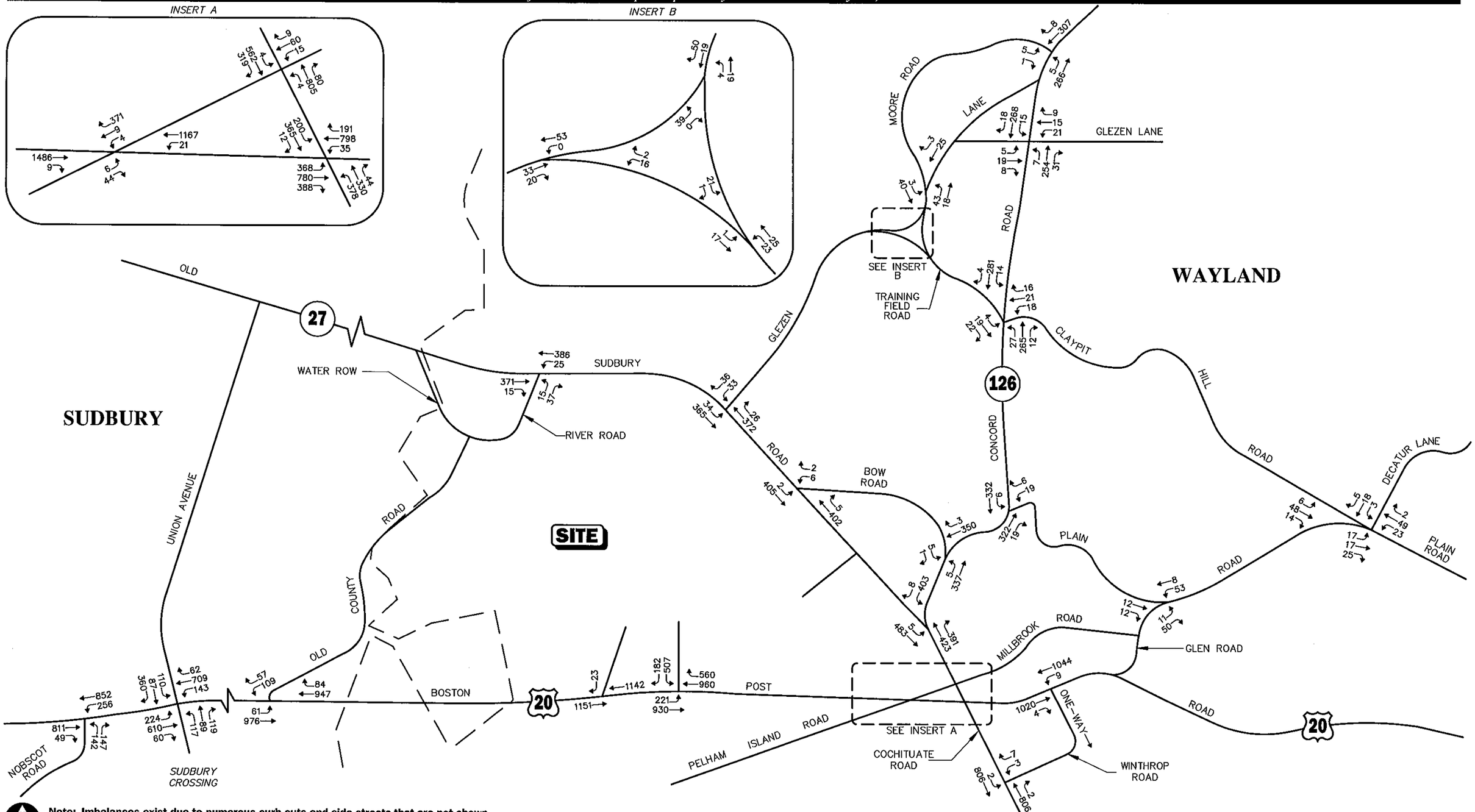

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-36

2011 Build
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative B

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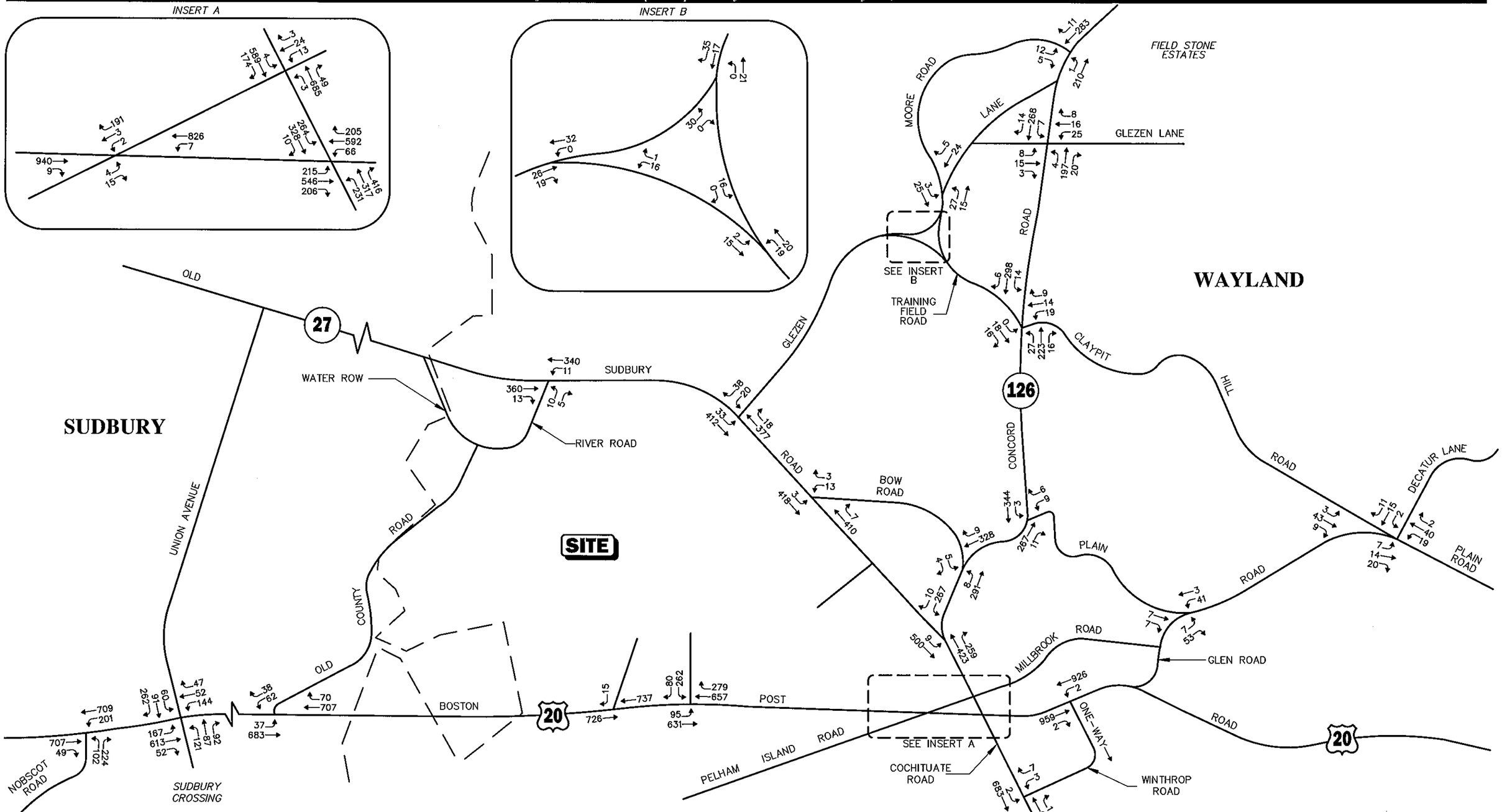

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-37

2011 Build
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative B

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Table 3-15 Traffic Volume Increases[a]

Location/Peak Hour	2011 No-Build	Access Alternative A 2011 Build	Access Alternative B 2011 Build	Access Alternative A Volume Increase Over No-Build	Access Alternative B Volume Increase Over No-Build
Route 20, west of Old County Road:					
Weekday Morning	2,030	2,000	2,000	-30	-30
Weekday Evening	2,156	2,233	2,233	17	17
Saturday Midday	1,783	2,041	2,041	258	258
Sunday Midday	1,371	1,465	1,465	94	94
Route 20, east of Glen Road:					
Weekday Morning	1,974	1,817	1,817	-157	-157
Weekday Evening	2,194	2,296	2,296	102	102
Saturday Midday	1,767	2,073	2,073	306	306
Sunday Midday	1,727	1,887	1,887	160	160
Route 27, south of Winthrop Road:					
Weekday Morning	1,574	1,465	1,465	-109	-109
Weekday Evening	1,756	1,820	1,820	64	64
Saturday Midday	1,401	1,615	1,615	214	214
Sunday Midday	1,220	1,346	1,346	126	126
Route 126, north of Moore Road:					
Weekday Morning	926	903	903	-23	-23
Weekday Evening	988	1,030	1,030	42	42
Saturday Midday	502	586	586	84	84
Sunday Midday	474	516	516	42	42
Millbrook Road, east of Route 27/126:					
Weekday Morning	208	205	205	-3	-3
Weekday Evening	157	167	167	10	10
Saturday Midday	151	168	168	17	17
Sunday Midday	93	93	93	0	0
Pelham Island Road, south of Route 20:					
Weekday Morning	131	127	127	-4	-4
Weekday Evening	99	103	103	4	4
Saturday Midday	80	89	89	9	9
Sunday Midday	32	38	38	6	6
Route 20, east of the site driveway:					
Weekday Morning	1,934	1,653	1,890	-281	-44
Weekday Evening	2,093	2,090	2,655	-3	562
Saturday Midday	2,041	2,273	2,957	232	913
Sunday Midday	1,377	1,592	1,829	215	452

[a]All volumes are vehicles per hour, total of both directions.

Table 3-15 (Continued) Traffic Volume Increases[a]

Location/Peak Hour	2011 No-Build	Access Alternative A 2011 Build	Access Alternative B 2011 Build	Access Alternative A Volume Increase Over No-Build	Access Alternative B Volume Increase Over No-Build
Route 20, west of the site driveway:					
Weekday Morning	1,795	1,763	1,763	-32	-32
Weekday Evening	1,969	2,083	2,106	114	137
Saturday Midday	2,037	2,293	2,316	256	279
Sunday Midday	1,362	1,480	1,478	118	116
Route 27, north of the site driveway:					
Weekday Morning	1,005	970	--	-35	--
Weekday Evening	1,186	1,236	--	50	--
Saturday Midday	766	948	--	182	--
Sunday Midday	812	864	--	52	--
Route 27, south of the site driveway:					
Weekday Morning	1,218	890	--	-328	--
Weekday Evening	1,381	1,304	--	-77	--
Saturday Midday	827	1,049	--	222	--
Sunday Midday	826	996	--	170	--
Route 27, west of River Road:					
Weekday Morning	1,206	1,185	1,206	-21	0
Weekday Evening	1,450	1,402	1,402	-48	-48
Saturday Midday	705	787	787	82	82
Sunday Midday	682	723	723	41	41

[a]All volumes are vehicles per hour, total of both directions.

3.4 Capacity Analysis

Measuring existing and future traffic volumes quantifies traffic flow within the study area. To assess quality of flow, roadway capacity and vehicle queue analyses were conducted under Existing, No-Build, and Build traffic-volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

3.4.1 Methodology

3.4.1.1 Levels of Service

A primary result of capacity analyses is the assignment of level-of-service to traffic facilities under various traffic-flow conditions[15]. The concept of level-of-service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Since the level-of-service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year.

3.4.1.2 Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- LOS A represents a condition with little or no control delay to minor street traffic.
- LOS B represents a condition with short control delays to minor street traffic.
- LOS C represents a condition with average control delays to minor street traffic.
- LOS D represents a condition with long control delays to minor street traffic.
- LOS E represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- LOS F represents a condition where minor street demand volume exceeds capacity of an approach lane, with control delays resulting.

[15]The capacity analysis methodology is based on the concepts and procedures presented in the *Highway Capacity Manual;* Transportation Research Board; Washington, DC; 2000.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2000 Highway Capacity Manual[16]. Level-of-service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP-signs. Control delay includes the affects of initial deceleration delay approaching a STOP-sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level-of-service at unsignalized intersections are also given in the 2000 Highway Capacity Manual. Table 3-16 summarizes the relationship between level-of-service and average control delay.

Table 3-16 Level-of-Service Criteria For Unsignalized Intersections[a]

Level-of-Service	Average Control Delay (Seconds Per Vehicle)
A	$\leq$ 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	$>$50.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000; page 17-2.

3.4.1.3 Signalized Intersections

The six levels of service for signalized intersections may be described as follows:

- LOS A describes operations with very low control delay; most vehicles do not stop at all.
- LOS B describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- LOS C describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- LOS D describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.

[16] *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000.

- LOS E describes operations with high control delay values. Individual cycle failures are frequent occurrences.

- LOS F describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of service for signalized intersections are calculated using the operational analysis methodology of the 2000 Highway Capacity Manual. This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. Level-of-service designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. Table 3-17 summarizes the relationship between level-of-service and control delay. The tabulated control delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table 3-17 Level-of-Service Criteria For Signalized Intersections[a]

Level-of-Service	Control (Signal) Delay Per Vehicle (Seconds)
A	$\leq$10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[a]Source: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2000; page 16-2.

3.4.2 Analysis Results

Level-of-service analyses were conducted for 2006 Existing, 2011 No-Build, and 2011 Build conditions for the intersections within the study area. The results of the capacity analyses are summarized in Table 3-18 for Access Alternative A and in Table 3-19 for Access Alternative B. Table 3-20 summarizes the levels of service for the internal site intersections. Detailed analysis sheets are presented in the Appendix.

The following is a summary of level-of-service operation for all the study area locations. The capacity analysis results are summarized within this report and generally indicate no change in level of service. Several unsignalized intersections are projected to operate at a poor level of service; however this is believed to be a result of the conservative nature of

the procedures and gap values identified in the Highway Capacity Manual (HCS). Unsignalized intersection capacity analyses often provide conservative analysis results resulting from conservative gap values used in the methodology when actual gap values are not available.

3.4.2.1 Route 27 at River Road

Under 2006 Existing conditions, the critical movements (left and right turns from River Road) currently operate at LOS C during the weekday morning peak hour, and at LOS B during the weekday evening, Saturday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS D during the weekday morning peak hour, at LOS C during the weekday evening peak hour, and at LOS B during the Saturday and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS D during the weekday morning peak hour, at LOS C during the weekday evening peak hour, and at LOS B during the Saturday and Sunday midday peak hours.

3.4.2.2 Route 27 at Glezen Lane

Under 2006 Existing conditions, the critical movements (left and right turns from Glezen Lane) currently operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Based on the observed gaps and delay observations conducted, during the weekday morning peak hour, the critical movements out of Glezen Lane currently operate at LOS C (average delay of 16.1 seconds) and during the weekday evening peak hour, the critical movements out of Glezen Lane currently operate at LOS B (average delay of 14.9 seconds). This is significantly better than the HCM model indicates.

Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Utilizing the observed gaps and delay measurements, the HCM default value gaps were adjusted to reflect existing conditions. With this adjustment, under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour.

Table 3-18 Level-of-Service Summary – Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27 at River Road												
All movements from River Road:												
Weekday Morning	106	0.37	20.6	C	116	0.48	26.8	D	117	0.47	25.7	D
Weekday Evening	44	0.09	11.9	B	69	0.25	22.4	C	62	0.27	23.5	C
Saturday Midday	32	0.07	11.1	B	47	0.13	13.7	B	52	0.16	14.8	B
Sunday Midday	7	0.03	12.4	B	13	0.07	14.0	B	15	0.08	14.2	B
Route 27 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	61	0.54	50.5	F	74	1.03	171.8	F	67	0.70	76.1	F
Weekday Evening	361	1.16	133.3	F	382	1.41	237.4	F	392	1.56	303.3	F
Saturday Midday	54	0.16	13.0	B	59	0.19	14.1	B	69	0.27	17.2	C
Sunday Midday	48	0.11	12.7	B	52	0.13	13.5	B	58	0.17	15.0	C
Route 27 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	61	0.22	16.6	C	64	0.27	19.2	C	67	0.29	20.0	C
Weekday Evening	361	0.53	15.2	C	380	0.61	18.2	C	392	0.72	25.7	D
Route 27 at the Site Driveway												
Left turns from Site Driveway:												
Weekday Morning	--	--	--	--	--	--	--	--	112	0.47	30.9	D
Weekday Evening	--	--	--	--	--	--	--	--	182	1.83	474.3	F
Saturday Midday	--	--	--	--	--	--	--	--	191	1.31	233.2	F
Sunday Midday	--	--	--	--	--	--	--	--	149	0.46	23.5	C
Route 27 at Bow Road												
All movements from Bow Road:												
Weekday Morning	28	0.08	13.5	B	29	0.09	14.4	B	29	0.09	14.2	B
Weekday Evening	129	0.57	35.6	E	136	0.71	52.3	F	136	0.77	63.0	F
Saturday Midday	8	0.03	13.5	B	8	0.03	14.3	B	8	0.04	16.0	C
Sunday Midday	15	0.06	14.8	B	16	0.07	15.6	C	16	0.07	16.5	C
Route 27 at Bow Road												
All movements from Bow Road:												
Weekday Morning	28	0.15	23.2	C	29	0.16	24.0	C	29	0.17	24.4	C
Weekday Evening	129	0.30	15.3	C	136	0.35	17.2	C	136	0.41	20.4	C
Route 27 at Route 126												
All movements from Route 126:												
Weekday Morning	246	1.09	121.9	F	322	2.04	524.0	F	286	1.23	166.0	F
Weekday Evening	311	2.19	594.3	F	353	8.21	>999.9	F	394	6.41	>999.9	F
Saturday Midday	305	0.88	53.7	F	352	1.29	187.0	F	411	1.69	357.9	F
Sunday Midday	213	0.74	40.3	E	244	1.01	94.5	F	276	1.42	253.8	F

See notes at end of table.

Table 3-18 (Continued) Level-of-Service Summary – Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27/Route 126 at Pelham Island Road/ Millbrook Road												
All movements from Millbrook Road:												
Weekday Morning	86	3.34	>999.9	F	97	15.80	>999.9	F	94	4.74	>999.9	F
Weekday Evening	44	NC	>999.9	F	89	11.13	>999.9	F	95	5.82	>999.9	F
Saturday Midday	68	0.71	76.9	F	75	2.15	701.2	F	84	2.11	664.8	F
Sunday Midday	31	0.25	36.1	E	35	0.49	80.0	F	40	0.67	122.8	F
Route 27 at Winthrop Road												
All movements from Winthrop Road:												
Weekday Morning	20	0.16	25.9	D	21	0.25	40.1	E	21	0.21	33.6	D
Weekday Evening	5	0.11	33.6	D	5	0.17	51.5	F	5	0.19	57.4	F
Saturday Midday	10	0.07	18.9	C	10	0.09	23.1	C	10	0.12	29.7	D
Sunday Midday	10	0.05	15.0	B	10	0.06	16.7	C	10	0.07	18.6	C
Route 126 at Bow Road												
All movements from Bow Road:												
Weekday Morning	70	0.20	14.6	B	74	0.26	17.4	C	74	0.24	16.4	C
Weekday Evening	11	0.03	13.1	B	11	0.04	14.6	B	11	0.04	15.3	C
Saturday Midday	6	0.03	12.5	B	6	0.04	13.5	B	6	0.04	15.2	C
Sunday Midday	9	0.03	11.4	B	9	0.03	11.9	B	9	0.03	12.5	B
Route 126 at Plain Road												
All movements from Plain Road:												
Weekday Morning	20	0.06	12.6	B	26	0.09	14.6	B	22	0.07	13.5	B
Weekday Evening	17	0.04	12.0	B	19	0.06	13.3	B	22	0.08	14.5	B
Saturday Midday	18	0.04	12.0	B	20	0.06	13.1	B	25	0.09	15.1	C
Sunday Midday	12	0.03	11.2	B	12	0.03	11.7	B	15	0.04	12.7	B
Route 126 at Claypit Hill Road and Training Field Road												
All movements from Training Field Road:												
Weekday Morning	55	0.47	29.7	D	57	0.61	44.8	E	57	0.58	40.7	E
Weekday Evening	51	0.16	17.5	C	54	0.21	20.7	C	57	0.24	22.7	C
Saturday Midday	41	0.11	13.4	B	45	0.14	15.0	B	55	0.21	18.5	C
Sunday Midday	35	0.13	13.5	B	36	0.15	14.7	B	42	0.18	16.2	C
Route 126 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	46	NC	>999.9	F	54	NC	>999.9	F	50	NC	>999.9	F
Weekday Evening	231	0.88	64.1	F	243	1.10	129.4	F	246	1.19	162.1	F
Saturday Midday	37	0.12	13.3	B	40	0.15	14.8	B	45	0.20	17.2	C
Sunday Midday	44	0.11	12.7	B	46	0.12	13.7	B	49	0.14	14.6	B

See notes at end of table.

Table 3-18 (Continued) Level-of-Service Summary – Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 126 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	46	0.25	24.0	C	49	0.32	30.1	D	50	0.35	33.0	D
Weekday Evening	231	0.74	39.5	E	242	0.87	61.1	F	246	1.02	100.0	F
Route 126 at Moore Road												
All movements from Moore Road:												
Weekday Morning	31	0.15	17.4	C	32	0.18	20.4	C	32	0.17	19.6	C
Weekday Evening	12	0.05	16.1	C	12	0.05	18.0	C	12	0.06	18.9	C
Saturday Midday	6	0.01	11.4	B	6	0.02	12.2	B	6	0.02	13.2	B
Sunday Midday	16	0.04	11.1	B	17	0.05	11.7	B	17	0.05	12.1	B
Glezen Lane at Moore Road												
All movements from Moore Road:												
Weekday Morning	35	0.09	11.0	B	37	0.10	11.3	B	37	0.10	11.2	B
Weekday Evening	333	0.67	17.5	C	344	0.72	19.5	C	350	0.73	19.9	C
Saturday Midday	27	0.05	9.2	A	28	0.05	9.3	A	28	0.05	9.3	A
Sunday Midday	28	0.05	9.0	A	29	0.05	9.0	A	29	0.05	9.1	A
Glezen Lane at Training Field Road												
All movements from Glezen Lane:												
Weekday Morning	449	0.58	12.4	B	471	0.61	13.2	B	473	0.62	13.3	B
Weekday Evening	351	0.42	10.0	A	371	0.64	14.3	B	374	0.45	10.4	B
Saturday Midday	44	0.07	7.3	A	48	0.08	7.4	A	53	0.08	7.4	A
Sunday Midday	14	0.02	7.3	A	15	0.15	7.4	A	17	0.03	7.4	A
Training Field Road at Glezen Lane south												
All movements from Glezen Lane:												
Weekday Morning	33	0.06	8.6	A	35	0.06	8.7	A	35	0.06	8.7	A
Weekday Evening	42	0.10	8.9	A	44	0.10	8.9	A	47	0.11	8.9	A
Saturday Midday	13	0.03	8.6	A	14	0.03	8.6	A	18	0.04	8.6	A
Sunday Midday	14	0.02	8.5	A	15	0.02	8.5	A	17	0.02	8.6	A
Glezen Lane at Training Field Road												
All movements from Glezen Lane:												
Weekday Morning	415	0.51	12.9	B	437	0.55	13.6	B	437	0.55	13.5	B
Weekday Evening	56	0.08	10.2	B	68	0.13	11.7	B	64	0.09	10.4	B
Saturday Midday	31	0.04	9.1	A	36	0.05	9.2	A	39	0.04	9.2	A
Sunday Midday	26	0.04	9.0	A	28	0.04	9.1	A	30	0.05	9.1	A

See notes at end of table.

Table 3-18 (Continued) Level-of-Service Summary – Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Plain Road at Claypit Hill Road												
All movements from Plain Road:												
Weekday Morning	159	0.42	15.9	C	166	0.45	16.8	C	167	0.46	17.0	C
Weekday Evening	24	0.06	11.1	B	26	0.06	11.3	B	26	0.07	11.5	B
Saturday Midday	25	0.05	10.0	A	26	0.05	10.1	B	26	0.05	10.3	B
Sunday Midday	26	0.04	9.5	A	28	0.05	9.6	A	28	0.05	9.7	A
Plain Road at Glen Road												
All movements from Glen Road:												
Weekday Morning	96	0.16	9.8	A	101	0.17	9.9	A	102	0.18	9.9	A
Weekday Evening	57	0.10	9.8	A	60	0.11	9.9	A	64	0.11	9.9	A
Saturday Midday	54	0.07	8.9	A	57	0.08	8.9	A	61	0.08	8.9	A
Sunday Midday	56	0.06	8.7	A	58	0.06	8.7	A	60	0.07	8.7	A
Route 20 at Winthrop Road												
All westbound movements from Route 20:												
Weekday Morning	795	0.01	0.3	A	1,083	0.01	0.6	A	915	0.01	0.4	A
Weekday Evening	944	0.01	0.3	A	1,100	0.01	0.5	A	1,217	0.01	0.5	A
Saturday Midday	712	0.01	0.3	A	892	0.01	0.4	A	1,053	0.02	0.6	A
Sunday Midday	616	0.00	0.1	A	755	0.00	0.1	A	848	0.00	0.1	A
Route 20 at Pelham Island Road												
All movements from Pelham Island Road:												
Weekday Morning	160	1.57	355.1	F	184	1.55	336.8	F	125	0.72	58.7	F
Weekday Evening	138	1.78	472.6	F	165	0.96	104.2	F	102	0.87	109.4	F
Saturday Midday	202	NC	>999.9	F	239	2.54	789.2	F	157	4.46	>999.9	F
Sunday Midday	106	0.43	21.8	C	132	0.43	24.1	C	130	0.61	42.5	E
Route 20 at Pelham Island Road (South)												
All westbound movements from Pelham Island Road:												
Weekday Morning	--	--	--	--	76	2.56	926.2	F	72	0.75	88.6	F
Weekday Evening	--	--	--	--	42	0.58	74.8	F	45	1.68	547.5	F
Saturday Midday	--	--	--	--	45	0.11	243.5	F	50	10.92	>999.9	F
Sunday Midday	--	--	--	--	16	0.06	19.2	C	19	0.26	66.3	F
Route 20 at Old County Road												
All movements from Old County Road:												
Weekday Morning	63	0.55	55.9	F	117	2.54	848.2	F	117	2.43	796.1	F
Weekday Evening	116	0.88	98.8	F	229	4.49	>999.9	F	229	4.93	>999.9	F
Saturday Midday	53	0.44	40.5	E	166	2.74	889.2	F	166	4.06	>999.9	F
Sunday Midday	34	0.11	17.6	C	100	0.67	64.0	F	100	0.76	85.9	F

[a]Demand (in vehicles per hour) for the critical movements.
[b]Volume-to-capacity ratio.
[c]Average control delay per vehicle (in seconds) for the critical movements. As the v/c ratio approaches 1.00, the calculated delay is not representative of actual conditions.
[d]Level-of-service. NC = Not calculated

Table 3-18 (Continued) Level-of-Service Summary – Access Alternative A

Signalized Intersection/Peak Hour	2006 Existing			2011 No-Build			2011 Build		
	V/C[a]	Delay[b]	LOS[c]	V/C	Delay	LOS	V/C	Delay	LOS
Route 20 at Route 27/Route 126									
Weekday Morning	0.97	38.8	D	1.13	101.2	F	0.94	80.5	F
Weekday Evening	1.48	71.2	E	1.22	129.3	F	1.16	118.0	F
Saturday Midday	0.81	26.4	C	0.99	64.0	E	1.12	105.1	F
Sunday Midday	0.80	24.9	C	0.81	39.8	D	0.91	48.8	D
Route 20 at Union Avenue									
Weekday Morning	0.79	29.2	C	0.86	34.0	C	0.87	34.7	C
Weekday Evening	0.96	38.1	D	1.07	54.7	D	1.11	60.4	E
Saturday Midday	0.79	24.6	C	0.89	31.6	C	0.96	40.2	D
Sunday Midday	0.59	17.7	B	0.64	19.2	B	0.65	19.6	B
Route 20 at Nobscot Road									
Weekday Morning	0.74	20.3	C	0.85	24.8	C	0.87	25.7	C
Weekday Evening	1.00	36.5	D	1.18	50.1	D	1.22	53.9	D
Saturday Midday	0.65	17.1	B	0.75	21.3	C	0.83	25.3	C
Sunday Midday	0.57	13.9	B	0.60	14.7	B	0.61	15.0	B
Route 20 at the Site Driveway									
Weekday Morning	–	–	–	–	–	–	0.71	12.5	B
Weekday Evening	–	–	–	–	–	–	0.84	21.7	C
Saturday Midday	–	–	–	–	–	–	0.92	32.9	C
Sunday Midday	–	–	–	–	–	–	0.68	13.3	B

[a]Volume-to-capacity ratio without 410,500 sf office included No-Build.
[b]Average control (signal) delay per vehicle (in seconds).
[c]Level-of-service.

Table 3-19 Level-of-Service Summary – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27 at River Road												
All movements from River Road:												
Weekday Morning	106	0.37	20.6	C	116	0.48	26.8	D	117	0.47	25.7	D
Weekday Evening	44	0.09	11.9	B	69	0.25	22.4	C	62	0.27	23.5	C
Saturday Midday	32	0.07	11.1	B	47	0.13	13.7	B	52	0.16	14.8	B
Sunday Midday	7	0.03	12.4	B	13	0.07	14.0	B	15	0.08	14.2	B
Route 27 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	61	0.54	50.5	F	74	1.03	171.8	F	67	0.70	76.1	F
Weekday Evening	361	1.16	133.3	F	382	1.41	237.4	F	392	1.56	303.3	F
Saturday Midday	54	0.16	13.0	B	59	0.19	14.1	B	69	0.27	17.2	C
Sunday Midday	48	0.11	12.7	B	52	0.13	13.5	B	58	0.17	15.0	C
Route 27 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	61	0.22	16.6	C	64	0.27	19.2	C	67	0.29	20.0	C
Weekday Evening	361	0.53	15.2	C	380	0.61	18.2	C	392	0.72	25.7	D
Route 27 at the Site Driveway												
Left turns from Site Driveway:												
Weekday Morning	No Intersection Under Access Alternative B											
Weekday Evening												
Saturday Midday												
Sunday Midday												
Route 27 at Bow Road												
All movements from Bow Road:												
Weekday Morning	28	0.08	13.5	B	29	0.09	14.4	B	29	0.09	14.2	B
Weekday Evening	129	0.57	35.6	E	136	0.71	52.3	F	136	0.77	63.0	F
Saturday Midday	8	0.03	13.5	B	8	0.03	14.3	B	8	0.04	16.0	C
Sunday Midday	15	0.06	14.8	B	16	0.07	15.6	C	16	0.07	16.5	C
Route 27 at Bow Road												
All movements from Bow Road:												
Weekday Morning	28	0.15	23.2	C	29	0.16	24.0	C	29	0.17	24.4	C
Weekday Evening	129	0.30	15.3	C	136	0.35	17.2	C	136	0.41	20.4	C
Route 27 at Route 126												
All movements from Route 126:												
Weekday Morning	246	1.09	121.9	F	322	2.04	524.0	F	286	1.48	275.8	F
Weekday Evening	311	2.19	594.3	F	353	8.21	>999.9	F	394	5.08	>999.9	F
Saturday Midday	305	0.88	53.7	F	352	1.29	187.0	F	411	1.64	334.7	F
Sunday Midday	213	0.74	40.3	E	244	1.01	94.5	F	277	1.26	181.8	F

See notes at end of table.

Table 3-19 (Continued) Level-of-Service Summary – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27/Route 126 at Pelham Island Road/ Millbrook Road												
All movements from Millbrook Road:												
Weekday Morning	86	3.34	>999.9	F	97	15.80	>999.9	F	94	8.57	>999.9	F
Weekday Evening	44	NC	>999.9	F	89	11.13	>999.9	F	95	24.31	>999.9	F
Saturday Midday	68	0.71	76.9	F	75	2.15	701.2	F	84	4.99	>999.9	F
Sunday Midday	31	0.25	36.1	E	35	0.49	80.0	F	40	0.87	197.6	F
Route 27 at Winthrop Road												
All movements from Winthrop Road:												
Weekday Morning	20	0.16	25.9	D	21	0.25	40.1	E	21	0.21	33.6	D
Weekday Evening	5	0.11	33.6	D	5	0.17	51.5	F	5	0.19	57.4	F
Saturday Midday	10	0.07	18.9	C	10	0.09	23.1	C	10	0.12	29.7	D
Sunday Midday	10	0.05	15.0	B	10	0.06	16.7	C	10	0.07	18.5	C
Route 126 at Bow Road												
All movements from Bow Road:												
Weekday Morning	70	0.20	14.6	B	74	0.26	17.4	C	74	0.24	16.4	C
Weekday Evening	11	0.03	13.1	B	11	0.04	14.6	B	11	0.04	15.3	C
Saturday Midday	6	0.03	12.5	B	6	0.04	13.5	B	6	0.04	15.2	C
Sunday Midday	9	0.03	11.4	B	9	0.03	11.9	B	9	0.03	12.5	B
Route 126 at Plain Road												
All movements from Plain Road:												
Weekday Morning	20	0.06	12.6	B	26	0.09	14.6	B	22	0.07	13.5	B
Weekday Evening	17	0.04	12.0	B	19	0.06	13.3	B	22	0.08	14.5	B
Saturday Midday	18	0.04	12.0	B	20	0.06	13.1	B	25	0.09	15.1	C
Sunday Midday	12	0.03	11.2	B	12	0.03	11.7	B	15	0.04	12.7	B
Route 126 at Claypit Hill Road and Training Field Road												
All movements from Training Field Road/ Claypit Hill Road:	55	0.47	29.7	D	57	0.61	44.8	E	57	0.58	40.7	E
Weekday Morning	51	0.16	17.5	C	54	0.21	20.7	C	57	0.24	22.7	C
Weekday Evening	41	0.11	13.4	B	45	0.14	15.0	B	55	0.21	18.5	C
Saturday Midday	35	0.13	13.5	B	37	0.15	14.7	B	42	0.18	16.2	C
Sunday Midday												
Route 126 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	46	NC	>999.9	F	54	NC	>999.9	F	50	NC	>999.9	F
Weekday Evening	231	0.88	64.1	F	243	1.10	129.4	F	246	1.19	162.1	F
Saturday Midday	37	0.12	13.3	B	40	0.15	14.8	B	45	0.20	17.2	C
Sunday Midday	44	0.11	12.7	B	46	0.12	13.7	B	49	0.14	14.6	B

See notes at end of table.

Table 3-19 (Continued) Level-of-Service Summary – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 126 at Glezen Lane												
All movements from Glezen Lane:												
Weekday Morning	46	0.25	24.0	C	49	0.32	30.1	D	50	0.35	33.0	D
Weekday Evening	231	0.74	39.5	E	242	0.87	61.1	F	246	1.02	100.0	F
Route 126 at Moore Road												
All movements from Moore Road:												
Weekday Morning	31	0.15	17.4	C	32	0.18	20.4	C	32	0.17	19.6	C
Weekday Evening	12	0.05	16.1	C	12	0.05	18.0	C	12	0.06	18.9	C
Saturday Midday	6	0.01	11.4	B	6	0.02	12.2	B	6	0.02	13.2	B
Sunday Midday	16	0.04	11.1	B	17	0.05	11.7	B	17	0.05	12.1	B
Glezen Lane at Moore Road												
All movements from Moore Road:												
Weekday Morning	35	0.09	11.0	B	37	0.10	11.3	B	37	0.10	11.2	B
Weekday Evening	333	0.67	17.5	C	344	0.72	19.5	C	350	0.73	19.9	C
Saturday Midday	27	0.05	9.2	A	28	0.05	9.3	A	28	0.05	9.3	A
Sunday Midday	28	0.05	9.0	A	29	0.05	9.0	A	29	0.05	9.1	A
Glezen Lane at Training Field Road												
All movements from Glezen Lane:												
Weekday Morning	449	0.58	12.4	B	471	0.61	13.2	B	473	0.62	13.3	B
Weekday Evening	351	0.42	10.0	A	371	0.64	14.3	B	374	0.45	10.4	B
Saturday Midday	44	0.07	7.3	A	48	0.08	7.4	A	53	0.08	7.4	A
Sunday Midday	14	0.02	7.3	A	15	0.15	7.4	A	17	0.03	7.4	A
Training Field Road at Glezen Lane south												
All movements from Glezen Lane:												
Weekday Morning	33	0.06	8.6	A	35	0.06	8.7	A	35	0.06	8.7	A
Weekday Evening	42	0.10	8.9	A	44	0.10	8.9	A	47	0.11	8.9	A
Saturday Midday	13	0.03	8.6	A	14	0.03	8.6	A	18	0.04	8.6	A
Sunday Midday	14	0.02	8.5	A	15	0.09	8.5	A	17	0.02	8.6	A
Glezen Lane at Training Field Road												
All movements from Glezen Lane:												
Weekday Morning	415	0.51	12.9	B	437	0.55	13.6	B	437	0.55	13.5	B
Weekday Evening	56	0.08	10.2	B	68	0.13	11.7	B	64	0.09	10.4	B
Saturday Midday	31	0.04	9.1	A	36	0.05	9.2	A	39	0.04	9.2	A
Sunday Midday	26	0.04	9.0	A	28	0.04	9.1	A	30	0.05	9.1	A

See notes at end of table.

Table 3-19 (Continued) Level-of-Service Summary – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Plain Road at Claypit Hill Road												
All movements from Plain Road:												
Weekday Morning	159	0.42	15.9	C	166	0.45	16.8	C	167	0.46	17.0	C
Weekday Evening	24	0.06	11.1	B	26	0.06	11.3	B	26	0.07	11.5	B
Saturday Midday	25	0.05	10.0	A	26	0.05	10.1	B	26	0.05	10.3	B
Sunday Midday	26	0.04	9.5	A	28	0.05	9.6	A	28	0.05	9.7	A
Plain Road at Glen Road												
All movements from Glen Road:												
Weekday Morning	96	0.16	9.8	A	101	0.17	9.9	A	102	0.18	9.9	A
Weekday Evening	57	0.10	9.8	A	60	0.11	9.9	A	64	0.11	9.9	A
Saturday Midday	54	0.07	8.9	A	57	0.08	8.9	A	61	0.08	8.9	A
Sunday Midday	56	0.06	8.7	A	58	0.06	8.7	A	60	0.07	8.7	A
Route 20 at Winthrop Road												
All westbound movements from Route 20:												
Weekday Morning	795	0.01	0.3	A	1,083	0.01	0.6	A	915	0.01	0.4	A
Weekday Evening	944	0.01	0.3	A	1,100	0.01	0.5	A	1,217	0.01	0.5	A
Saturday Midday	712	0.01	0.3	A	892	0.01	0.4	A	1,053	0.02	0.6	A
Sunday Midday	616	0.00	0.1	A	755	0.00	0.1	A	848	0.00	0.1	A
Route 20 at Pelham Island Road												
All movements from Pelham Island Road:												
Weekday Morning	160	1.57	355.1	F	184	1.55	336.8	F	213	1.32	225.9	F
Weekday Evening	138	1.78	472.6	F	165	0.96	104.2	F	271	3.12	>999.9	F
Saturday Midday	202	NC	>999.9	F	239	2.54	789.2	F	384	36.03	>999.9	F
Sunday Midday	106	0.43	21.8	C	132	0.43	24.1	C	196	1.13	156.0	F
Route 20 at Pelham Island Road (South)												
All westbound movements from Pelham Island Road:												
Weekday Morning	--	--	--	--	76	2.56	926.2	F	72	1.31	306.9	F
Weekday Evening	--	--	--	--	42	0.58	74.8	F	45	10.58	>999.9	F
Saturday Midday	--	--	--	--	45	0.11	243.5	F	50	319.40	>999.9	F
Sunday Midday	--	--	--	--	16	0.06	19.2	C	19	0.53	174.7	F

See notes at end of table.

Table 3-19 (Continued) Level-of-Service Summary – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 20 at Old County Road												
All movements from Old County Road:												
Weekday Morning	63	0.55	55.9	F	117	2.54	848.2	F	117	2.43	796.1	F
Weekday Evening	116	0.88	98.8	F	229	4.49	>999.9	F	229	4.93	>999.9	F
Saturday Midday	53	0.44	40.5	E	166	2.74	889.2	F	166	6.06	>999.9	F
Sunday Midday	34	0.11	17.6	C	100	0.67	64.0	F	100	0.76	85.9	F

[a]Demand (in vehicles per hour) for the critical movements.
[b]Volume-to-capacity ratio.
[c]Average control delay per vehicle (in seconds) for the critical movements. As the v/c ratio approaches 1.00, the calculated delay is not representative of actual conditions.
[d]Level-of-service.
[e]Based on observed delay measurements.
NC = Not calculated.

Table 3-19 (Continued) Level-of-Service Summary – Access Alternative B

Signalized Intersection/Peak Hour	2006 Existing			2011 No-Build			2011 Build		
	V/C[a]	Delay[b]	LOS[c]	V/C	Delay	LOS	V/C	Delay	LOS
Route 20 at Route 27/Route 126									
Weekday Morning	0.97	38.8	D	1.13	101.2	F	1.02	89.4	F
Weekday Evening	1.48	71.2	E	1.22	129.3	F	1.46	172.8	F
Saturday Midday	0.81	26.4	C	0.99	64.0	E	1.41	149.3	F
Sunday Midday	0.80	24.9	C	0.81	39.8	D	1.24	110.6	F
Route 20 at Union Avenue									
Weekday Morning	0.79	29.2	C	0.86	34.0	C	0.87	34.7	C
Weekday Evening	0.96	38.1	D	1.07	54.7	D	1.11	60.4	E
Saturday Midday	0.79	24.6	C	0.89	31.6	C	0.96	40.2	D
Sunday Midday	0.59	17.7	B	0.64	19.2	B	0.65	19.6	B
Route 20 at Nobscot Road									
Weekday Morning	0.74	20.3	C	0.85	24.8	C	0.87	25.7	C
Weekday Evening	1.00	36.5	D	1.18	50.1	D	1.22	53.9	D
Saturday Midday	0.65	17.1	B	0.75	21.3	C	0.83	25.3	C
Sunday Midday	0.57	13.9	B	0.60	14.7	B	0.61	15.0	B
Route 20 at the Site Driveway									
Weekday Morning	–	–	–	–	–	–	0.73	14.5	B
Weekday Evening	–	–	–	–	–	–	0.99	34.5	C
Saturday Midday	–	–	–	–	–	–	1.11	56.0	E
Sunday Midday	–	–	–	–	–	–	1.09	60.9	E

[a]Volume-to-capacity ratio.
[b]Average control (signal) delay per vehicle (in seconds).
[c]Level-of-service.

Table 3-20 Level-of-Service Summary – Internal Intersections Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Street "D" at Municipal Drive 1												
All movements from Municipal Drive 1:												
Weekday Morning	–	–	–	–	–	–	–	–	5	0.01	8.5	A
Weekday Evening	–	–	–	–	–	–	–	–	53	0.06	8.9	A
Saturday Midday	–	–	–	–	–	–	–	–	46	0.05	8.9	A
Sunday Midday	–	–	–	–	–	–	–	–	35	0.04	8.8	A
Street "C" at Residential Drive 1												
All movements from Residential Drive 1:												
Weekday Morning	–	–	–	–	–	–	–	–	8	0.01	8.7	A
Weekday Evening	–	–	–	–	–	–	–	–	95	0.11	9.4	A
Saturday Midday	–	–	–	–	–	–	–	–	81	0.10	9.4	A
Sunday Midday	–	–	–	–	–	–	–	–	62	0.07	9.1	A
Street "A" at Retail Drive 1												
All westbound movements from Retail Drive 1:												
Weekday Morning	–	–	–	–	–	–	–	–	11	0.02	10.7	B
Weekday Evening	–	–	–	–	–	–	–	–	76	0.29	23.1	C
Saturday Midday	–	–	–	–	–	–	–	–	98	0.57	46.6	E
Sunday Midday	–	–	–	–	–	–	–	–	41	0.10	13.9	B
Street "B" at Street "A"												
All movements from Street "B" southbound:												
Weekday Morning	–	–	–	–	–	–	–	–	17	0.03	10.0	B
Weekday Evening	–	–	–	–	–	–	–	–	70	0.17	14.5	B
Saturday Midday	–	–	–	–	–	–	–	–	126	0.48	28.6	D
Sunday Midday	–	–	–	–	–	–	–	–	54	0.09	11.3	B
Street "E" at Street "A"												
All movements from Street "E":												
Weekday Morning	–	–	–	–	–	–	–	–	12	0.02	9.7	A
Weekday Evening	–	–	–	–	–	–	–	–	81	0.18	13.7	B
Saturday Midday	–	–	–	–	–	–	–	–	102	0.27	17.2	C
Sunday Midday	–	–	–	–	–	–	–	–	44	0.07	10.7	B
Retail Drive 2 at Street "B"												
All movements from Retail Drive 2:												
Weekday Morning	–	–	–	–	–	–	–	–	12	0.01	8.6	A
Weekday Evening	–	–	–	–	–	–	–	–	86	0.10	9.3	A
Saturday Midday	–	–	–	–	–	–	–	–	108	0.13	9.7	A
Sunday Midday	–	–	–	–	–	–	–	–	47	0.05	8.9	A

See notes at end of table.

Table 3-20 (Continued) Internal Intersections Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2006 Existing				2011 No-Build				2011 Build			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Street "A" at Retail Drive 3												
All movements from Retail Drive 3:												
Weekday Morning	–	–	–	–	–	–	–	–	2	0.00	9.8	A
Weekday Evening	–	–	–	–	–	–	–	–	12	0.03	13.7	B
Saturday Midday	–	–	–	–	–	–	–	–	2	0.01	15.2	C
Sunday Midday	–	–	–	–	–	–	–	–	36	0.05	10.2	B
Street "C" at Street "A"												
All movements from Street "C":												
Weekday Morning	–	–	–	–	–	–	–	–	32	0.04	9.0	A
Weekday Evening	–	–	–	–	–	–	–	–	76	0.17	13.7	B
Saturday Midday	–	–	–	–	–	–	–	–	73	0.19	15.8	C
Sunday Midday	–	–	–	–	–	–	–	–	65	0.10	10.7	B
Street "C" at Street "B"												
All movements Street "C":												
Weekday Morning	–	–	–	–	–	–	–	–	18	0.02	8.6	A
Weekday Evening	–	–	–	–	–	–	–	–	38	0.04	9.0	A
Saturday Midday	–	–	–	–	–	–	–	–	39	0.05	9.1	A
Sunday Midday	–	–	–	–	–	–	–	–	33	0.04	8.9	A
Street "B" at Street "A"												
All movements from Street "B":												
Weekday Morning	–	–	–	–	–	–	–	–	13	0.02	10.1	B
Weekday Evening	–	–	–	–	–	–	–	–	54	0.13	14.2	B
Saturday Midday	–	–	–	–	–	–	–	–	55	0.16	16.2	C
Sunday Midday	–	–	–	–	–	–	–	–	37	0.07	11.4	B

[a]Demand (in vehicles per hour) for the critical movements.
[b]Volume-to-capacity ratio.
[c]Average control delay per vehicle (in seconds) for the critical movements. As the v/c ratio approaches 1.00, the calculated delay is not representative of actual conditions.
[d]Level-of-service.
NC = Not calculated.

Under 2011 Build conditions, without any gap adjustments, the critical movements are projected to continue to operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS C during the Saturday and Sunday midday peak hours. Utilizing the observed gaps and delay measurements, under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour and at LOS D during the weekday evening peak hour.

3.4.2.3 Route 27 at Bow Road

Under 2006 Existing conditions, the critical movements (left and right turns from Bow Road) currently operate at LOS B during the weekday morning peak hour, at LOS E during the weekday evening peak hour, at LOS B during the Saturday and Sunday midday peak hours. Based on the observed gaps and delay observations conducted, during the weekday morning peak hour, the critical movements out of Bow Road currently operate at LOS C (average delay of 23.1 seconds) and during the weekday evening peak hour, the critical movements out of Bow Road currently operate at LOS C (average delay of 15.8 seconds). During the morning peak hour, the observed delays are close to the modeled delay and are significantly better than the HCM model indicates during the weekday evening peak hour.

Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS B during the weekday morning peak hour, at LOS F during the weekday evening peak hour, at LOS B during the Saturday midday peak hour and at LOS C during the Sunday midday peak hour. Utilizing the observed gaps and delay measurements, the HCM default value gaps were adjusted to reflect existing conditions. With this adjustment, under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour.

Under 2011 Build conditions, the critical movements are projected to operate at LOS B during the weekday morning peak hour, at LOS F during the weekday evening peak hour, and at LOS C during the Saturday and Sunday midday peak hours. Utilizing the observed gaps and delay measurements, under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour and at LOS C during the weekday evening peak hour.

3.4.2.4 Route 27 at Site Driveway

Under 2011 Build conditions, Access Alternative A, the critical movements are projected to operate at LOS D during the weekday morning peak hour, and at LOS F during the weekday evening and Saturday midday peak hours and at LOS C during the Sunday midday peak hour. Under Access Alternative B, this location would not exist. Actual operations are expected to be better based on the delay observations recorded at the Route 27 intersections with Glezen Lane and Bow Road.

3.4.2.5 Route 27 at Route 126

Under 2006 Existing conditions, the critical movements (all movements from Route 126) currently operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS E during the Sunday midday peak hour. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours. Under 2011 Build conditions, under both access alternatives, the critical movements are projected to operate at LOS F during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours.

3.4.2.6 Route 27/Route 126 at Pelham Island Road/Millbrook Road

Under 2006 Existing conditions, the critical movements (all movements from Millbrook Road) currently operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS E during the Sunday midday peak hour. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours. Under 2011 Build conditions, under both access alternatives, the critical movements are projected to operate at LOS F during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours.

3.4.2.7 Route 20 at Route 27/126

Under 2006 Existing conditions, this signalized intersection is modeled to currently operate at LOS D during the weekday morning peak hour, at LOS E during the weekday evening peak hour, and at LOS C during the Saturday and Sunday midday peak hours. This intersection was analyzed without an exclusive pedestrian phase per cycle, as identified in the signal plans for this location. Under 2011 No-Build conditions, the intersection is projected to operate at LOS F during the weekday morning peak hour, at LOS F during the weekday evening peak hour, at LOS E during the Saturday midday peak hour and LOS D during the Sunday midday peak hour. Under 2011 Build conditions, under both access alternatives, the intersection is projected to operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS D during the Sunday midday peak hour.

3.4.2.8 Route 27 at Winthrop Road

Under 2006 Existing conditions, the critical movements (left and right turns from Winthrop Road) currently operate at LOS D during the weekday morning peak hour, at LOS D during the weekday evening peak hour, at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS E during the weekday morning peak hour, at LOS F during the weekday evening peak hour, at LOS C during the Saturday

midday peak hour and at LOS C during the Sunday midday peak hour. Under 2011 Build conditions, the critical movements are projected to operate at LOS D during the weekday morning peak hour, at LOS F during the weekday evening peak hour, at LOS D during the Saturday midday peak hour and at LOS C during the Sunday midday peak hour.

3.4.2.9 Route 126 at Bow Road

Under 2006 Existing conditions, the critical movements (left and right turns from Bow Road) currently operate at LOS B during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour and at LOS B during the weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to operate at LOS C during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS B during the Sunday midday peak hour.

3.4.2.10 Route 126 at Plain Road

Under 2006 Existing conditions, the critical movements (left and right turns from Plain Road) currently operate at LOS B during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS B during the weekday morning, weekday evening, Saturday and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to operate at LOS B during the weekday morning peak hour, at LOS B during the weekday evening peak hour, at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour.

3.4.2.11 Route 126 at Claypit Hill Road and Training Field Road

Under 2006 Existing conditions, the critical movements (all movements from Training Field Road) currently operate at LOS D during the weekday morning peak hour, at LOS C during the weekday evening peak hour, and at LOS B during the Saturday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS E during the weekday morning peak hour, at LOS C during the weekday evening peak hour, at LOS B during the Saturday midday and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to operate at LOS E during the weekday morning peak hour, at LOS C during the weekday evening peak hour, Saturday midday and Sunday midday peak hours.

3.4.2.12 Route 126 at Glezen Lane

Under 2006 Existing conditions, the critical movements (left, through and right turns from Glezen Lane eastbound during the morning peak hour and westbound during the weekday evening peak hour) currently operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Based on the observed gaps and delay observations conducted, during the weekday morning peak hour, the critical movements out of Glezen Lane currently operate at LOS C/D (average delay of 24.9 seconds) and during the weekday evening peak hour, the critical movements out of Glezen Lane currently operate at LOS E (average delay of 40.1 seconds). This is better than the HCM model indicates.

Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Utilizing the observed gaps and delay measurements, the HCM default value gaps were adjusted to reflect existing conditions. With this adjustment, under 2011 No-Build conditions, the critical movements are projected to operate at LOS D during the weekday morning peak hour and at LOS F during the weekday evening peak hour (better than the unadjusted LOS).

Under 2011 Build conditions, without any gap adjustments, the critical movements are projected to continue to operate at LOS F during the weekday morning and weekday evening peak hours, and at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Utilizing the observed gaps and delay measurements, under 2011 No-Build conditions, the critical movements are projected to operate at LOS D during the weekday morning peak hour and at LOS F during the weekday evening peak hour (which is also better than the unadjusted LOS.

3.4.2.13 Route 126 at Moore Road

Under 2006 Existing conditions, the critical movements (left and right turns from Moore Road) currently operate at LOS C during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS C during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS C during the weekday morning and weekday evening peak hours, and at LOS B during the Saturday and Sunday midday peak hours.

3.4.2.14 Glezen Lane at Moore Road

Under 2006 Existing conditions, the critical movements (left and right turns from Moore Road) currently operate at LOS B during the weekday morning peak hour, at LOS C during the weekday evening peak hour, and at LOS A during the Saturday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS B during the weekday morning peak hour and at LOS C during the weekday evening peak hour, and at LOS A during the Saturday and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS B during the weekday morning peak hour, at LOS C during the weekday evening peak hour, and at LOS A during the Saturday and Sunday midday peak hours.

3.4.2.15 Glezen Lane at Training Field Road

Under 2006 Existing conditions, the critical movements currently operate at LOS B or better during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS B or better during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS B or better during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours.

3.4.2.16 Plain Road at Claypit Hill Road

Under 2006 Existing conditions, the critical movements (left and right turn movements from Claypit Hill Road) currently operate at LOS C during the weekday morning peak hour, at LOS B during the weekday evening peak hour, and at LOS A during the Saturday and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS C during the weekday morning peak hour, at LOS B during the weekday evening peak hour, at LOS B during the Saturday midday peak hour and at LOS A during the Sunday midday peak hour. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS C during the weekday morning peak hour, at LOS B during the weekday evening peak hour, at LOS B during the Saturday midday peak hour and at LOS A during the Sunday midday peak hour.

3.4.2.17 Plain Road at Glen Road

Under 2006 Existing conditions, the critical movements (left and right turn movements from Glen Road) currently operate at LOS A during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS A during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under

2011 Build conditions, the critical movements are projected to operate at LOS A during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours.

3.4.2.18 Route 20 at Winthrop Road

Under 2006 Existing conditions, the critical movements (all movements from Route 20) currently operate at LOS A during the weekday morning, weekday evening peak hour, Saturday midday peak hour and Sunday midday peak hours. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS A during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS A during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours.

3.4.2.19 Route 20 at Pelham Island Road (North)

Under 2006 Existing conditions, the critical movements (all movements from Pelham Island Road) currently operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS C during the Sunday midday peak hour. Under 2011 No-Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS C during the Sunday midday peak hour. Under 2011 Build conditions, under both access alternatives, the critical movements are projected to operate at LOS F during the weekday morning, weekday evening, and Saturday midday peak hours and at LOS E during the Sunday midday peak hour.

3.4.2.20 Route 20 at Pelham Island Road (South)

Under 2011 No-Build conditions, the critical movements are projected to operate at LOS F during the weekday morning peak hour, LOS C during weekday evening peak hour, and at LOS D during the Saturday midday peak hours. Under 2011 Build conditions, under both access alternatives, the critical movements are projected to operate at LOS F during the weekday morning, weekday evening, Saturday midday and Sunday midday peak hours.

3.4.2.21 Route 20 at the Site Driveway

Under 2011 Build traffic-volume conditions, Access Alternative A with the installation of a fully-actuated, demand-responsive traffic signal system, this intersection is projected to operate at LOS B during the weekday morning peak hour, and at LOS C during the weekday evening and Saturday midday peak hours and at LOS B during the Sunday midday peak hour. Under Access Alternative B, with the installation of a fully-actuated traffic signal system, this intersection is projected to operate at LOS E or better during the peak hours.

3.4.2.22 Route 20 at Old County Road

Under 2006 Existing conditions, the critical movements (left and right turn movements from Old County Road) currently operate at LOS F during the weekday morning peak hour, at LOS F during the weekday evening peak hour, at LOS E during the Saturday midday peak hour and at LOS C during the Sunday midday peak hour. Under 2011 No-Build conditions, the critical movements are projected to operate at LOS F during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours. Under 2011 Build conditions, the critical movements are projected to continue to operate at LOS F during the weekday morning, weekday evening, Saturday midday, and Sunday midday peak hours.

3.4.2.23 Route 20 at Union Avenue

Under 2006 Existing conditions, this signalized intersection is modeled to currently operate at LOS C during the weekday morning peak hour, at LOS D during the weekday evening peak hour, and at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Under 2011 No-Build conditions, the intersection is projected to continue to operate at LOS C during the weekday morning peak hour, at LOS D during the weekday evening peak hour, at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Under 2011 Build conditions, the intersection is projected to operate at LOS C during the weekday morning peak hour, at LOS E during the weekday evening peak hour, at LOS D during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour.

3.4.2.24 Route 20 at Nobscot Road

Under 2006 Existing conditions, this signalized intersection is modeled to currently operate at LOS C during the weekday morning peak hour, at LOS D during the weekday evening peak hour, and at LOS B during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Under 2011 No-Build conditions, the intersection is projected to operate at LOS C during the weekday morning peak hour, at LOS D during the weekday evening peak hour, at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour. Under 2011 Build conditions, the intersection is projected to continue to operate at LOS C during the weekday morning peak hour, at LOS D during the weekday evening peak hour, at LOS C during the Saturday midday peak hour and at LOS B during the Sunday midday peak hour.

3.4.3 Parking and Loading Analysis

3.4.3.1 Parking

A shared parking analysis was performed to determine if the number of proposed parking spaces, 1,256 parking spaces, would be sufficient for the proposed mixed-use development. Parking data compiled by the Urban Land Institute (ULI) Shared Parking[17] and parking data compiled by the Institute of Transportation Engineers (ITE) Parking Generation 3rd Edition[18] were reviewed.

Shared parking consists where there are differing land uses that over the course of a day share the same parking space. This is because the sharing uses either operate at totally different times, or if they do operate at the same time, the uses do not peak at the same time. For the residential component of up to 100 units, 200 parking spaces have been identified solely for the residential units.

Analyses were performed reviewing the peak characteristics of the proposed uses, as well as an analysis during December conditions (typical peak time for a retail development). Included in the Appendix are the worksheets.

For the non-December conditions, the analysis of parking based on the ITE and ULI data for weekday and Saturdays shows a range of parking requirements ranging from 1,013 spaces to 1,101 spaces (without shared parking). With shared parking, the range of required spaces is from 826 spaces to 912 spaces, less than 1,256 spaces that will be provided.

The second analysis of parking was based on the ITE and ULI data for weekday and Saturdays December conditions. This data shows a range of parking requirements ranging from 1,129 spaces to 1,437 spaces (without shared parking). With shared parking, the range of required spaces is from 937 spaces to 1,208 spaces, less than the 1,256 spaces that will be provided.

3.4.3.2 Loading

All truck access will by way of the Route 20 site driveway. The project Proponent will work with the retail tenants to restrict deliveries to off-peak hours. For the smaller retail uses, loading will be from the parking field associated with each retail use. For the potential supermarket tenant, trucks will enter from Route 20 and use the first retail driveway to access the supermarket along the external roadway at the southerly edge of the site. These trucks would egress the site by the reverse route.

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[17]Shared Parking, Urban Land Institute, Washington D.C.; 1983.

[18]Parking Generation, Institute of Transportation Engineers, Washington D.C.; 2004.

3.5 Mitigation Measures and Conclusions

3.5.1 Mitigation Measures

The final phase of the analysis process is to identify the mitigation measures necessary to minimize the impacts of the project on the transportation system. The mitigation measures consist of improvements required to correct existing deficiencies and project related impacts.

The most challenging transportation related issue that must be addressed for the Glezen Lane and Bow Road neighborhoods is the "cut through" traffic volumes. Currently many drivers find it more convenient to utilize sections of Glezen Lane and Bow Road either to avoid the Route 20, Route 27 and Route 126 intersection or to avoid Route 20 in the Wayland area. The Route 20, Route 27 and Route 126 intersection re-construction is almost complete. Unfortunately, when the construction is complete and the site is re-occupied as an office building, the intersection will continue to operate at LOS F. Therefore, it is anticipated that drivers will continue to avoid that intersection and continue to use neighborhood streets as a "cut through" The best traffic management technique to reduce the "cut through" traffic and increase road safety is to make the use of the neighborhood streets in-convenient or impossible for use by commuters.

Tables 3-21 and 3-22 provide a summary of the potential improvements for Glezen Lane and Bow Road and the recommendations. Tables 3-23 and 3-24 provide a summary of the potential improvements for the Route 20 and Route 27 site driveway intersections.

Table 3-21 Summary of Traffic Related Issues – Glezen Lane

Glezen Lane

Existing Issues

- Cut through traffic (Approximately 400 vehicles per hour during commuter periods)
- Excessive speeds (up to 49 mph)
- Excessive commercial truck traffic

Possible Mitigation:

Improvement	Impact	Effect
Prohibit left turns from Route 27 southbound	Eliminate 400 vehicles per hour during morning commute	Improved level of service Route 27 and Glezen Lane from F to B during morning peak hour. Reduction of traffic on Glezen Lane from Route 27.
Increase police enforcement of speed limit	Reduce speed	Safer street
Install speed humps	Reduce speed	Safer street
Install stop signs at side streets	Reduce speed	Safer street
Narrow sections of Glezen Lane at Route 27 and at Route 126	Reduce speed	Safer street
Make section of Moore Road, Glezen Lane, and Training Field Road one way	More difficult access for "cut through commuter" traffic	Reduce traffic volume on street. Increase safety
Prohibit commercial truck traffic	Reduce traffic	Safer street

Developer's Recommendations

- Prohibit left turns From Route 27 South to Glezen Lane during the morning peak period (6:00 – 9:00 AM)
- Make sections of Moore Road, Glezen Lane, and Training Field Road one way
- Increase police enforcement and install stop signs
- Install speed humps

Table 3-22 Summary of Traffic Related Issues – Bow Road

Bow Road

Existing Issues

- Cut through traffic (> 50 vehicles per hour during commuter time)
- Excessive speed (Up to 44MPH)
- Excessive commercial truck traffic

Possible Mitigation:

Improvement	Impact	Effect
Prohibit left turns from Route 27 southbound	Eliminate 50 Vehicles per hour during morning commute	Increased level of service
Increase police enforcement of speed limit	Reduce speed	Safer street
Install speed humps	Reduce speed	Safer street
Make Bow Road dead end	Eliminate cut through traffic	Safer street
Narrow sections of Bow Road at Route 27 and at Route 126	Reduce speed	Safer street
Prohibit commercial truck traffic	Reduce traffic	Safer street

Developer's Recommendations

- Make Bow Road dead end
- Increase police enforcement
- Install speed humps

Table 3-23 Summary of Traffic Related Issues – Route 20 and Site Driveway

Route 20 at Proposed Site Driveway

Issues

- Increase traffic generation during some peak periods
- Need to consider existing Russell Garden Center Route 20 Curb Cuts

Possible Mitigation:

Improvement	Impact	Effect
Install traffic light with turn lanes on Route 20	Traffic management – level of service	Acceptable traffic flow
Incorporate entrance with Russell's Garden Center	Reduce existing Route 20 curb cuts	Decrease accidents

Developer's Recommendations

- Install traffic light and turn lanes
- Combine main entrance with Russell's Garden Center entrance

Table 3-24 Summary of Traffic Related Issues – Route 27 and Site Driveway

Route 27 at Proposed Site Driveway

Issues

- Increase traffic generation during some peak periods
- Multiple Route 27 curb cuts with Wayland Commons residential project

Possible Mitigation:

Improvement	Impact	Effect
Install traffic light with turn lanes on Route 27	Traffic management – level of service	Acceptable traffic flow
Incorporate Wayland Commons curb cuts to Wayland Town Center Route 27 driveway	Reduce Route 27 curb cuts	Increased safety
Prohibit commercial truck traffic from using Route 27 driveway	Reduce tendency of truck traffic to use Route 27 area.	Increase safety.

Developer's Recommendations

- Install traffic signal infrastructure but do not install lights until after project is open and equipment is warranted (Town's transportation consultant recommendation).
- Incorporate Wayland Commons curb cuts into Route 27 driveway
- Prohibit commercial trucks from using Route 27 driveway

Table 3-25 summarizes the improvements that are expected to be realized at the Route 20, Route 27 and Route 126 and at the Route 27 and Route 126 intersections.

Table 3-25 Summary of Future No-Build Condition Against Future Build Conditions With Mitigation

Route 20, Route 27 and Route 126 (Public Safety Building)

Weekday Morning Peak Hour Summary
- Level of service improves from LOS F to LOS D
- Calculated delay time decreases by approximately 47 seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 816 Feet (33 Car Lengths) for Route 20 westbound

Weekday Evening Peak Hour Summary
- Level of service stays at LOS F
- Calculated delay time increases by approximately 14 seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 547 Feet (22 Car Lengths) for Route 20 eastbound

Saturday Midday Peak Hour Summary
- Level of service declines from LOS E to LOS F
- Calculated delay time increases by approximately 26 seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 735 Feet (29 Car Lengths) for Route 20 westbound

Route 27/Route 126 (Library Area)

Weekday Morning Peak Hour Summary
- Level of service improves from LOS F to LOS B
- Calculated delay time decreases by approximately 155 Seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 620 Feet (25 Car Lengths) for Route 126 approach

Weekday Evening Peak Hour Summary
- Level of service changes from LOS F to LOS C
- Calculated delay time decreases by approximately 625 seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 625 Feet (25 Car Lengths) for Route 126 approach

Saturday Midday Peak Hour Summary
- Level of service changes from LOS F to LOS B
- Calculated delay wait time decreases by approximately 108 seconds
- Queue length (vehicles lined up waiting to go through intersection) – Projected to decrease by 195 Feet (8 Car Lengths) for Route 126 approach

3.5.2 Improvements – Existing Deficiencies

The following intersections have been analyzed without the proposed project and have been determined to require potential modifications and improvements. It should be noted that these improvements are precipitated by existing conditions and are not required solely due to the project's impacts. Intersection capacity deficiencies either exist without the project or are expected to exist at the following locations:

- Route 27 at Glezen Lane
- Route 27 at Bow Road
- Route 126 at Glezen Lane
- Route 20, Route 27 and Route 126
- Route 27 and Route 126
- Route 20 at Old County Road

Mitigation measures at these locations have been identified so that the community and local planning agencies have the tools to identify needed improvements.

3.5.2.1 Route 27 at Glezen Lane

Review of the existing traffic volumes and the existing gap analysis and delay measurements indicates that this intersection currently does not operate as poorly as the HCM analysis indicates (LOS C vs LOS F). With the project, the critical movements at the intersection are projected to operate at LOS D or better during the peak hours. Several measures were reviewed in an attempt to improve operations and reduce the potential for cut-through traffic. Analyses indicate that a traffic signal would not meet the criteria established in Warrant No. 1, Eight-Hour Vehicular Volume, as established in the Manual on Uniform Traffic Control Devices[19] (MUTCD). MassHighway uses this warrant to determine the need for signalization. Measures were reviewed that would improve operating conditions. A signal could be installed along with a peak hour left-turn prohibition (no left-turns from Route 27 to Glezen Lane during the 7:00 to 9:00 AM hours). This would force traffic to stay on Route 27, or to stay on Route 20 (if using Old County Road and River Road as a cut-through) or to stay further to the north on Route 117 in Concord, Sudbury and Lincoln. These measures are shown conceptually on Figure 3-38.

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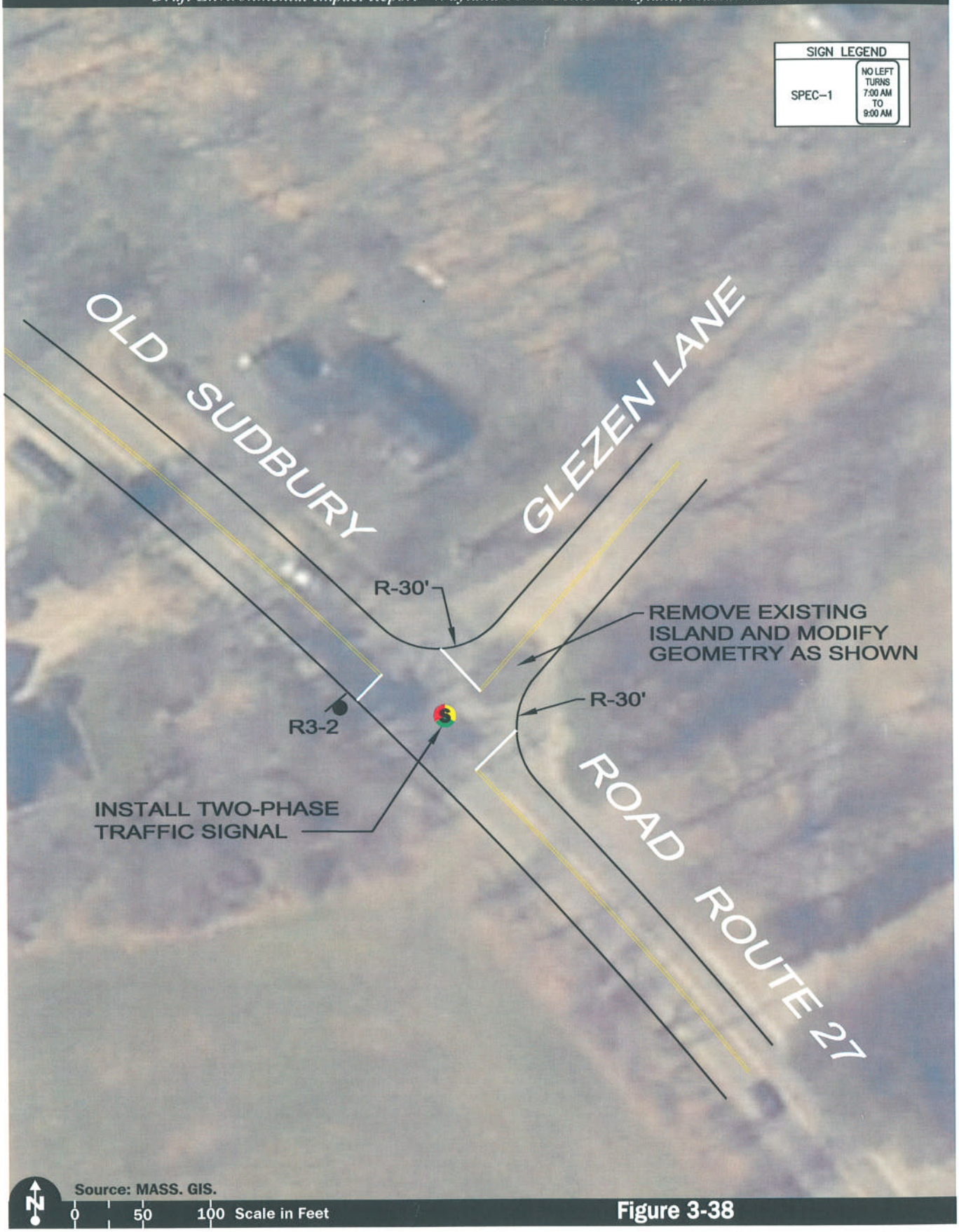
[19] *Manual on Uniform Traffic Control Devices* (MUTCD); Federal Highway Administration; Washington, DC; 2003.



Source: MASS. GIS.

Figure 3-38

Conceptual Improvements Glezen Lane at Route 27

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Transportation Engineers & Planners

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Prohibition of left turns out of Glezen Lane during peak periods (16 vph during the existing morning peak hour and 50 vph during the weekday evening peak hour) would reduce vehicular conflicts and increase capacity. Additional measures to calm traffic and reduce cut-through traffic are discussed below in Traffic Calming Measures.

3.5.2.2 Route 27 at Bow Road

Review of the existing traffic volumes and the existing gap analysis and delay measurements indicates that this intersection currently does not operate as poorly as the HCM analysis indicates (LOS E vs LOS C during the weekday evening peak hour). A weekday morning peak hour left-turn prohibition into Bow Road would force traffic to stay on Route 27.

Review of the existing traffic volumes indicate that a traffic signal would not meet the criteria established in the MUTCD for Warrant No. 1, Eight-Hour vehicular volumes. Again, prohibiting left turns out of Bow Road during peak weekday periods (9 vph during the existing weekday morning peak hour and 73 vph during the weekday evening peak hour) will reduce vehicular conflicts and increase capacity.

Another measure would be to make Bow Road a dead end. This would eliminate cut-through traffic.

3.5.2.3 Route 126 at Glezen Lane

Review of existing traffic volumes indicates that a traffic signal would not meet the criteria established in the MUTCD for Warrant No. 1, Eight-Hour Vehicular Volume. Again, the HCS model indicates poor levels of service. Review of the existing traffic volumes and the existing gap analysis and delay measurements indicates that this intersection currently does not operate as poorly as the HCM analysis indicates (LOS E vs LOS C during the weekday evening peak hour). Measures are described in the Traffic Calming section to address concerns at this location.

3.5.2.4 Route 20 at Old County Road

The critical movements at this unsignalized intersection, all movements from Old County Road, currently operate at LOS F during the weekday peak hours. These critical movements will continue to operate at LOS F with or without the development of the proposed project under future No-Build and Build conditions. The Wayland Town Center project is not expected to increase the critical movements, left and right turns out of Old County Road. There are several proposed developments on Old County Road which will impact this intersection and should be responsible for any future mitigation.

3.5.2.5 Route 20, Route 27 and Route 126

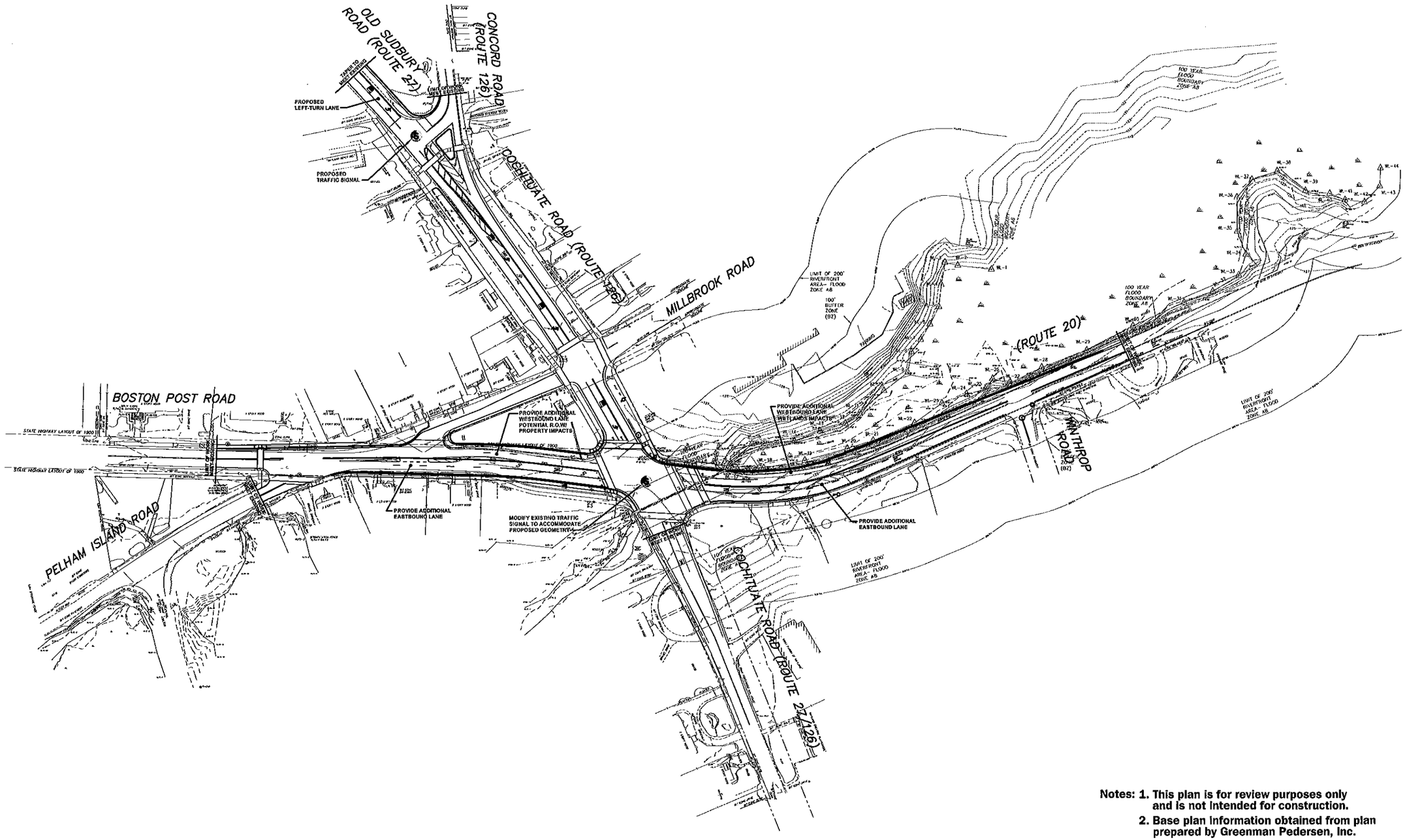
For each Access Alternative, appropriate mitigation measures have been identified and are discussed in the following paragraphs. It should be noted that Access Alternative A provides better access (two points of access/egress to Route20 and Route 27) than Access Alternative B (single access to Route 20). With Access Alternative A, traffic to and from the site is dispersed over the two driveways and provides better directionality for site traffic. With the single access alternative, all traffic is loaded onto Route 20, which will further exacerbate the Route 20, Route 27/Route 126 intersection, as well as require additional roadway widening for mitigation. The project Proponent is committed to working with the Town of Wayland and MassHighway to implement these measures.

Access Alternative A

Route 20 at Route 27/126 – It is recommended that the existing five-lane cross-section at Routes 27/126 on Route 20 be replaced with a four-lane cross section. With the four-lane cross section, the lane uses on the Route 20 eastbound and westbound approaches should be designated as shared through/left-turn lane and a shared through/right-turn lane. Signal equipment modifications would also be necessary to accommodate the revised intersection geometry. Any potential mitigation measure would require the review and approval of the Massachusetts Highway Department (MassHighway), as this location is under their jurisdiction. A preliminary Conceptual Improvement Plan, showing the basic four-lane cross section, is shown on Figure 3-39.

Route 27/126 at Pelham Island Road/Millbrook Road – As a result of the signalization of Route 27 and Route 126, and the interconnection with the signal at Route 20, operations at this intersection are projected to improve. This is a result of gaps created by the two signals to allow vehicles to exit Millbrook Road. Do Not Block Intersection signs should be installed on the Routes 27/126 approaches. These measures are shown on the preliminary Conceptual Improvement Plan, Figure 3-39.

Route 27 at Route 126 – Independent of the proposed Wayland Town Center project, a traffic signal at this intersection can be justified, based on criteria set forth by the MUTCD. Analysis has demonstrated that with traffic signal control at this location, projected levels-of-service will greatly improve. Due to its proximity to the intersection of Route 20 at Route 27/126, any future efforts to signalize the Route 27 at Route 126 intersection should provide for a coordinated traffic signal system between the two locations. Vehicle queue detectors should be installed on the Route 27 approaches to Route 126 such that vehicular queues do not extend back to and block Millbrook Road or the proposed Route 27 site driveway. These measures are shown on the preliminary Conceptual Improvement Plan, Figure 3-39.



Notes: 1. This plan is for review purposes only and is not intended for construction.
2. Base plan information obtained from plan prepared by Greenman Pedersen, Inc.

0 75 150 Scale in Feet

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Figure 3-39

Preliminary Conceptual Improvement Plan Route 20 at Routes 27/126 Access Alternative A

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Access Alternative B

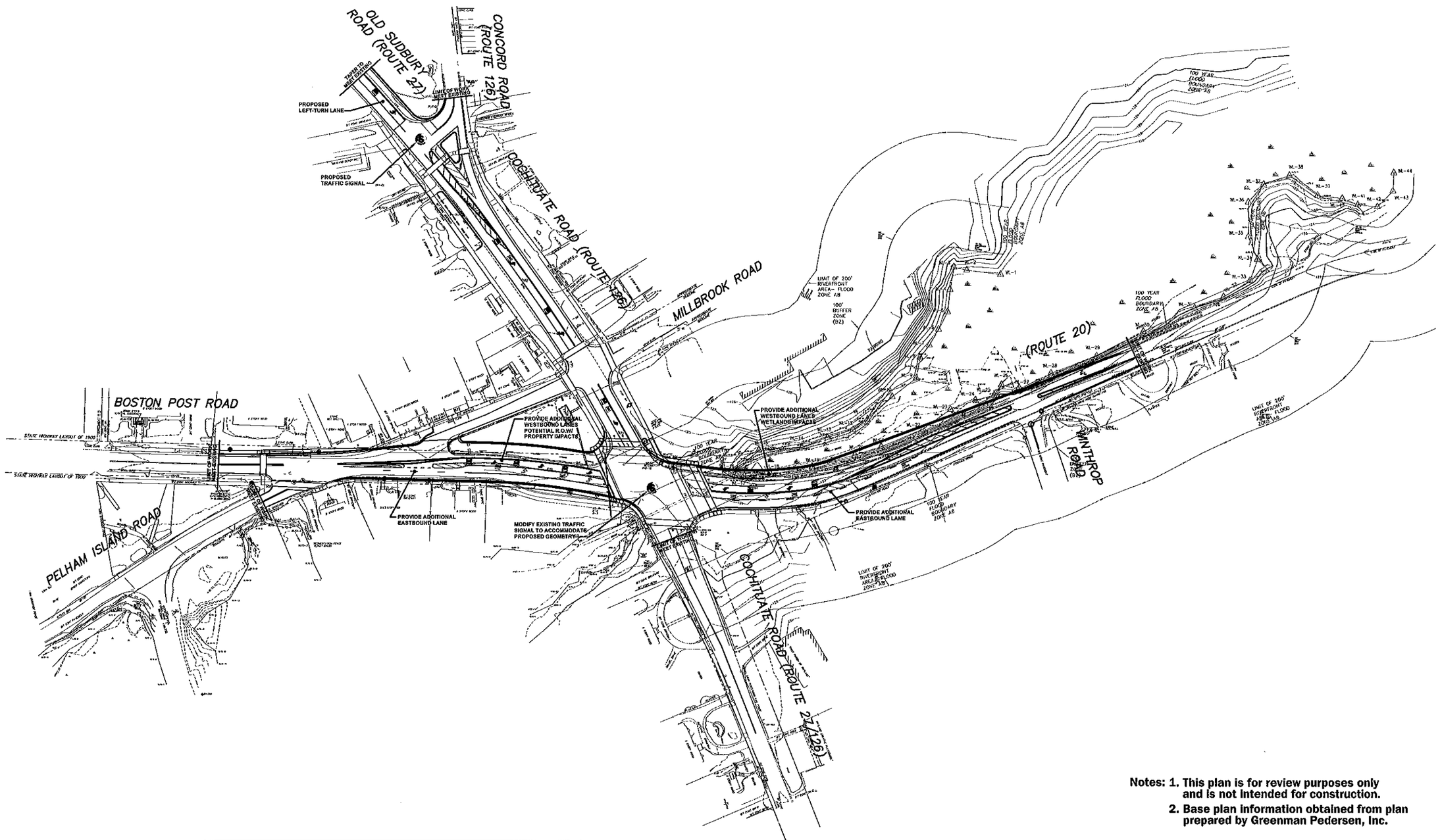
Under this access alternative, no access would be provided to Route 27. However, the mitigation measures described above for Access Alternative A would still be recommended, with additional measures needed at the Route 20 and Routes 27/126 intersection. Specifically, the current five-lane cross section at Route 20 would be replaced with a similar four lane cross section, with two through lanes per direction with an exclusive left turn lane on each approach. The existing signal would also need to be upgraded to reflect the revised intersection geometry. With these measures, operations will improve and will be better than the No-Build conditions with the in-fill of the existing site during the weekday morning and evening peak hours. These measures are also shown on the preliminary Conceptual Improvement Plan, Figure 3-40.

3.5.3 Improvements – Site Access

Route 20 at the Site Driveway – The existing intersection geometry will need to be modified to safely and efficiently accommodate the projected site-generated traffic and cut-through traffic associated with the internal connector road. A roundabout was assessed to determine if implementation at the intersection of Route 20 and the proposed site driveway with and without a potential relocated Russell's Garden Center driveway would be feasible. A roundabout was discounted because there is not sufficient right-of-way to construct (Route 20 right-of way is fifty (50) feet wide in the vicinity of the proposed site driveway. Analyses performed for the Build conditions indicate that the roundabout would fail, with lengthy queues on Route 20. Further analyses indicate that Route 20 would need to be widened to provide two lanes per direction entering the roundabout, which would require property beyond the Proponent's control. The roundabout analyses are contained in Appendix A.

Conventional improvement measures were then reviewed. Based on the analyses performed, the Route 20 eastbound approach should be widened to accommodate a single exclusive left-turn lane and a through travel lane. A review of the projected traffic volumes indicate an exclusive left-turn lane is warranted. The Route 20 westbound approach should be widened to accommodate a through travel lane and an exclusive right-turn lane. The site driveway approach to Route 20 should provide separate left- and right-turn lanes. Based on projected traffic volumes, a signal is warranted at this intersection (Warrant analysis in Appendix A) and should be installed. Approximately 400 feet east of the site driveway, there will be a right-turn out only driveway to Route 20 westbound. This driveway should be placed under STOP-sign control. These measures are shown on the preliminary Conceptual Improvement Plan, Figure 3-41.

Further, a second option has been reviewed. It is recommended that the proposed site driveway intersection be aligned opposite a new driveway to Russell's Garden Center which would be brought under traffic signal control. By constructing a new driveway to serve Russell's Garden Center, the existing wide and uncontrolled curb cut along the south



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2. Base plan information obtained from plan prepared by Greenman Pedersen, Inc.

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Figure 3-40

Preliminary Conceptual Improvement Plan Route 20 at Routes 27/126 Access Alternative B

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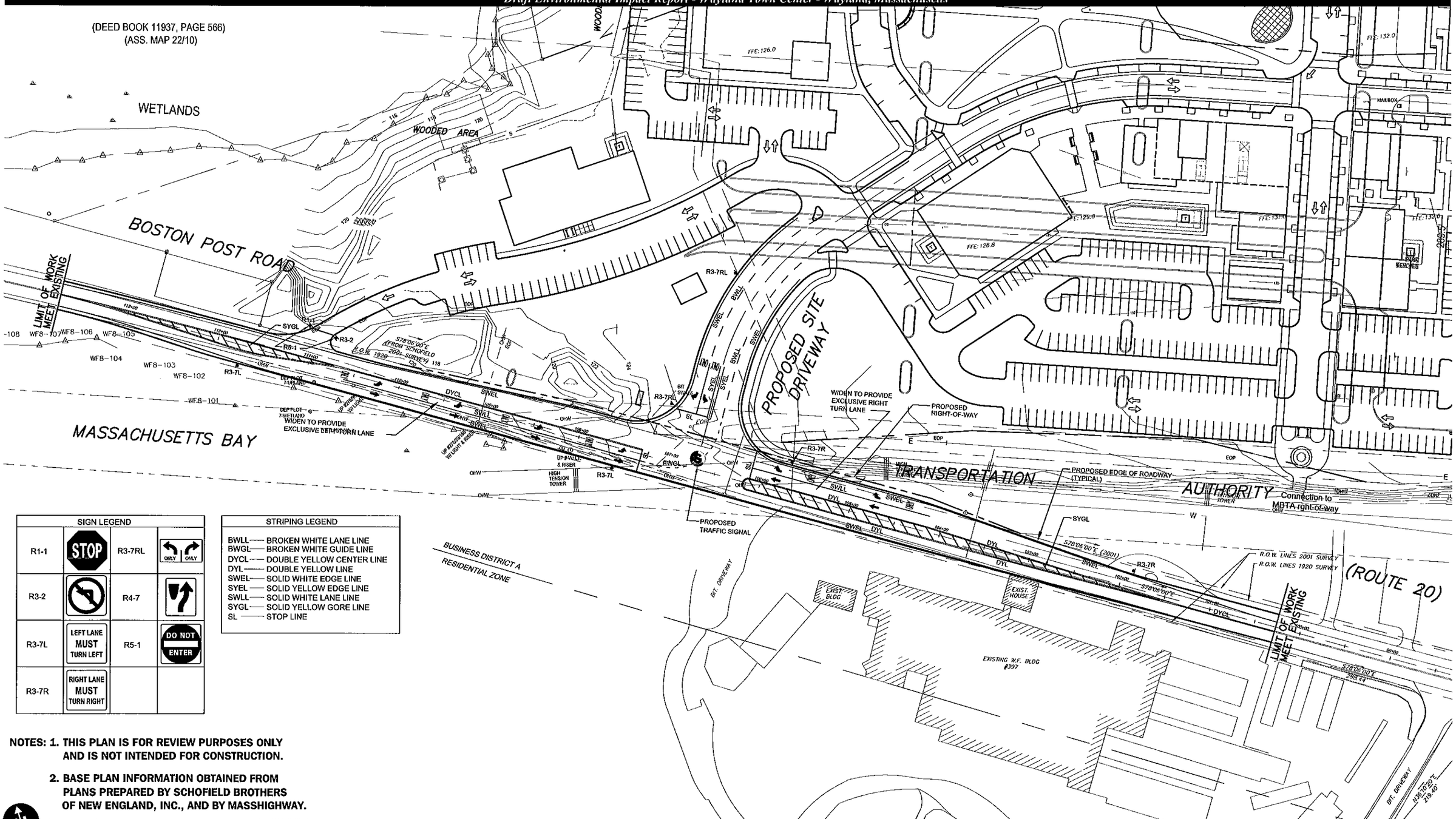

SIGN LEGEND			
R1-1	STOP	R3-7RL	ONLY ONLY
R3-2		R4-7	
R3-7L	LEFT LANE MUST TURN LEFT	R5-1	DO NOT ENTER
R3-7R	RIGHT LANE MUST TURN RIGHT		

STRIPING LEGEND
BWLL —— BROKEN WHITE LANE LINE
BWGL —— BROKEN WHITE GUIDE LINE
DYCL —— DOUBLE YELLOW CENTER LINE
DYL —— DOUBLE YELLOW LINE
SWEL —— SOLID WHITE EDGE LINE
SYEL —— SOLID YELLOW EDGE LINE
SWLL —— SOLID WHITE LANE LINE
SYGL —— SOLID YELLOW GORE LINE
SL —— STOP LINE

NOTES: 1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.

2. BASE PLAN INFORMATION OBTAINED FROM PLANS PREPARED BY SCHOFIELD BROTHERS OF NEW ENGLAND, INC., AND BY MASSHIGHWAY.

N 0 50 100 Scale in Feet

Figure 3-41

Preliminary Conceptual Improvement Plan Route 20 at Proposed Site Driveway

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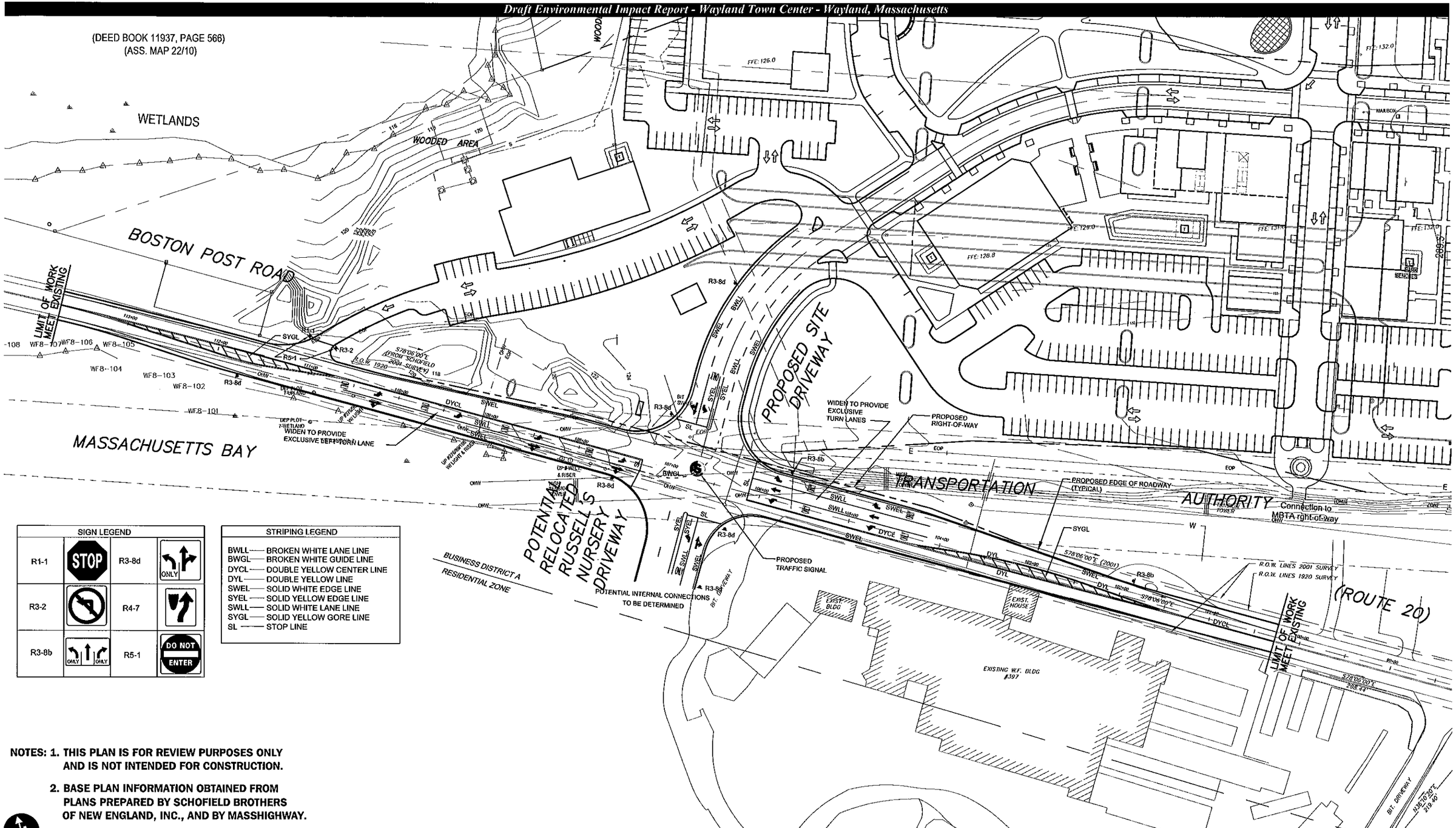
side of Route 20 (for Russell's Garden Center) can be closed, significantly reducing vehicular conflicts along this section of Route 20. A preliminary conceptual improvement plan, showing modifications at this driveway location, is also included at the end of this report. These measures are shown on the preliminary Conceptual Improvement Plan, Figure 3-42.

Route 27 at the Site Driveway – The existing intersection geometry will need to be modified to safely and efficiently accommodate the projected site-generated traffic and by-pass traffic associated with the internal connector road. Specifically, the Route 27 northbound approach should be widened to accommodate an exclusive left-turn lane and a through travel lane. A review of the projected traffic volumes indicate an exclusive left-turn lane is warranted. The Route 27 southbound approach should be widened to accommodate a through travel lane permitting right-turns. The site driveway approach to Route 27 should provide separate left--and right-turn lanes. Further, it is recommended that signal conduit and foundations be installed at this intersection such that when warranted, the intersection would be brought under traffic signal control. A preliminary Conceptual Improvement Plan is shown on Figure 3-43. This plan also shows potential driveway locations of the site driveways for the neighboring Wayland Commons condominium development. By providing these connections, there will be fewer driveways to Route 27 which will reduce the potential for vehicular conflicts.

The results of the mitigation capacity analyses are summarized in Table 3-26 for Access Alternative A and in Table 3-27 for Access Alternative B.



NOTES: 1. THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.

2. BASE PLAN INFORMATION OBTAINED FROM PLANS PREPARED BY SCHOFIELD BROTHERS OF NEW ENGLAND, INC., AND BY MASSHIGHWAY.

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Figure 3-42

Preliminary Conceptual Improvement Plan Route 20 at Proposed Site Driveway/Relocated Russell's Garden Center Driveway

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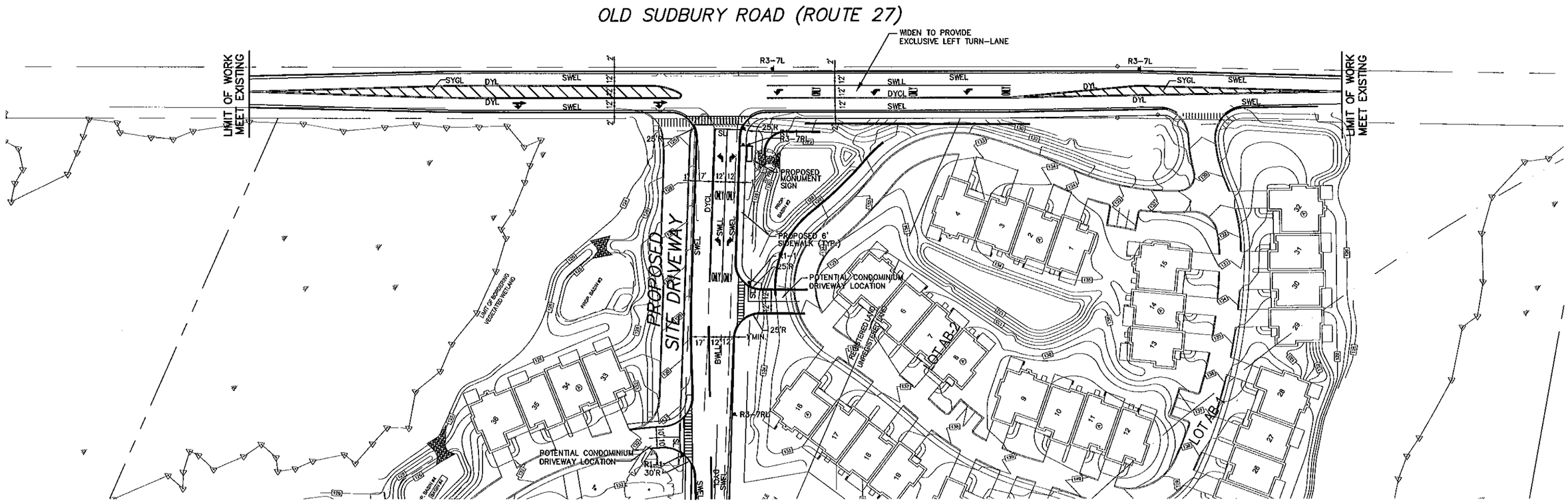

STRIPING LEGEND	
BWLL	BROKEN WHITE LANE LINE
BWGL	BROKEN WHITE GUIDE LINE
DYCL	DOUBLE YELLOW CENTER LINE
DYL	DOUBLE YELLOW LINE
SWEL	SOLID WHITE EDGE LINE
SYEL	SOLID YELLOW EDGE LINE
SWLL	SOLID WHITE LANE LINE
SYGL	SOLID YELLOW GORE LINE
SL	STOP LINE

SIGN LEGEND	
R1-1	STOP
R3-7L	LEFT LANE MUST TURN LEFT
R3-7RL	ONLY ONLY

Note: 1. This plan is for review purposes only and is not intended for construction.

Source: 1987 USGS Map

0 50 100 Scale in Feet

Figure 3-43

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Preliminary Conceptual Improvement Plan Route 27 at Proposed Site Driveway

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Table 3-26 Level-of-Service Summary With Mitigation – Access Alternative A

Unsignalized Intersection/ Critical Movement/Peak Hour	2011 No-Build				2011 Build				2011 Build with Mitigation			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27 at the Site Driveway												
Left turns from Site Driveway:												
	–	–	–	–	112	0.47	30.9	D	–	0.49	7.6	A
Weekday Morning	–	–	–	–	182	1.83	474.3	F	–	0.83	17.4	B
Weekday Evening	–	–	–	–	191	1.31	233.2	F	–	0.73	13.2	B
Saturday Midday	–	–	–	–	149	0.46	23.5	C	–	0.41	6.9	A
Sunday Midday												
Route 27 at Route 126												
All movements from Route 126												
	322	2.04	524.0	F	286	1.23	166.0	F	–	0.66	11.3	B
Weekday Morning	353	8.21	>999.9	F	394	6.41	>999.9	F	–	0.80	20.4	C
Weekday Evening	352	1.29	187.0	F	411	1.69	357.9	F	–	0.58	17.2	B
Saturday Midday	244	1.01	94.5	F	276	1.42	253.8	F	–	0.55	10.3	B
Sunday Midday												
Route 27/Route 126 at Pelham Island Road/ Millbrook Road												
All movements from Millbrook Road:												
Weekday Morning	97	15.80	>999.9	F	94	4.74	>999.9	F	94	1.49	339.4	F
Weekday Evening	89	11.13	>999.9	F	95	5.82	>999.9	F	95	2.43	801.0	F
Saturday Midday	75	2.15	701.2	F	84	2.11	664.8	F	84	1.04	164.2	F
Sunday Midday	35	0.49	80.0	F	40	0.67	122.8	F	40	0.33	40.4	E

See notes at end of table.

Table 3-26 (Continued) Level-of-Service Summary With Mitigation – Access Alternative A

Signalized Intersection/Peak Hour	2011 No-Build			2011 Build			2011 Build with Mitigation		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Route 20 at Route 27/Route 126									
Weekday Morning	1.13	101.2	F	0.94	80.5	F	1.02	53.9	D
Weekday Evening	1.22	129.3	F	1.16	118.0	F	1.23	111.1	F
Saturday Midday	0.99	64.0	E	1.12	105.1	F	1.23	89.2	F
Sunday Midday	0.81	39.8	D	0.91	48.8	D	0.98	38.2	D

[a]Demand (in vehicles per hour) for the critical movements.
[b]Volume-to-capacity ratio.
[c]Average delay per vehicle (in seconds).
[d]Level-of-service.

Table 3-27 Level-of-Service Summary With Mitigation – Access Alternative B

Unsignalized Intersection/ Critical Movement/Peak Hour	2011 No-Build				2011 Build				2011 Build with Mitigation			
	Demand[a]	V/C[b]	Delay[c]	LOS[d]	Demand	V/C	Delay	LOS	Demand	V/C	Delay	LOS
Route 27 at Route 126												
All movements from Route 126:												
Weekday Morning	322	2.04	524.0	F	286	1.48	275.8	F	--	0.68	10.8	B
Weekday Evening	353	8.21	>999.9	F	394	5.08	>999.9	F	--	0.96	29.0	C
Saturday Midday	352	1.29	187.0	F	411	1.64	334.7	F	--	0.65	11.7	B
Sunday Midday	244	1.01	94.5	F	277	1.26	181.8	F	--	0.53	11.9	B
Route 27/Route 126 at Pelham Island Road/ Millbrook Road												
All movements from Millbrook Road:												
Weekday Morning	97	15.80	>999.9	F	94	8.57	>999.9	F	94	1.98	574.6	F
Weekday Evening	89	11.13	>999.9	F	95	24.3	>999.9	F	95	5.45	>999.9	F
Saturday Midday	75	2.15	701.2	F	84	4.99	>999.9	F	84	1.86	541.6	F
Sunday Midday	35	0.49	80.0	F	40	0.87	197.6	F	40	0.34	42.8	E

See notes at end of table.

Table 3-27 (Continued) Level-of-Service Summary With Mitigation – Access Alternative B

Signalized Intersection/Peak Hour	2011 No-Build			2011 Build			2011 Build with Mitigation		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Route 20 at Route 27/Route 126									
Weekday Morning	1.13	101.2	F	1.02	89.4	F	0.90	45.0	D
Weekday Evening	1.22	129.3	F	1.46	172.8	F	1.21	97.6	F
Saturday Midday	0.99	64.0	E	1.41	149.3	F	1.09	65.3	E
Sunday Midday	0.81	39.8	D	1.24	110.6	F	1.05	68.0	E

[a]Demand (in vehicles per hour) for the critical movements.
[b]Volume-to-capacity ratio.
[c]Average delay per vehicle (in seconds).
[d]Level-of-service.

3.5.3.1 Traffic Calming Measures

Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users20. Four types of measures are generally used and include vertical deflections, horizontal shifts in alignment, roadway narrowings and roadway closures. Vertical deflections, horizontal shifts in alignment and roadway narrowings are intended to reduce speed and enhance the street environment for non-motorists. Closures (diagonal diverters, half closures, full closures, and median barriers) are intended to reduce cut-through traffic by obstructing traffic movements in one or more directions.

To reduce the use of Glezen Lane, Bow Road and other local streets by residents of the Wayland Town Center project, and to slow travel speeds through these residential areas, appropriate traffic calming measures should be implemented. Suggested measures include:

- Reducing the width of the Glezen Lane between Route 27 and Training Field Road to 18 to 20 feet over a distance of approximately 100 feet to slow vehicle travel speeds.
- Modify flow through the Glezen Lane and Training Field Road intersection into a triangular shaped round-a-bout, as shown on Figure 3-44.
- Reducing the width of the Glezen Lane between Route 126 and Moore Road to 18 to 20 feet over a distance of approximately 100 feet to slow vehicle travel speeds.
- Making a portion of Glezen Lane at Route 126 one-way, as well as a section of Moore Road one-way to reduce cut-through potential, as shown on Figure 3-45.
- Reducing the width of the Bow Road between Route 27 and Route 126 to 16 to 18 feet over a distance of approximately 100 feet to slow vehicle travel speeds.
- Potential consideration of round-a-bouts, depending on availability of right-of-way.

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[20] I. M. Lockwood, "ITE Traffic Calming Definition," *ITE Journal*, Vol. 67, July 1997, pp. 22-24.

Figure 3-44

Conceptual Improvements Glezen Lane and Training Field Road

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Figure 3-45

Conceptual Improvements
Glezen Lane and Moore Road

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- Speed tables to slow down vehicles.
- Peak hour turn restrictions.
- Selective speed enforcement on troublesome road sections.
- Decorative side friction devices to reduce speeds (fences, stone walls, etc.).

Shown on Figures 3-44 and 3-45 are suggestions for measures to assist in the reduction of cut-through traffic. Shown on Figure 3-44 is the intersection of Glezen Lane and Training Field Road which could be modified into a triangular shaped roundabout. This would have a minor impact on several residential driveways, bur would force cut-through traffic in a roundabout fashion and take more time to cut-through. Shown on Figure 3-45 is a suggestion of making Glezen Lane and a portion of Moore Road one-way in an easterly direction at Route 126. This would eliminate cut-through traffic during the weekday evening peak hour.

These restrictions should be designed in a location where appropriate lines of sight are available to allow motorists approaching the restriction to have clear lines of sight. Appropriate warning signs (for example, ROAD NARROWS, YIELD TO ONCOMING TRAFFIC, and DO NOT BLOCK INTERSECTION) and pavement markings should be installed in advance of the restriction.

Additional suggested measures include:

- Terminating one end of Bow Road such that Bow Road becomes a dead-end roadway.
- Make Bow Road a one-way roadway.

These suggested traffic calming measures can be combined or selected individually to produce the desired effect of reducing travel speeds on Glezen Lane and diverting traffic from the usage of local residential streets to the main collector roadways. All traffic calming measures should be reviewed by the Town of Wayland Fire Department to ensure that timely and efficient emergency vehicle response is maintained to the residents of Glezen Lane and Bow Road.

In addition, several minor street intersection approaches to either Routes 27 or 126 do not have STOP signs. This includes River Road and Winthrop Road. STOP signs should be installed on these roadways.

3.5.3.2 Pedestrian Measures

The project Proponent is also committed to provide pedestrian access to the site. The project Proponent will donate $250,000 to the Town of Wayland for the purpose of constructing a walkway/bikeway along the existing MBTA right-of-way south of the site. The project Proponent is also committed to provide access to the site from this walkway/bikeway, as well as to work with property owners south of the MBTA right-of-way to provide pedestrian access to Route 20.

3.5.3.3 Transportation Demand Management

To reduce single occupant vehicles (SOV) traveling to and from the site, and to encourage the use of alternative modes of transportation to reach the site, the project Proponent has committed to implement a Transportation Demand Management (TDM) program as an integral part of the proposed project. A TDM program also encourages the use of alternative modes of transportation to reach the site. The Proponent will assign responsibility for implementing the TDM program to a Transportation Manager. The core of successful TDM strategies are ridesharing, public transportation, bicycling, and pedestrian travel, and are discussed below.

Ridesharing Programs – Ridesharing refers to encouraging commuters to ride in vehicles with other commuters rather than drive alone to work. The most common forms of ridesharing are carpool and vanpools. The benefits of such programs include less congestion, reduced fuel consumption, and better air quality. The program will include:

- Newsletters about the program;
- Coordination with MassRides, which leases commuter vans and provides administrative and organizational assistance; and
- In addition, the Proponent will evaluate the demand for a shared car service, such as ZipCar, to lessen the need for residents to own cars.
- Participation with MassRides, the region's commute management program, in ridesharing program, promotion of transit, and other "commuter choice" programs.
- Join the Metro West/495 Transportation Management Agency (TMA)

Shuttle Service –The Proponent is committed to implement ridesharing programs and to coordinate ridesharing efforts with other local businesses. The Proponent will also promote the use of and consider providing shuttle bus service for a nominal fee (to be determined subject to appropriate approvals). The route could run from the site to the MBTA's Lincoln station (Fitchburg Line) or the MBTA's Natick station (Framingham/Worcester Line), the closest two MBTA commuter rail stations. The shuttle service would solely be for the residents and employees of Wayland Town Center. The shuttle could also provide service

to Wayland, including the downtown, shopping opportunities and medical offices. It is expected that the shuttle could loop from the site to the MBTA commuter rail stations primarily during the morning and evening peak periods. During midday hours, the shuttle could either have a fixed schedule, making trips to the other retail opportunities along Route 20, or could be as an on-call service for residents for specific purposes, such as doctors visits off-site. A schedule for the shuttle bus would to be determined, as it will largely be determined by the expressed demand of residents and employees. However, at a minimum, it is anticipated that there will be regularly scheduled pick-ups and drop-offs at either of the two MBTA commuter stations during the hours of 6:00 to 9:00 AM and 4:00 to 7:00 PM, so as to coincide with the anticipated shift changes for employees. Scheduling beyond this will be determined by resident and employee need.

Bicycle Facilities – To encourage bicycle commuting to and from the site, the Proponent will install bicycle racks as a part of the project. Connections to the rail trail will also be explored.

3.5.4 Projected Vehicle Queues

At the Route 20, Route 27 and Route 126 intersections, the projected vehicular queues were determined and are tabulated in Tables 3-28 through 3-31. The projected queues are also shown graphically on Figures 3-46 through 3-51.

Table 3-28 Vehicle Queue Analysis – Access Alternative A, Route 27 at Route 126

	Queue Length in Feet				
	2006 Existing	2011 No-Build	2011 Build	2011 Build w/Mitigation	
Peak Hour/Approach/Lane Group	95th Percentile	95th Percentile	95th Percentile	Average	95th Percentile
Weekday Morning Peak Hour:					
Route 27 Southbound:					
All movements	0	2	2	--	--
Left turns	--	--	--	2	9
Through movements	--	--	--	123	218
Route 27 Northbound:					
Through movements	0	0	0	32	66
Right turns	0	0	0	0	42
All movements	--	--	--	--	--
Route 126 Westbound:					
All movements	311	756	407	85	136
Weekday Evening Peak Hour:					
Route 27 Southbound:					
All movements	0	12	14	--	--
Left turns	--	--	--	20	34
Through movements	--	--	--	218	237
Route 27 Northbound:					
Through movements	0	0	0	232	220
Right turns	0	0	0	0	0
All movements	--	--	--	--	--
Route 126 Westbound:					
All movements	777	NC	NC	310	375
Saturday Midday Peak Hour:					
Route 27 Southbound:					
All movements	0	1	7	--	--
Left turns	--	--	--	15	38
Through movements	--	--	--	134	246
Route 27 Northbound:					
Through movements	0	0	0	92	166
Right turns	0	0	0	0	36
All movements	--	--	--	--	--
Route 126 Westbound:					
All movements	216	465	722	195	270

Table 3-29 Vehicle Queue Analysis – Access Alternative A, Route 20 at Route 27/126

Peak Hour/Approach/ Lane Group	Queue Length in Feet							
	2006 Existing		2011 No-Build		2011 Build		2011 Build w/Mitigation	
	Average	95th Percentile	Average	95th Percentile	Average	95th Percentile	Average	95th Percentile
Weekday Morning Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	177	356	66	125	–	–
Through movements	–	–	718	981	730	1,011	–	–
Right turns	–	–	53	102	56	103	–	–
All movements	274	423	–	–	–	–	353	482
Route 20 Westbound:								
Left turns	–	–	30	59	30	59	–	–
Through movements	–	–	904	1,151	740	996	–	–
Right turns	–	–	127	195	76	127	–	–
All movements	329	564	–	–	–	–	249	335
Route 27/126 Southbound:								
Left turns	112	235	140	231	131	227	93	220
Through/right turns	260	444	619	855	549	849	419	644
Route 27/126 Northbound:								
Left turns	79	188	156	256	106	183	69	172
Through/right turns	227	365	611	866	500	749	349	565
Weekday Evening Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	219	397	69	153	–	–
Through movements	–	–	989	1,264	1,034	1,309	–	–
Right turns	–	–	89	143	83	141	–	–
All movements	326	562	–	–	–	–	580	717
Route 20 Westbound:								
Left turns	–	–	16	37	16	37	–	–
Through movements	–	–	900	1,147	860	1,108	–	–
Right turns	–	–	152	231	157	239	–	–
All movements	432	716	–	–	–	–	326	426
Route 27/126 Southbound:								
Left turns	165	239	230	378	171	257	174	280
Through/right turns	195	281	474	672	485	661	304	510
Route 27/126 Northbound:								
Left turns	54	141	103	176	138	228	108	267
Through/right turns	351	586	850	1,101	888	1,141	673	910
Saturday Midday Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	205	423	78	149	–	–
Through movements	–	–	635	975	929	1,215	–	–
Right turns	–	–	83	163	124	209	–	–
All movements	310	545	–	–	–	–	424	554
Route 20 Westbound:								
Left turns	–	–	29	63	20	44	–	–
Through movements	–	–	696	999	1,042	1,285	–	–
Right turns	–	–	85	147	113	175	–	–
All movements	313	491	–	–	–	–	198	264
Route 27/126 Southbound:								
Left turns	77	180	112	167	134	232	86	201
Through/right turns	146	232	319	447	381	519	256	416
Route 27/126 Northbound:								
Left turns	91	210	140	203	197	362	162	325
Through/right turns	143	230	316	457	391	549	278	461

Table 3-30 Vehicle Queue Analysis – Access Alternative B, Route 27 at Route 126

	Queue Length in Feet				
	2006 Existing	2011 No-Build	2011 Build	2011 Build w/Mitigation	
Peak Hour/Approach/ Lane Group	95th Percentile	95th Percentile	95th Percentile	Average	95th Percentile
Weekday Morning Peak Hour:					
Route 27 Southbound:					
All movements	0	2	1	--	--
Left turns	--	--	--	1	5
Through movements	--	--	--	166	267
Route 27 Northbound:					
Through movements	0	0	0	86	132
Left turns	0	0	0	0	0
Through movements	--	--	--	--	--
Route 126 Westbound:					
All movements	311	756	518	91	147
Weekday Evening Peak Hour:					
Route 27 Southbound:					
All movements	0	12	0	--	--
Left turns	--	--	--	0	2
Through movements	--	--	--	116	145
Route 27 Northbound:					
Through movements	0	0	0	206	545
Right turns	0	0	0	0	12
All movements	--	--	--	--	--
Route 126 Westbound:					
All movements	777	NC	NC	122	274
Saturday Midday Peak Hour:					
Route 27 Southbound:					
All movements	0	1	1	--	--
Left turns	--	--	--	1	5
Through movements	--	--	--	123	200
Route 27 Northbound:					
Through movements	0	0	0	90	218
Right turns	0	0	0	0	12
All movements	--	--	--	--	--
Route 126 Westbound:					
All movements	216	465	700	97	265

Table 3-31 Vehicle Queue Analysis – Access Alternative B, Route 20 at Route 27/126

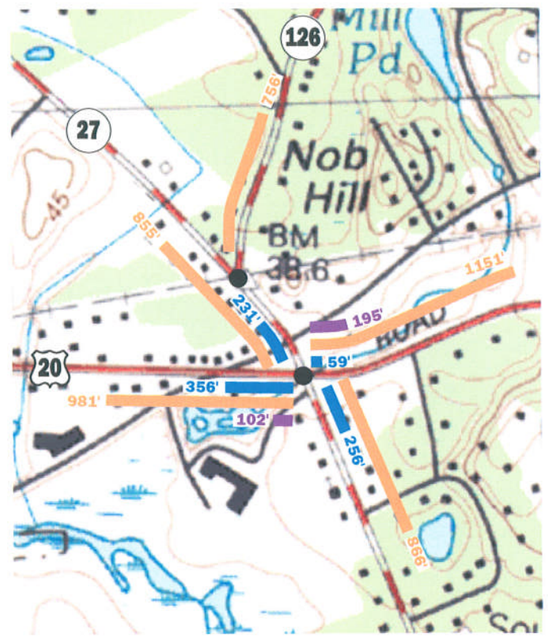
	Queue Length in Feet							
	2006 Existing		2011 No-Build		2011 Build		2011 Build w/Mitigation	
Peak Hour/Approach/Lane Group	Average	95th Percentile	Average	95th Percentile	Average	95th Percentile	Average	95th Percentile
Weekday Morning Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	177	356	203	394	123	275
Through movements	–	–	718	981	741	1,032	284	362
Right turns	–	–	53	102	57	107	–	–
All movements	274	423	–	–	–	–	–	–
Route 20 Westbound:								
Left turns	–	–	30	59	29	59	23	48
Through movements	–	–	904	1,151	749	1,015	307	421
Right turns	–	–	127	195	72	121	–	–
All movements	329	564	–	–	–	–	–	–
Route 27/126 Southbound:								
Left turns	112	235	140	231	124	213	89	199
Through/Right turns	260	444	619	855	574	832	398	633
Route 27/126 Northbound:								
Left turns	79	188	156	256	118	203	90	221
Through/Right turns	227	365	611	866	474	717	351	535
Weekday Evening Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	219	297	451	655	298	490
Through movements	–	–	989	1,264	1,117	1,394	421	516
Right turns	–	–	89	143	108	179	–	–
All movements	326	562	–	–	–	–	–	–
Route 20 Westbound:								
Left turns	–	–	16	37	16	37	12	29
Through movements	–	–	900	1,147	1,164	1,420	566	706
Right turns	–	–	152	231	150	221	–	–
All movements	432	716	–	–	–	–	–	–
Route 27/126 Southbound:								
Left turns	165	239	230	378	132	204	129	266
Through/Right turns	195	281	474	672	416	526	375	540
Route 27/126 Northbound:								
Left turns	54	141	103	176	162	278	166	347
Through/Right turns	351	586	850	1,101	801	1,074	699	940
Saturday Midday Peak Hour:								
Route 20 Eastbound:								
Left turns	–	–	205	423	78	149	236	423
Through movements	–	–	635	975	929	1,215	365	506
Right turns	–	–	83	163	124	209	–	–
All movements	310	545	–	–	–	–	–	–
Route 20 Westbound:								
Left turns	–	–	29	69	20	44	12	28
Through movements	–	–	696	999	1,042	1,285	404	525
Right turns	–	–	85	147	113	175	–	–
All movements	313	491	–	–	–	–	–	–
Route 27/126 Southbound:								
Left turns	77	180	112	167	134	232	89	184
Through/Right turns	146	232	319	447	381	519	278	466
Route 27/126 Northbound:								
Left turns	91	210	140	203	197	362	247	437
Through/Right turns	143	230	316	457	391	549	235	383

95th Percentile Queue

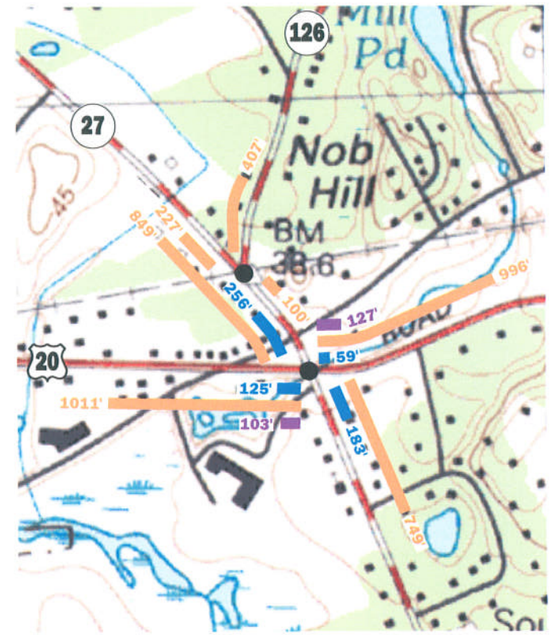
- Left-Turn Lane
- Through Lane
- Right-Turn Lane

2006 EXISTING

2011 NO-BUILD



2011 BUILD
ACCESS ALTERNATIVE NO. 1



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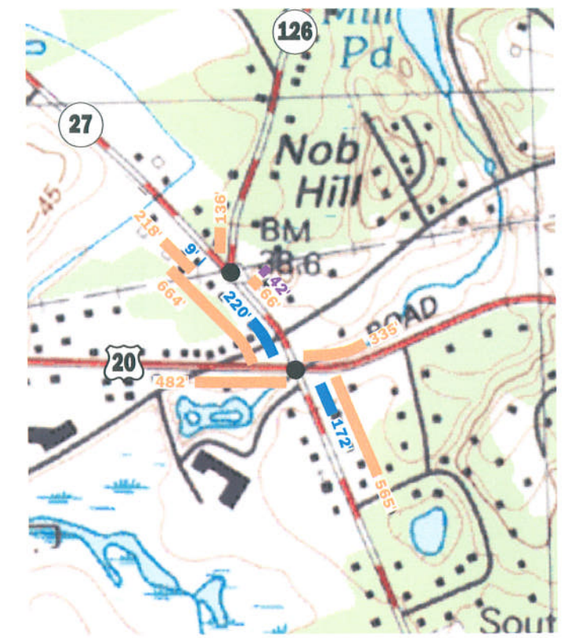


Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-46

Projected Vehicular Queues
Weekday Morning Peak Hour
Access Alternative A

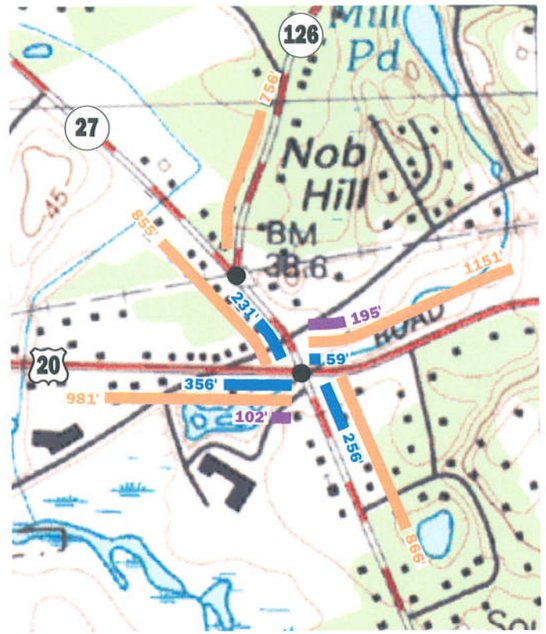
R:\4886\DEIR\4886queue1.dwg 11/8/2006 9:49:13 AM EST

95th Percentile Queue

- Left-Turn Lane
- Through Lane
- Right-Turn Lane

2006 EXISTING

2011 NO-BUILD



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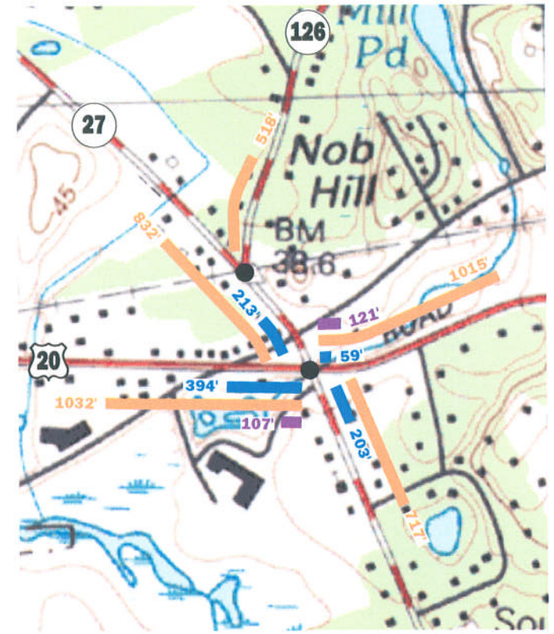
ACCESS ALTERNATIVE NO. 2



2011 BUILD WITH MITIGATION
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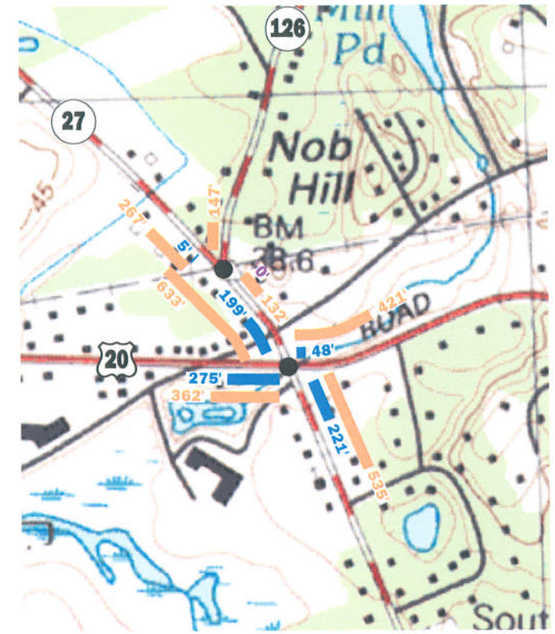


Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

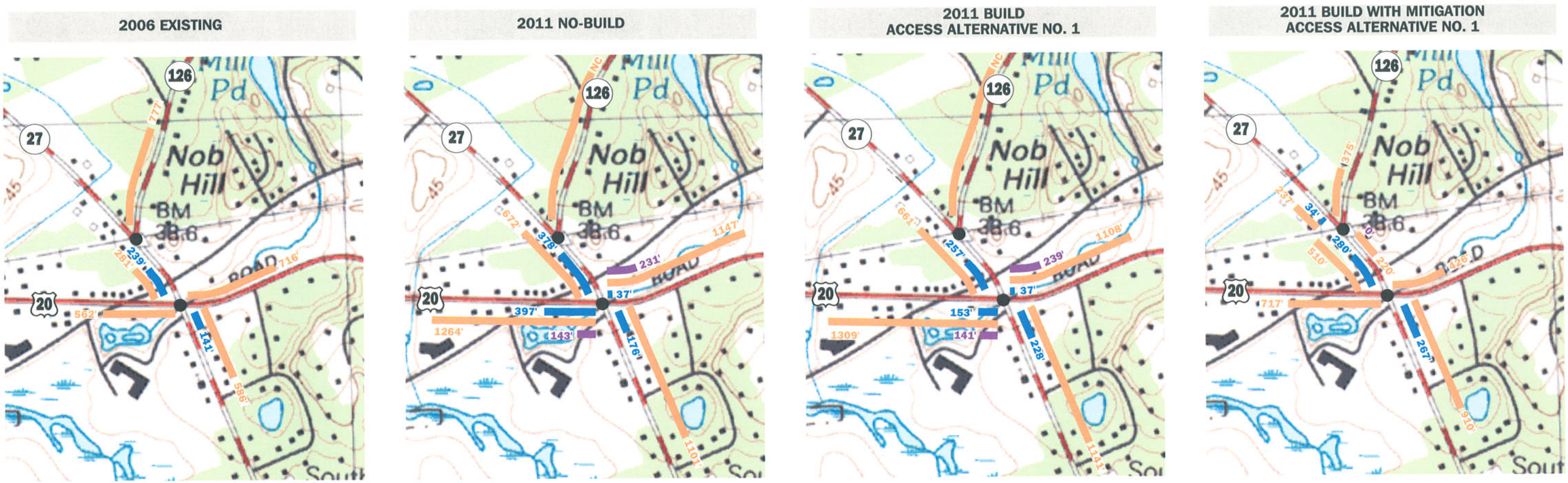
Figure 3-47

Projected Vehicular Queues
Weekday Morning Peak Hour
Access Alternative B

R:\4886\DEIR\4886queue2.dwg 11/22/2006 2:54:01 PM EST

95th Percentile Queue

- Left-Turn Lane
- Through Lane
- Right-Turn Lane
- NC: Not Caculated.



Note: NC = Not calculated
Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

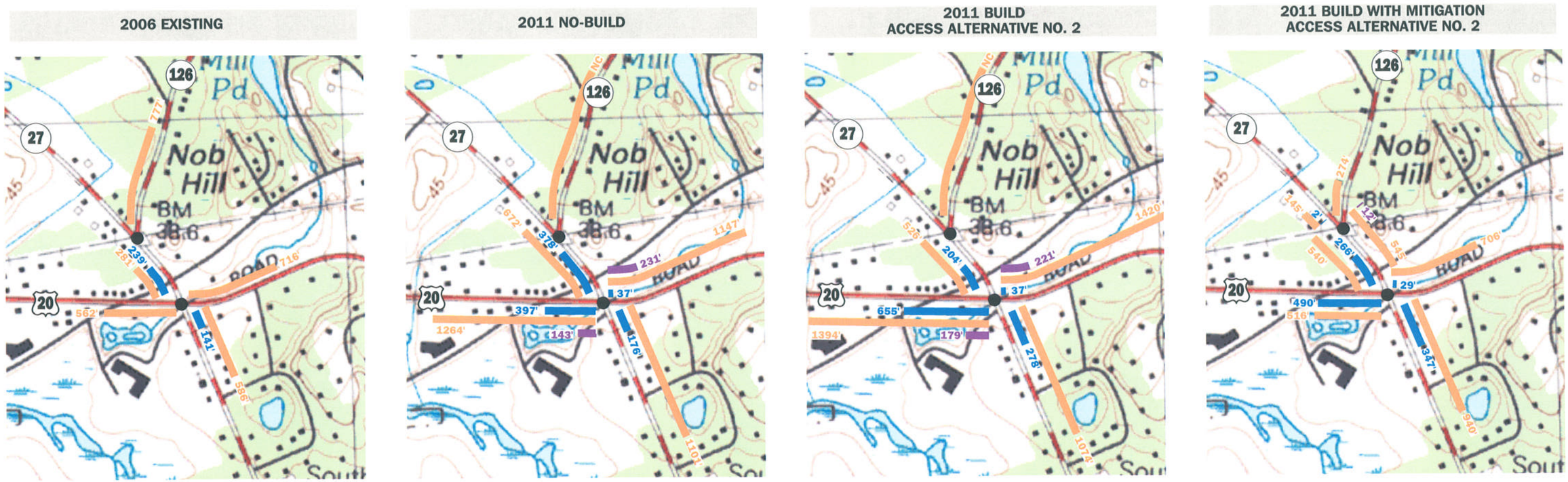
Figure 3-48

Projected Vehicular Queues
Weekday Evening Peak Hour
Access Alternative A

R:\4886\DEIR\4886queue3.dwg 11/22/2006 2:54:29 PM EST

95th Percentile Queue

- Left-Turn Lane
- Through Lane
- Right-Turn Lane
- NC: Not Caculated.



Note: NC = Not calculated
Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-49

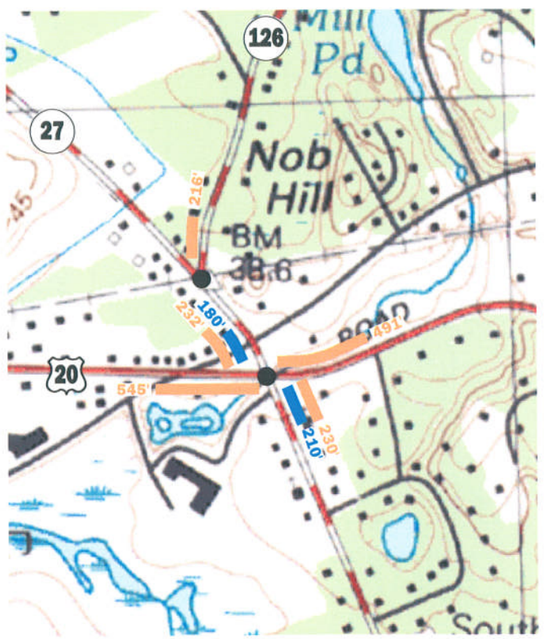
Projected Vehicular Queues
Weekday Evening Peak Hour
Access Alternative B

R:\4886\DEIR\4886queue4.dwg 11/22/2006 2:54:59 PM EST

95th Percentile Queue

- Left-Turn Lane
- Through Lane
- Right-Turn Lane

2006 EXISTING



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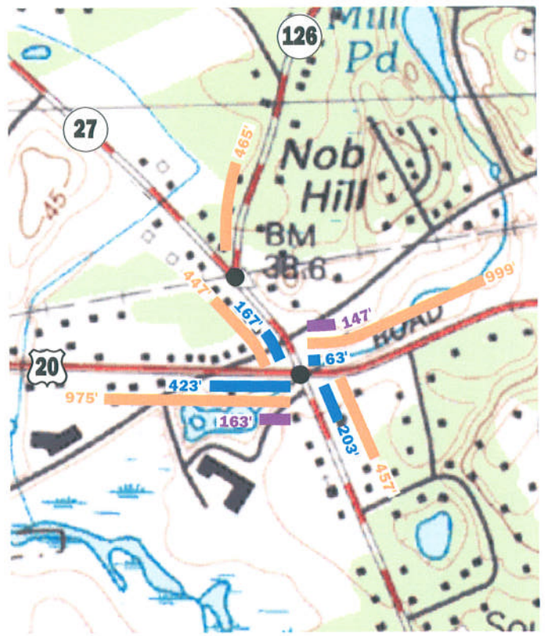
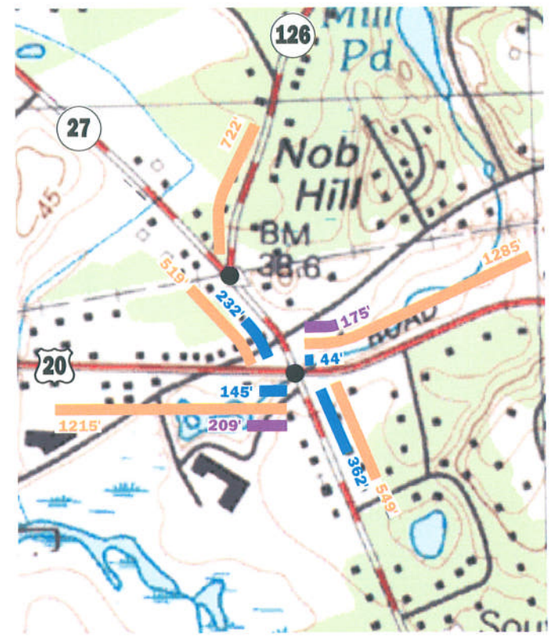
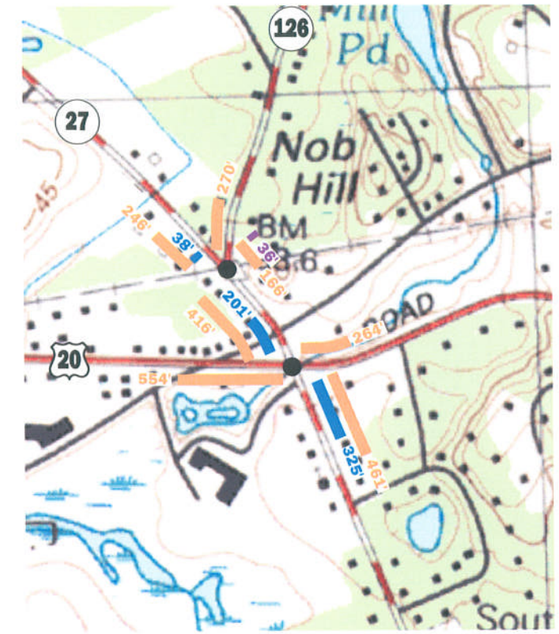


2011 BUILD
ACCESS ALTERNATIVE NO. 1



2011 BUILD WITH MITIGATION
ACCESS ALTERNATIVE NO. 1



Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-50

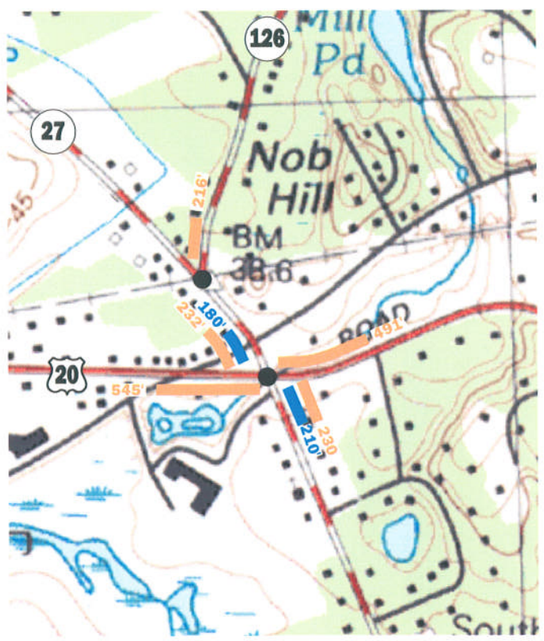
Projected Vehicular Queues
Saturday Midday Peak Hour
Access Alternative A

R:\4886\DEIR\4886queue5.dwg 11/22/2006 2:55:29 PM EST

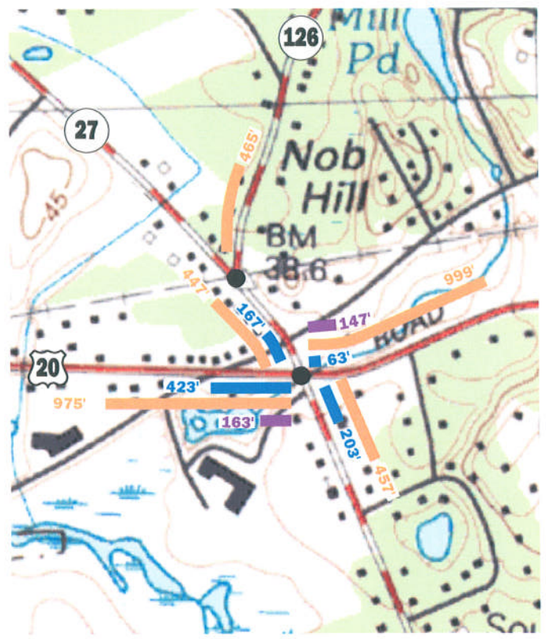
95th Percentile Queue

- Left-Turn Lane
- Through Lane
- Right-Turn Lane

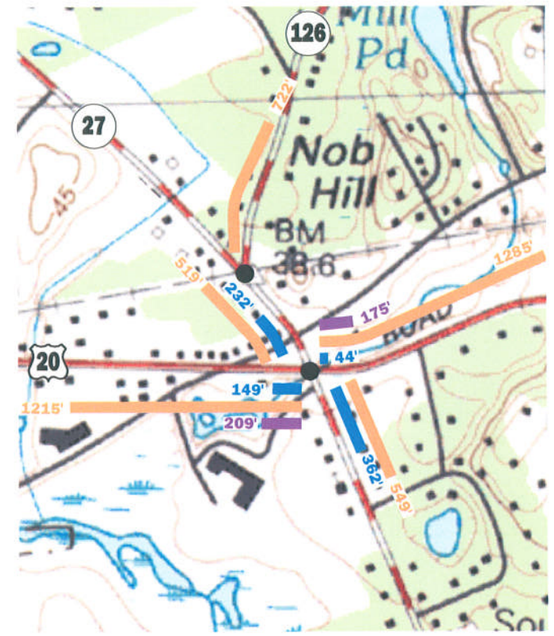
2006 EXISTING



2011 NO-BUILD



2011 BUILD
ACCESS ALTERNATIVE NO. 1



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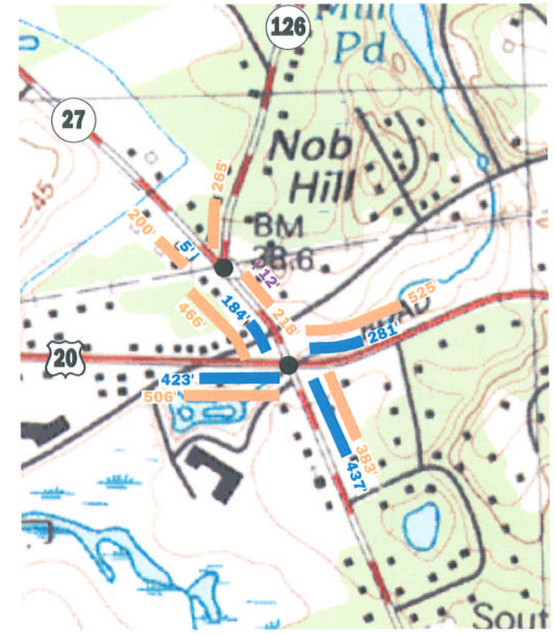

Source: 1987 USGS Map

0 400 800 Scale in Feet

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-51

Projected Vehicular Queues
Saturday Midday Peak Hour
Access Alternative B

R:\4886\DEIR\4886queue6.dwg 11/22/2006 2:56:00 PM EST

3.5.5 Construction

3.5.5.1 Construction Period

The construction period will generate truck traffic and construction employee traffic. The construction of the project will involve the use of designated routes, defined in coordination with Town of Wayland staff, prior to the start of construction. The project Proponent will require all contractors to access the site from Route 20. The use of local residential streets will be prohibited. The contractor will establish site trailers and staging areas to minimize impacts on traffic. Trucks will be required to wait in on-site staging areas and will be prohibited from waiting on Route 20.

The project Proponent is also committed to working with Town of Wayland and MassHighway officials to help ensure appropriate maintenance and protection measures are in place during the project's construction. Appropriate traffic maintenance plans will be developed during the off-site improvement design phase.

The off-site construction of the associated transportation improvements and utility relocations will be performed during off-peak travel periods. It is anticipated that traffic patterns would be maintained on any affected roadways at all times and that there would not be a need for a full road closure or detours during the construction period.

3.5.5.2 Environmental Impacts

The proposed improvements to Route 20 at the Route 27 intersection may result in the disturbance of up to 300 feet of bank and between 500 and 3,400 square feet of bordering vegetated wetlands associated with Mill Brook, depending upon the access alternative selected and associated grading and retaining wall requirements. The disturbance area will be comprised of a narrow band of wetland located at the toe of slope of the current roadway bank.

All bordering vegetated wetlands impacted by the proposed roadway improvements will be replicated at a ratio of 1.5 to 1 in an area hydrologically connected to the area of the impact. Per the Development Agreement with the Town of Wayland, the proposed replication area will also be located on town-owned land.

The final need for and identification of a replication area will be determined in coordination with the Town of Wayland Natural Resources department and the Conservation Commission during the Notice of Intent process. In the meantime, a preliminary area meeting the above conditions and the regulatory standards and performance criteria for wetland replication has been identified immediately west of the area proposed for roadway widening (see Section 4.1). This area is located in the same hydrologic environment as the anticipated encroachment area and at a common elevation relative to flood storage mitigation. The replacement area would be constructed near the impacted wetland and

along the same elevation to ensure that the functions and values presumed significant under both the state and local wetland regulations are not impaired. Ultimately, the area would be designed so as to enhance site conditions by diversifying the wetland as compared to the impact area through the use of shrub and tree species native to and compatible with those portions of this wetland system that are more removed from the roadway.

3.5.5.3 Land Taking

The identified mitigation does not require land from private landowners to implement. The only land that will be used is located within existing rights of way, or land from the Town of Wayland or the MBTA.

3.5.5.4 Schedule

It is anticipated that the Wayland Town Center project may be constructed in two phases. The identified off-site improvements for the site access, Route 20 and Route 27/Route 126 intersection, and north Wayland intersections will be implemented prior to the occupancy of the project. Occupancy is currently targeted for 2009.

3.5.6 Mitigation Commitment

Following is a summary of the mitigation that has been developed by the project Proponent. These measures have been specifically geared towards mitigating the impacts of the project. These measures will be completed prior to project occupancy. The measures are as follows:

Route 20, Route 27 and Route 126

Replace the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section. With the four-lane cross section, the lane uses on the Route 20 eastbound and westbound approaches should be designated as a shared through/left-turn lane and a shared through/right-turn lane. Signal equipment modifications would also be necessary to accommodate the revised intersection geometry.

Route 27 and Route 126

Signalize the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20. Vehicle queue detectors should be installed on the Route 27 approaches to Route 126 such that vehicular queues do not extend back to and block Millbrook Road or the proposed Route 27 site driveway.

Route 27, Route 126, and Millbrook Road

As a result of the signalization of Route 27 and Route 126 intersection, and the interconnection with the signal at Route 20, operations at this intersection are projected to improve. This is a result of gaps created by the two signals to allow vehicles to exit Millbrook Road. Do Not Block Intersection signs should be installed on the Routes 27/126 approaches.

Route 20 and Proposed Site Driveway

The existing intersection geometry will need to be modified to safely and efficiently accommodate the projected site-generated traffic and cut-through traffic associated with the internal connector road. Specifically, the Route 20 eastbound approach should be widened to accommodate a single exclusive left-turn lane and a through travel lane. The Route 20 westbound approach should be widened to accommodate a through travel lane and an exclusive right-turn lane. The site driveway approach to Route 20 should provide separate left- and right-turn lanes. Approximately 400 feet east of the site driveway, there will be a right-turn out only driveway to Route 20 westbound. This driveway should be placed under STOP-sign control.

Further, a second option has been reviewed. It is recommended that the proposed site driveway intersection be aligned opposite a new driveway to Russell's Garden Center which would be brought under traffic signal control. By constructing a new driveway to serve Russell's Garden Center, the existing wide and uncontrolled curb cut along the south side of Route 20 (for Russell's Garden Center) can be closed, significantly reducing vehicular conflicts along this section of Route 20. This driveway would be constructed with assistance and approval from Russell's Garden Center.

Route 27 and Proposed Site Driveway

The Route 27 northbound approach should be widened to accommodate an exclusive left-turn lane and a through travel lane. The Route 27 southbound approach should be widened to accommodate a through travel lane permitting right-turns. The site driveway approach to Route 27 should provide separate left- and right-turn lanes. Further, it is recommended that signal conduit and foundations be installed at this intersection such that when warranted, the intersection would be brought under traffic signal control.

Traffic Calming Measures

To reduce the use of Glezen Lane, Bow Road and other local streets by residents of the Wayland Town Center project, and to slow travel speeds through these residential areas, appropriate traffic calming measures should be implemented. These measures have been identified above and with the approval of the Town of Wayland, will be installed.

Traffic Demand Management

The program will include:

- Newsletters about the program;
- Coordination with MassRides which leases commuter vans and provides administrative and organizational assistance; and
- In addition, the Proponent will evaluate the demand for a shared car service, such as ZipCar, to lessen the need for residents to own cars.
- Participation with MassRides, the region's commute management program, in ridesharing program, promotion of transit, and other "commuter choice" programs.
- Join the Metro West/495 Transportation Management Agency (TMA)

The Proponent is committed to providing TDM measures. To this end, the Proponent will assign the Transportation Demand Management responsibilities to the campus transportation manager, who will oversee the various TDM programs.

Shuttle Service

The Proponent will promote the use of and consider providing shuttle bus service. A schedule for the shuttle bus would to be determined, as it will largely be determined by the expressed demand of residents and employees.

Bicycle Facilities

To encourage bicycle commuting to and from the site, the Proponent will install bicycle racks as a part of the project. Connections to the rail trail will also be explored.

Pedestrian Measures

The project Proponent is also committed to provide pedestrian access to the site. The project Proponent will donate $250,000 to the Town of Wayland for the purpose of constructing a walkway/bikeway along the existing MBTA right-of-way south of the site. The project Proponent is also committed to provide access to the site from this walkway/bikeway, as well as to work with property owners south of the MBTA right-of way to provide pedestrian access to Route 20.

3.6 Air Quality Analysis

3.6.1 Introduction

As required by the MEPA Certificate, a mesoscale analysis was performed for the project based on the number of vehicle trips per day ("vtd") generated, which will exceed the 3,000 vtd threshold for a mesoscale analysis. The analysis includes both an estimate of the volatile organic carbon ("VOC") emissions associated with all project-related vehicle trips and a demonstration that the VOC emissions associated with the build condition will be less than those from the existing condition in both the short and long term. In the case where hydrocarbon emissions from the build condition are expected to be greater than the future No-build, the analysis includes identification and review of reasonable and feasible reduction and mitigation measures.

The analysis was conducted consistent with the Massachusetts Department of Environmental Protection ("DEP") mesoscale guidance and other similar projects. The Secretary's Certificate required that the Draft EIR include an air quality analysis to demonstrate compliance with the State Implementation Plan ("SIP").

A mesoscale analysis was performed to assess the total VOCs/nitrogen oxides (NOx) associated with motor vehicle emissions related to the project. Transportation demand management ("TDM") and other mitigation strategies to reduce air quality impacts are described in Section 3.5 of this Draft EIR.

3.6.1.1 Mesoscale Analysis

A mesoscale analysis predicts the change in regional emissions due to the project. The total vehicle pollutant burden was estimated for the no-build and build conditions for the future year 2011 based on the traffic analysis performed by Vanasse & Associates, Inc. The conditions are described in more detail in the Transportation Section 3.4.

For each condition modeled, the EPA MOBILE6.2 computer program was used to estimate motor vehicle emissions of VOC/NOx on the roadway network. Emission estimates derived from MOBILE6.2 for VOCs/NOx are based on the worst case of either wintertime or summertime conditions.

Intersection Selection

Intersection selection criteria for a mesoscale analysis is typically based on the area where the project will affect the surrounding intersections and traffic patterns. For this analysis, twenty seven intersections were included in the analysis based on the traffic study. The intersections are identified in Table 3-18 in Section 3.4.2.

The traffic volumes calculations provided in Section 3.2 and 3.3, and Appendix F form the basis of the air quality study.

Emissions Calculations (MOBILE6.2)

For each case modeled, the EPA MOBILE6.2[21] computer program was used to estimate motor vehicle emissions on the roadway network. Emissions data calculated by the MOBILE6.2 model are based on motor vehicle operations typical of peak periods. The Commonwealth's statewide annual Inspection and Maintenance ("I&M") Program was included, as well as state specific vehicle age registration distribution. The MOBILE6.2 inputs are based on the latest guidance issued by DEP[22] regarding updated inputs to the model. MOBILE6.2 input parameters are provided in the air quality appendix, Appendix F. In addition, emission calculations are presented for the VOC build and no-build scenarios.

The mesoscale analysis predicts the change in regional emissions due to the project. This is accomplished by multiplying changes in traffic flow (in vehicle miles traveled[23]) by an emission factor (grams per vehicle mile traveled). An average vehicle speed of 30 miles per hour ("mph") was used to estimate emissions for all links.

3.6.1.2 Conclusion

Results of the mesoscale analysis are presented in Table 3-32 for the 2011 buildout condition. The results show an increase in daily VOC and NOx emissions for the 2011 build conditions versus the no-build condition for most conditions except the morning time period, where a slight reduction is observed. This could be attributed to higher volumes in the AM associated with the industrial park related traffic at the site for the No-build condition compared to the project.

The 2011 build condition results in a slight decrease in morning VOC/NOx emissions of 6.4 percent, while the evening peak hourly VOC/NOx emissions show an increase of 31 percent. The Saturday and Sunday peak condition results in an increase of 15 percent and 5.3 percent, respectively.

The 2011 build condition results in a decrease of VOC/NOx emissions for all peak periods when compared to the existing conditions due to cleaner, more efficient vehicles.

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21 MOBILE6.2 is an EPA computer model that calculates emission factors for hydrocarbons, carbon monoxide, and oxides of nitrogen form gasoline and diesel fueled highway motor vehicles

22 MADEP: February 12, 2003 memorandum for MOBILE6 inputs for performing microscale and mesoscale analysis. Inputs are based on the latest MOBILE6 inputs from MADEP dated 7/7/2004.

23 Vehicle Miles Traveled (VMT) – the average daily traffic multiplied by the roadway link length.

3.6.1.3 Mitigation Measures and Conclusions

As is required when the mesoscale results show an increase in emissions from the no-build to build conditions, the Proponent has identified and reviewed reasonable and feasible reduction and mitigation measures to address the increase in emissions associated with the 2011 build scenario. Proposed traffic mitigation measures are described in detail in Section 3.5 of this Draft EIR.

Table 3-32 2011 Buildout Mesoscale Analysis Summary

Pollutant	Time	Units	Existing	Full Build	No-Build	BD-NB	% Difference (BD-NB)	BD-Existing	% Difference (BD-existing)
VOC	AM Peak	grams/hr	9,399.5	6,200.3	6,623.0	-422.8	-6.4%	-3199.3	-51.6%
		tons/hr	0.01036	0.00683	0.00730	-0.00047	-6.4%		
		tons/day*	0.104	0.068	0.073	-0.005	-6.4%		
	PM Peak	grams/hr	9977.001	9269.910	7077.310	2,192.6	31.0%	-707.1	-7.6%
		tons/hr	0.01100	0.01022	0.00780	0.00242	31.0%		
		tons/day*	0.110	0.102	0.078	0.024	31.0%		
	SAT Peak	grams/hr	7,276.7	5,943.6	5,179.8	763.8	14.8%	-1333.2	-22.4%
		tons/hr	0.00802	0.00655	0.00571	0.00084	14.8%		
		tons/day*	0.080	0.066	0.057	0.008	14.8%		
	SUN Peak	grams/hr	6,448.6	4,584.1	4,353.7	230.5	5.3%	-1864.4	-40.7%
		tons/hr	0.00711	0.00505	0.00480	0.00025	5.3%		
		tons/day*	0.071	0.051	0.048	0.003	5.3%		

BD = Full Build
NB = No-build
* Tons/day estimated by assuming hourly peak is 10 percent of total volume.

Table 3-32 (Continued) 2011 Buildout Mesoscale Analysis Summary

Pollutant	Time	Units	Existing	Full Build	No-Build	BD-NB	% Difference (BD-NB)	BD-Existing	% Difference (BD-existing)
NOx	AM Peak	grams/hr	22,840.0	13,934.3	14,884.4	-950.1	-6.4%	-8905.67	-63.9%
		tons/hr	0.02518	0.01536	0.01641	-0.00105	-6.4%		
		tons/day*	0.252	0.154	0.164	-0.010	-6.4%		
	PM Peak	grams/hr	24,243.2	20,832.9	15,905.3	4,927.6	31.0%	-3410.28	-16.4%
		tons/hr	0.02672	0.02296	0.01753	0.00543	31.0%		
		tons/day*	0.267	0.230	0.175	0.054	31.0%		
	SAT Peak	grams/hr	17,681.8	13,357.4	11,640.9	1,716.5	14.8%	-4324.41	-32.4%
		tons/hr	0.01949	0.01472	0.01283	0.00189	14.8%		
		tons/day*	0.195	0.147	0.128	0.019	14.8%		
	SUN Peak	grams/hr	15,669.4	10,302.2	9,784.3	518.0	5.3%	-5367.19	-52.1%
		tons/hr	0.01727	0.01136	0.01079	0.00057	5.3%		
		tons/day*	0.173	0.114	0.108	0.006	5.3%		

BD = Full Build
NB = No-build
* Tons/day estimated by assuming hourly peak is 10 percent of total volume.

4.0 Wetlands and Drainage

4.0 WETLANDS AND DRAINAGE

4.1 Wetlands

This section describes wetlands resource areas on the project site, the project's potential impacts on those resource areas, and measures that the project will implement to avoid or minimize and mitigate impacts to wetlands. Efforts to insure compliance with the DEP Stormwater Management Policy are presented in Section 4.2.

4.1.1 Wetland Delineation

Wetland resource areas have been delineated on both the Wayland Town Center site and at the area of proposed roadway improvements at the intersection of Routes 20 and 27. An Abbreviated Notice of Resource Area Delineation (ANRAD) for these resource areas was submitted to the Wayland Conservation Commission on October 5, 2006. Public hearings on the ANRAD filing were held by the Conservation Commission on October 19 and November 2, 2006, and an Order of Resource Area Delineation was issued by the Conservation Commission on November 21, 2006.

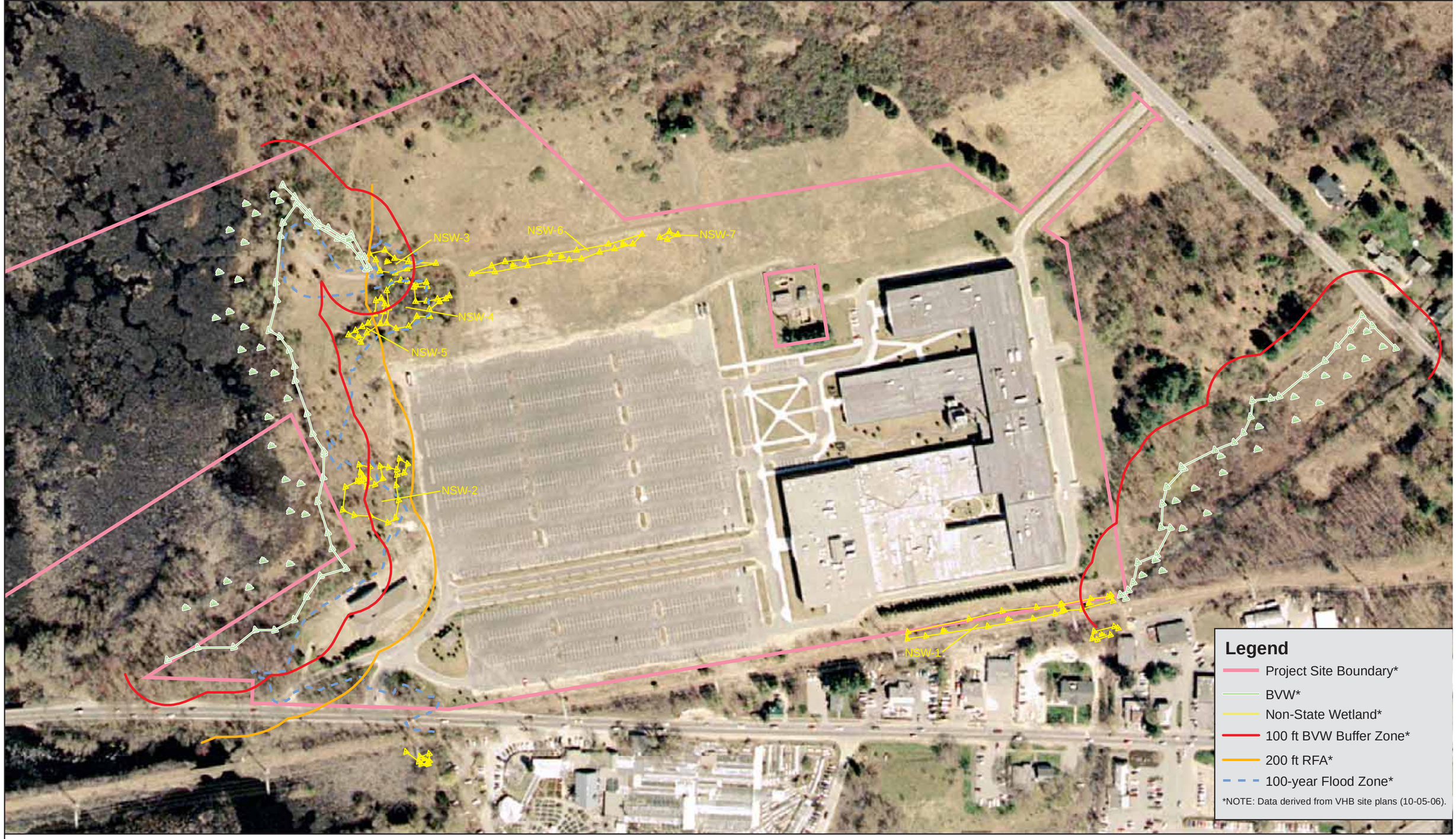
Wetland resource areas identified on the Wayland Town Center and Route 20 sites include bordering vegetated wetlands, land under water bodies/waterways, banks, land subject to flooding and riverfront areas. In addition, small isolated areas of vegetated wetlands subject to the Town of Wayland Wetlands and Water Resources Bylaw (the Bylaw), but not subject to the Massachusetts Wetland Protection Act (the Act), were also identified and delineated (non-state wetlands). The location and extent of each of these resource areas are shown on Figures 4-1 and 4-2 and are reviewed below.

4.1.1.1 Bordering Vegetated Wetlands

Bordering vegetated wetlands (BVW) primarily occur in association with the Sudbury River, as well as Mill Brook within the Route 20 delineation area. These wetlands are described as follows:

Wayland Town Center Site – Sudbury River Floodplain

A line of BVW extends north/south across the western side of the Wayland Town Center site and is associated with the Sudbury River floodplain (see Figure 4-1). For the most part, this floodplain area is vegetated with various species of wetland grasses [e.g. rice cutgrass (*Leersia oryzoides*)], cattail (*Typha sp*), purple loosestrife (*Lythrum salicaria*), and buttonbush (*Cephalanthus occidentalis*). Proximate to floodplain's and wetland's perimeter, however, woody plant species are more abundant, and include black willow (*Salix nigra*), swamp white oak (*Quercus bicolor*), red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), glossy buckthorn (*Frangula alnus),* silky dogwood



Basemap: 2001 Orthophotography, MassG

Scale 1:2,400
1 inch = 200 feet

100 0 100 200 Feet

Figure 4-1
Project Site -- Wetland Resources

Wayland Town Center
Wayland, Massachusetts

Epsilon ASSOCIATES INC.

Scale 1:1,200
1 inch = 100 feet

50 0 50 100 Feet

Figure 4-2
Boston Post Road -- Wetland Resources

Wayland Town Center
Wayland, Massachusetts

Basemap: 2001 Orthophotography, MassG

Epsilon Associates Inc.

(*Cornus amomum)* and honeysuckle (*Lonicera morrowii*). The herbaceous layer is dominated by sensitive fern (*Onoclea sensiblis*) and royal fern (*Osmunda regalis*). A steep break in topography characterizes much of this wetland boundary, in many places reflecting site grading activities conducted in the distant past.

At the north center end of the wetland line on the western side of the Wayland Town Center site an intermittent stream channel extends east and landward from the Sudbury River floodplain. Areas of BVW also occur along portions, but not all, of this channel, which was dry during field investigations conducted in September 2006. Plant species associated with this area primarily include gray birch (*Betula populifolia*), silky dogwood, glossy buckthorn, American elm, purple loosestrife and sensitive fern.

Wayland Town Center Site – Southeast Corner

An area of BVW is located immediately off the southeastern corner of the Wayland Town Center site. This wetland is associated with an intermittent stream also located off the southeast corner of the site. The BVW boundary was derived from a Notice of Intent filed with the Wayland Conservation Commission on August 3, 2005, and is dominated by woody plant species such as black willow, swamp white oak, red maple, green ash, American elm, glossy buckthorn, silky dogwood and honeysuckle. While this wetland is not located on-site, the 100-foot buffer zone does extend onto the project site.

There is a narrow area of vegetated wetlands located in the railroad right-of-way immediately off the southeastern edge of the Wayland Town Center site. This wetland is located immediately parallel to the southern property line directly adjacent to the MBTA rail line and was derived from a Notice of Intent filed with the Wayland Conservation Commission on November 29, 2001. This wetland may have at one time connected via a culvert to the off-site stream/drainage channel and BVW at the southeastern corner of the site, but no evidence of a connection currently exists. Given its limited size and holding capacity, this area is deemed a non-state wetland (NSW-1 on Figure 4-1).

Route 20 at Route 27

The extent of delineated BVW at the intersection of Routes 20 and 27 is shown on Figure 4-2. This wetland is associated with a perennial stream that flows from Mill Pond in a southwesterly direction, discharging to Pine Brook and the Sudbury River south of Pelham Island Road. This wetland is characterized by a steep slope surrounding the wetland perimeter, particularly along Route 20. During field investigations conducted in September 2006, standing water was observed throughout much of the wetland, with dead trees occurring within the central portion of the wetland. Due to the extent of inundation, the stream channel was not visible. Dominant wetland vegetation includes red maple in the canopy, with understory species consisting of silky dogwood, purple loosestrife and cattail, among others.

4.1.1.2 Land Under Water Bodies and Waterways

Land under waterways is limited to the Sudbury River located west of the site and Mill Brook north of Route 20. As indicated on the USGS topographic map of the Framingham quadrangle, and acknowledged in the ANRAD, each of these surface waters constitutes a perennial waterway.

4.1.1.3 Bank

Bank resources occur along the channels of both the Sudbury River and Mill Brook. By definition, however, bank resources also occur in conjunction with the entirety of the intermittent streams and/or drainage channels located in the northwestern and off the southeastern corner of the Wayland Town Center site. As noted previously, areas of BVW occur along portions, but not all, of the intermittent channel at the northwestern area of the Wayland Town Center site. Segments of this intermittent channel lacking BVW consist exclusively of bank.

4.1.1.4 Bordering Land Subject to Flooding

Based on the Flood Insurance Rate Map for the Town of Wayland, bordering lands subject to flooding during a 100-year storm event extend to elevation 123.0 National Geodetic Vertical Datum (NGVD) along both the Sudbury River and Mill Brook; however, the 100-year flood elevation actually extends to elevation 122.65 NGVD. This elevation is based upon the flood profiles for the Sudbury River (Sheet 03P) contained in the Flood Insurance Study for the Town of Wayland dated February 19, 2006. The 100 year flood zone is shown on both Figures 4-1 and 4-2.

In addition to areas subject to flooding bordering upon larger wetlands and waterways, the site wetland resource area delineation effort identified a number of separate isolated depressions on the Wayland Town Center site that included evidence of wetland vegetation, hydric soils and/or of seasonal standing water. The extent of these areas as shown on Figure 4-1 was determined through vegetation, soils, and water marks.

To meet the definition of isolated land subject to flooding under state wetland regulations, an isolated depression must confine standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches at least once a year, and be located outside of the 100-year flood zone. In contrast, the Wayland Wetlands and Water Resources Protection Bylaw only requires that "land subject to flooding or inundation" consist of a depression at least 500 square feet in area, and that this area "floods periodically and/or serves as a ponding area or ground or surface water."

Per the above-referenced state and municipal definitions, none of the isolated depressions identified on the Wayland Town Center site were deemed to meet the criteria of isolated land subject to flooding under the state wetland regulations. This is due to the relatively

small size of these depressions, the limited watershed areas that drain to each of these depressions, and/or their location within the 100-year flood zone. However, based on site-specific observations made during field investigations conducted in September 2006, each of these isolated depressions is deemed to meet the criteria of a protected resource area under the Bylaw relative to land subject to flooding and inundation. A brief description of each of these areas is included in Section 4.1.1.6.

4.1.1.5 Riverfront Area

Riverfront Area is associated with the Sudbury River west of the Wayland Town Center site and the Mill Brook at Routes 20 and 27. The extent of the Riverfront Areas associated with these streams in shown on Figures 4-1 and 4-2.

As can be seen in Figure 4-1, the Riverfront Area on the Wayland Town Center site parallels the western edge of the existing parking lot and includes the upland scrub vegetation along this section of the site. In all, there is approximately 287,000 square feet of Riverfront Area on the site. As can be seen on Figure 4-2, the Riverfront Area along Route 20 east of the Route 27 intersection extends across the roadway and encompasses the first 100 to 150 feet of the residential properties along Route 20.

Consistent with the state wetland regulations, the Riverfront Area limits were based upon visible markings or changes in the character of soils or vegetation. Bank full indications as described in the regulations also served to guide the mean annual high water mark determination, including changes in slope, changes in vegetation and stain lines.

As noted above, the stream located off the southeast corner of the Wayland Town Center site was deemed to be intermittent under the Act and associated regulations. This waterway is indicated as intermittent on the USGS topographic map (Framingham quadrangle). Additionally, an analysis using the USGS StreamStats model indicated that the stream has an estimated streamflow of 0.00 cubic feet/second in conjunction with the 99 percent duration flow. Notwithstanding this finding, it should also be noted that the watershed of the stream above Route 20 is approximately 0.16 square miles. Thus, in accordance with the state wetland regulations, the stream does not constitute a perennial waterway.

4.1.1.6 Non-State Wetlands

There are a number of small, isolated depressions on the site that contain wetland vegetation and/or hydric soils. These are, for the most part, small, isolated topographic low areas created by former site disturbances. These areas are not subject to the state wetland jurisdiction, but are identified as resource areas under the Town of Wayland Wetlands and Water Resources Bylaw. It is of note, however, that at least half of these non-state vegetated wetlands lie within other state-protected resource areas, including the 100-year floodplain and Riverfront Area. In addition, given their proximity to larger wetland areas, these

isolated wetland areas may also be subject to Army Corps of Engineers jurisdiction under the Clean Water Act.

Non-State Wetland # 1

Non-State Wetland #1 (NSW-1) is the narrow area of vegetated wetlands located in the railroad right-of-way immediately off the southeastern edge of the Wayland Town Center site referenced above. This wetland may have at one time connected via a culvert to the offsite intermittent stream and BVW at the southeastern corner of the site, but no evidence of a connection currently exists. Given its limited size and holding capacity, this area is deemed a non-state wetland. In that the right-of-way had been recently cleared, no vegetation is currently present in this wetland. However, cut stems suggested that silky dogwood, black willow and honeysuckle shrubs dominated the area.

Non-State Wetland # 2

Non-State Wetland #2 (NSW-2) is an irregularly shaped area of town wetland, the shape of which reflects former disturbance and the presence of a dirt cart path. Dominant vegetation includes swamp white oak, gray birch, green ash, silky dogwood, glossy buckthorn, honeysuckle and soft rush (*Juncus effusus*). This wetland lies entirely within Riverfront Area, and a large portion also lies within the 100-year flood zone (BLSF).

Non-State Wetland # 3

Non-State Wetland #3 (NSW-3) is a small isolated depression located within the northwestern portion of the property, areas of which exhibit evidence of standing water, e.g. water stained leaves. Dominant vegetation includes glossy buckthorn, grey birch, pussy willow (*Salix discolor*), silky dogwood, sensitive fern, rough-leaved goldenrod (*Solidago rugosa*) and false nettle (*Boehmeria cylindrica*). This wetland lies almost entirely within the 100-year flood zone (BLSF).

Non-State Wetland # 4

Non-State Wetland #4 (NSW-4) is also a small isolated depression located within the northwest portion of the property. Like NSW-3, NSW-4 exhibits evidence of standing water, e.g. water stained leaves. Dominant vegetation includes red maple, glossy buckthorn, silky dogwood, honeysuckle and sensitive fern. This wetland lies almost entirely within the 100-year flood zone (BLSF).

Non-State Wetland #5

Similar to NSW-3 and NSW-4, Non-State Wetland #5 (NSW-5) is a small isolated depression located within the northwest portion of the property. Dominant vegetation includes swamp white oak, gray birch, silky dogwood, glossy buckthorn, honeysuckle and

soft rush. NSW-5 is subject to periodic inundation, as well. This wetland lies partially within Riverfront Area, and entirely within the 100-year flood zone (BLSF).

Non-State Wetland #6

Non-State Wetland #6 (NSW-6) is an elongated isolated depression located proximate to and north of the existing parking lot onsite. Evidence of standing water, including water-stained leaves, is present in scattered location throughout NSW-6. Dominant vegetation includes American elm, glossy buckthorn, gray birch, silky dogwood purple loosestrife, grass-leaved goldenrod (*Euthamia graminifolia*), sensitive fern and tussock sedge (Carex stricta). This non-state wetland lies well beyond the Riverfront Area and flood zones of the site.

Non-State Wetland #7

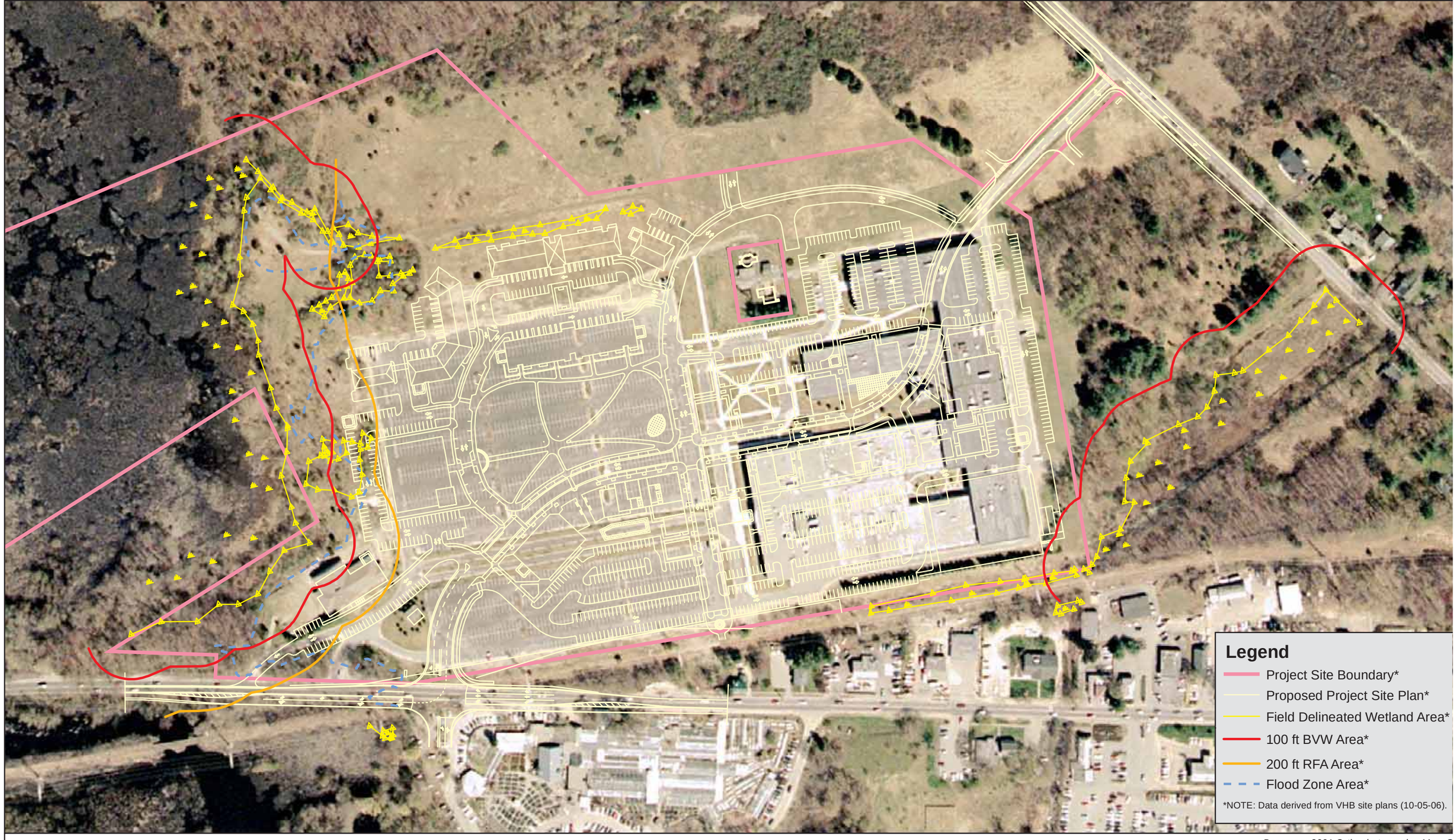
Non-State Wetland #7 (NSW-7) is an extremely small isolated depression located approximately 25-feet east of NSW-6. This wetland exhibits evidence of standing water, with silky dogwood and tussock sedge being the most abundant wetland plant species. This non-state wetland also lies well beyond the Riverfront Area and flood zones of the site.

4.1.2 Wetland Impacts

As discussed above, there are a number of wetland resource areas located on the Wayland Town Center site and proximate to the proposed Route 20 improvements. These include BVW, bank, land subject to flooding, land under water, and Riverfront Area. However, in that the project is centered primarily on previously developed lands, little impact to wetland resources is anticipated. Indeed, as described below, the existing stormwater control system will be significantly improved and brought into compliance with the DEP Stormwater Management Policy and Standards and the Town of Wayland's Wetlands and Water Resources Bylaw Chapter 194 Rules and Regulations. As such, the water quality in the receiving wetland resource areas should be improved as a result of project implementation. The following sections review the Wayland Town Center project and Route 20 improvements in relation to adjacent wetland resource areas.

4.1.2.1 Wayland Town Center Project

Figure 4-3 shows the proposed Wayland Town Center project in relation to the mapped wetland resources. The proposed project does not extend into state-regulated BVW or, with the exception of one location, the associated 100-foot buffer zone. The exception is a small area of the outer ten feet of buffer zone in the far southeast corner of the property; but even here the project is located in a previously developed portion of the site. In that the bank coincides with the BVW on most of the western portion of the site, no work is proposed on or within 100-feet of the bank resource area. A small portion of the parking area associated



Basemap: 2001 Orthophotography, MassG

Scale 1:2,400
1 inch = 200 feet

100 0 100 200
Feet

Figure 4-3
Project Site -- Wetland Resources

Wayland Town Center
Wayland, Massachusetts

Epsilon ASSOCIATES INC.

with the proposed municipal building extends into an area of approximately 2,000 square feet of the 100 year flood plain along the western-most boundary of the project.

A limited portion of the parking area associated with the proposed municipal building extends approximately 25 to 70 feet beyond the existing parking lot along the western edge of the project area (see Figure 4-3). In doing so, sections of this portion of the development will extend into the outer 100 feet of the 200-foot Riverfront Area. In all, approximately 22,000 square-feet of the development will extend into Riverfront Area.

The outer portion of the Riverfront Area in the area of project overlap, and indeed most of the Riverfront Area in this area of the site, consists of a formerly disturbed or graded lands characterized by emergent herbaceous and shrub species. Two of the non-state wetlands developed in a topographic low spots are located entirely or partially within the Riverfront Area (NSW-2 and NSW-5, respectively), and a portion of NSW-2 lies within the proposed development area.

4.1.2.2 Route 20 Improvements

The improvements to Route 20 at the intersection of Route 27 will occur adjacent to wetland resources that parallel the north side of Route 20 at this locale. As noted above, these wetland resources areas are associated with a perennial stream that flows from Mill Pond in a southwesterly direction, discharging to Pine Brook and the Sudbury River south of Pelham Island Road. This wetland is characterized by a steep slope surrounding the wetland perimeter, particularly along Route 20.

As discussed in Section 3.0, two improvement alternatives for the westbound section of Route 20 east of Route 27 are under consideration. Both of these alternatives would involve roadway improvements and some widening of the roadway.

Figure 4-4 shows the current concept plans for the widening of Route 20 in relation to the mapped BVW along this section of roadway. Also shown is the extent of Riverfront Area which, given the proximity of the stream to the existing roadway, extends across Route 20 and another 100 to 150 feet south onto the residential properties along this section of roadway. As shown, the proposed edge of pavement for Alternative 1 extends close to the edge of the BVW, but does not involve any encroachment into BVW. Alternative 2, however, does extend beyond the wetland line and, as shown, results in the filling of approximately 1,700 square feet of BVW and the disturbance of 300 linear feet of bank.

These concept layouts shown in Figure 4-4 do not include potential impacts associated with the need for grading and/or slope protection along the proposed section of improvements. Assuming that the area associated with any such impacts can be limited to five feet beyond the roadway layout, the wetland encroachment under Alternative 1 would be on the order of 500 square feet, while that of Alternative 2 would be approximately 3,400 square feet. All of the work associated with the roadway improvements would occur in Riverfront Area

Basemap: 2001 Orthophotography, MassGIS

Scale 1:1,200
1 inch = 100 feet

50 0 50 100 Feet

Figure 4-4
Proposed Route 20 Roadway Improvements - Alternatives 1 & 2

Wayland Town Center
Wayland, Massachusetts

Epsilon Associates Inc.

G:\Projects2\MA\Wayland\1921\DEIR\figure 4-4.mxd

11/13/06

but, other than the BVW encroachment described above, all work in the Riverfront Area will occur in the existing roadway or roadway shoulder.

4.1.3 Regulatory Overview and Wetland Impact Mitigation

The project has been designed to avoid wetland resource area impacts to the extent practicable, and will mitigate unavoidable resource impacts in accordance with applicable state and local regulations. The concentration of the proposed Wayland Town Center project onto the footprint of the developed portion of the former Raytheon site results in avoidance of any significant wetland encroachment. Similarly, the improvements on Route 20 are designed to minimize the expansion of the roadway surface into the resources areas adjacent to the existing roadway.

4.1.3.1 Wayland Town Center Project

The Wayland Town Center project has been designed to avoid and minimize wetland impacts. State-regulated resource areas that may be affected by the project are limited to BLSF and Riverfront Areas. An area of non-state wetland located entirely within Riverfront Area and partially in BLSF will also be affected.

Bordering Land Subject to Flooding

The proposed Wayland Town Center project involves approximately 2,000 square feet of site alteration in the 100-year floodplain in association with the construction of the parking lot for the proposed municipal building. These alterations should not reduce on-site flood storage volumes or restrict flood flows. The Proponent will mitigate any loss in flood storage capacity in accordance with the Town of Wayland Wetland and Water Resources Bylaw and the DEP regulatory performance standards at 310 CMR 10.57(4)(a)(1), which generally require that the volumetric compensation for lost flood storage be located so as to have an unrestricted hydraulic connection to the same waterway, and have the same elevation, volume and area as that which is lost. Given the small area necessary for meeting these standards, replication of the lost flood storage area will be proposed for an area adjacent or proximate to Non-State Wetland 3, 4 or 5. The exact location will be determined during the Notice of Intent process.

The proposed site alterations in BLSF are not anticipated to impair lands found to be significant to the protection of wildlife habitat, as defined in the Massachusetts Wetland Protection Act regulations at 310 CMR 10.60, or affect specified wildlife habitat sites of rare vertebrate or invertebrate species, as defined in 310 CMR 10.59. The proposed site alterations are located outside the lower floodplain (ten-year floodplain), wetlands, or vernal pool habitat. As discussed in Section 7.0, Rare Species, this area is shown to lie within Estimated and Priority Habitats in the most recent edition of the Massachusetts Natural Heritage Atlas. However, as also discussed in Section 7.0, this area does appear to meet the habitat requirements of the species in question. This issue will be resolved and the

project's compliance with both the Wetland Protection Act and Massachusetts Endangered Species Act will be verified during the Notice of Intent and NHESP review processes.

Riverfront Area

The Wayland Town Center project will encompass approximately 22,100 square feet of Riverfront Area, which is roughly eight percent of the total Riverfront Area on the project site. All of this work is associated with the parking area of the proposed municipal building and will be undertaken in the outer 100 feet of the Riverfront Area. The area of encroachment consists of formerly disturbed uplands with scrub vegetation and a non-state wetland formed in a topographic low area associated with those former disturbances.

The proposed alterations in Riverfront Area should not cause a significant adverse impact, as defined by the regulations 310 CMR 10.58(4)(d). The proposed alterations constitute less than ten percent of the total Riverfront Area on the site and will be designed to maintain existing areas of undisturbed vegetation within 100 feet of the mean annual high water line of the Sudbury River. The project also provides stormwater management in accordance with the DEP Stormwater Management Policy, including the use of erosion and sedimentation controls to attenuate non-point source pollution (see below). Wildlife habitat functions of the Riverfront Area provided by the upland scrub habitat within the inner riparian zone will not be disturbed. The Proponent will further assess the project's effects on important wildlife habitat functions of the Riverfront Area during the Notice of Intent and NHESP review processes.

Buffer Zone

As can be seen in Figure 4-3, there will be virtually no work in the buffer zone. The exception is the small area in the southeast corner of the site. Erosion control measures will be established at the limit of work area throughout the site, precluding impacts from work in or beyond the site wetland buffer zones

4.1.3.2 Route 20 Improvements

The Route 20 improvements will include lane improvements and some widening of the existing roadway. While these improvements will meet the definition of Limited Project as defined in the regulations of the Massachusetts Wetlands Protection Act regulations (310 CMR 10.53), they are likely to fall below the threshold necessitating use of those provisions.

Bordering Vegetated Wetlands

The proposed improvements to Route 20 at the Route 27 intersection will likely result in the disturbance of between 500 and 3,400 square feet of BVW associated with Mill Brook, depending upon the alternative selected and associated grading and retaining wall requirements. The disturbance area will be comprised of a narrow band of wetland located at the toe of slope of the current roadway bank.

BVW impacted by the proposed roadway improvements will be replicated at a ratio of 1.5 to 1 in an area hydrologically connected to the area of the impact. Per the Development Agreement with the Town of Wayland, the proposed replication area will also be located on town-owned land.

The final need for and identification of a replication area will be determined in coordination with the Town of Wayland Natural Resources Department and the Conservation Commission during the Notice of Intent process. In the meantime, a preliminary area meeting the above conditions and the regulatory standards and performance criteria for wetland replication has been identified immediately west of the area proposed for roadway widening. The area under consideration is shown on Figure 4-4 and consists of an area of historic filling possibly associated with a much earlier roadway improvement project. As can be seen in Figure 4-4, this area of fill extends over 100 feet out into the wetlands along Route 20.

The benefits of conducting any necessary wetland mitigation at the above site include it's proximity to the anticipated encroachment area and its common elevation relative to flood storage mitigation, as discussed below. As importantly, it offers the opportunity to address a former un-mitigated impact area currently vegetated with invasive herbaceous plant species. Specifically, the replacement area would be constructed near the impacted wetland and along the same elevation to ensure that the functions and values presumed significant under the both the state and local wetland regulations are not impaired. Ultimately, the area would be designed so as to enhance site conditions by diversifying the wetland as compared to the impact area through the use of shrub and tree species native to and compatible with those portions of this wetland system that are more removed from the roadway.

In that the anticipated impacts to BVW will occur immediately along and abutting Route 20, they are not anticipated to impair lands found to be significant to the protection of wildlife habitat, as defined in the Massachusetts Wetland Protection Act regulations at 310 CMR 10.60, or affect specified wildlife habitat sites of rare vertebrate or invertebrate species, as defined in 310 CMR 10.59. As discussed in Section 7.0, Rare Species, the stream along which these wetlands border is shown to lie within Estimated and Priority Habitats in the most recent edition of the Massachusetts Natural Heritage Atlas. However, as also discussed in Section 7.0, this area does not appear to meet the habitat requirements of the species in question. This issue will be resolved and the project's compliance with both the Wetland Protection Act and Massachusetts Endangered Species Act will be verified during the Notice of Intent and NHESP review processes. The proposed wetland replication area offers the additional benefit of restoring an area of wetland more removed from the roadway and, hence, anticipated to have greater potential as wildlife habitat.

Bordering Land Subject to Flooding

The proposed Route 20 roadway improvements will involve some alteration of the BLSF associated with Mill Brook. The amount of such impact is anticipated to be minor given the small lateral widening of the roadway. The Proponent will mitigate any loss in flood storage capacity in accordance with the Town of Wayland Wetland and Water Resources Bylaw and the DEP regulatory performance standards at 310 CMR 10.57(4)(a)(1), which generally require that the volumetric compensation for lost flood storage be located so as to have an unrestricted hydraulic connection to the same waterway, and have the same elevation, volume and area as that which is lost. While the location for such mitigation will be determined during the Notice of Intent process, the wetland replication area described directly above offers an excellent opportunity to meet these conditions and will be given strong consideration during the selection process.

The proposed alterations in BLSF are also not anticipated to impair lands found to be significant to the protection of wildlife habitat, as defined in the Massachusetts Wetland Protection Act regulations at 310 CMR 10.60, or affect specified wildlife habitat sites of rare vertebrate or invertebrate species, as defined in 310 CMR 10.59. Similarly, this issue will be resolved and the project's compliance with both the Wetland Protection Act and Massachusetts Endangered Species Act will be verified during the Notice of Intent and NHESP review processes.

Riverfront Area

The Riverfront Area affected by the proposed improvements will be limited to the roadway embankment between the BVW line and the existing roadway pavement, or the roadway pavement itself. As such, the interests and performance standards for Riverfront Area will be addressed in the mitigation of the impacts for BVW and BLSF as discussed above.

Buffer Zone

As with Riverfront Area, the area of buffer zone associated with the roadway improvements will also be limited to the roadway embankment between the BVW line and the existing roadway pavement, or the roadway pavement itself. As such, the interests and performance standards for conducting work in buffer zone areas will be addressed in the mitigation of the impacts for BVW and BLSF as discussed above.

4.2 Stormwater Management

The stormwater management system for the proposed Wayland Town Center project has been designed in accordance with the DEP Stormwater Management Policy and the Standards and the Town of Wayland's Wetlands and Water Resources Bylaw Chapter 194 Rules and Regulations. Stormwater quality control will be achieved through a program of

Best Management Practices (BMPs) and the proposed stormwater management system will significantly improve the quality of the stormwater runoff from this site.

The existing pavement runoff at the Wayland Town Center site drains to catch basins which direct the runoff to wetland resource areas without additional water quality treatment. The proposed stormwater management system for the project will include new catch basins with deep sumps and hoods, and low impact development (LID) techniques such as water quality swales, rain gardens, and bioretention basins. For a detailed description of the stormwater management system and design calculations please refer to the report *Stormwater Management Study, Wayland Town Center, Wayland, MA* prepared by R.J. O'Connell and Associates, November 13, 2006, in Appendix B.

A Stormwater Pollution Prevention Plan (SWPPP) prepared in accordance with the NPDES Phase II General Permit will be developed, and a Notice of Intent for Stormwater Discharges Associated with Construction Activities will be submitted to the US Environmental Protection Agency prior to the start of construction. During construction, the contractor will be required to comply with the NPDES General Permit and the SWPPP for the project.

In accordance with the Clean Water Act, DEP has compiled a list of waterbodies that are not expected to meet surface water quality standards and has scheduled them for the development of a total maximum daily load (TMDL). A TMDL establishes the maximum amount of a pollutant that may be introduced into a waterbody and still ensure attainment and maintenance of water quality standards. This list, entitled the Massachusetts Year 2006 Integrated List of Waters, has classified the section of the Sudbury River that is located in the area of the project site as a Category 5 – Water requiring a TMDL. The cause of impairment for this section of the Sudbury River is listed as metals (other than mercury).

The Wayland Conservation Commission is the stormwater quality authority for Wayland, and has indicated to the project Proponent that a TMDL for the applicable section of the Sudbury River has not yet been developed. In the meantime, the uses proposed for the project are not anticipated to generate any pollutants which will adversely impact the Sudbury River. The LID techniques associated with the stormwater management system, and the FAST system, or equivalent wastewater treatment technology proposed for the site wastewater, will provide enhanced water quality and maintenance of water quality standards.

The project site is located within the Town's Aquifer Protection Overlay District and within the Zone II Wellhead protection area for the Baldwin Pond Wells, a series of three gravel pack wells. The stormwater management system for the project will be designed to meet DEP stormwater quality standards for Zone II Wellhead Protection Areas.

4.2.1 Stormwater Management Standards

The following is a discussion of the Stormwater Management Standards as they pertain to the proposed Wayland Town Center project.

Standard #1 – Untreated Stormwater

Standard #1 of the Stormwater Policy Handbook requires that the project be designed so that no new outfalls release untreated stormwater from the site. The proposed project meets this standard. For a more in depth discussion of the features incorporated in the design to meet this requirement, refer to the discussion included under Standard #4.

Standard #2 – Post Development Peak Discharge Rates

Standard #2 requires that the stormwater management design incorporate measures to ensure that post development peak flow rates, specifically the 2-year and 10-year storm peaks, are at or below pre-development rates, and to ensure that there is no increase in impacts caused by downstream flooding during the 100-year storm event. The study completed as part of the stormwater system design analyzed the 2-year, 10-year, 25-year, and 100-year storm events using the USDA Soil Conservation Services (SCS) Technical Release 55 (TR-55), 1986, Tabular Method. Stormwater management computations (hydrographs, basin routing, etc.) were performed using the SCS based computer program Hydraflow Hydrographs 2004 by Intellisolve. For more specific information regarding the stormwater system design, refer to the *Stormwater Management Study* included in Appendix B.

Standard #3 – Recharge to Groundwater

Standard #3 requires that the annual recharge from the post-development site shall approximate the annual recharge from pre-development site conditions based on soil types. The proposed development is located within hydrologic group A soils, which require a recharge volume equal to 0.40 inches multiplied by the increase in impervious area. The project will provide the required groundwater recharge through the use of water quality swales and bioretention basins. For groundwater recharge calculations, please refer to the *Stormwater Management Study* included in Appendix B.

Standard #4 – 80% TSS Removal

Standard #4 of the MSMP requires that stormwater management systems be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). The basis for the TSS criteria stems from studies suggesting that many of the pollutants in urban runoff are associated with (or attached to) particulate matter, and hence would be removed with total suspended solids. Therefore, if the appropriate TSS criterion is met, the removal of the other pollutants will be reduced to levels that will not impair water quality. The actual treatment methods (or combination of methods) are known as

Best Management Practices (BMPs). The BMPs proposed for this project include a regular program of parking lot sweeping, catch basins with deep sumps, and low impact development techniques such as water quality swales, rain gardens, and bioretention basins.

Standard #5 – Higher Potential Pollutant Loads

Standard #5 dictates requirements for projects containing land uses with higher potential pollutant loads. The proposed project contains a commercial parking lot associated with a retail use that generates more than 1,000 vehicle trips per day and therefore falls under this classification. The DEP Stormwater Management Standards require that source reduction and pretreatment must be incorporated into the stormwater management systems. The proposed system provides source reduction through the implementation of an operation and maintenance plan that includes parking lot sweeping and a snow management plan. Pretreatment is provided through the use of catch basins with deep sumps and hoods, water quality swales, rain gardens, and forebays.

Standard #6 - Protection of Critical Areas

Standard #6 dictates requirements for projects that discharge stormwater to critical areas as defined in the policy. The proposed project is located in a Zone II Aquifer Protection District and is therefore classified as a critical area. The BMPs selected for the project are consistent with the DEP list of BMPs approved for use in critical areas.

Standard #7 – Redevelopment of Previously Developed Sites

Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. If it is not practicable to meet all standards, the stormwater management system must be designed to improve existing conditions. Although the proposed project is a redevelopment, it has been designed to meet all of the Stormwater Management Standards.

Standard #8 – Erosion/Sediment Control

Standard #8 requires the incorporation of erosion and sediment controls in the project design. The construction activity associated with a project of this type will be accompanied by a variety of erosion and sediment control measures and stabilization practices designed to reduce pollutants in stormwater discharges from the site. Erosion and sediment controls will be installed prior to any on-site construction activity to minimize the potential for construction related impacts to receiving waters and adjacent properties. These controls will be regularly inspected, maintained, and, if necessary, augmented, until the development site has been stabilized with permanent ground cover and vegetation.

Standard #9 – Operation and Maintenance Plan

Standard #9 states that all stormwater management systems must have an operation and maintenance (O&M) plan to ensure that systems function as designed throughout the life of the project. Refer to the *Stormwater Management Study* included in Appendix B for a copy of the O&M plan for the project.

5.0 Wastewater and Water

5.0 WASTEWATER AND WATER

5.1 Wastewater

Wastewater generated by the proposed Wayland Town Center project will be divided between two wastewater treatment options. As detailed below, 45,000 gallons per day (gpd) of wastewater flow will be treated at the Town of Wayland Wastewater Treatment Plant in accordance with the Development Agreement with the Town of Wayland, and 9,900 gpd will be treated in an on-site septic system.

5.1.1 Projected Wastewater Generation

Based upon Title V State Environmental Code regulatory design flows, the Wayland Town Center project will generate a maximum, or peak, wasterwater flow of approximately 54,900 gpd (310 CMR 15.00). These flows will be generated by the project's various proposed uses as shown in Table 5-1 below.

Table 5-1 Estimated Peak Wastewater Generation

Land Use	Program Quantity	Title V Design Flow(1)	Wastewater Generation (Gallons per Day)
Retail	93,400 sf	50 GPD/1k SF	4,670
Restaurants	570 Seats	35 GPD/Seat	19,950
Supermarket	45,000 sf	97 GPD/ 1k SF	4,365
Municipal Allocation	(2)	(2)	3,000
Residential	200 Bedrooms	110 GPD/Bedroom	22,000
Office	10,000 sf	75 GPD/1k SF	750
TOTAL			54,735 Rounded to 54,900

(1) Title V Design Flow is equivalent to estimated average generated flow for the proposed use plus a factor representing flow variations.
(2) The municipal building allocation of 3,000 gpd is provided by the Proponent to the Town of Wayland for the future municipal building. The municipal building use is not defined but may be a library.

5.1.2 Wayland Municipal Wastewater Treatment Plant

As described in the ENF, the Town of Wayland Wastewater Treatment Plant (WWTP) is located on the project site but is owned and operated by the Wayland Wastewater

Management District Commission (WWMDC). The plant currently accepts flow from a variety of residential, municipal, and commercial sources in Wayland. That flow distribution is expected to continue. The Proponent is planning to utilize the WMWTP to discharge 45,000 gallons-per-day. As detailed in Section 5.1.3, below, the remaining 9,900 gpd will be discharged to a proposed on-site septic system.

The Proponent of the Wayland Town Center project has the right to discharge 45,000 gpd of wastewater to the WWTP. This right was established in 1999, as described in Article D(1)3 of the Development Agreement, which is excerpted below and included in its entirety in Appendix C.

> "Developer and Wayland hereby acknowledge and confirm that each has certain rights and obligations under a August 30, 1999 Memorandum of Agreement by and between Wayland and [the Wayland Wastewater Management District] and Wayland Business Center, LLC (Developer's predecessor in interest), as modified by a Supplemental Agreement dated September 25, 1999 (collectively the "MOA"), including, without limitation, regarding gallons per day of maximum daily design flow (as defined in 310 CMR 15.000) of 20,000 for Wayland and WWMDC and 45,000 for Developer."

The Proponent anticipates that wastewater from the residential units, restaurants, and some of the retail will discharge to the Town's wastewater plant. The plant will continue to process wastewater from other users.

5.1.2.1 WWTP NPDES Discharge Permit

The WWTP NPDES discharge permit is currently under review by DEP and the USEPA, and its issuance is anticipated in the next few months. It is anticipated that the new permit will include stricter discharge limits and that the WWMDC will upgrade the plant as required in order to continue to serve its customers, including the proposed Wayland Town Center project.

The USEPA has told the WWMDC that WWTP capacity can not be expanded if the current discharge location is maintained. If the WWMDC were to pursue other disposal options, such as groundwater discharge, a capacity increase may be feasible. However, because of site constraints, environmental considerations, and property ownership issues, no practical means of an alternative discharge location is available, and it is therefore understood that the WWTP capacity can not be increased. This position was confirmed by the WWMDC in a February 28, 2006 memorandum to the Wayland Board of Selectmen that stated: "The EPA made it clear that it is virtually impossible to have a larger plant permitted and the new (NPDES) permit contains no increase in flow".

The WWMDC is contemplating how to upgrade the WWTP to meet the anticipated NPDES permit. The Proponent has agreed to assist in this evaluation by conducting an initial study as described in the project Development Agreement:

"Developer will initially conduct the Assessment Study to assess the necessity of replacing the Plant with the New Plant or upgrading the Plant, based on public health and environmental considerations and legal requirements of EPA and MDEP. Wayland and WWMDC shall, as a precondition of Developer's obligation to conduct the Assessment Study, provide a license or other authorization to allow Developer and its consultants access to the Plant and any records relating to the design, construction or operation thereof. Upon completion of the Assessment Study, Developer will provide WWMDC and Wayland with a technical memorandum describing the study and its conclusions and recommendations. Developer will review the recommendations with WWMDC and Wayland to enable them to determine whether to proceed toward developing the New Plant."

5.1.3 Subsurface Disposal

In addition to discharging 45,000 gpd to the WWMDC wastewater treatment plant, the project will use an on-site subsurface wastewater disposal system. This system will be designed in accordance with Title V of the State Environmental Code and the Town of Wayland Board of Health Regulations. The system will be designed to treat 9,900 gpd of wastewater generated from residential, restaurants/cafes and possibly some retail tenants.

The Wayland Town Center project site is located within a Zone II aquifer protection district and, hence, a nitrogen sensitive area. Subsurface wastewater treatment and disposal systems located in nitrogen sensitive areas must be designed in accordance with Title V nitrogen loading limitations. Since the system is located in a nitrogen sensitive area and also is designed to treat more than 2,000 gallons per day, it will be required to use a re-circulating sand filter (RSF) or other equivalent technology approved by DEP. In order to comply with the Title V nitrogen loading limitations the Proponent is proposing the use of a DEP-approved alternative treatment technology, such as a Fixed Activated Sludge Treatment (FAST) system or an equivalent.

The FAST system consists of an underground tank packed with a fixed film activated sludge media that provides a high surface-to-volume ratio to maintain microbial growth during low, average, and peak usage. A remote mounted, above ground blower circulates the waste to be treated through the media and oxygenates the liquid, thereby allowing multiple biological, bio-chemical, chemical and physical processes occur simultaneously within the wastewater treatment system. These processes result in the reductions of nitrogen levels – including nitrates and all other nitrogen species - at exceptionally high percentage rates. Should the FAST system not be utilized, another DEP-approved technology that provides adequate environmental protection will be utilized.

The leaching field associated with the proposed subsurface wastewater disposal system will include a pressure distribution system and a disposal distribution area of approximately 25,000 square feet. The leaching field has been sized based on general site soil conditions and percolation tests that were conducted in the spring of 2006. Additional soil testing will

be performed in the spring of 2007 to confirm the suitability of soil conditions in the area of the proposed leaching field. If there is variability in the soil conditions, the leaching fields will be redesigned as necessary.

5.2 Water and Water Resources

The projected water supply demand of the Wayland Town Center is presented below, as are measures designed to protect the town well Zone II areas and to reduce project water usage. A discussion of the town's water system and its compliance with the Massachusetts Water Management Act is also presented.

5.2.1 Projected Water Demand

The water supply demand of the Wayland Town Center project is estimated to be approximately 55,000 gallons per day (gpd) for domestic use and up to 25,000 gpd for irrigation use, for a total of 80,000 gpd. The irrigation demand estimate is very conceptual since the landscaping design is not complete and the estimate does not incorporate water conservation measures, such as xeriscaping, which are currently under development.

In order to compare the anticipated daily water supply demand to more typically utilized units for water supply projections, the water supply demand estimate must be translated from the 80,000 gpd to an instantaneous Maximum Day Demand (MDD) estimate presented as gallons per minute (gpm). The MDD estimates are then increased by a peaking factor that is determined based on flow variations within each of the proposed uses. The total water used per day is divided by the number of hours per day the water is expected to be used to determine the water used per hour. That number is then multiplied by the peaking factor and divided by 60 to obtain the MDD in gallons per minute (gpm). For instance, the residential MDD is calculated as follows:

22,000 gpd/ 12 hours per day (number of hours per day of use) * 2 (peaking factor)/60 = 61 gpm

Table 5-2 presents a break-down of the MDD by use category, and indicates a total MDD for the project of 243 gpm. This number is deemed conservative for a number of reasons, particularly the fact that irrigation demand estimates will likely be reduced once the site design is complete. In addition, the irrigation systems will typically be operated in off hours (early morning and late evenings) when there is less likelihood of overlapping uses creating overlapping demand. Nonetheless, the 243 gpm estimate can be utilized to conservatively determine if adequate water supplies are available for the project.

The town's water supply consultant, Tata and Howard, Inc prepared a June 14, 2005 assessment of the available water supply and pressure for a larger development on-site. The report concluded that with a demand of 257 gpm the static pressure available on-site would be 95 pounds per square inch (psi). To supplement this analysis, Tata and Howard then conducted fire flow tests on-site. Those tests concluded that the available water flow on-site

Table 5-2 Water Demand Summary

Use	MDD (gpd)	# Hrs/Day	Peaking Factor (1)	MDD (gpm)
Residential	22,000	12	2	61
Retail/Restaurants/Supermarket	28,985	10	2	96
Office	750	8	2	3
Preliminary Irrigation Demand	25,000	5	1	83
Total				243

(1) Peaking Factor depends upon the water usage patterns.

averages 1,450 gpm at 20 psi residual pressure. The flow test results indicate that adequate water flow and pressure are available to provide the projected MDD of 243 gpm.

The Wayland Water Department has requested the Proponent replace the existing 8-inch on-site water main with a 12-inch water main connecting the existing water main in Route 20 to an the existing main in Route 27. This connection is not needed to provide the project with adequate water supply, but will strengthen the town's water distribution system infrastructure. The applicant has agreed to install this 12-inch main connection.

The on-site water distribution system is designed to provide adequate fire flow pressure throughout the site. Fire hydrants will be located in accordance with Wayland Fire Department requirements. Fire hydrants will be spaced at no greater than 300 foot intervals and will be located within 100 feet of building Siamese connections. The fire hydrant locations will be submitted to the Town of Wayland's Fire Chief for review and approval.

5.2.2 Water Conservation Measures

The Wayland Town Center project will include water conservation measures to minimize water use. It is anticipated that such measures will include selecting drought-resistant native plant materials for landscaping, using high-efficiency irrigation technology, and harvesting rainwater for irrigation, as appropriate. Where conditions allow, irrigation will be avoided altogether. The use of bioswales and planting buffers can mitigate stormwater runoff and promote natural irrigation.

It is anticipated that residential buildings will be designed to use less than 65 gallons of potable water per residential occupant per day, consistent with Massachusetts Water Resource Commission standards. Office and retail buildings will reduce potable water use through the use of water-conserving appliances such as low-flow toilets, sinks, faucets and showerheads.

Additional water conservation measures will be identified as project and building design progress.

5.2.3 Wayland Municipal Water Supply

The Town of Wayland obtains its water from eight gravel-packed ground wells which are located at six different sites throughout the Town. The locations of these wells and their associated wellhead protection areas are shown in Figure 5-1. As shown on Figure 5-1, the project site is located within the Zone II wellhead protection area for the Baldwin Pond Wells, and within the Town of Wayland Aquifer Protection Overlay District.

5.2.3.1 Protection of Zone II

As described above, the Wayland Town Center project site is located within the Zone II wellhead protection area for the Baldwin Pond Wells, and within the Town of Wayland Aquifer Protection Overlay District. To protect the water quality and quantity of the aquifer that supplies these wells, the stormwater management system for the project will be designed to meet DEP stormwater quality standards for Zone II Wellhead Protection Areas. A discussion of the proposed stormwater management system is included in Section 4.2. In addition, as described in Section 5.1.3 above, the on-site septic system will be designed in accordance with Title V nitrogen loading limits and will use a re-circulating sand filter, or other equivalent technology approved by DEP.

5.2.3.2 Water Management Act Compliance

The Town of Wayland has entered into an Administrative Consent Order (ACO) with DEP because the Town exceeded its registered withdrawal volume by an average of more than 100,000 gpd from 1991 through 2000 and also withdrew an average of more than 100,000 gpd from another well (the Chamberlain Well) without applying for a Water Management Act (WMA) Permit. In 2000 the Town applied for a WMA permit for the Chamberlain Well. DEP issued a WMA permit for the Chamberlain Well in August 2002 that contained an interim allocation increasing the total volume the Town is authorized to withdraw to an annual average of 1.77 million gallons per day (mgd). At the same time, DEP determined that the Town should be able to come into compliance with the WMA by reducing its per capita water use to 80 gpd and its unaccounted water use to 15 percent. DEP also stated that it will revisit the issue of appropriate withdrawal volume when the Town applies to the Department of Conservation and Recreation Office of Water Resources for a water needs forecast.

According to information submitted to DEP on the behalf of the Town of Wayland by Tata & Howard on January 22, 2004, the Town's average daily water demand had dropped to 1.62 mgd in 2003, approximately 0.15 mgd less than the permitted withdrawal of 1.77 mgd. Per capita water usage declined to 77 gpd in 2003 from a high of 100 gpd in 2001.

Unaccounted water, which reached a high of 40 percent in 1996, was reported to be 12 percent of the total water pumped in 2003.

In summary, the Town entered into an ACO with the DEP as a result of a history of noncompliance with the Water Management Act. Since that time, the Town of Wayland has reduced its water usage to below the permitted levels through conservation measures, leak detection, water use restrictions, and public education.

Town of Wayland Wellhead Protection

Wayland GIS

Survey Department
Wayland GIS
41 Cochituate Road
Wayland, Mass 01778
May 7, 2002

Approximate Site Location

Legend

- Wellhead
- Zone I
- Zone II
- IWPA
- APD
- MWRA

CAMPBELL RD. GP WELL #1
CHAMBERLAIN WELL
BALDWIN POND
BALDWIN POND WELL #1
BALDWIN POND WELL #3
BALDWIN POND WELL #2
CLAYPIT HILL ROAD
PLAIN ROAD
MBTA
WAYLAND CENTER
HEARD POND
SUDBURY RIVER
Pelham Island
OLD CONNECTICUT PATH
Reeves Hill
MEADOWVIEW WELL
HAPPY HOLLOW WELL #2
HAPPY HOLLOW WELL #1
BIRCH ST. WELL #2
BIRCH ST. WELL #1
BIRCH ST. WELL #3
DUDLEY POND
RICE ROAD
WEST PLAIN STREET
EAST PLAIN STREET
COCHITUATE
LAKE COCHITUATE
126
27
20
30
90

Figure 5-1

DISCLAIMER
The information depicted on this map is for planning purposes only. It may not be adequate for legal boundary definition, regulatory interpretation or conveyancing purposes.

N
W E
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6.0 Hazardous Waste

6.0 HAZARDOUS WASTE

6.1 Previous Releases On-Site

There have been seven separate releases of oil or hazardous materials at the project site as reported to the Massachusetts Department of Environmental Protection per the Massachusetts Contingency Plan (MCP). Table 6-1 lists the DEP Release Tracking Number for these releases, the characteristics of the release and the current regulatory status of each under the MCP.

Table 6-1 Previous On-Site Releases

Release Tracking Number	Notification Date	Chemical Type	Source	Compliance Status/ Date
3-01783	1-15-87	Oil and Hazardous Material	Floor drains /Crossed sewer connection /surface impoundments	Class B-1 RAO/ 8-3-95
3-13302	1-2-96	Oil RTN originally assigned to 20,000-gallon fuel oil underground storage tank (UST)	Underground Storage Tank	REMOPS for VOCs in ground water above GW-1 12-3-04 Class A-3 RAO for 20,000-gal fuel oil UST
3-13574	3-15-96	Hazardous Material RTN originally assigned to VOCs in groundwater	Not listed	RTN Closed/ 11-28-00 Linked to 3-13302
3-14042	7-25-96	Oil and Hazardous Material RTN assigned to low levels of PCBs detected in test pit sample – RAM Completion filed after soil removed	Not listed	RTN Closed/ 11-28-00 Linked to 3-13302
3-19482	4-26-00	Hazardous Material RTN assigned to imminent hazard due to stunted wetland vegetation – sediment remediation completed under Phase IV CRA	Unknown	RTN Closed/ 11-28-00 Linked to 3-13302

Table 6-1 Previous On-Site Releases (Continued)

Release Tracking Number	Notification Date	Chemical Type	Source	Compliance Status/ Date
3-22408	12-17-02	Hazardous Material RTN assigned to Northern area VOCs – separately classified as Tier IB – currently undergoing remediation under Phase IV CRA; also includes MTBE in southern area from off-site source and arsenic under wetlands area	Not listed	Tier 1B/ 12-17-03
3-22665	3-12-03	Hazardous Material RTN assigned to chromium detected in ground water in Southern Area – Chromium was result of In-Situ Chemical Oxidation Pilot Testing	Not listed	RTN Closed, 12-10-03 Linked to 3-22408

RAO = Response Action Outcome
RTN = Release Tracking Number
VOCs = volatile organic compounds
CRA = Comprehensive Response Action
REMOPS = Remedy Operation Status
RAM = Release Abatement Measure
PCBs = polychlorinated biphenyls
MTBE = methyl tert butyl ether

As shown in Table 6-1, only two Release Tracking Numbers (RTNs 3-13302 and 3-22408) remain open. The locations of these release areas are shown on Figure 6-1.

RTN 3-13302 encompasses the release of metals, polychlorinated biphenyls (PCBs) and polynuclear aromatic hydrocarbons (PAHs) in the wetlands near the historical combined wastewater and stormwater outfall for the former Raytheon Company facility. Between October 2003 and February 2004 the Raytheon Company removed approximately 8,000 cubic yards of impacted wetland soils and sediment from the release area. Approximately 63,000 plants were restored to the wetland area and yearly monitoring of the area is being undertaken through 2009. Also included in this RTN is trichloroethylene (TCE) contamination in area groundwater. An in-situ chemical oxidation treatment program was completed in 2004 to break down the TCE. Currently, quarterly post treatment monitoring is being conducted to evaluate the efficacy of the remediation program.

RTN 3-22408 includes chlorinated solvents detected in groundwater in the northern portion of the site, arsenic beneath the wetlands in the western area of the site, and methyl tertiary butyl ether (MTBE) in groundwater in the southern area of the site. Assessments of the contamination have been completed and remediation efforts have initiated.

Figure 6-1
Locations of Active On-Site Release Tracking Numbers

Wayland Town Center
Wayland, Massachusetts

Epsilon ASSOCIATES INC.

6.2 Activity and Use Limitations (AULs)

Under the MCP an Activity and Use Limitation (AUL) can be established that specify the future use of the property given the existing conditions. An AUL can be subsequently modified or removed if additional remediation of the site so warrants. Two AULs currently exist on the project site but, as discussed below, both are subject to modification given the remedial activities that have taken place since the AULs were established.

6.2.1 1997 AUL

In 1997 an Activity and Use Limitation (AUL) was recorded for RTNs 3-13302, 3-13574, and 3-14042 (which were later consolidated into the single RTN 3-13302.) This AUL applies to the entire project site as well as to the land adjoining the northern border of the project site; a total of approximately 83 acres. The AUL was filed prior to completion of the site assessment and remedial activities required to achieve a Response Action Outcome (RAO).

As stated in the Activity and Use Limitation Opinion:

> "This Notice of AUL is recorded by the Property owner as a precautionary measure to ensure appropriate use of the Portion of Property during completion of Comprehensive Response Actions, including further assessment to fully define final Disposal Site Boundaries. In so far as assessment and/or remediation further define the boundaries of the Disposal Site…this Notice of AUL may, in the Opinion of the LSP, be terminated or amended."

The full text of the AUL, including a graphic showing the location of the AUL, is included in Appendix D. As detailed in the AUL, activities permitted at the project site include:

- Commercial or industrial activities including office space, wholesale, retail, manufacturing, storage/warehousing, and assembly of goods.
- Interior reconstruction of existing site buildings.
- Other activities that, in the Opinion of the Licensed Site Professional (LSP), do not present risk of harm to health, safety and public welfare.

Prohibited activities include:

- Residential, childcare, recreational, agricultural use.
- Groundwater use.
- Subsurface activities that could render contaminated media accessible to exposure.

- Activities that, in the Opinion of the LSP, would limit performance of Comprehensive Response Actions.

- Other activities that, in the Opinion of the LSP, present risk of harm to health, safety and public welfare.

6.2.2 1999 AUL

A second AUL was filed for a portion of the project site in 1999. This AUL also applies to RTN 3-13302, but covers an area measuring less than one acre of the current project site. The full text of this AUL, including a graphic illustrating the location of the AUL, is included in Appendix D. The AUL refers to petroleum-impacted soil remaining at the site of an oil release from an abandoned underground storage tank (UST). As stated in the AUL Opinion:

> "There is no Significant Risk of harm to human health, public welfare, safety or the environment for anticipated exposures to a construction worker, building occupant, visitor, nearby resident or trespasser that may be exposed to Disposal-Site related constituents under current/foreseeable or unrestricted site usage. However, since the residual levels of petroleum-related compounds in soil exceed residential criteria, an Activity and Use Limitation is required to prevent activities which could pose a future risk. The intent of the AUL is to restrict activities in the area of soil contamination so that any disruption is controlled and that the soil does not become accessible."

Activities permitted under this AUL include:

- Commercial or industrial uses including, but not limited to, parking, pedestrian and vehicular traffic and landscaping that do not disturb soils located greater than six feet below grade.

- Shallow excavation activities.

- Deep excavation activities provided a Soil Management Plan and, if appropriate, a Health and Safety Plan developed in accordance with a LSP are enacted.

- Other activities that, in the Opinion of the LSP, do not present risk of harm to health, safety and public welfare.

Prohibited activities include:

- Residential, childcare, recreational, agricultural use.

- Subsurface activities that could render contaminated media accessible to exposure.

- Relocation of the petroleum-impacted soil without the guidance of an LSP.

- Placement of wells for the withdrawal of groundwater for non- Massachusetts Contingency Plan (MCP) purposes.

6.2.3 Current Status of AULs

The Proponent is working to amend the 1997 AUL to reflect the current remediation status of the property. Negotiations with the Raytheon Company are ongoing to separate this AUL into two separate filings, one for the current project site and one for the adjoining property to the north. Under this arrangement, the AUL for the current project site would only apply to the eastern portion of the project site, thereby allowing the residential, municipal and retail uses as well as the town green that are proposed for the eastern portion of the site.

6.3 Compatibility of Proposed Development

As described above, the AUL that applies to the entire property requires updating to reflect the current state of remediation efforts before the proposed project can be constructed.

Once construction does begin, the developer will adhere to all stipulations of the applicable AULs relating to construction work and permissible land use. The developer will file a Release Abatement Measure Plan (RAM Plan) with DEP in accordance with the MCP prior to commencement of construction. The plan will include an appropriate Monitoring Program and Health and Safety Program to be detailed by the LSP overseeing the project. Safety of the site workforce and adjacent neighbors is the highest priority of the development team. Construction activities will be coordinated with the ongoing site remediation and monitoring activities so as to avoid conflict.

7.0 Rare Species

7.0 RARE SPECIES

7.1 Rare Species Mapping

The Wayland Town Center project site consists of an approximately 56.5-acre parcel of land situated north of Route 20 and west of Route 27 in Wayland. The site is occupied by a vacant 400,000 square-foot commercial building, which previously housed the Raytheon Company, the Polaroid Corporation, and several other business operations. Also located on the site are a large paved parking lot and a second smaller (approximately 10,500 square feet) vacant office building. To the northwest of the larger commercial building is a sewage treatment plant owned and operated by the Town of Wayland. The western portion of the site beyond the existing parking lot includes a formerly graded and disturbed area now vegetated with upland scrub and emergent forest vegetation, while the far-western portion of the site consists of undisturbed wetlands and floodplain associated with the Sudbury River.

Although not located on-site, roadway improvements associated with the proposed Wayland Town Center project are anticipated along Route 20 immediately east of the Route 27/Route 20 intersection east of the project site. For the most part these improvements include the existing paved and shoulder sections of Route 20, but some minor widening of the roadway will likely be required.

The undeveloped westernmost portion of the site has been identified by the Natural Heritage and Endangered Species Program (NHESP) as including Priority Habitats for State-Protected Rare Species (Polygon PH 107) and Estimated Habitats for Rare Wildlife (Polygon EH 765) for four avian species protected under the Massachusetts Endangered Species Act (MESA)(MGL c131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife is also protected under the Massachusetts Wetlands Protection Act (the Act) and it's implementing regulations at 310 CMR 10.37 and 10.59. The limit of the identified habitat as mapped on-site is shown on Figure 7-1. As discussed below, this area is mapped as extending onto both the disturbed upland potions of the site and the existing built portions of the site. Given the wetland/waterways habitats required of the species in question, some refinement of this line is in order, as discussed in Section 7.3 below.

The stream running beneath the intersection of Route 20 and Route 27 and paralleling the north side of Route 20 has been similarly been mapped by NHESP as including Priority Habitat (also Polygon PH 107), apparently for these same avian species. The limit of the identified Priority Habitat as mapped proximate to Route 20 is shown on Figure 7-2. The location of this mapping is also reviewed in Section 7.3

Scale 1:2,400
1 inch = 200 feet

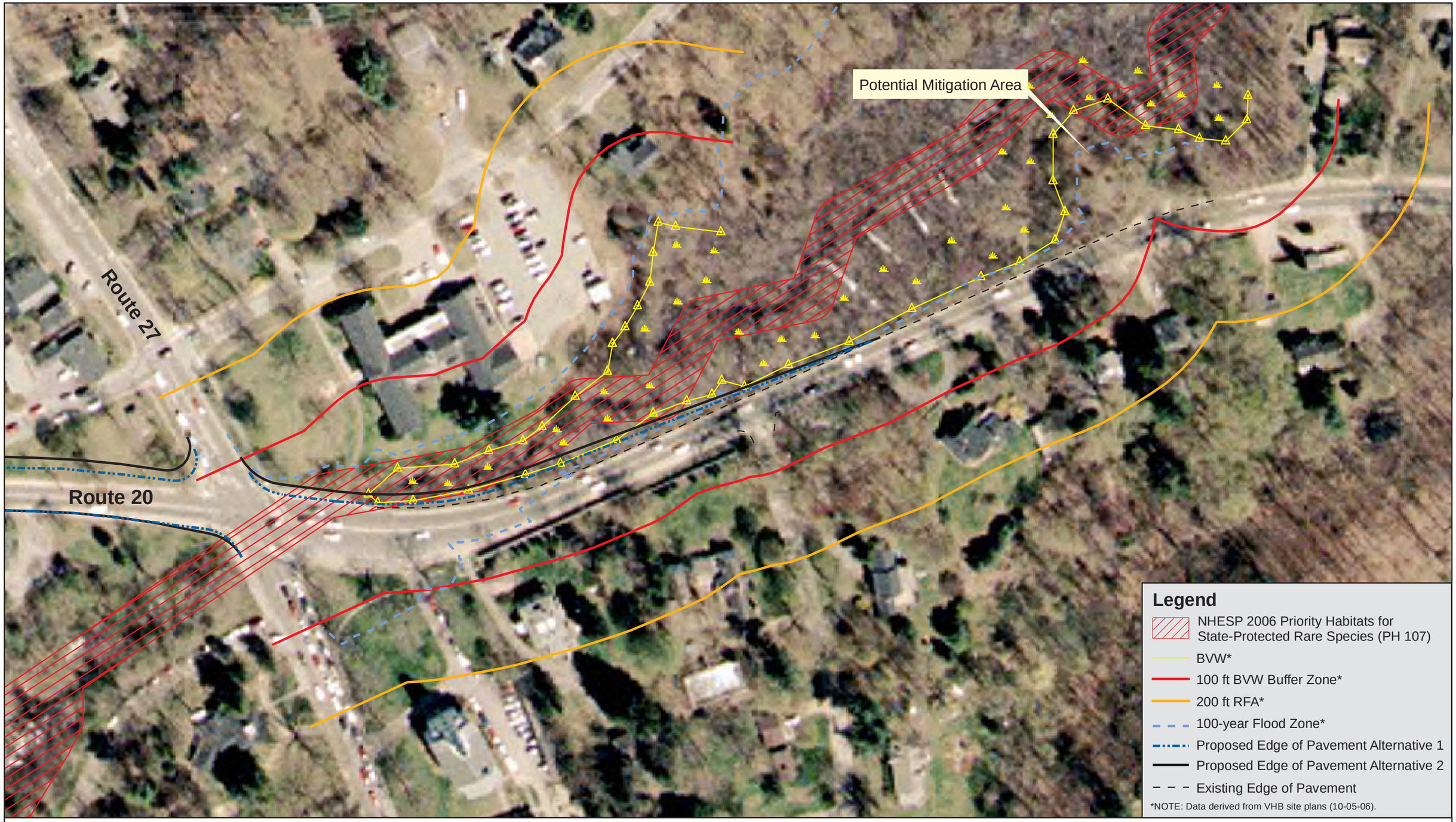
100 0 100 200 Feet

Figure 7-1
NHESP Priority and Estimated Habitat

Wayland Town Center
Wayland, Massachusetts

Basemap: 2001 Orthophotography, MassG

Epsilon ASSOCIATES INC.



Basemap: 2001 Orthophotography, MassGIS

Scale 1:1,200
1 inch = 100 feet

50 0 50 100 Feet

Figure 7-2
NHESP Priority Habitat at Routes 20 and 27

Wayland Town Center
Wayland, Massachusetts

Epsilon Associates Inc.

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An information request form was submitted to NHESP for the project site on September 7, 2006. By letter response dated October 10, 2006, NHESP indicates that the four species identified within the mapped areas include the following:

Scientific Name	Common Name	State Status
Ixobrychus exilis	Least Bittern	Endangered
Botaurus lentiginosus	American Bittern	Endangered
Podilymbus podiceps	Pied-Billed Grebe	Endangered
Gallinula chloropus	Common Moorhen	Special Concern

As reviewed below, each of these is a bird of the freshwater marsh and/or open waters and would not be anticipated to be found either nesting or feeding within the confines of the proposed project, nor immediately proximate to an active roadway. The NHESP response letter and NHESP Fact Sheets for the above species are included in Appendix E.

7.1.1 Least Bittern (Ixobrychus exilis) – State Endangered

At approximately 11 to 14 inches in length and having a wingspan of 16 to 18 inches, the Least Bittern is the smallest of the Heron Family. Its breeding range extends from southern Canada to southern Texas and into the West Indies. The NHESP fact sheet suggests that in Massachusetts the Least Bittern breeds in less than twenty wetland locations throughout the state, primarily in freshwater wetlands along the coast.

The habitat of the Least Bittern consists of freshwater wetlands where cattails and reeds predominate. The preferred feeding areas of the Least Bittern are generally the open areas of the wetland where the bird can be found walking the water's edge or wading into the shallower water.[1]

The Least Bittern winters from the Gulf Coast south, and arrives in Massachusetts in early May. Nest building is usually completed by late May. The nest is constructed in cattail or reed stands by bending the stalks of several plants to form a nest base. The nest is then constructed on this base out of reeds and grasses. Nesting locations are, by definition, located within the actual wetland habitat.

On the Wayland Town Center property the habitat of the Least Bittern would be the state-regulated wetlands of the Sudbury River west of the existing site and well beyond the limits of the proposed project. No appropriate Least Bittern habitat is located proximate to Route 20 at Route 27.

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[1] Peterson, Wayne R. and Meservey, W.R., eds, Massachusetts Breeding Bird Atlas, University of Massachusetts Press, Boston, 2003.

7.1.2 American Bittern (Botaurus lentiginosus) - State Endangered

The American Bittern is a medium-sized (23 to 34 inch long) ground-dwelling heron of both freshwater and brackish wetland. The breeding range of the American Bittern extends from eastern southern Canada south to Maryland and westward through the mid-west to California. The NHESP fact sheet indicates that the American Bittern has been recorded at approximately 75 sites throughout Massachusetts during the breeding season.

Like the Least Bittern, the American Bittern is a bird of the wetland. The habitat of the American Bittern is described in the NHESP fact sheet as "freshwater marshes, fens, and bogs dominated by emergent vegetation such as cattails, bulrushes, sedges, and grasses. It may also occur in brackish wetlands." Generally the American Bittern feeds in wetlands, wet meadows, and shallow waters, with the preferred foods including frogs, small snakes and eels, salamanders, fish and occasionally mice and grasshoppers. As with the Least Bittern, this habitat on the Wayland Town Center property would be the state-regulated wetlands of the Sudbury River west of the existing site and beyond the limits of the proposed project, although the American Bittern may also be encountered in any open grassy areas of the buffer zone.

The American Bittern winters from the southern United States to Central America, and arrives in Massachusetts to breed in early to mid-April. As noted in the NHESP fact sheet, "the nest is about a foot in diameter and is located on the ground in dense vegetation or on a platform located a foot or so above the water." The nesting material consists of reeds, cattails, sedges and grasses. As with the Least Bittern, nesting locations are generally located within the actual wetland habitat.

As with the Least Bittern, this habitat on the Wayland Town Center property would be the state-regulated wetlands of the Sudbury River west of the existing site and beyond the limits of the proposed project, although the American Bittern may also be encountered in the open grassy areas of the buffer zone. No appropriate American Bittern habitat is located proximate to Route 20 at Route 27.

7.1.3 Pied-Billed Grebe (Podilymbus podiceps) –State Endangered

The Pied-Billed Grebe is a small, duck-like waterbird, approximately 12 to 15 inches in length. It is found throughout Southern Canada, the United States, Central America and much of South America, but its breeding range generally extends from the Midwest into New England and southern Canada. Although found throughout North America, the Pied-Billed Grebe is known to nest in only ten to fifteen locations in Massachusetts.

The habitat of the Pied-billed Grebe consists of wetlands, lakes, and ponds with an abundant supply of cattails, reeds and similar vegetation. The Pied-billed Grebe is foremost a water bird and requires water to fly. Not known as a strong flier, the bird must "run" across the water in order to take off. Its legs are located toward the back of its body, which

facilitates its diving and underwater swimming, but hinders its ability to walk on land. The Pied-billed Grebe's diet consists of aquatic vegetation, seeds, frogs, tadpoles, fish, aquatic insects and crayfish.

The Pied-billed Grebe arrives in Massachusetts in late March, with nesting usually initiated in late April. The nest is usually located in dense vegetation proximate to or surrounded by open water. This allows the bird to approach the nest underwater and thereby avoid predators. The nest is constructed of decayed reeds, sedges, grasses and similar vegetation. As noted in the NHESP program fact sheet, the territory of the breeding pair is usually confined to an area of approximately 150 feet of the nest, while the "home range" of the pair is approximately twice that limit.

On the Wayland Town Center property the Pied-billed Grebe presence would be limited to the state-regulated wetlands and open waters of the Sudbury River west of the existing site and beyond the limits of the proposed project. No appropriate Pied-billed Grebe habitat is located proximate to Route 20 at Route 27.

7.1.4 Common Moorhen (Gallinula chloropus) – State Special Concern

The Common Moorhen is a duck-like swimming bird of about 13 inches in length. The Common Moorhen breeds from Maine to Minnesota, south to Florida and eastern Texas. It winters in the southeastern United States and west along the Gulf coast. While the Common Moorhen is a widely distributed breeding bird throughout the eastern United States, it is less common in Massachusetts where it approaches the northern extent of its range. Less than ten breeding sites are verified in Massachusetts.

The Common Moorhen generally inhabits large freshwater marshes and ponds with dense stands of cattails and other wetland emergent vegetation. As noted in the NHESP fact sheet, the Common Moorhen "generally keeps to the cover of dense vegetation and feeds by wading or diving at the edges of open water." Its diet consists of grass and sedge seeds and insects. The nest of the Common Moorhen consists of a cup-like structure, usually built of dried cattails, typically with a runway of rushes or cattails extending "from the rim of the nest to the water, allowing easy access to and from the nest."[2] The nest is occasionally built on floating vegetation.

Like the Pied-billed Grebe, the Common Moorhen is a waterbird whose feeding and nesting habitat is well within the wetter or open water portion of the wetland. On the Wayland Town Center property the Common Moorhen's presence would be limited to the state-regulated wetlands and open waters of the Sudbury River west of the existing site and beyond the limits of the proposed project. No appropriate Common Moorhen habitat is located proximate to Route 20 at Route 27.

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[2] Ibid.

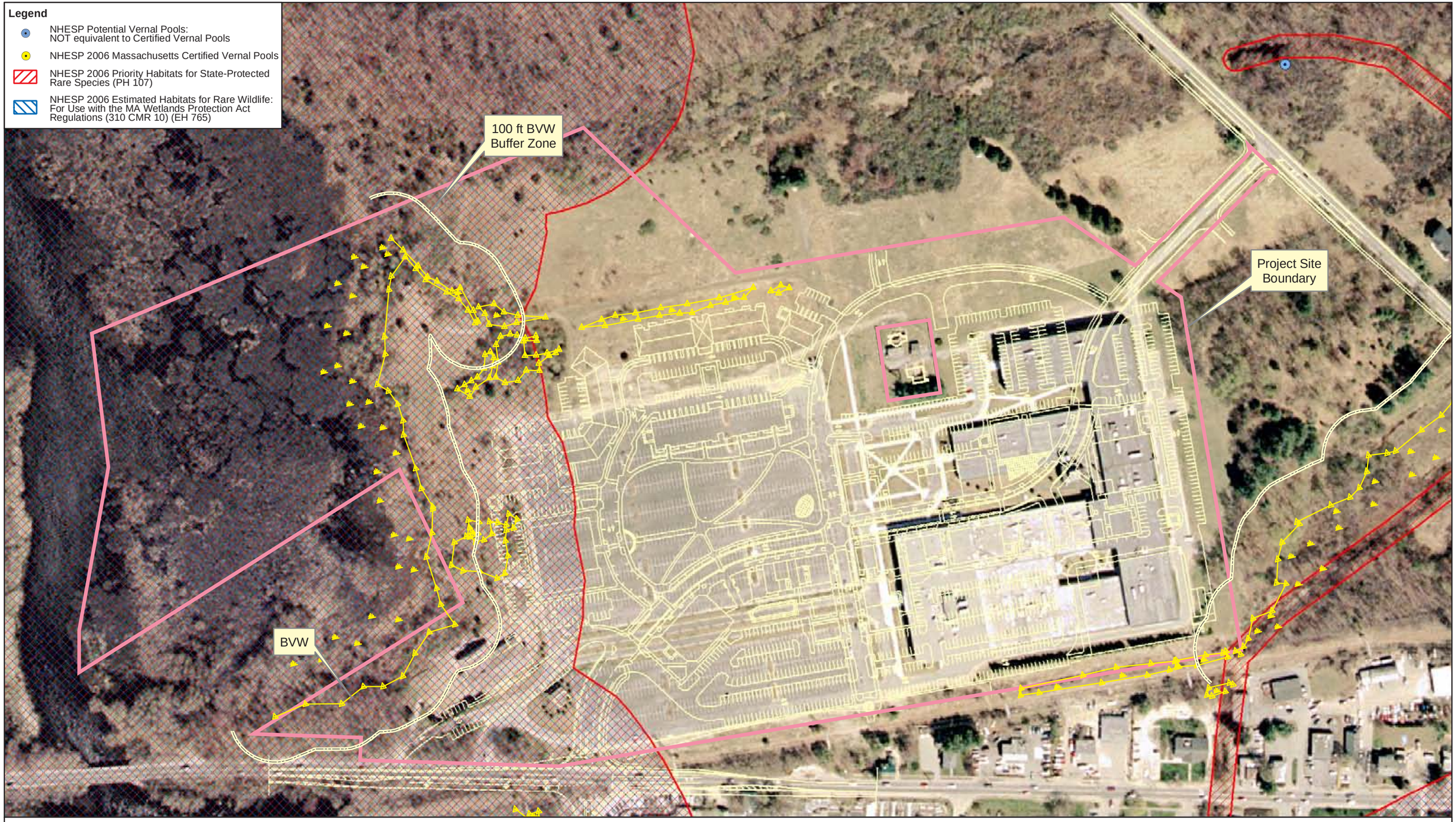
7.2 Potential Impacts to Priority and Estimated Habitats

The limits of the Wayland Town Center project in relation to the NHESP mapped Priority and Estimated Habitats are shown in Figure 7-3. The proposed development is located primarily within the existing built environment, but does extend 20 to 70 feet west of the existing parking lot and into a formerly disturbed area comprised of emergent herbaceous and shrub vegetation. As such, the project extends into the easternmost edge of the NHESP mapped habitats. However, as discussed below, the Wayland Town Center project is not anticipated to impact breeding or feeding habitat for any of the bird species identified above.

The limits of the proposed Route 20 improvements in relation to the NHESP mapped Priority Habitat are shown in Figure 7-2. The proposed roadway improvements are located outside of the mapped polygon (PH-107), except in the immediately vicinity of the entrance to the stream culvert as it extends beneath the Route 20/Route 27 intersection.

Each of these four bird species identified above, with the occasional exception of the American Bittern, is a bird of the deep marsh or open water. Both the Pied-billed Grebe and the Common Moorhen are waterbirds that nest and feed in or immediately proximate to open water. Similarly, the Least Bittern typically feeds along the open water and constructs its nests in cattails over the water. Such conditions are only found in the wetlands and waters of the Sudbury River at/or west of the wetland line at the western side of the Wayland Town Center project site and well beyond the limits of the project. Similarly, no such conditions are found along Route 20 immediately east of or at the intersection of Route 20 and Route 27. The American Bittern is also a bird of the deep marsh, but may forage in wet meadows or fields. Such conditions may be found in the buffer zone areas of the northwestern portion of the Wayland Town Center site but, again, in areas outside the limits of the project.

As noted in Section 4.0, no portion of the project extends into the bordering vegetated wetlands of the Wayland Town Center project site, or into the 100-foot buffer zone of these wetlands. For the most part the project is being advanced over an area that is currently developed as either parking lot or building structure. As such, the project does not encroach on likely habitat, does not create barriers to wildlife movement and does not contribute to habitat fragmentation. At the western end of the site the proposed development will extend up to 70 feet west of the existing pavement line and into an area of emergent field vegetation and a low area of poor drainage created by past site grading activities. As shown in Figures 7-1 and 7-3, this area includes an isolated town-regulated, vegetated wetland dominated by swamp white oak, gray birch, green ash, glossy buckthorn, silky dogwood, honeysuckle and sensitive fern. None of this area represents typical or likely habitat or forage area for any of the above species.



Scale 1:2,400
1 inch = 200 feet

100 0 100 200 Feet

Figure 7-3
NHESP Priority and Estimated Habitat

Wayland Town Center
Wayland, Massachusetts

Basemap: 2001 Orthophotography, MassGIS

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7.3 NHESP Consultations

As noted above, the NHESP atlas has mapped the western end of the site as Estimated and Priority Habitats for several avian species. To the degree this area includes the vegetated wetlands and buffer zones of the Sudbury River as they extend on the site, such mapping would appear reasonable. However, as also noted above, the habitat mapping also encompasses the existing parking lot and the disturbed, emergent scrub brush environment of the area immediately west of the existing parking lot. This designation would therefore appear to need some refinement. Similarly, the atlas indicates that Priority Habitats exist for these same avian species proximate to the proposed roadway work on Route 20 at the Route 20/Route 27 intersection. This designation may also require refinement in this area.

The project has been in contact with the NHESP to initiate review of the project and to assess whether the project as designed would include a taking as defined by MESA. The results of this assessment will be presented in the FEIR.

7.4 Conservation Restriction

As part of the Development Agreement with the Town of Wayland the Proponent has committed to placing a conservation restriction on ten acres of the Wayland Town Center site. Although the above analysis would suggest that the project as designed will not result in a taking or other impact to Priority or Estimated Habitat, this proposed acreage could be located as to create additional protected buffer between the development and the actual habitat areas.

8.0 Construction Period

8.0 CONSTRUCTION PERIOD

8.1 Potential Impacts and Mitigation

The following sections detail the potential construction-related impacts of the project and the measures proposed to prevent such impacts. The mitigation measures proposed are designed to preclude and/or minimize construction-period impacts to both the built and natural environment. The location of the Wayland Town Center project on a pre-developed site removed from existing roadways, residences and business, should further insure that the construction-period impacts are minimal.

8.1.1 Erosion and Sedimentation

The Wayland Town Center project will comply with all applicable federal, state and local regulations and the conditions of all permits obtained for this project. A Stormwater Pollution Prevention Plan (SWPPP) will be developed in accordance with the NPDES Phase II General Permit and a Notice of Intent for Stormwater Discharges Associated with Construction Activities will be submitted to the US Environmental Protection Agency prior to the start of construction. During construction the contractor will be required to comply with the NPDES General Permit and the SWPPP for the project.

Erosion controls that will be implemented for the project are detailed below.

8.1.1.1 Controls During Construction

The following stabilization measures will be taken to minimize and prevent on-site erosion and sedimentation of adjacent resource areas during construction:

- Disturbed areas shall be kept as small as possible.
- Disturbed areas of the construction site where final grades have been reached, or those areas that will not be re-disturbed for 30 days or more, shall be stabilized by the seventh day after the last disturbance. Stabilization may be accomplished by temporary seeding, permanent seeding, mulching or other equivalent practice.
- Disturbed areas shall be stabilized by seeding and mulching. All areas where final grading, placing of topsoil and seeding can be accomplished rapidly shall be so treated to establish cover.

Appropriate erosion and sediment control practices must remain in place and be maintained until stabilization of the area affected by the control measure occurs.

The following structural measures will be taken to minimize on-site erosion and sedimentation of adjacent resource areas during construction:

- Disturbed areas shall be protected from stormwater runoff. Runoff shall be diverted from flowing over disturbed slopes by the use of temporary drainage swales with haybale check dams.

- Silt fences/haybales or equivalent sediment controls shall be installed along all side slope and down slope boundaries of the construction area.

- Temporary and permanent sediment traps shall be constructed as part of the drainage system. Sediment traps shall be located at all inlets to the storm drainage system during construction and shall remain in place and be maintained until disturbed areas are stabilized. Permanent sediment traps consisting of 4-foot deep sumps shall be constructed in the catch basins.

- Sediment shall be retained on-site within the limit of work areas.

- The bioretention basins shall be used as temporary sedimentation basins during construction and shall be cleaned of sediments after construction.

- Rip rap splash pads shall be constructed at all drain outlets.

In addition to the previously described controls, construction shall conform to all specifications as designated on the site plan, and in any other documents or permits issued in association with this project. Additional measures will include the following:

- Anti-tracking pads or other means shall be used to minimize off-site movement of soil with vehicles.

- Sanitary wastes generated on-site shall be treated and/or disposed of in accordance with applicable state and local requirements.

- Construction site waste materials shall be properly contained on-site and disposed of at an off-site location in accordance with local and state regulations.

A spill contingency plan will be implemented during construction, including the following provisions:

- Equipment necessary to quickly attend to inadvertent spills or leaks shall be stored on-site in a secure but accessible location. Such equipment shall include but not be limited to the following: safety goggles, chemically resistant gloves and overshoe boots, water and chemical fire extinguisher, sand and shovels, suitable absorbent materials, storage containers and first aid equipment.

- Spills or leaks shall be treated properly according to material type, volume of spillage and location of the spill. Mitigation shall include preventing further spillage, containing

the spilled material in the smallest practical area, removing spilled material in a safe and environmentally sound manner, and remediating any damage to the environment.

- For spills of less than five (5) gallons of material, mitigation shall include source control and containment and clean-up with absorbent materials or other applicable means, unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.

- For spills greater than five (5) gallons of material contact shall be initiated immediately with the MA DEP Hazardous Waste Incident Response Group at (617) 792-7653 and an approved emergency response contractor. Information shall be collected and relayed to the emergency response contractor or coordinator as to the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill. The contractor shall proceed with the prevention of further spillage, containment and/or clean-up.

- If there is a Reportable Quantity (RQ) release during the construction period, the National Response Center shall be notified immediately at (800) 424-8802. Within 14 days a report shall be submitted to the EPA regional office describing the release, the date and circumstances of the release and the steps taken to prevent another release. This Stormwater Pollution Prevention Plan shall be updated to reflect any such steps or actions taken.

8.1.1.2 Controls After Construction

The following measures will be taken to minimize the impact of stormwater on downstream resources after construction:

- A checklist of all maintenance items shall be developed and used for each stormwater treatment component. Each time an inspection is completed or a maintenance procedure is performed, it shall be documented on the checklist. The checklist shall be kept on the project site.

- Parking lot and driveway areas shall be swept to remove sediments before they can enter the catch basins, twice annually, in the early spring and late fall, and on an as needed basis at other times.

- The deep sump catch basins, including the oil/grease traps, shall be inspected monthly and cleaned at least four times per year so as to prevent blockage and to remove accumulated sediments. All sediment and hydrocarbons shall be properly handled and disposed in accordance with local, state, and federal guidelines and regulations.

- The Vortechs Treatment Unit shall be inspected and cleaned in accordance with manufacturer's recommendations. The by-pass manholes shall be inspected and cleaned of any sediment or debris during the routine catch basin inspections discussed above.

- The compactor and loading areas shall be routinely inspected for spillage and clean as necessary.

- Landscape areas and edges of paved areas shall be routinely inspected for any signs of erosion or damaged curbing. Any necessary curb replacement, earth repair, reseeding or mulching shall be restored upon identification.

- Litter shall be routinely picked-up and removed from the parking areas and perimeter landscape areas. Leaves or trash shall be removed from catch basin grates when observed.

- No sodium based de-icing compounds shall be used on any areas of the project.

- No herbicides or pesticides shalll be used on the site and the use of fertilizers is to be kept to a minimum. Fertilizers shall not be used closer than 50 feet from any bordering vegetated wetland, stream, bank, or other resource area, or from significant wildlife habitat.

In order to meet the above provisions during construction, the following maintenance measures will be undertaken:

- The contractor or designated site monitor shall have on the premises at all times an extra stockpile of new/unused haybales in a quantity of approximately 10% of the number of haybales required with stakes and 200 LF of silt fence for the purpose of making immediate repairs in erosion/sedimentation barriers as needed.

- Siltation barriers and other erosion and sediment control practices shall not be removed and shall be maintained until final stabilization (at least 70% vegetative cover or equivalent) of all up-gradient areas has occurred.

The General Permit Conditions require routine inspections of the site and careful documentation of events and conditions. The following inspection activities will be completed by a qualified, designated site monitor:

- Erosion control, sedimentation prevention and stormwater management measures shall be inspected at least once every two weeks throughout the construction period.

- All controls, outfalls and potential problem areas shall also be inspected within 24 hours of any storm exceeding 0.5 inches of precipitation.

- A log of inspection results shall be maintained on-site.

- All needed repairs or modifications shall be reported to the contractors to permit the timely implementation of required actions. Necessary repairs or modifications shall be implemented within seven (7) days of the inspection.

- The Stormwater Pollution Prevention Plan shall be modified within seven (7) calendar days to reflect any modifications to the pollution prevention measures required as a result of an inspection.

- Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sedimentation control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are assessable, they shall be inspected to ascertain whether control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

- A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the stormwater pollution prevention plan, and actions taken shall be made and retained as part of the stormwater pollution prevention plan for at least three years after the date of inspection. The report shall be signed by the permittee.

- Inspection and weekly reporting shall continue until final site stabilization (70% vegetative cover, or equivalent physical stabilization) is achieved.

- Final stabilized areas shall be inspected at least once every month for a minimum of three months.

8.1.2 Noise and Vibration

Every reasonable effort will be made to minimize the noise and vibration generated by construction activities. Mitigation measures will include the following:

- Using mufflers on construction equipment and maintaining intake and exhaust systems.

- Muffling enclosures on continuously running equipment, such as air compressors and welding generators.

- Replacing specific construction operations and techniques with less noisy and less vibratory ones where feasible (e.g., mixing concrete off-site instead of on-site).

- Scheduling equipment operations to keep average noise and vibration levels low, to synchronize noisiest and most vibratory operations with times of highest ambient noise levels, and to maintain relatively uniform noise levels.

- Turning off idling equipment.

- Locating noisy and vibratory equipment as far as possible from sensitive areas.

8.1.3 Dust

During the construction period, temporary effects on ambient air quality adjacent to the construction site may occur. Impacts associated with construction activities will generate fugitive dust, which may result in localized increases in particulate levels.

Principal on-site sources of particulates include cleared areas, exposed storage piles, and unpaved areas. For each source type, fugitive emissions will depend on such factors as the properties of emitting surfaces (e.g., soil silt content, moisture content, and volume of spoils), meteorological variables and the construction practices employed. The site grading process or stockpiles of exposed earth are potential dust emitters during mechanical disturbance and transfer operations, as well as during high winds.

The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts. These measures include:

- Providing street cleaning during the active excavation process;
- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on-site; and
- Conducting periodic street cleaning to minimize dust accumulations.

The project contractors will adhere to Massachusetts General Law Ch. 90, Section 16A and 3.10 CMR 7.11, which prohibits the idling of engines of stopped vehicles in excess of five minutes. Note that cement trucks are excluded from this requirement while mixing and pouring cement. All other construction vehicles associated with the project will comply.

8.1.4 Traffic

The construction period will generate truck traffic and construction employee traffic. The construction of the project will involve the use of designated routes, defined in coordination with Town of Wayland staff, prior to the start of construction. The project Proponent will require all contractors to access the site from Route 20. The use of local residential streets will be prohibited. The contractor will establish site trailers and staging areas to minimize impacts on traffic. Trucks will be required to wait in on-site staging areas and will be prohibited from waiting on Route 20.

The project Proponent is also committed to working with Town of Wayland and MassHighway officials to help ensure appropriate maintenance and protection measures are in place during the project's construction. Appropriate traffic maintenance plans will be developed during the off-site improvement design phase.

The off-site construction of the associated transportation improvements and utility relocations will be performed during off-peak travel periods. It is anticipated that traffic patterns would be maintained on any affected roadways at all times and that there would not be a need for a full road closure or detours during the construction period.

8.2 Demolition

Prior to demolition of the existing buildings, the Proponent will put in place a health and safety program. This program will consist of installed protection materials and operational means and methods. The Proponent will seek to minimize the disturbance to neighbors caused by demolition or other site activities.

To the extent feasible, demolition materials, including unpainted and uncoated brick and concrete, will be reused on-site. These materials will be separated during the demolition process and crushed on-site for reuse as paving sub-base material. Demolition debris will be reused in accordance with DEP's guidelines regarding the recycling of asphalt, brick and concrete materials to the maximum extent feasible. The remaining demolition materials will be trucked to an appropriately licensed disposal facility.

8.3 Clean Construction Equipment Initiative/ Diesel Retrofit Program

The DEP Diesel Retrofit Program, formerly called the Clear Air Construction Initiative of the Clean Construction Equipment Initiative, originated as an air quality mitigation measure for the Central Artery/Tunnel Project. The program encourages users of diesel construction equipment to install exhaust emission controls such as oxidation catalysts or particulate filters on their diesel engines.

While DEP requires participation in the Diesel Retrofit Program by municipalities applying for funding under the State Revolving Fund for water and wastewater projects, there is no requirement for participation by other project proponents.

The Proponent acknowledges the importance of emission control and will seek bids from companies that have made voluntary compliance with the Clean Construction Equipment Initiative / Diesel Retrofit Program a priority. Proper emission controls, use of clean fuels, control of truck and equipment idling times and conducting operations without affect to neighbors' clean air are all important priorities to the Proponent.

9.0 Sustainable Design

9.0 SUSTAINABLE DESIGN

The Proponent supports goals of the Commonwealth of Massachusetts and the Town of Wayland to promote sustainable design measures for construction projects. Although the Wayland Town Center project is still in the preliminary design stages, this section provides a description of the sustainable design measures to be evaluated for incorporation into the building designs.

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System sponsored by the US Green Building Council provides a measure of the sustainable efforts of the final building designs. Although the project is still in the preliminary design stage, the Proponent intends to evaluate potential sustainable design measures using the LEED Green Building Rating System as a general guideline.

The following is a brief analysis of the sustainable design measures that will be evaluated as the project progresses.

9.1 Sustainable Site Provisions

The Wayland Town Center project is situated on land which has been previously developed as a surface parking lot and a large commercial building. When completed, the project will create a new mixed use community featuring housing, retail space and a municipal building.

The Proponent will work to reduce the absorbed heat on landscape and roof surfaces by providing trees for shading. The design will include small landscaped parking fields with the goal of reducing the heat-island effect as compared to the existing surface parking lots on the site. Efforts to reduce light pollution from site lighting will likely include low-level indirect light fixtures with cut-off lens or other appropriate devices.

9.1.1 Water Use

Plumbing fixtures and appliances will be specified to reduce the usage of water as required by the Massachusetts State Building Code.

9.1.2 Energy and Atmosphere

The goal of harvesting site energy is addressed by the buildings massing, unit layouts and the HVAC design. For the residential buildings, the floor plates will be articulated to provide as much day-lighting as possible to living areas. The overall depth of the floor plates will be kept small to reduce the reliance on artificial lighting. Living rooms and bedrooms will be located at the perimeter of the buildings and internal spaces such as kitchens will be open to allow natural light and ventilation.

The residences will be heated and cooled with 4-pipe fancoil units or heat pumps, either of which will allow simultaneous heating or cooling of the units depending on the building orientation, reducing the need to heat or cool the entire building simultaneously. The windows in the residential units will be operable to allow the occupants to use natural ventilation when weather allows. Individual metering will also provide financial incentives to conserve energy.

Care will be taken to assure that all systems are installed and function as designed, and commissioning requirements will be included in the specifications, if appropriate. All building components will meet the Massachusetts Energy Code Ch.13.

Efforts to reduce energy use will be evaluated and incorporated as appropriate. Wherever feasible, building systems will be controlled by automated building management systems to reduce energy consumption.

9.1.3 Indoor Environmental Quality

The Proponent will work toward the goal of meeting the minimum requirements of the voluntary consensus standard ASHRAE 62-1999 Ventilation for Acceptable Indoor Air Quality and approved addenda. Entrance lobbies will likely include fixed entryway systems to capture dirt and other particles, and fumes, if present, will be vented or drained to prevent re-circulation of contaminants.

Where possible, CO_2 monitoring will be incorporated with the building management systems to maintain indoor air quality. Ventilation throughout the project will be designed to permit natural ventilation where practical, and mechanical ventilation will strive to attain an air change effectiveness of 0.9 as defined by ASHRAE 129-1997.

Wherever practicable, individual thermostats, humidity and ventilation controls will be incorporated to improve the comfort of occupied spaces and conserve energy in unoccupied areas.

Indoor air quality management plans for construction and pre-occupancy phases will be reviewed during the final design phases for the project and the Proponent will evaluate building components, including paints, sealants, carpets and other products with the goal of reducing volatile organic compounds.

9.2 Construction and Building Materials

The residential buildings will include provisions for designated recycling storage to encourage residents to participate in town-sponsored recycling programs.

The exterior façade materials, with proper maintenance of sealant and waterproofing, are expected to have a long life span.

As material components and finishes are selected, the Proponent will evaluate materials that contain a percentage of post-consumer and post-industrial recycled content. Materials that include recycled products are steel, concrete, and interior finishes such as carpet, tile, and fabrics. Where recycled products are not available, virgin materials will be evaluated that are rapidly renewable and readily recycled at the end of their useful service life. In addition, regionally manufactured materials will be used wherever practicable.

Where feasible and consistent with environmental regulations, abandoned concrete foundations and other stone material encountered during excavation will be crushed and reused as drainage fill.

9.3 Building Systems

Although the project is in the preliminary design stage, the Proponent will evaluate a range of sustainable building design and construction measures, as further outlined below:

Thermal Performance. The buildings will be designed to comply with current energy code requirements to improve thermal performance. The proposed designs will likely provide a high percentage of solid, insulated walls that will improve the overall thermal performance of the buildings. Windows and other glass areas will be double-glazed with low E glass and thermal break frames to minimize heat transfer. Additional air barrier detailing will be provided at the window frames to minimize air infiltration.

Building Mechanical Systems. The Proponent will evaluate sustainable design measures for the building mechanical systems to minimize energy consumption. The residential mechanical system is likely to be a four pipe fan coil system or heat pumps, either of which allows individual control of heating and to minimize the amount of energy consumed. The Proponent will also evaluate sustainable design elements for the heating, cooling, and circulation system components, including high-efficiency motors for fans and pumps, energy-efficient lighting, and energy management systems with space temperature control.

Recycling. The Proponent will encourage recycling efforts by retail tenants, restaurants and residents. Recycled materials will likely include mixed paper, newspaper, cardboard, cans and bottles, glass, plastics, magazines, phone books, and wooden pallets, as is accepted by the Town of Wayland's recycling program. Space for sorting, storage, and pick-up of recyclable materials will be provided in the residential buildings. Building management will also provide residents with the facilities and services necessary to recycle materials consistent with the Town of Wayland's recycling guidelines and regulations.

Local Building Materials. Local building materials will be used for construction and operation of the project whenever possible and economically feasible.

Future Adaptability. Accommodations for future energy and environmental technologies will be evaluated during the design phase and incorporated whenever possible and feasible.

Carbon Monoxide Alarms. Carbon monoxide meters will be included in the residential units and the proposed garages.

Anti-idling Signage. Anti-idling signage will be installed in all loading areas.

Sensor-operated Toilets and Faucets. As required by the Massachusetts State Building Code, the Proponent will install low-flow toilets and urinals, flow aerators on lavatory faucets, and sensor-operated faucets and toilets in public restrooms.

9.4 Exterior Spaces

Native Plantings. The Proponent will include native and drought-resistant plant species in project landscaping to the extent feasible to reduce irrigation needs.

Sprinkler System. Irrigation system sprinklers will include timers, tension meters, and rainfall sensors.

Exterior Project Lighting. The Proponent will consider the use of shielded lights with full-cutoff lens and fixtures that direct the light properly and uniformly on the ground and energy efficient lighting, such as fluorescent or low-pressure sodium light sources.

10.0 Mitigation and Draft Section 61 Findings

10.0 MITIGATION AND DRAFT SECTION 61 FINDINGS

10.1 Introduction

This section describes proposed mitigation measures and provides proposed Section 61 findings in accordance with the requirements of Massachusetts General Laws Chapter 30, Section 61. Section 61 requires that state agencies to "review, evaluate and determine the impact on the natural environment of all works, projects or activities conducted by them and [to] use all practicable means and measures to minimize damage to the environment." It further requires that "any determination made by an agency . . . include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." A summary of project-wide mitigation measures is also provided in Section 1.0 of this DEIR.

The state agency actions necessary for this project include:

State Agency	Permit
Department of Environmental Protection	Sewer Extension Permit
Massachusetts Highway Department	Highway Access Permit

Separate Section 61 findings for the use of the state agencies issuing permits for the Wayland Town Center project are provided below to assist the state agencies in meeting their obligations. In addition, a summary of anticipated environmental impacts and mitigation measures proposed by the project (i.e., those falling within state agency jurisdiction) are presented in Table 10-1, located at the end of this section.

10.2 MassHighway Proposed Section 61 Findings

The following letter has been prepared in accordance with MassHighway practices for the preparation of a draft Section 61 Finding.

November 13, 2006

Mr. J. Lionel Lucien
Manager, Public/Private Development Unit
Bureau of Transportation Planning and Development
Massachusetts Highway Department
10 Park Place, Room 4150, 4th Floor
Boston, MA 02116

Re: Proposed Draft Section 61 Commitment Letter
Wayland Town Center
Wayland, Massachusetts (EOEA No. 13844)

Dear Mr. Lucien:

In order to assist you in the preparation of the Section 61 Finding for the proposed Wayland Town Center development (Executive Office of Environmental Affairs (EOEA) No. 13844), Vanasse & Associates, Inc. (VAI), on behalf of Twenty Wayland, LLC has prepared a summary of the proposed transportation mitigation commitments. The approximately 56.5 acre site is bordered by Route 20 and the MBTA right-of-way to the south, Route 27 and residential properties to the north and east, and wetlands to the north. Currently, the site contains the former Raytheon Company building.

The elements of the proposed transportation mitigation program are documented in the November 30, 2006 Draft Environmental Impact Report (DEIR) prepared for the project and are listed below.

The following measures will be implemented prior to site occupancy, with extensions allowable for permitting, or other excusable delays, except as noted below:

Route 20, Route 27 and Route 126

Replace the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section. With the four-lane cross section, the lane uses on the Route 20 eastbound and westbound approaches should be designated as shared through/left-turn lane and a shared through/right-turn lane. Signal equipment modifications would also be necessary in order to accommodate the revised geometry.

Route 27 and Route 126

Signalize the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20. Vehicle queue detectors should be installed on the Route 27 approaches to Route 126 such that vehicular queues do not extend back to and block Millbrook Road or the proposed Route 27 site driveway.

Route 27, Route 126, and Millbrook Road

As a result of the signalization of Route 27 and Route 126 intersection, and the interconnection with the signal at Route 20, operations at this intersection are projected to improve. This is a result of gaps created by the two signals to allow vehicles to exit Millbrook Road. Do Not Block Intersection signs should be installed on the Routes 27/126 approaches.

Route 20 and Proposed Site Driveway

The existing intersection geometry will need to be modified to safely and efficiently accommodate the projected site-generated traffic and cut-through traffic associated with the internal connector road. Specifically, the Route 20 eastbound approach should be widened to accommodate a single exclusive left-turn lane and a through travel lane. The Route 20 westbound approach should be widened to accommodate a through travel lane and an exclusive right-turn lane. The site driveway approach to Route 20 should provide separate left- and right-turn lanes.

Further, a second option has been reviewed. It is recommended that the proposed site driveway intersection be aligned opposite a new driveway to Russell's Garden Center which would be brought under traffic signal control. By constructing a new driveway to serve Russell's Garden Center, the existing wide and uncontrolled curb cut along the south side of Route 20 (for Russell's Garden Center) can be closed, significantly reducing vehicular conflicts along this section of Route 20. This driveway would be constructed with assistance and approval from Russell's Garden Center.

Route 27 and Proposed Site Driveway

The Route 27 northbound approach should be widened to accommodate an exclusive left-turn lane and a through travel lane. The Route 27 southbound approach should be widened to accommodate a through travel lane permitting right-turns. The site driveway approach to Route 27 should provide separate left- and right-turn lanes. Further, it is recommended that signal conduit and foundations be installed at this intersection such that when warranted, the intersection would be brought under traffic signal control.

Traffic Calming Measures

In an effort to reduce the use of Glezen Lane, Bow Road and other local streets by residents of the Wayland Town Center project, and to slow travel speeds through these residential areas, appropriate traffic calming measures should be implemented. Suggested measures include:

- Reducing the width of the Glezen Lane between Route 27 and Training Field Road to 18 to 20 feet over a distance of approximately 100 feet in order to slow vehicle travel speeds.
- Modify flow through the Glezen Lane and Training Field Road intersection into a triangular shaped round-a-bout.
- Reducing the width of the Glezen Lane between Route 126 and Moore Road to 18 to 20 feet over a distance of approximately 100 feet in order to slow vehicle travel speeds.
- Making a portion of Glezen Lane at Route 126 one-way, as well as a section of Moore Road one-way to reduce cut-through potential.
- Reducing the width of the Bow Road between Route 27 and Route 126 to 16 to 18 feet over a distance of approximately 100 feet in order to slow vehicle travel speeds.
- Potential consideration of round-a-bouts, depending on availability of right-of-way.
- Speed tables to slow down vehicles.
- Peak hour turn restrictions.
- Selective speed enforcement on troublesome road sections.
- Decorative side friction devices to reduce speeds (fences, stone walls, etc.).

These restrictions should be designed in a location where appropriate lines of sight are available to allow motorists approaching the restriction to have clear lines of sight. Appropriate warning signs (ROAD NARROWS, YIELD TO ONCOMING TRAFFIC, DO NOT BLOCK INTERSECTION, etc.) and pavement markings should be installed in advance of the restriction.

Additional suggested measures include:

- Terminating one end of Bow Road such that Bow Road becomes a dead-end roadway.
- Make Bow Road a one-way roadway.

These suggested traffic calming measures can be combined or selected individually to produce the desired effect of reducing travel speeds on Glezen Lane and diverting traffic from the usage of local residential streets to the main collector roadways. All traffic calming measures should be reviewed by the Town of Wayland Fire Department to ensure that timely and efficient emergency vehicle response is maintained to the residents of Glezen Lane and Bow Road and those within the planned community.

In addition, several minor street intersection approaches to either Routes 27 or 126 do not have STOP signs. This includes River Road and Winthrop Road. STOP signs should be installed on these roadways.

Traffic Demand Management

Transportation Demand Management (TDM) measures serve to reduce single occupant vehicles (SOV) traveling to and from the site. A TDM program also encourages the use of alternative modes of transportation to reach the site. The Proponent will implement a TDM program as an integral part of the proposed project. The TDM program for the project primarily includes ridesharing, and bicycling, as discussed below.

Ridesharing Programs – Ridesharing refers to encouraging commuters to ride in vehicles with other commuters rather than drive alone to work. The most common forms of ridesharing are carpool and vanpools. The benefits of such programs include less congestion, reduced fuel consumption, and better air quality. The program will include:

- Newsletters about the program;
- Coordination with MassRides which leases commuter vans and provides administrative and organizational assistance; and
- In addition, the Proponent will evaluate the demand for a shared car service, such as ZipCar, to lessen the need for residents to own cars.
- Participation with MassRides, the region's commute management program, in ridesharing program, promotion of transit, and other "commuter choice" programs.
- Join the Metro West/495 Transportation Management Agency (TMA)

The Proponent is committed to providing TDM measures. To this end, the Proponent will assign the Transportation Demand Management responsibilities to the campus transportation manager, who will oversee the various TDM programs.

Bicycle Facilities

To encourage bicycle commuting to and from the site, the Proponent will install bicycle racks as a part of the project. Connections to the rail trail will also be explored.

Pedestrian Measures

The project Proponent is also committed to provide pedestrian access to the site. The project Proponent will donate $250,000 to the Town of Wayland for the purpose of constructing a walkway/bikeway along the existing MBTA ROW south of the site. The project Proponent is also committed to provide access to the site from this walkway/bikeway, as well as to work with property owners south of the MBTA ROW to provide pedestrian access to Route 20.

We trust that this information is helpful. The Section 61 Finding should be issued to Frank Dougherty at Twenty Wayland, LLC, c/o KGI Properties, 45 Broad Street, 4th Floor, Boston, MA 02109. If you have any questions regarding the transportation mitigation commitments associated with the project, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.

Kenneth P. Cram, P.E.
Associate

KPC/rla

cc: RDV, SMB, File

10.3 Department of Environmental Protection Proposed Section 61 Findings

DEPARTMENT OF ENVIRONMENTAL PROTECTION
WAYLAND TOWN CENTER
(EOEA #13844)
(FOR A SEWER CONNECTION PERMIT)
UNDER M.G.L. C.30, S.61

These Findings for the Wayland Town Center project (EOEA #12683) have been prepared in accordance with the provisions of M.G.L. c. 30, Section 61 and 301 CMR 11.00. On *[insert date]* the Secretary of Environmental Affairs issued a Certificate stating that the project's Final Environmental Impact Report (FEIR), dated *[insert date]* complied with the MEPA statute and regulations.

The Wayland Town Center project (the project) includes a mix of commercial, residential, town green open space, municipal amenities, and the designation of a site for a future municipal building. The project has been approved by Town Meeting for a maximum of 167,500 square feet of residential use (100 units), 155,000 square feet of retail space and 10,000 square feet of office space. Additionally, the Town of Wayland will be deeded a parcel within the development for construction of a 40,000 square-foot municipal building. Wastewater disposal service will be provided for the project through connection to the existing Town of Wayland municipal wastewater treatment plant and construction of an on-site subsurface disposal system. It is anticipated that the project, including the town's parcel, will generate up to 54,900 gallons per day (gpd) of wastewater based on Massachusetts Department of Environmental Protection (DEP) Title V wastewater generation rates. The Proponent has the contractual right to discharge 45,000 gpd into the Wayland municipal wastewater treatment plant. This right has been confirmed in the project's Development Agreement with the Town of Wayland. In addition, the Proponent anticipates using sections of the project site to construct an on-site septic system to discharge 9,900 gpd of wastewater.

As this project is currently described, it will require a Sewer Connection Permit from Department for wastewater disposal into the municipal sewerage system. Through the MEPA review process, the following measures have been determined to be adequate to mitigate the project's potential impacts:

- Water conservation measures, including, low-flow fixtures, will be installed in residential, retail, office, and other facilities;
- A resident and employee awareness program will be implemented to minimize wastewater generation and ensure ongoing water conservation.

Based upon its review of the MEPA documents, the permit applications submitted to date and the Department's regulations, the Department finds that the terms and conditions to be incorporated into the permits required for this project will constitute all feasible measures to avoid damage to the environment and will minimize and mitigate such damage to the maximum extent practicable for those impacts subject to the Department's authority. Implementation of the mitigation measures will occur in accordance with the terms and conditions set forth in the permits.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

_____ _____

BY DATE

Table 10-1 Summary of Impacts and Mitigation Measures

Subject Matter	Impact	Mitigation	Schedule
Traffic	Generation of 9,404 new vehicle trips per day	Traffic mitigation commitments are detailed in Section 3.5.6 and include: Replacing the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section; signalizing the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20; modifying the existing intersection geometry at the site driveway; and widening the Route 27 northbound approach to accommodate an exclusive left-turn lane and a through travel lane. In addition, a Traffic Demand Management program will be put in place, a shuttle service will be promoted, bike racks will be installed and pedestrian access will be enhanced.	During construction
Air Quality	Slight decrease in daily VOC and NOx emissions in AM peak period of the build condition versus the no-build condition. Increases in emissions in PM peak period and weekend peak periods.	Traffic mitigation commitments are detailed in Section 3.5.6 and include: Replacing the existing five lane cross-section on Route 20 at Route 27 and Route 126 with a four-lane cross section; signalizing the Route 27 at Route 126 intersection and provide for a coordinated traffic signal system with the signal at Route 20; modifying the existing intersection geometry at the site driveway; and widening the Route 27 northbound approach to accommodate an exclusive left-turn lane and a through travel lane. In addition, a Traffic Demand Management program will be put in place, a shuttle service will be promoted, bike racks will be installed and pedestrian access will be enhanced.	During construction
Wetlands	Impacts to bordering vegetated wetlands (off-site roadway improvements only). Work in Riverfront Area (off-site and on-site).	Replication of bordering vegetated wetlands at a 1.5:1 ratio, as required by the Town of Wayland Wetlands and Water Resources Bylaw. Riverfront Area development confined to upland and previously disturbed areas.	Prior to occupancy
Stormwater	0.4 net new acres of impervious area	The proposed stormwater management system will significantly improve the quality of the stormwater runoff and will include new catch basins with deep sumps and hoods, and low impact development (LID) techniques such as water quality swales, rain gardens, and bioretention basins.	During construction and occupancy

Table 10-1 Summary of Impacts and Mitigation Measures (continued)

Wastewater	Generation of 54,900 gallons per day of wastewater	Water conservation fixtures will be installed in the residences and businesses.	During construction and occupancy
Water Supply	Consumption of 80,000 gallons per day of water	Water conservation fixtures will be installed in the residences and businesses. Landscape design will use native and drought-resistant species to minimize irrigation requirements.	During construction and occupancy
Hazardous Waste Cleanup	None	None required. Section 6.0 discusses the Raytheon Company's ongoing cleanup activities at the site.	
Rare Species	None identified	The project is in the process of consulting with the NHESP to determine whether the project as designed would include a taking as defined by MESA. The results of this consultation and any further assessment will be presented in the FEIR.	Prior to construction
Sustainable Design	The full range of potential impacts associated with development and occupancy of the site.	Sustainable design building elements, energy efficient building systems, and recycling efforts are just some of the measures that will be evaluated for inclusion as the project proceeds. During the final design of the project, the Proponent will evaluate sustainable construction and operation measures, including sustainable design measures identified by the Leadership in Energy and Environmental Design (LEED) Green Building Rating System.	During construction and occupancy
Construction	Temporary impacts on traffic, air quality, erosion control, noise and vibration, dust and wildlife and rare species.	Careful planning of construction. Planning to minimize water quality impacts. Maintenance of a comprehensive SWPPP. Requiring contractor compliance with air quality, noise, vibration, dust and construction traffic requirements.	During construction

11.0 Response to Comments

11.0 RESPONSE TO COMMENTS

This Draft Environmental Impact Report (DEIR) is structured in response to the Certificate of the Secretary of Environmental Affairs on the Environmental Notification Form (ENF) issued August 25, 2006. A copy of the Secretary's Certificate is included at the end of Section 1.0 of this DEIR.

Section 11.0 responds to comment letters received from government agencies, elected officials, private organizations, and individuals on the ENF submitted July 17, 2006. Each of these comment letters is included in this section of the DEIR.

All of the attached comment letters have been assigned an abbreviation, as listed in Table 11-1. Specific comments within each letter are noted in the margin of the letter with this abbreviation and a sequential numbering. Preceding each comment letter is a listing of comment numbers accompanied by a response and/or a reference to the appropriate section of the DEIR in which the specific comment is addressed.

Table 11-1 Comment Letters Received

Commenter	Abbreviation
State Agencies	
Natural Heritage and Endangered Species Program	NHESP
Department of Environmental Protection – Boston	DEP
Department of Environmental Protection – Northeast Regional Office (2 letters)	NERO
Executive Office of Transportation	EOT
Regional Planning Agencies and Private Organizations	
Metropolitan Area Planning Council	MAPC
Metro West Growth Management Committee	GMC
Sudbury Valley Trustees	SVT
Sudbury, Assabet and Concord Wild Scenic River Stewardship Council	RSC
Mass Central Rail Trail	MCRT
Municipal	
Wayland Planning Board	WPB
Wayland Highway Department	WHD
Wayland Conservation Commission	WCC

Table 11-1 Comment Letters Received (Continued)

Individuals	
Maurice Rockett	MR
Joy Viola	JV
Judith Canty Graves	JCG
Jean Ann Schulte	JAS
Alan D. Mandl	ADM
Susan Reed	SR
Spencer Shearer	SS
Molly Upton (2 letters)	MU
William J. Murphy, Jr.	WJM
Frank Kennedy	FK
Richard Rayne	RP
Kim Reichelt	KR
Sherre Greenbaum	SG
Tom Sciacca	TS
Julia and Kevin Leney	JKL
Phil Kling	PK
Stan Robinson	SR
Linda Segal	LS

NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM

NHESP.01 An Information Request form was submitted to NHESP on September 7, 2006, and a response letter from NHESP was received on October 10, 2006. This letter is included in Appendix E. Rare species issues are reviewed in Section 7.0.

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

HJ

Wayne F. MacCallum, *Director*

August 8, 2006

Stephen R. Pritchard, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Holly Johnson, EOEA No. 13844
100 Cambridge St.
Boston, Massachusetts 02114

RECEIVED
AUG 11 2006
MEPA

Project Name:	*Wayland Town Center*
Proponent:	*Twenty Wayland, LLC*
Location:	*400 Boston Post Road*
Document Reviewed:	*Environmental Notification Form*
NHESP Tracking No.	***06-20298***

Dear Secretary Pritchard:

The Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries & Wildlife (Division) has reviewed the Environmental Notification Form (ENF) and conceptual project plans (dated 7/6/06). At this time, the NHESP would like to offer the following comments in regard to state-listed rare species.

A portion of the subject property is located within Priority Habitat 600 (PH 600) and Estimated Habitat 169 (WH 169) as indicated in the *11th Edition of the Massachusetts Natural Heritage Atlas*. A review of the NHESP database indicates that the American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), and Pied-billed Grebe (*Podilymbus podiceps*) and, Common Moorhen (*Gallinula chloropus*) are documented in PH 600/WH169. The Least Bittern and Pied-billed Grebe documented since 2003, and American Bittern are state-listed as "Endangered," while the Common Moorhen is state-listed as "Special Concern." A fact sheet for each species is located on our website, www.nhesp.org. State-listed rare species are protected from a "take" pursuant to the provisions of the Massachusetts Endangered Species Act (MESA) (M.G.L. c.131A) and it's implementing regulations (321 CMR 10.00). A review of the preliminary draft of the *12th Edition of the Massachusetts Natural Heritage Atlas*, due out in October 2006, indicates that a portion of the property will remain in *Priority Habitat*. Please note that proposed activities located in Priority Habitat require a direct filing with the NHESP in compliance with MESA (321 CMR 10.18). Please visit the NHESP website, for more information regarding the MESA filing requirements, regulations, and other resources. If you have further questions regarding this letter please contact Dan Nein, Endangered Species Review Biologist at (508) 792-7270, ext 151. NHESP.01

We appreciate the opportunity to comment on this project.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

cc: Twenty Wayland, LLC
Wayland Planning Board
Wayland Board of Selectmen
Laura Rome, Epsilon Associates, Inc.
DEP Northeast Regional Office, Wetlands Program

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP.01 The project's air quality analysis is described in Section 3.6.

DEP.02 The project's air quality analysis is described in Section 3.6.

DEP.03 The project's air quality analysis is described in Section 3.6.

DEP.04 The Proponent will post idling restriction signs on the project site.

DEP.05 As applicable, the Proponent will comply with the Rideshare Regulation. Proposed transportation demand management measures are discussed in Section 3.5.3.3.

DEP.06 As is required when the mesoscale results show an increase in emissions from the no-build to build conditions, the Proponent has identified and reviewed reasonable and feasible reduction and mitigation measures to address the increase in emissions associated with the 2011 build scenario. Proposed traffic mitigation measures are described in detail in Section 3.5.

DEP.07 Truck deliveries will be scheduled for off-peak hours to the extent practicable.

DEP.08 The Proponent acknowledges the importance of emission control and will seek bids from companies that have made voluntary compliance with the Clean Construction Equipment Initiative / Diesel Retrofit Program a priority. Proper emission controls, use of clean fuels, control of truck and equipment idling times and conducting operations without affect to neighbors' clean air are all important priorities to the Proponent. Please see Section 8.3.

DEP.09 The project Proponent is committed to implementing TDM measures. The TDM program also encourages the use of alternative modes of transportation to reach the site. The Proponent will implement a TDM program as an integral part of the proposed project. The TDM program for the project primarily includes ridesharing, and bicycling, as discussed below.

Ridesharing Programs – Ridesharing refers to encouraging commuters to ride in vehicles with other commuters rather than drive alone to work. The most common forms of ridesharing are carpool and vanpools. The benefits of such programs include less congestion, reduced fuel consumption, and better air quality. The program will include:

- Dissemination of promotional TDM materials to residents;
- Newsletters about the program;
- Coordination with MassRides which leases commuter vans and provides administrative and organizational assistance; and

- In addition, the Proponent will evaluate the demand for a shared car service, such as ZipCar, to lessen the need for residents to own cars.

- Participation with MassRides, the region's commute management program, in ridesharing program, promotion of transit, and other "commuter choice" programs.

- Join the Metro West/495 Transportation Management Agency (TMA)

The Proponent is committed to providing TDM measures. To this end, the Proponent will assign the Transportation Demand Management responsibilities to the campus transportation manager, who will oversee the various TDM programs.

Bicycle Facilities -- To encourage bicycle commuting to and from the site, the Proponent will install bicycle racks as a part of the project. Connections to the rail trail will also be explored.

DEP.10 Retail tenants will be encouraged to offer incentives to shoppers who have arrived via carpool or other method other than single occupancy vehicle. Bicycle racks will be installed at part of the project and connections to the rail trail will be explored.

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

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Lieutenant Governor

STEPHEN R. PRITCHARD
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

RECEIVED
AUG 11 2006
MEPA

August 9, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
MEPA Office
Holly Johnson, Analyst
100 Cambridge Street, 9th floor
Boston, MA 02114

Re: Review of Environmental Notification Form, Wayland Town Center, Wayland, Massachusetts
EOEA No. 13844

Dear Secretary Pritchard:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the Environmental Notification Form (ENF) submitted by Twenty Wayland, LLC, regarding the proposed Wayland Town Center Project in Wayland, Massachusetts. According to the ENF, the proposed project will consist of a 372,500 square-foot mixed used development that will include residential (167,500 square feet), commercial (156,750 square feet), office space (48,250 square feet), and 1,296 parking spaces. The proposed project is estimated to draw 7,834 new vehicle trips per day.

The significant number of projected new daily vehicle trips triggers MassDEP's review threshold requiring the project proponent to conduct an air quality mesoscale analysis of Build and No Build conditions. The purpose of the mesoscale analysis is to determine whether and to what extent the proposed project will increase the amount of volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the project area. The mesoscale analysis will also be used to determine if the project will be consistent with the Massachusetts State Implementation Plan (SIP). Emission increases due to the project must be mitigated and subsequent environmental documents should include the project proponent's commitment to implement said mitigation measures.

Requirements

Mesoscale Analysis

For the mesoscale analysis, the project proponent must conduct an analysis of all roadway segments affected by the project, specifically the area within a 0.3 to 16 km radius of the project; the exact geographical area depends on local conditions and the impact of the project on area travel patterns. The area should be large enough to include all roadway links that could experience a 10% potential DEP.01

increase in traffic and which currently operate at or, will be degraded to, a Level of Service (LOS) D or lower.

The project proponent should consult with MassDEP staff and staff in the Massachusetts Environmental Policy Act (MEPA) office to determine the boundaries of each of the project alternatives, including the Existing condition in the Base Year, and the No-Build, Build and Build-with-Mitigation conditions in the project completion and project design years. The current emission model, MOBILE 6 should be used for this effort. VOC and NOx emissions for the Existing condition can be estimated using existing characteristics on the roadway segments. Emissions in the Build condition can be estimated by changing the traffic characteristics on the roadway segments to those that are expected to occur when the entire project is completed. VOC and NOx emissions for the No-Build condition for the future year can be similarly estimated. DEP.02

If the mesoscale analysis indicates an increase in VOC and NOx emissions, the project proponent and/or the owner/occupant of the proposed site must develop mitigation measures to offset these increases. The project proponent should then conduct an analysis for the Build-with-Mitigation condition in the project design year. DEP.03

Compliance with the Massachusetts Idling Regulation

The Massachusetts Idling regulation (310 CMR 7.11) prohibits motor vehicles from idling their engines more than five minutes unless the idling is necessary to service the vehicle or to operate engine-assisted power equipment (such as refrigeration units) or other associated power. The proponent should consider posting idling restriction signs on the premises to remind all drivers, patrons, and delivery personnel of the state's idling regulation. Questions regarding this regulation should be directed to Julie Ross of MassDEP at 617-292-5958. DEP.04

Compliance with the Massachusetts Rideshare Regulation

MassDEP implements the Rideshare Regulation (310 CMR 7.16), a clean air program that applies to employers with 250 or more daily employees. Employers subject to the Rideshare Program must implement a series of incentives that are designed to reduce the number of trips made by employees who drive alone to work. To date, employers with 1,000 or more employees and employers with 250 or more employees that are also subject to the Air Operating Permit Program (as detailed in MassDEP's regulation, 310 CMR 7.00, Appendix C) must comply with the Rideshare regulation. Questions regarding this regulation should be directed to Gail Costelas of MassDEP at 617-292-5663 for assistance in complying with this air quality program. DEP.05

Recommendations

MassDEP recommends that the project proponent take all reasonable steps to mitigate the potential air quality impact associated with this project. DEP.06

Delivery Restrictions

MassDEP recommends that the proponent restrict truck deliveries to off-peak hours to minimize traffic impacts and diesel emissions in the project area. DEP.07

Construction Period Air Quality Mitigation Measures

MassDEP believes it is necessary to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible and thus recommends that the project proponent participate in the MassDEP Diesel Retrofit Program. Diesel emissions contain fine particulates that exacerbate a number of heath conditions, such as asthma and respiratory ailments. MassDEP recommends that the project proponent work with its staff to implement construction-period diesel emission mitigation, which could include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters. Additional information is available on the MassDEP website: http://www.state.ma.us/dep/brp/mf/files/diesel.pdf. DEP.08

In addition, MassDEP recommends that the project proponent require its contractor(s) to use currently available on-road low sulfur diesel (LSD) fuel and ultra low diesel fuel (ULSD) by October 2006 in their off-road construction equipment. On-road LSD fuel has a sulfur content of approximately 500 parts per million (ppm) in contrast to lower grade off-road diesel fuel which has a sulfur content of 3,000 ppm. As part of a federal Clean Air Act mandate, ULSD, with sulfur content of 15 ppm, will become available statewide by October 2006. The use of LSD or ULSD fuel, in conjunction with after-engine emission controls, can reduce fine particulate matter by an additional 25 percent beyond that obtainable with after-engine controls only.

Transportation Demand Management (TDM) Measures

The project proponent should also consider implementing additional incentives to reduce vehicle trips by residents, employees, and shoppers: DEP.09

- **On-Site Vehicle Trip Reduction Coordinator.** The project proponent should consider designating an employee at the site as the on-site vehicle trip reduction coordinator to implement, promote and follow up on the use of the mitigation trip reduction measures.

- **Commuter Tax Benefit Program.** This transportation tax benefit program encourages employees to take transit or vanpools to work, providing transit and bus services are available within a mile of the project site. This program provides the added benefit of decreasing taxes for employers and employees. People that use transit are often dependent on retail jobs and providing financial incentives will encourage more people to take transit, thereby reducing emissions and expanding the number of people available for employment in the proposed project.

- **Rideshare-Matching Program.** The project proponent should set up a rideshare-matching program to match employees in carpools and/or vanpools. The project proponent could also enlist the services of a third-party provider to carry out this program.

- **Form or Join an Existing Transportation Management Association (TMA).** TMAs are organizations that help several employers in a local area develop and implement incentives that reduce traffic and trips to the worksite. Employers pay a fee for this service to a centralized coordinator to market and implement these incentives on their behalf.

- **Guaranteed Ride Home Program.** The project proponent should consider providing emergency rides home to employees in the proposed project that participate in carpools/vanpools.

- **Bicycle Incentives.** The project proponent should consider the installation of showers, clothing lockers, and bicycle lockers, and provide other enhancements, such as bicycle helmets, coupons to bike stores and bike locks, to increase employee bicycle use to the site.

- **Preferential Parking.** MassDEP recommends that the project proponent designate special, preferred parking spaces for carpools and/or vanpools as an incentive to encourage people to rideshare to work. Preferential parking could also be designated for hybrid vehicles.

- **Shuttle.** To help reduce vehicle trips to the store, the project proponent should run a shuttle to transport employees to nearby transit stations, senior citizen housing, or other locations.

Finally, MassDEP recommends that the project proponent explore ways to encourage shoppers to use transit or carpool to the proposed project, including offering discounts to customers who come to the retail establishment in a carpool, by transit or another method. Other projects in Massachusetts have instituted these incentives to discourage drive-alone commuting. DEP.10

Should you have any questions, please contact Jerome Grafe at 617-292-5708.

Sincerely,

Richard Blanchet, Branch Chief
Transportation Management Programs
Bureau of Waste Prevention

JG|MEPA-Wayland Center, Wayland – ENF Aug. 06

DEPARTMENT OF ENVIRONMENTAL PROECTION – NORTHEAST REGIONAL OFFICE

NERO.01 Proposed Section 61 Findings are found in Section 10.0.

NERO.02 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

NERO.03 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

NERO.04 Core Habitat C723 extends onto the project site from the west approximately to the mapped extent of bordering vegetated wetlands. The Proponent recognizes the sensitive nature of this portion of the project site and is not proposing development in this location. In addition a ten acre conservation restriction in this area will be granted to either the Sudbury Valley Trustees, Inc. or another non-profit corporation. In the very southwestern corner of the project site C723 extends farther to the east, crossing a proposed access roadway to the site. This roadway is a secondary access point and is being constructed over an existing paved roadway.

NERO.05 Erosion and sedimentation controls to be employed during construction are discussed in Section 8.1.1. The project's stormwater management system is described in Section 4.2.

NERO.06 Stormwater management for the project has been designed utilizing low impact development (LID) techniques such as water quality swales, rain gardens, and bioretention basins, which work together to protect the quantity and quality of stormwater recharged to the aquifer beneath the site.

NERO.07 The project's stormwater management system is described in Section 4.2.

NERO.08 Peak wastewater flows for the proposed project uses are tabulated in Section 5.1.1 and usage of the proposed septic system is described in Section 5.1.3.

NERO.09 The project site is located within a Zone II aquifer protection district and therefore is designated as a nitrogen sensitive area and must be designed in accordance with Title V nitrogen loading limitations. Since the system is located in a nitrogen sensitive area and is also designed to treat more than 2,000 gallons per day, it will be required to use a re-circulating sand filter (RSF) or other equivalent technology approved by DEP. An alternative technology is proposed for the project such as a Fixed Activated Sludge Treatment (FAST) system. Section 5.1.3 discusses the proposed septic system.

NERO.10 The project's air quality analysis is described in Section 3.6.

NERO.11 The project's air quality analysis is described in Section 3.6.

NERO.12 As is required when the mesoscale results show an increase in emissions from the no-build to build conditions, the Proponent has identified and reviewed reasonable and feasible reduction and mitigation measures to address the increase in emissions associated with the 2011 build scenario. Proposed traffic mitigation measures are described in detail in Section 3.5.

NERO.13 The Proponent will post idling restriction signs on the project site.

NERO.14 As applicable, the Proponent will comply with the Rideshare Regulation.

NERO.15 The Proponent will take reasonable steps to mitigate the project's air quality impacts. See Sections 3.5, 3.6 and 8.3 for specific air quality mitigation measures.

NERO.16 To the extent feasible, deliveries will be made in off-peak hours.

NERO.17 The Proponent will evaluate participation in the Diesel Retrofit Program.

NERO.18 The project's TDM plan is described in Section 10.0.

NERO.19 The project's TDM plan is described in Section 10.0.

NERO.20 To the extent feasible, the project will recycle C&D waste.

NERO.21 The project will comply with regulations applicable to the processing of asphalt, brick and concrete rubble.

NERO.22 The project will comply will regulations applicable to crushing equipment.

NERO.23 The project will comply will applicable asbestos handling regulations.

NERO.24 The project will comply with all air pollution control regulations and will properly notify DEP of asbestos removal and demolition work. Measures designed to mitigate dust, noise and odor nuisances are described in Section 10.0.

NERO.25 As building design advances, appropriate recycling infrastructure will be incorporated into the project.

NERO.26 Wastewater is characterized in Section 5.1.

NERO.27 The Proponent will work with the Town on issues relating to wastewater treatment capacity for the project.

NERO.28 Please see Section 6.0 for discussion of hazardous waste issues.

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
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Lieutenant Governor

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Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

H2

August 15, 2006

Stephen R. Pritchard, Secretary
Executive Office of
Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Wayland
Town Center
400 Boston Post Road
EOEA # 13844

RECEIVED
AUG 16 2006
MEPA

Attn: MEPA Unit

Dear Secretary Pritchard:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed the Environmental Notification Form (ENF) submitted by Twenty Wayland LLC to construct a mixed-use commercial, residential, municipal development on a 56.5- acre site of the former Raytheon Corporation in Wayland (EOEA #13844). At full build out it is anticipated that the project would consist of 156,750 square feet of retail, 8,250 sf of office space, 100 residential units (167,500 sf), 40,000 square foot municipal facility, and parking for 1,296 vehicles. The project is categorically included for the preparation of an environmental impact report. The Department provides the following comments.

Section 61 Finding

The Department requests that the Draft EIR include a Section 61 Finding that describes and lists those measures to avoid, minimize, and mitigate environmental impacts from the project that relate to the MassDEP permits. The Finding also should identify the parties responsible for implementing these measures, and an approximate schedule for completing the work after the environment is impacted. NERO.01

Wetlands

An Order of Conditions for wetlands alterations would be required for this project (which is acknowledged in the ENF). It is possible that a 401 WQC will be required as well, depending on the amount of alteration that is ultimately proposed. The ENF identifies Bank, BVW and Riverfront Area on the site. Any areas of 100-year FEMA floodplain (Bordering Land Subject to Flooding (BLSF)), if present, should also be identified and shown on site plans. While wetland alteration does not seem to be needed for development of the site itself, access from Routes 20 NERO.02

and 27 may involve wetland impacts due to widening of the existing driveways. In addition, the ENF mentions widening of Route 20. MassDEP recommends that wetland impacts associated with each of the access ways and Route 20 be identified and analyzed separately. Wetland replication will be required for all wetland alterations and should be designed and constructed in accordance with the *Massachusetts Inland Wetland Replication Guidelines*, BRP/DWM/WetG02-2, 2002, which is available at the following website: http://www.mass.gov/dep/water/laws/replicat.doc. NERO.03

Core Habitat

The project site is within a Core Habitat, C723, which is a critical or exemplary habitat for aquatic species, according to the Biomap. According to the report, Living Waters, Guiding the Protection of Freshwater Biodiversity in Massachusetts, 2003, "Critical Supporting Watersheds cover 1,380,000 acres of undeveloped and developed lands that need protection or careful management to ensure the ecological integrity of our freshwater Core Habitats." For additional information and access to the Biomap, visit the following website: http://www.mass.gov/dfwele/dfw/nhesp/nhaqua.htm. NERO.04

Stormwater

Wetland resource areas in Massachusetts are protected from adverse water quality, flooding, and erosion impacts caused by stormwater runoff during construction and post-construction, under the provisions in the DEP Stormwater Management Policy. Municipalities such as Wayland also are required to prepare and implement Stormwater Management Programs for compliance with the NPDES Phase II Stormwater General Permit. An EIR should demonstrate that source controls, pollution prevention measures, erosion and sediment controls during construction, and the post-development drainage system will be designed to comply with the Massachusetts Stormwater Management Policy and standards for water quality and quantity impacts and with the town of Wayland's Storm Water Program. Calculations, stormwater system design plans at a readable scale, best management practice (BMP) designs, and supporting information should supplement the information provided in the ENF to affirm that the stormwater system design provides adequate protection for wetland resources in conformance with the Policy and the town's NPDES Storm Water General Permit. Additional information on the SMP is available on the following DEP website: http://www.mass.gov/dep/water/laws/policies.htm - storm. NERO.05

In addition, the ENF indicates that the project increases the imperviousness by more than eight percent for a total of more than 41 percent of impervious roadways, parking areas, and rooftops. Impervious surfaces are the source of more runoff and pollutants than any other land use. Therefore, the proponent should consider ways to minimize paved areas and restore undeveloped infiltration conditions. Reducing the amount of imperviousness will benefit the environment and the stormwater control system will be less costly. Low impact development techniques may be appropriate to address this issue on the project site by breaking up or disconnecting flow pathways, by increasing the number of points for infiltration, and by redirecting runoff to vegetated buffers or swales instead of closed drainage systems. Where feasible, landscaped traffic islands and vegetated islands in the parking areas should be lower in elevation to capture runoff, and pervious pavement materials should be substituted for asphalt. Additional information is available on low impact development techniques in the DEP/MCZM NERO.06

Stormwater Management, Volume Two: Stormwater Technical Handbook, Chapter 2 and the USEPA *Low Impact Development Design Strategies, An Integrated Design Approach,* (EPA 841-B-00-003).

Category 5 Impaired Waterbody

The proponent is advised to consult the town of Wayland to ensure that the new drainage system is consistent with the town of Wayland's NPDES Phase II Stormwater General Permit. For compliance with the NPDES Phase II Stormwater General Permit, the town should have a plan for controlling water quality in the stormwater runoff in accordance with the permit requirements in Part I.C.2, in order to "(e)nsure that the discharges will not cause an instream exceedance of the water quality standards" for impaired waterbodies, such as the Sudbury River, which is contaminated with metals, and is classified as a Category 5 impaired waterbody on the Massachusetts 2002 303(d) List of Impaired Waterbodies. [1] NERO.07

Wastewater

The wastewater discharged from the project will be separated: 45,000 gallons per day will be discharged to the wastewater treatment facility on site; and the remainder of the wastewater, which is estimated at 9,900 gpd, will be treated and discharged to a septic system onsite. The existing wastewater treatment facility discharges to the Sudbury River under a National Pollutant Discharge Elimination System (NPDES) Permit.

The Department requests that the EIR identify the average and peak wastewater flows from the buildings, which should be described in terms of the amount of square feet in each use category that would be discharging to the proposed septic system. Information provided in the report should demonstrate that the flow to each of the two treatment systems would be separate and distinct. NERO.08

Given that the site is within the Zone II of several municipal wells, the site is located within a Nitrogen Sensitive Area and the flows to the septic system must not exceed 440 gallons/building acre in accordance with 310 CMR 15.310 CMR 15.214 and 15.215. In addition, the septic system must be designed with a recirculating sand filter or an equivalent technology as required by 310 CMR 15.202. NERO.09

Air Quality

The significant number of projected new daily vehicle trips triggers MassDEP's review threshold requiring the project proponent to conduct an air quality mesoscale analysis of Build and No Build conditions. The purpose of the mesoscale analysis is to determine whether and to what extent the proposed project will increase the amount of volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the project area. The mesoscale analysis will also be used to determine if the project will be consistent with the Massachusetts State Implementation Plan (SIP). Emission increases due to the project must be mitigated and subsequent environmental documents should include the project proponent's commitment to implement said mitigation measures.

[1] A Total Maximum Daily Load (TMDL) is required for this class of impaired waterbodies. A TMDL is an estimate of the greatest amount of pollutants a waterbody can accept and still meet the water quality standards to protect public health and the environment. A TMDL requires implementation of controls to meet water quality standards.

Mesoscale Analysis

For the mesoscale analysis, the project proponent must conduct an analysis of all roadway segments affected by the project, specifically the area within a 0.3 to 16 km radius of the project; the exact geographical area depends on local conditions and the impact of the project on area travel patterns. The area should be large enough to include all roadway links that could experience a 10% potential increase in traffic and which currently operate at or, will be degraded to, a Level of Service (LOS) D or lower. NERO.10

The project proponent should consult with MassDEP staff and staff in the Massachusetts Environmental Policy Act (MEPA) office to determine the boundaries of each of the project alternatives, including the Existing condition in the Base Year, and the No-Build, Build and Build-with-Mitigation conditions in the project completion and project design years. The current emission model, MOBILE 6 should be used for this effort. VOC and NOx emissions for the Existing condition can be estimated using existing characteristics on the roadway segments. Emissions in the Build condition can be estimated by changing the traffic characteristics on the roadway segments to those that are expected to occur when the entire project is completed. VOC and NOx emissions for the No-Build condition for the future year can be similarly estimated. NERO.11

If the mesoscale analysis indicates an increase in VOC and NOx emissions, the project proponent and/or the owner/occupant of the proposed site must develop mitigation measures to offset these increases. The project proponent should then conduct an analysis for the Build-with-Mitigation condition in the project design year. NERO.12

Compliance with the Massachusetts Idling Regulation

The Massachusetts Idling regulation (310 CMR 7.11) prohibits motor vehicles from idling their engines more than five minutes unless the idling is necessary to service the vehicle or to operate engine-assisted power equipment (such as refrigeration units) or other associated power. The proponent should consider posting idling restriction signs on the premises to remind all drivers, patrons, and delivery personnel of the state's idling regulation. Questions regarding this regulation should be directed to Julie Ross of MassDEP at 617-292-5958. NERO.13

Compliance with the Massachusetts Rideshare Regulation

MassDEP implements the Rideshare Regulation (310 CMR 7.16), a clean air program that applies to employers with 250 or more daily employees. Employers subject to the Rideshare Program must implement a series of incentives that are designed to reduce the number of trips made by employees who drive alone to work. To date, employers with 1,000 or more employees and employers with 250 or more employees that are also subject to the Air Operating Permit Program (as detailed in MassDEP's regulation, 310 CMR 7.00, Appendix C) must comply with the Rideshare regulation. Questions regarding this regulation should be directed to Gail Costelas of MassDEP at 617-292-5663 for assistance in complying with this air quality program. NERO.14

Recommendations

MassDEP recommends that the project proponent take all reasonable steps to mitigate the potential air quality impact associated with this project. NERO.15

Delivery Restrictions

MassDEP recommends that the proponent restrict truck deliveries to off-peak hours to minimize traffic impacts and diesel emissions in the project area. NERO.16

Construction Period Air Quality Mitigation Measures

MassDEP believes it is necessary to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible, and thus recommends that the project proponent participate in the MassDEP Diesel Retrofit Program. Diesel emissions contain fine particulates that exacerbate a number of heath conditions, such as asthma and respiratory ailments. MassDEP recommends that the project proponent work with its staff to implement construction-period diesel emission mitigation, which could include the installation of after-engine emission controls such as oxidation catalysts or diesel particulate filters. Additional information is available on the MassDEP website: http://www.state.ma.us/dep/brp/mf/files/diesel.pdf. NERO.17

In addition, MassDEP recommends that the project proponent require its contractor(s) to use currently available on-road low sulfur diesel (LSD) fuel and ultra low diesel fuel (ULSD) by October 2006 in their off-road construction equipment. On-road LSD fuel has a sulfur content of approximately 500 parts per million (ppm) in contrast to lower grade off-road diesel fuel which has a sulfur content of 3,000 ppm. As part of a federal Clean Air Act mandate, ULSD, with sulfur content of 15 ppm, will become available statewide by October 2006. The use of LSD or ULSD fuel, in conjunction with after-engine emission controls, can reduce fine particulate matter by an additional 25 percent beyond that obtainable with after-engine controls only.

Transportation Demand Management (TDM) Measures

The project proponent should also consider implementing additional incentives to reduce vehicle trips by residents, employees, and shoppers: NERO.18

- **On-Site Vehicle Trip Reduction Coordinator.** The project proponent should consider designating an employee at the site as the on-site vehicle trip reduction coordinator to implement, promote and follow up on the use of the mitigation trip reduction measures.

- **Commuter Tax Benefit Program.** This transportation tax benefit program encourages employees to take transit or vanpools to work, providing transit and bus services are available within a mile of the project site. This program provides the added benefit of decreasing taxes for employers and employees. People that use transit are often dependent on retail jobs and providing financial incentives will encourage more people to take transit, thereby reducing emissions and expanding the number of people available for employment in the proposed project.

- **Rideshare-Matching Program.** The project proponent should set up a rideshare-matching program to match employees in carpools and/or vanpools. The project proponent could also enlist the services of a third-party provider to carry out this program.

- **Form or Join an Existing Transportation Management Association (TMA).** TMAs are organizations that help several employers in a local area develop and implement incentives that reduce traffic and trips to the worksite. Employers pay a fee for this service to a centralized coordinator to market and implement these incentives on their behalf.

- **Guaranteed Ride Home Program.** The project proponent should consider providing emergency rides home to employees in the proposed project that participate in carpools/vanpools.

- **Bicycle Incentives.** The project proponent should consider the installation of showers, clothing lockers, and bicycle lockers, and provide other enhancements, such as bicycle helmets, coupons to bike stores and bike locks, to increase employee bicycle use to the site.

- **Preferential Parking.** MassDEP recommends that the project proponent designate special, preferred parking spaces for carpools and/or vanpools as an incentive to encourage people to rideshare to work. Preferential parking could also be designated for hybrid vehicles.

- **Shuttle.** To help reduce vehicle trips to the store, the project proponent should run a shuttle to transport employees to nearby transit stations, senior citizen housing, or other locations.

Finally, MassDEP recommends that the project proponent explore ways to encourage shoppers to use transit or carpool to the proposed project, including offering discounts to customers who come to the retail establishment in a carpool, by transit or another method. Other projects in Massachusetts have instituted these incentives to discourage drive-alone commuting. NERO.19

Recycling Issues

The project includes demolition and reconstruction, which will generate a significant amount of construction and demolition (C&D) waste. Although the ENF has not made a commitment to recycling construction debris (p.5-90), MassDEP encourages the project proponent to incorporate C&D recycling activities as a sustainable measure for the project. NERO.20

The project proponent is advised that demolition activities must comply with both Solid Waste and Air Pollution Control regulations, pursuant to M.G.L. Chapter 40, Section 54, which provides:

> "Every city or town shall require, as a condition of issuing a building permit or license for the demolition, renovation, rehabilitation or other alteration of a building or structure, that the debris resulting from such demolition, renovation, rehabilitation or alteration be disposed of in a properly licensed solid waste disposal facility, as defined by Section one hundred and fifty A of Chapter one hundred and eleven. Any such permit or license shall indicate the location of the facility at which the debris is to be disposed. If for any reason, the debris will not be disposed as indicated, the permittee or licensee shall notify the issuing authority as to the location where the debris will be disposed. The issuing authority shall amend the permit or license to so indicate."

For purposes of implementing the requirements of M.G.L. Chapter 40, Section 54, MassDEP considers an asphalt, brick, and concrete (ABC) rubble processing or recycling facility, pursuant to the provisions of section (3) of 310 CMR 16.05 Site Assignment Regulations for Solid Waste Management Facilities, to be conditionally exempt from the site assignment requirements if the ABC rubble at such facilities is separated at the point of generation from other solid waste materials. Under 310 CMR 16.05(3), ABC can be crushed on-site with just a 30-day notification to MassDEP. However, the asphalt is limited to weathered bituminous concrete (no roofing asphalt) and the brick and concrete must be uncoated or not impregnated with materials such as roofing epoxy. If the brick and concrete are not clean, e.g., coated and/or impregnated, the material is defined as construction and demolition (C&D) waste and requires either a Beneficial Use Determination (BUD) or a Site Assignment and permit before it can be crushed. NERO.21

Pursuant to the requirements of 310 CMR 7.02 of the Air Pollution Control Regulations, if the ABC crushing activities are projected to result in the emission of one ton or more of

particulate matter to the ambient air per year and/or if the crushing equipment employs a diesel oil fired engine with an energy input capacity of three million or more British thermal units per hour for either mechanical or electrical power which will remain on-site for twelve or more months, then a plan application must be submitted to MassDEP for written Approval prior to installation and operation of the crushing equipment. NERO.22

In addition, since it appears that significant portions of the demolition project contain asbestos, the project proponent is advised that asbestos and asbestos-containing waste material are a special waste as defined in the Solid Waste Management regulations (310 CMR 19.061). Asbestos removal notification on permit form ANF 001 and building demolition notification on permit form AQ06 must be submitted to MassDEP at least 10 working days prior to initiating work. Except for vinyl asbestos tile (VAT) and asphaltic-asbestos felt and shingles, the disposal of asbestos containing materials within the Commonwealth must be at a facility specifically approved by MassDEP (310 CMR 19.061). No asbestos containing material including VAT, and/or asphaltic-asbestos felts or shingles may be disposed at a facility operating as a recycling facility, (310 CMR 16.05). The disposal of the asbestos containing materials outside the jurisdictional boundaries of the Commonwealth must comply with all the applicable laws and regulations of the state receiving the material. NERO.23

The demolition activity also must conform to current Massachusetts Air Pollution Control Regulations governing nuisance conditions at 310 CMR 7.01, 7.09 and 7.10. As such, the proponent should propose measures to alleviate dust, noise, and odor nuisance conditions, which may occur during the demolition. MassDEP must be notified in writing, at least 10 days in advance of removing any asbestos. MassDEP also must be notified in writing, at least 10 days prior to any demolition work. The removal of asbestos from the buildings must adhere to the special safeguards defined in the Air Pollution Control Regulations (310 CMR 7.15 (2)). NERO.24

Facilitating future waste reduction and recycling and integrating recycled materials into the project are necessary to minimize or mitigate the long-term solid waste impacts of this type of development. The Commonwealth's waste diversion strategy is part of an integrated solid waste management plan, contained in The Solid Waste Master Plan that places a priority on source reduction and recycling. Efforts to reduce waste generation and promote recycling have yielded significant environmental and economic benefits to Massachusetts' residents, businesses and municipal governments over the last ten years. Waste diversion will become even more important in the future as the key means to conserve the state's declining supply of disposal capacity and stabilize waste disposal costs.

As the lead state agencies responsible for helping the Commonwealth achieve its waste diversion goals, MassDEP and EOEA have strongly supported voluntary initiatives by the private sector to institutionalize source reduction and recycling into their operations. Adapting the design, infrastructure, and contractual requirements necessary to incorporate reduction, recycling and recycled products into existing large-scale developments has presented significant challenges to recycling proponents. Integrating those components into developments such as the Wayland Town Center at the planning and design stage enable the project's management and occupants to establish and maintain effective waste diversion programs. For example, facilities with minimal obstructions to trash receptacles and easy access to main recycling areas and trash NERO.25

chutes allow for implementation of recycling programs and have been proven to reduce cleaning costs by 20 percent to 50 percent. Other designs that provide sufficient space and electrical services will support consolidating and compacting recyclable material and truck access for recycling material collection.

By incorporating recycling and source reduction into the design, the proponents would have the opportunity to join a national movement toward sustainable design. Sustainable design was endorsed in 1993 by the American Institute of Architects with the signing of its *Declaration of Interdependence for a Sustainable Future.* The project proponent should be aware there are several organizations that provide additional information and technical assistance, including WasteCap, the Chelsea Center for Recycling and Economic Development, and MassRecycle.

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Claire Golden at (978) 694-3244 for further information on the wastewater issues and Rachel Freed at 978-694-3258 for information on wetlands issues. Should you have any questions regarding air quality issues, please contact Jerome Grafe at 617-292-5708. If you have any general questions regarding these comments, please contact Nancy Baker, MEPA Review Coordinator at (978) 694-3338.

Sincerely,

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Jerome Grafe, MassDEP-Boston
Kevin Brander, Claire Golden, Richard Tomczyk, Rachel Freed, MassDEP-NERO
Town of Wayland, Department of Public Works and Conservation Commission

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

STEPHEN R. PRITCHARD
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

August 16, 2006

Stephen R. Pritchard, Secretary
Executive Office of
Environmental Affairs
100 Cambridge Street
Boston MA, 02114

RE: Wayland
Town Center
400 Boston Post Road
EOEA # 13844

Attn: MEPA Unit

Dear Secretary Pritchard:

The Massachusetts Department of Environmental Protection (MassDEP) has reviewed and commented on the Environmental Notification Form (ENF) submitted by Twenty Wayland LLC to construct a mixed-use commercial, residential, municipal development on a 56.5- acre site of the former Raytheon Corporation in Wayland (EOEA #13844). Subsequently, MassDEP has become aware that comments on wastewater and hazardous waste issues were omitted from the August 15, 2006 correspondence to the Secretary of Environmental Affairs. Therefore, the Department requests that the following comments be added for consideration in the scope of the environmental impact report.

Wastewater

The Wayland Wastewater Treatment Facility is presently permitted for up to 52,000 gallons per day on average, with a maximum flow of 65,000 gpd. The wastewater flows from this project, as presently proposed, could result in violations of the NPDES permit. In addition, the NPDES permit includes load limitations for biochemical oxygen demand (BOD) and total suspended solids (TSS) for the facility, and effluent limitations for a number of parameters to control pollutant discharges to the Sudbury River. The DEIR should include a characterization of the wastewater quality and quantity to be conveyed to this facility from this project, and an assessment of capacity of the treatment plant to treat the waste in compliance with the NPDES discharge permit limitations. The proponent should coordinate the review of the treatment facility with the town of Wayland and operators at the plant. NERO.26

MassDEP also is aware that the town of Wayland is presently exploring options to manage wastewater in the community. Use of the remaining capacity of the treatment plant may

constrain or impact future wastewater needs in the community. Therefore, the town should consider the demands of this project in the context of any plans to proceed with a wastewater needs analysis or Comprehensive Wastewater Management Plan. NERO.27

Hazardous Waste

Finally, the Department has records of releases of hazardous materials to the soil and groundwater occurring at this site, Release Tracking Numbers, 3-0001783, 3-0013574, 3-14042, 3-0019482, 3-0022408, and 0022665. To ensure that the project is consistent with the remediation of the site, the EIR should provide a chronology of the cleanup program for this release and demonstrate that the infrastructure, stormwater system, and construction work for the proposed development are compatible with the remedial activities planned as the MCP Release Abatement Measure (RAM). The project proponent also is advised that removing contaminated soil, pumping contaminated groundwater, or working in contaminated media must be done under the provisions of MGL c.21E/21C and OSHA. Failure to obtain the necessary permits under these provisions beforehand may result in considerable delay of the project as well as administrative penalties. The appropriate soil and groundwater tests should be conducted well in advance of the start of construction and professional environmental consulting services should be readily available to provide the contractor the technical guidance required to facilitate any necessary permits. NERO.28

The MassDEP appreciates the opportunity to comment on this proposed project. Please contact Claire Golden at (978) 694-3244 for further information on the wastewater issues. If you have any general questions regarding these comments, please contact Nancy Baker, MEPA Review Coordinator at (978) 694-3338.

Sincerely,

Nancy Baker for

John D. Viola
Deputy Regional Director

cc: Brona Simon, Massachusetts Historical Commission
Jerome Grafe, MassDEP-Boston
Kevin Brander, Claire Golden, Richard Tomczyk, Rachel Freed, MassDEP-NERO
Town of Wayland, Department of Public Works and Conservation Commission

EXECUTIVE OFFICE OF TRANSPORTATION

EOT.01 The transportation study is presented in Section 3.0.

EOT.02 Mitigation measures developed for the project by the Proponent are discussed in detail in Section 3.5. The measures presented in Section 3.5 will be completed prior to the occupancy of the project, as appropriate.

EOT.03 Level of service summary tables as well as projected vehicular queues and presented in Section 3.0.

EOT.04 The existing site was occupied within the last three years. It should be noted that for future No-Build conditions, the existing facility was assumed to be re-occupied with office uses (if the Wayland Town Center project does not move ahead). No credit was taken for existing trips that were counted as part of this DEIR.

EOT.05 A traffic signal warrant analysis was performed for the proposed site driveway intersection and Route 20 and is included in the Appendix A. The signal warrant analysis shows that based on existing Route 20 traffic volumes and the proposed site traffic volumes, a traffic signal is warranted.

EOT.06 A roundabout was assessed to determine if implementation at the intersection of Route 20 and the proposed site driveway with and without a potential relocated Russell's Garden Center driveway. A roundabout was discounted because there is not sufficient right-of-way to construct (Route 20 right-of way is 50 feet wide in the vicinity of the proposed site driveway. Analyses performed for the Build conditions indicate that the roundabout would fail, with lengthy queues on Route 20. Further analyses indicate that Route 20 would need to be widened to provide two lanes per direction entering the roundabout, which would require property beyond the Proponent's control. The roundabout analyses are contained in Appendix A.

EOT.07 The traffic study in Section 3.0 includes the requested study area.

EOT.08 Conceptual improvement plans have been included in Section 3.0 of this DEIR.

EOT.09 A complete drainage analysis will be performed for the culvert under Route 20 at Route 27/Route 126.

EOT.10 A TDM program has been developed for the proposed project. Sidewalks have been incorporated into the site design, and potential locations for connections to the potential rail trail (to be located within the adjacent

MBTA right-or-way) have been identified. The residential component of the project is not intended to be an age-restricted development. Currently, 100 apartment units are proposed.

As it relates to the elderly, the Wayland Council on Aging (COA) offers shuttle service to town residents Monday through Friday, 8:00 AM to 4:00 PM through JFK Transportation. This service is by appointment, with two to three days advance notice.

EOT.11 The status of state and local permitting is reviewed Section 1.0, Project Description.

MITT ROMNEY
GOVERNOR

KERRY HEALEY
LIEUTENANT GOVERNOR

JOHN COGLIANO
SECRETARY

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF TRANSPORTATION

EOT

HJ

August 14, 2006

Stephen Pritchard, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2150

RECEIVED
AUG 17 2006
MEPA

ATTN: MEPA Unit
Holly Johnson

RE: Wayland - Wayland Town Center – ENF
(EOEA #13844)

Dear Secretary Pritchard:

On behalf of the Executive Office of Transportation, I am submitting comments regarding the proposed Wayland Town Center mixed-use project (EOEA #13844), as prepared by the Office of Transportation Planning. If you have any questions regarding these comments, please call J. Lionel Lucien, P.E., Manager of the Public/Private Development Unit, at (617) 973-7341.

Sincerely,

David J. Mohler for

Kenneth S. Miller, P.E.,
Deputy Secretary for Planning

KSM/jll

TEN PARK PLAZA, BOSTON, MA 02116-3969
TELEPHONE: (617) 973-7000 • TELEFAX: (617) 523-6454 • TDD: (617) 973-7306 • WWW.MASS.GOV/EOT

cc: Luisa Paiewonsky, Commissioner
John Blundo, P.E., Chief Engineer
Charles Mistretta, P.E., District 3 Director
State Traffic Engineer
PPDU files
MPO Activities files
Central Transportation Planning Staff
Metropolitan Area Planning Coincil
Town of Wayland, Planning Board

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF TRANSPORTATION
OFFICE OF TRANSPORTATION PLANNING

MEMORANDUM

TO: Kenneth S. Miller, P.E., Executive Director
Office of Transportation Planning

FROM: J. Lionel Lucien, P.E., Manager
Public/Private Development Unit

DATE: August 14, 2006

RE: Wayland - Wayland Town Center – ENF
(EOEA #13844)

The Public/Private Development Unit (PPDU) has reviewed the Environmental Notification Form (ENF) for the proposed Wayland Town Center mixed-use development project. The property, which has housed the former Raytheon Corporation, Polaroid Corporation and other businesses, is located on 56.5 acres, bounded by Boston Post Road (Route 20) and the Massachusetts Bay Transportation Authority (MBTA) right-of-way to the north, Old Sudbury Road (Route 27) to the west and the Sudbury River to the east. The project entails the reduction of 38,000 square feet of structural development, and the construction of approximately 100 residential units, 156,750 square feet of retail space and 8,250 square feet of office space. Based on ITE Land Use Codes 710 (General Office), 590 (Library), 220 (Apartments) and 820 (Shopping Center), the project is expected to generate 7,834 new vehicle trips on an average weekday for a total of 11,792 trips. A MassHighway permit is required for access to Route 20. The project is categorically included for the preparation of an Environmental Impact Report.

The Draft Environmental Impact Report (DEIR) should include a transportation study prepared in conformance with the EOEA/EOT Guidelines for EIR/EIS Traffic Impact Assessments and should identify appropriate mitigation measures for areas where the project will have an impact on traffic operations. The proponent should also provide a clear commitment to implement mitigation measures and should describe the timing of their implementation based on the phases of the project, if any. The DEIR should present capacity analyses and a summary of average and 95th percentile vehicle queues for each intersection within the study area. In the ENF, the proponent has taken vehicle trip generation credit of approximately 4,000 trips for existing land uses. The DEIR should include documentation to demonstrate that the site activity has not exceeded the three-year time limitation allowed for trip credit. The traffic study should include a signal warrant analysis for the Route 20/Site Drive intersection. MassHighway requests that as part of the traffic study, a modern roundabout be evaluated for installation at this location. At a minimum, the traffic study should analyze the following state highway and local roadway locations:

EOT.01
EOT.02
EOT.03
EOT.04
EOT.05
EOT.06
EOT.07

In Wayland

- the Route 20 (Boston Post Road)/South Site Drive intersection,
- the Route 20/Old Country Road intersection,
- the Route 20 (Boston Post Road)/Route 27/Route 126 (Conchituate Road) intersection,
- the Route 20/Pelhan Island Road intersection,
- the Route 27/Route 126 (Conchituate Road)/Millbrook Road/Pelhan Island Road intersection,
- the Route 27 (Old Sudbury Road)/Route 126 (Concord Road) intersection,
- the Route 27 (Old Sudbury Road)/North Site Drive intersection, and
- the Route 27 (Old Sudbury Road)/River Road intersection,

In Sudbury

- the Route 20/Union Avenue intersection, and
- the Route 20/Nobscot Road intersection .

The DEIR should include conceptual plans for the proposed roadway improvements that should be of sufficient detail to verify the feasibility of constructing such improvements. The conceptual plans should clearly show proposed lane widths and offsets, layout lines and jurisdictions, and the land uses (including access drives) adjacent to areas where improvement are proposed. Any mitigation within the state highway layout must conform to MassHighway standards, including but not limited to, provisions for lane, median and shoulder widths, and bicycle lanes and sidewalks. EOT.08

To ensure that site drainage can be adequately accommodated on site, the DEIR should contain a comprehensive drainage analysis of the state highway culverts. The proponent should make every effort possible to redirect, retain, and infiltrate all storm water discharge on site. EOT.09

The proponent should investigate and recommend for implementation Transportation Demand Management (TDM) measures aimed at reducing site trips. In addition the proponent should inventory the existing pedestrian infrastructure in the vicinity of the site and should ensure adequate on site circulation and connectivity to any existing pedestrian and bicycle networks. In addition, the proponent should work with the Town of Wayland to provide local transportation services for the development's elderly residents. The DEIR should contain the outcome of these discussions. EOT.10

The DEIR should provide an update of the local permitting processes for the proposed project, particularly with respect to any state highway issues being discussed. We strongly encourage the proponent to consult with MassHighway before any state highway issues are discussed in local meetings or hearings. EOT.11

We also encourage the proponent to meet with the Public/Private Development Unit and the MassHighway District 3 Office during the preparation of the DEIR. If you have any questions regarding these comments, please contact me at (617) 973-7341 or Melody Graves (617) 973-7344.

METROPOLITAN AREA PLANNING COUNCIL

MAPC.01 The proposed rail trail is a Town of Wayland project. The Proponent is contributing $250,000 towards its completion.

MAPC.02 The Wayland Council on Aging (COA) offers the only shuttle service in the area. This is for town residents, Monday through Friday, 8:00 AM to 4:00 PM through JFK Transportation. This service is by appointment, with two to three days advance notice. The MBTA offers no public transportation services in Wayland.

Should bus service be provided to the area, the design of the site could be modified to permit bus stops on-site.

MAPC.03 A TDM program has been developed for the proposed project.

MAPC.04 LID techniques proposed for the project include the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. The water quality swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. The rain gardens and bioretention basins will be planted with a combination of grasses, perennials, shrubs, and small trees. The clean stormwater runoff from the building rooftops will be directed to the water quality swales and bioretention basins to provide additional groundwater recharge.

Metropolitan Area Planning Council

60 Temple Place, Boston, Massachusetts 02111 617-451-2770 fax 617-482-7185 www.mapc.org

Serving 101 cities and towns in metropolitan Boston

August 18, 2006

Robert W. Golledge, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
Holly Johnson, MEPA # 13844
100 Cambridge Street, Suite 900
Boston, MA 02114

RECEIVED
AUG 18 2006
MEPA

RE: Wayland Town Center, Wayland, EOEA # 13844 ENF

Dear Secretary Golledge:

The Metropolitan Area Planning Council (MAPC) regularly reviews proposals deemed to have regional impacts. The Council reviews these projects for consistency with MetroPlan, the regional policy plan for the Boston metropolitan area, MAPC's Smart Growth Principles, and the Commonwealth's Sustainable Development Principles, as well as for their impacts upon the environment. MAPC has reviewed the project's Environmental Notice Form (ENF) and offers the following comments.

The proposed Wayland Town Center project will create a mixed use development on property formerly occupied by Raytheon Corporation on Boston Post Road. The project will include up to 100 residential units, 156,750 square feet of retail space, 8,250 square feet of office space, a "town green" open space, public amenities, and a future municipal building.

Wayland Town Meeting Approved a Mixed Use Overlay district for the project and the proponent has committed to $4.2 million in traffic mitigation and $250,000 for a potential bike path on a dormant MBTA right-of-way.

MAPC supports this project. We applaud the proponent's commitment to redevelop an underutilized site and to minimize impact on undeveloped and sensitive land. The proponent has shown a commitment to work with area residents and the mixed-use nature of the site will provide a strong foundation for a town center in Wayland.

We are concerned by the ethereal nature of the $250,000 the proponent is providing to develop a rail trail along the MBTA right-of-way. Controls should be placed on these funds to ensure that they are used as they were intended, to develop bicycle and pedestrian accessibility to the town. The DEIR should include an explanation of this

MAPC.01

process and a detailed plan that includes secondary investments for the funds, should the rail trail prove infeasible due to right-of-way conflicts.

The DEIR should contain a full review of bus routes and para-transit providers and destinations in the area as well as a plan for incorporating the proposed development into these systems. For the site to truly be a "town center" it should be designed in such a way that includes bus access and locations for future bus stops. MAPC.02

The ENF makes no mention of Transportation Demand Management (TDM) measures aimed at reducing single occupant vehicles. Given the size of the proposed project, MAPC strongly suggests a site-wide TDM plan. This plan should include: the establishment and funding of an on-site Transportation Coordinator position; the creation of measurable trip reduction goals, targets, monitoring, and long term maintenance of the TDM program; creation and promotion of pedestrian and bicycle facilities and activity; organization of an on-site rideshare program and guaranteed ride home program; and participation in MassRides. MAPC.03

Stormwater management and protection of water quality will be an important aspect of this project, especially given its location in the Sudbury River watershed. Low Impact Development (LID) techniques can effectively addresss these issues; we request that the proponent incorporate LID features, such as bioretention cells, stormwater infiltration, and porous pavement. Guidelines for LID are available in MAPC's Low Impact Development Tool Kit, available from MAPC and online at www.mapc.org/lid. We also encourage the proponent to incorporate a set of sustainable building design guidelines such as those that would result in LEED certification. MAPC.04

Thank you for the opportunity to comment on this project.

Sincerely,

Marc D. Draisen
Executive Director

cc: Ms. Mary M. Antes, MAPC Representative, Wayland
Donna Jacobs, Metro West Growth Management Committee

METRO WEST GROWTH MANAGEMENT COMMITTEE

GMC.01 Project related impacts and proposed mitigation measures for those impacts are discussed in Section 10.0.

GMC.02 The project site is located within a Zone II aquifer protection district and therefore is designated as a nitrogen sensitive area and must be designed in accordance with Title V nitrogen loading limitations. Since the system is located in a nitrogen sensitive area and also is designed to treat more than 2,000 gallons per day, it will be required to use a re-circulating sand filter (RSF) or other equivalent technology approved by MA DEP. An alternative technology is proposed for the project such as a Fixed Activated Sludge Treatment (FAST) system. Section 5.1.3 discusses the proposed septic system.

GMC.03 The water supply needs of the proposed project are discussed in Section 5.2.

GMC.04 LID techniques proposed for the project include the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. The water quality swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. The rain gardens and bioretention basins will be planted with a combination of grasses, perennials, shrubs, and small trees. The clean stormwater runoff from the building rooftops will be directed to the water quality swales and bioretention basins to provide additional groundwater recharge.

GMC.05 Sustainable design measures proposed for this project are discussed in Section 9.0.

GMC.06 The town of Wayland and the town of Sudbury were contacted to determine projects that could impact traffic volumes in the study area. Traffic from these projects was included in the background traffic projections. Additionally, a 1.0 percent growth rate, compounded annually, was applied to the existing traffic volumes to account for growth not attributed to the specific identified background projects.

GMC.07 The number of parking spaces for the project was determined using a shared parking analysis, which is described in Section 3.4.3. Stormwater management for the project has been designed utilizing low impact development (LID) techniques such as water quality swales, rain gardens, and bioretention basins, which work together to protect the quantity and quality of stormwater recharged to the aquifer beneath the site.

GMC.08 A TDM program has been developed for the proposed project.

Growth Management Committee

20 Main Street, Suite 205
Natick, MA 01760
www.metrowestgrowth.org

Doug Gillespie, Chairman (Weston Board of Selectmen)
John Stasik, Vice-Chairman (Framingham Board of Selectmen)
Ken Soderholm, Clerk (Natick Planning Board)
Marc Draisen, MAPC Executive Director
Charlie Gaffney, Past Board Member (Southborough Planning Board)
Philip Jack, Member-At-Large (Ashland Board of Selectmen)
Ann Welles, Member-At-Large (Framingham Planning Board)
Donna Jacobs, Director

508.907.6740
508.651.0085
508.907.6743 fax

August 14, 2006

Stephen R. Pritchard, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street Suite 900
Boston, MA 02114

Attention: MEPA Unit– Holly Johnson

RE: ENF Comments for
EOEA # 13844 Wayland Town Center

Dear Secretary Pritchard:

MetroWest Growth Management Committee (MWGMC) includes leaders from Ashland, Framingham, Holliston, Marlborough, Natick, Southborough, Sudbury, Wayland, Wellesley, and Weston. Local leaders face significant challenges. MWGMC helps local leaders meet growth management challenges by facilitating inter-local collaborative planning and problem solving to enhance the quality of life and economic competitiveness of the MetroWest region. In addition, MWGMC is the oldest subregion of the Metropolitan Area Planning Council (MAPC).

Through the MWGMC Regional Impact Review (RIR) program, we review proposed developments deemed to have significant regional impacts to assess regional impacts and to influence local and state permitting of development. The review process was created by unanimous agreement of MWGMC members to better understand and mitigate negative impacts, and enhance the positive impacts of development in the MetroWest region. MWGMC supports economic growth and understands the need for a diversified tax base; however, this growth should be sustainable and not come at the cost of undue strains on natural resources or public services.

The communities of Framingham, Southborough, Sudbury, Wellesley, and Wayland participated in the review of the proposed Wayland Town Center project. We understand that the proposed project involves redevelopment of a 56.5 acre parcel currently undergoing brownfield remediation. The proposed project would result in a maximum of 167,500 square feet of residential use (not more than 100 units), 156,750 square feet of retail space, 8,250 square feet of office space and a parcel that will be deed to the Town of Wayland for a future 40,000 square foot municipal building..

In general, the RIR Committee (the Committee) had an almost completely positive reaction to the proposal, and was pleased with that the Commonwealth's Smart Growth Principles are reflected in the proposed redevelopment project. The Committee offers the following comments from its regional perspective.

1. Locus

The locus of this project lies within close proximity to the Sudbury River, a wild and scenic river that lies within the SuAsCo river basin. The Sudbury River is an important environmental and recreational asset. Every effort should be made to ensure that there will be no adverse impacts to this important natural resource. The parcel of land has frontage on both Route 20 and Route 27 and is in close proximity to the intersection of Routes 126/27 and 20. These roads experience very heavy traffic volumes in the AM and PM peak period. GMC.01

2. Sewer Treatment Capacity

The proponent proposes to connect to the municipal wastewater treatment plant, and to construct an on-site subsurface disposal system to provide flexibility in the types of land uses that could be sited there. The proponent is proposing a subsurface system that could handle up to 9,900 gpd. Given the proximity of the project to the Sudbury River, we believe that nitrogen removal should be required. Because the proposed system is so close to the requirements for a tertiary treatment system, we strongly recommend that a tertiary treatment plant be constructed in lieu of the proposed subsurface disposal system. GMC.02

3. Water Supply

MetroWest is one of the two fastest growing regions of the Commonwealth and is predicted to continue to be one of the four economic growth areas in the Commonwealth through the next two decades. However, this growth could be seriously constrained due to water supply and the related water withdrawal caps. Water Supply is a serious issue facing all communities in MetroWest. The proponent must clearly identify how much water will be needed for the project, and should factor in high water users such as restaurants, which seem to be a natural fit for the proposed project. GMC.03

4. Smart Growth

Now that we've discussed the most serious environmental challenges facing the proponent, I'd like to make some recommendations that would provide a financial benefit for the proponent and help the Town of Wayland and the region with water supply issues. In addition they would be in concert with the Commonwealth's Smart Growth Principles.

Although the proposed Wayland Town Center does not have to comply with Stormwater regulations because it is a redevelopment project, this project is ideally suited for the use of Low Impact Development (LID) principles and techniques. Conventional design and construction methods generally use expensive systems of curbs, gutters, pipes, and ponds to collect and treat runoff. In contrast, the LID development approach uses a more decentralized approach to reduce the amount of runoff and treat it closer to the source using smaller, less expensive techniques. Some LID techniques can cost more than conventional approaches, but overall LID is cost-competitive or lower because it can reduce the size of stormwater pipes and downstream ponds, reduce the amount spent on paving, and enhance site aesthetics and value. The life-cycle cost of green roofs is lower than conventional roofs due to a much longer life span and considerable savings on heating and cooling costs. Additional information about these techniques can be found at www.mass.gov/czm and www.metrowestgrowth.org.

Basic LID design strategies should be required to reduce the extent of rooftops and paved areas. The use of infiltration techniques such as bioretention areas and grass swales will help to improve water quality and to reduce the amount of land devoted to stormwater management because smaller detention ponds are necessary. These same LID techniques can also be employed to fulfill site landscaping and open space requirements. GMC.04

We strongly urge the proponent to use green building materials and to seek LEEDs certification for the new buildings to comply with green building criteria. The proponent shared with us that they would consider the use of xeriscape on the portions of the site where it would be appropriate. As part of the approval process, we ask that the Town urge the proponent to utilize LID techniques to reduce stormwater runoff and to treat non-point source pollution such as: GMC.05

- Dry wells for rooftop runoff
- Filter buffer strips
- Sand/organic filters
- Green roofs
- Stormwater planters.
- Grassed (vegetated) swales;
- Bioretention areas
- Permeable pavers
- Rain barrels and cisterns; and

5. Background Growth

The project proponent should carefully review the background growth for the site locus. A quick tally of the residential projects that have been recently approved or are in the permitting pipeline shows another 3500 houses in MetroWest within the next 2-3 years. In addition, commercial growth is picking up rapidly. Westborough, Framingham, Natick and Northborough have recently approved over 2 million square feet of commercial floor area and EMC has just filed an application for a new 2.1 million square foot facility on the Southborough town line. Just these few approved and proposed projects bring the total of new commercial growth to almost 4 million square feet. GMC.06

6. Traffic and Parking

The journey to work data for the MetroWest region is virtually a black blob when mapped due to the varied commuting patterns. Current conditions indicate that commuting trends that emerged in the 1980s, continued into the 1990s and the early 2000s are still relevant: Major highways such as nearby I-90 and I-95, and Routes 20, 9, 30 all experience extremely heavy traffic during peak commuting hours. This is exacerbated by extensive commercial/industrial development along Routes 495 and 9, I-90 and I-95, which continue to expand as foci of employment in MetroWest.

The intersection of Route 20/27 and 126 is at level of service F. Routes 27, 20, 126 and 30 are a gridlock in the peak commuting hours. We applaud the fact that the project proponent will contribute $4.2 million to address community mitigation needs, particularly, the proposed widening of the westbound lanes of Route 20 to provide additional turning lane length. We urge the Secretary to facilitate the proposed reduction of curb cuts along Route 20 at Russell's Garden Center, and the signalization of the intersection of Routes 27 and 126. We also applaud the proposal too turn the MBTA right-of-way into a bicycle and pedestrian trail.

The proposed project includes a reduction in parking spaces. We recommend that a significant number of spaces be "reserved" for future use if needed. In addition, we recommend that a combination of pavers and porous pavement be utilized wherever feasible. GMC.07

7. Mitigation

There has been a steady growth of significant employment centers and concentrations of population in the MetroWest region. On April 11th, we held our second annual transportation event, "Gridlock or Green Light?", at Fidelity Investments in Marlborough. The symposium brought together local officials, legislators, representatives from regional economic organizations, and state officials for an annual review of the transportation issues in the communities between interstates 495 and 95. The issue in Metrowest is suburban mobility. We have to continue our economic development, and increase our transportation capacity to accommodate that growth. But we can't continue to keep putting people in cars on our already overcrowded roads.

The following are some additional measures the Planning Board may wish to employ.

GMC.08

- The Planning Board may want to consider the requirement of sustained membership in the 495/Metrowest Transportation Management Association (TMA) as a condition of approval. The TMA has many programs that can influence worker behavior and help them to consider alternatives to single occupant vehicle commuting.
- Transportation Demand Management (TDM) techniques should be a routine practice for all future tenants and employers. We believe that additional TDM measures can contribute toward a solution to regional and local traffic congestion.
- Another TDM measure that should be explored is the use of monetary incentives provided to employees who elect not to commute. This incentive could be easily employed and may provide a further benefit to the project proponent through potential tax benefits to the employers.

In summary, the Committee believes that the proposed Wayland Town Center would make an important contribution to economic development in the region. At the same time, it would fulfill its core function as a mixed use town center in a manner that largely minimizes potential impacts.

Thank you for the opportunity to comment on the proposed Wayland Town Center.

Sincerely,

Donna M. Jacobs

Donna M. Jacobs
Director

cc: Members of the Regional Impact Review Committee
Metropolitan Area Planning Council
Joseph Laydon, Wayland Town Planner
Frank Dougherty, Twenty Wayland, LLC
Corinne Snowdon, Epsilon Associates, Inc.

SUDBURY VALLEY TRUSTEES

SVT.01 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

SVT.02 LID techniques proposed for the project include the use of water quality swales, rain gardens, and bioretention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. The water quality swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. The rain gardens and bioretention basins will be planted with a combination of grasses, perennials, shrubs, and small trees. The clean stormwater runoff from the building rooftops will be directed to the water quality swales and bioretention basins to provide additional groundwater recharge.

SVT.03 The Proponent will evaluate organic landscaping practices.

SVT.04 The project's stormwater management system is described in Section 4.2.

SVT.05 Water supply is discussed in Section 5.2.

SVT.06 Rare species issues are discussed in Section 7.0.

SVT.07 Wastewater issues are discussed in Section 5.1.

SVT.08 The Proponent acknowledges the commenter's interest in becoming the grantee of a conservation restriction.

SVT.09 Rare species issues are discussed in Section 7.0, and the Proponent anticipates that additional information will be provided in the FEIR.

SUDBURY
VALLEY
TRUSTEES

Protecting the natural resources of the Sudbury, Assabet and Concord River Valleys since 1953

H5

RECEIVED
AUG 17 2006
MEPA

August 15, 2006

Ms. Holly Johnson
MEPA Office
Executive Office of Environmental Affairs
100 Cambridge St., Suite 900
Boston, MA 02114

Dear Ms. Johnson:

These comments, submitted on behalf of Sudbury Valley Trustees, pertain to the Environmental Notification Form for Wayland Town Center dated July 17, 2006.

Sudbury Valley Trustees works to protect wildlife habitat and ecological integrity in the Sudbury, Assabet, and Concord River Basin by preserving open space within the watershed. From its inception 53 years ago our organization has placed a high value on protecting the meadow habitat bordering the Sudbury River. Because the Wayland Town Center proposal affects this natural resource, we offer the following comments.

Under the heading "Summary of Project Size and Environmental Impacts", subhead "Land", we learn that the proposal would alter additional acreage of land characterized as *bordering vegetated wetlands*. Obviously, it would be ideal to avoid this, but if this is an effect of safety-based changes to Route 20, perhaps the town and the state will find it acceptable. SVT.01

Under the same subhead the proposal would increase the acreage of impervious area. A serious effort to implement "low-impact development" techniques to mitigate adverse effects of *all* of the site's impervious surfaces is highly desirable and, if thoroughly utilized, ought to offset the additional impervious area proposed. SVT.02

Under the subhead "Structures" it is indicated that there will be an increase from zero to a hundred units of housing. It is common for residential landscaping practices to consume water through irrigation, and to pollute water resources through application of toxic or nutrient substances which are carried by runoff. All plans for the project should call for organic horticultural practices. Because it occupies such an environmentally sensitive area, and will be much visited by the public, the project should model ecologically sound maintenance and landscaping procedures. SVT.03

Under the subhead "Transportation" the project foresees a large, actively used parking lot. The final design should control potentially destructive side effects from these SVT.04

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vehicles. Wintertime sand must be captured to prevent its filling of adjacent wetlands. Toxic substances from vehicles and pavement must be separated from run-off and disposed of appropriately.

Under the subhead "Water/Wastewater", the project foresees a use of 54,900 gallons per day. To ensure that a maximum quantity of this water will be returned to the environment, avoidance of consumptive uses of water must be a top priority in all plans for the project, with a goal of minimizing the impact on the river-side water table. The landscaping should not assume irrigation. SVT.05

Although they are at different scales, we tried to comp are Figure 3, the Schematic Site Layout, with the map from Attachment 3, the 2005 NHESP Mapping. The latter map shows the habitat for rare species. It appears that the Schematic Site Layout would reduce the current incursion into the rare species habitat at the southwestern corner of the development, but would increase it on the northern edge. The final design should reflect an intention to restore and protect a maximum amount of the rare-species habitat. SVT.06

The fourth paragraph of the "Project Description" states that the proposed connection to the municipal wastewater treatment plant is limited to 45,000 gallons per day, and that the proponents hope to construct a septic system to release an additional 9,900 gallons into the ground. This possibility is contingent on soil testing. We hope that the septic system will prove unnecessary because we believe introducing additional nutrients into groundwater near the river will, eventually but inevitably, have an adverse effect on water quality. SVT.07

In the final paragraph of the project description our organization is mentioned as a possible grantee for a conservation restriction on 10 acres of the property. We affirm our positive interest in receiving such a grant contingent on agreements satisfactory to our Board of Directors. SVT.08

Under the heading "Rare Species Section" the proposal states that further consultation with the Natural Heritage and Endangered Species Program is required. Because we are very concerned about the welfare of this unique habitat, we look forward to receiving further information about this consultation when it occurs. SVT.09

Thank you for the opportunity to comment. Please add us to the distribution list for information about this project.

Sincerely,

Ron McAdow
Executive Director

SUDBURY, ASSABET AND CONCORD WILD SCENIC RIVER STEWARDSHIP COUNCIL

RSC.01 Rare species issues are addressed in Section 7.0.

RSC.02 Rare species issues are addressed in Section 7.0.

RSC.03 Wastewater issues are discussed in Section 5.1, and the project's stormwater management plan is discussed in Section 4.2.

RSC.04 Wastewater issues are discussed in Section 5.1, and the project's stormwater management plan is discussed in Section 4.2.

RSC.05 Wastewater issues are discussed in Section 5.1.

RSC.06 Wastewater issues are discussed in Section 5.1.

RSC.07 The project's stormwater management plan is discussed in Section 4.2.

RSC.08 Hazardous waste is discussed in Section 6.0.

RSC.09 This matter is not within the MEPA Scope.

RSC.10 The Proponent will evaluate the use of organic fertilizers and pesticides and will use minimal amounts of either.

RSC.11 The project's landscaping plan will specify native, drought tolerant plant materials as much as possible.

RSC.12 The project's stormwater management plan is discussed in Section 4.2.

RSC.13 Water supply is address in Section 5.2.

RSC.14 The project's stormwater management plan is discussed in Section 4.2.

RSC.15 This comment is not within the MEPA Scope.

RSC.16 The Proponent is coordinating with MassHighway on the project's transportation issues (see Section 3.0).

August 15, 2006

Stephen R. Pritchard
Executive Office of Environmental Affairs
ATTN: MEPA Office
Holly Johnson, EOEA # 13844
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Mr. Pritchard,

Thank you for the opportunity to comment on the Wayland Town Center Project, MEPA # 13844. Based on the size and complexity of the project, located adjacent to sensitive environmental resources, the River Stewardship Council recommends that an Environmental Impact Review be undertaken. We have outlined below our issues of concern and scope of analysis that should be included in the EIR.

Twenty nine miles of the Sudbury, Assabet and Concord Rivers – from Framingham to Billerica- were designated as part of the national Wild and Scenic River System in 1999 because of the outstanding resource values they possess. These include outstanding ecology, recreational opportunities, scenery, history and literature. The legislation created the River Stewardship Council (RSC), a body comprised of representatives from each of the shoreline communities, three conservation organizations, state and federal governments, and authorized them to work with the National Park Service (NPS) to administer the Wild and Scenic Program. NPS and RSC work in partnership to ensure that these important resources are protected.

The Wayland Town Center Project is located on the banks of the Sudbury River, within the Wild and Scenic segment. The RSC has reviewed the Wayland Town Center Project in light of its responsibilities to protect the river resource values and offers the following comments with this consideration in mind.

Protection of Ecological Resources – habitat protection

It appears that consideration was given to habitat of rare and threatened species as indicated on maps from the NHESP Program. This will provide some protection of these flora and fauna along the river corridor. The letter and accompanying map from the NHESP Program is dated 2003, and was written in reply to a different project. Project proponents should consult with NHESP again to ensure these maps are up to date. RSC.01

Efforts should be made to make minor adjustments to ensure that the entire development is outside these mapped areas. Presently it seems that some of the residential buildings in the northwest part of the site straddle the borders. RSC.02

Protection of Ecological resources – water quality and water quantity concerns

There are many inter-related projects ongoing in Wayland that may affect the water quality of the wetlands and the river – EPA/DEP are in the process of reissuing the NPDES permit for the wastewater treatment plant, Raytheon is testing the groundwater in and around this site for contamination and implementing a plan for its remediation. This project proponent is proposing to build a 9.9K Title V groundwater discharge. These projects, and their cumulative impacts, must be considered together and the State is in the best position to do this type of impact analysis. RSC.03

In addition, there are many water quantity issues affecting the River that must also be considered, in part because of their impact on water quality, and on the health of the river ecosystem. The river must

be considered a system, and water use and recharge on site must be considered in light of the low flow conditions of the river, the impacts of water withdrawals, both up and down stream, and water demand projections for the Town of Wayland. RSC.04

The wastewater treatment plant discharge, whether into the river or the wetland, will affect the river. Our recommendation is that phosphorus levels should be limited to 0.02mg/l (see our comments on EPA/DEP on the NPDES draft permit, attached). The MEPA process should coordinate with the ongoing NPDES permitting process for this treatment plant. RSC.05

The proposed groundwater discharge will be located near the river and will likely migrate over time, with the flow of groundwater, towards the river. Although the 9.9K proposal will require a Title V permit, it is just below the threshold for a groundwater discharge permit. Because of the sensitivity of this site, a groundwater discharge permit should be required, and a full evaluation of impacts should be undertaken. As part of the evaluation, secondary treatment of the effluent should be considered. Impacts of both phosphorus and nitrogen in the groundwater, and eventually in the river should be considered. RSC.06

All stormwater should be treated using a myriad of low impact development techniques in order to ensure that there is minimal impact, if any, to water quality of the groundwater, wetland or the river. These could include smaller streets, rain gardens, porous pavement especially in areas that are not used all the time, oil/water separators. Because of the proximity to a wild and scenic river, as well as a national wildlife refuge, the proponent should be held to the highest standard when implementing the stormwater regulations and precise maintenance plans should be required. If done correctly this site could be used as a showcase for a variety of LID techniques. RSC.07

In recent public meetings with Raytheon Corporation there were concerns raised about the quality of the groundwater on the site, which Raytheon is presently addressing through investigation and clean up activities. Raytheon said that they will review all proposals for excavation on the site, as well as any discharges into the groundwater to ensure that their remediation activities are not compromised and that there are not adverse environmental impacts from these activities. The State should closely coordinate with Raytheon on these issues. RSC.08

The State should consider how snow will be stored and removed from the site. Snow, and accompanying salt and sand should be kept as far as possible from the wetland and the river. Monitoring should be established at the edge of the disturbed property to ensure that contaminants are not moving off the site. RSC.09

The RSC has sponsored a demonstration organic lawn at the intersection of Routes 20 and 27 in Wayland. Over the past 5 years, only organic treatments have been used to maintain the lawn, and <u>no</u> watering, other than natural rainfall, has been applied. This lawn should be used as a model for any green space within the Town Center Project. Because of the proximity to the river, and the already eutrophic conditions (the draft NPDES permit states that the river exhibits eutrophic conditions), minimal fertilizers and pesticides should be applied, and all should be organic. RSC.10

The RSC supports landscaping that does not require any consumptive water use, such as the organic lawn. In situations that do require some watering – to establish plant growth for example, grey water collected from the site should be utilized. There are low impact development techniques, including rainbarrels and cisterns that could accomplish this. RSC.11

Work being done by United States Geological Survey in the upper Sudbury River should be expanded to determine causes of low flow and potential impacts on habitat in this portion of the Sudbury River. Anecdotal information, including photographs, shows very low flow conditions in the Wayland stretch of the Sudbury in late summer and fall. Just north of Route 27, the river splits for a short distance. The original channel, which flows to the east and under the Old Town Bridge, ran dry in October 2005. We are told that this is a fairly common occurrence. During the same time period in October 2005, the RSC.12

more western segment had water but no perceptible flow. Because the river has such a low gradient, these type of flows are generally typical up and down stream of the site.

In Wayland, all the public water supply wells are in close proximity to the river, both up and downstream of the site. Analysis should determine if these wells are hydrologically connected to the river, and then determine the impacts of this new demand on water supply capacity and the river. DEP will be evaluating the Water Management Act permits for towns in the Sudbury Basin in the upcoming year, and the impacts of this project should be incorporated into their review. RSC.13

Upstream of the site, the Hop Brook flows into the Sudbury near the Route 20 Bridge. Hop Brook does not experience as drastic reductions in flow because of the contributions from the Marlboro Easterly Wastewater Treatment Plant which constitute a significant portion of its total volume in times of low flow. Analysis of flow in the Sudbury should consider impacts of nutrients, especially during periods of low flow. RSC.14

Protection of Scenic and Recreational Resources

The RSC's goal is to minimize any views of the development from the river. Efforts to setback buildings, maintain low height limits and utilize natural screening as much as possible will help maintain a natural viewscape for those on the river. The RSC will work with the town, which has authority over height limits, to accomplish this. RSC.15

Massachusetts Highway Department is planning to rehabilitate the bridge over the Sudbury River at Route 20. The RSC has worked very closely with MHD to develop plans to restore and enhance the boat launch at the foot of the bridge. Project proponents should coordinate with MHD, especially as plans progress to widen Route 20. RSC.16

Thank you for the opportunity to comment on this project. If you have any questions, please contact Lee Steppacher at 617-223-5225 or lee_steppacher@nps.gov.

Sincerely,

Deirdre C. Menoyo, Chair
Sudbury, Assabet and Concord Wild and Scenic River Stewardship Council

ATTACHMENT TO COMMENT LETTER ON MEPA #13844, WAYLAND TOWN CENTER PROJECT

L5815 (BSO-W&SR)

April 12, 2006

Linda M. Murphy, Director
Office of Ecosystem Protection
Environmental Protection Agency
1 Congress St.
Boston, MA 02114

Glenn Haas, Director
Division of Watershed Management
Massachusetts Department of Environmental Protection
1Winter St.
Boston, MA 02108

Dear Ms. Murphy and Mr. Haas,

Thank you for the opportunity to comment on the recently issued draft NPDES permit MA0039853 for the Town of Wayland Wastewater Treatment Plant. The National Park Service is especially interested in this draft permit because it discharges directly into that part of the Sudbury River that has been designated as a Wild and Scenic River.

As you know, 29 miles of the Sudbury Assabet and Concord Rivers have been nationally designated as part of the Wild and Scenic River System. The National Park Service as the administering agency is responsible for long term protection and stewardship of the rivers' 'outstandingly remarkable resources' including scenic, historic, cultural, recreational and ecological values. One of the greatest threats to these resources is impaired water quality, especially due to high nutrient loads. Section 7 of the Wild and Scenic Rivers Act gives the National Park Service the responsibility to evaluate this permit to ensure the proposed discharge will not adversely affect the resource values for which the river was designated.

Following are our comments on this permit.

1. Recent water quality data confirms that the Sudbury River both upstream and downstream of this discharge currently violates water quality standards. In fact, as reported in the Permit Fact Sheet, results of instream monitoring of total phosphorus,

chlorophyll a and dissolved oxygen indicate the existence of eutrophic conditions. For this reason, the final permit should include a water quality based limit for phosphorus which will eventually enable the river to meet water quality standards. The Sudbury River water quality data, along with EPA's most current nutrient guidance documents, clearly show that the 0.2 mg/L technology-based total phosphorus limit will not meet state water quality standards and has reasonable potential to contribute to the Sudbury and Concord Rivers' existing cultural eutrophication problems.

2. Because Massachusetts does not yet have a numeric criteria for phosphorus, regulators should depend on current relevant studies which suggest appropriate phosphorus limits for effluent discharges. All guidance documents produced by EPA and discussed in the fact sheet suggest numeric phosphorus criteria for this ecoregion and this type of slow moving river system, ranging from 0.1mg/l to 0.02 mg/l. However, the most recent EPA funded analysis, done by Mitchell, Liebman, Ramseyer and Clark (2004) utilizing the most current data and having been subjected to quality assurance measures suggests the need for even more conservative concentrations (0.020 -0.022 mg/l). In light of this growing body of information, a total phosphorus limit of 0.02 mg/L, which is an order of magnitude lower than the proposed 0.2mg/L limit, is required to protect and restore water quality in the Sudbury and Concord Rivers.

3. Wastewater treatment technologies are commercially available that can achieve a phosphorus limit of 0.02 mg/L. EPA and DEP should make information on these technologies available to Wayland.

4. Utilizing the growing body of information, including the recent work by EPA (2004), MA DEP should expedite the development of numeric phosphorus criteria that will better protect water quality. Excessive nutrient enrichment poses a serious water quality threat to many of the rivers in this watershed and through out the State. It would be very helpful if DEP presented a timeframe within which these criteria would be adopted.

5. Additional important questions must be answered before it is decided where the discharge outfall should be placed. Before the pipe is extended to discharge into the river, an evaluation of potential impacts must occur. Much of the river bottom sediments are laden with mercury from an upstream Superfund site. It is imperative to know whether the laying of the pipe, or the use of a diffuser or sparger as part of the discharge, will disturb these sediments.

In addition, the State should immediately list this segment of the Sudbury River as impaired by nutrients on the 303(d) list and, as soon as possible, conduct a nutrient TMDL for the Sudbury and Concord Rivers, as requested by the SuAsCo Watershed Team over 4 years ago. Before a decision is made to place the discharge in the river, a load allocation should be established.

Impacts of a pipe discharge into the river should also be evaluated for effects on the recreational and scenic values of the river. These are two resource values for which the Sudbury River was designated a Wild and Scenic River.

Similarly, there is little information available on impacts to the wetland of continuing the discharge there. Impacts to flora and fauna from the effluent should be assessed, and made available, before deciding where to place the discharge pipe. The discharge point is adjacent to wetlands which have recently been restored as part of the Raytheon remediation. New native species have been planted and are now being monitored to ensure their survival. This monitoring should continue to ensure that the wastewater discharge does not contribute to any compromise of the wetland.

6. DEP and EPA are to be commended for imposing a phosphorus limit in the winter months. Monitoring requirements to determine the amount of particulate phosphorus will also be very helpful. Ultimately, only 10% of the phosphorus discharge should be in particulate form during the winter. These limits should apply whether the discharge is into the wetland or the river.

7. In the recently circulated revisions to the surface water quality standards (314 CMR 4.00) DEP has added new wording to protect 'special resource waters' defined as 'those waters of exceptional significance, such as waters in national or state parks and wildlife refuges'. This portion of the Sudbury River has not only been designated by Congress as a Wild and Scenic River, because of its outstanding resources, it also flows through the U.S. Fish and Wildlife Service's Great Meadows National Wildlife Refuge. Maintaining the highest possible level of water quality in the River is necessary in order to achieve the goals of the national wildlife refuge system and the wild and scenic river system including conserving, managing and restoring wildlife, fish and plant resources and their habitats. Any discharge must be evaluated to ensure that "... no new or increased discharge ...that would result in lower water quality in the Special Resource Water may be allowed..." (proposed section 4:04(4) of MA. Water Quality Standards revisions).

8. Based on the convincing data presented in the Permit Fact Sheet regarding the over – allocation of nutrients in the watershed and the existing eutrophic conditions in the river, there should not be an increase in flow from this discharge to the river which exacerbates water quality problems. Alternatives such as water conservation, low impact development, groundwater discharge and/or treated wastewater irrigation should be seriously evaluated as ways to accommodate more flow without increasing a discharge to the river.

Thank you for the opportunity to comment. If you have any questions please contact Lee Steppacher at lee_steppacher @nps.gov.

Sincerely,

Jamie Fosburgh, Director
River Program

MASS CENTRAL RAIL TRAIL COALITION

The Proponent thanks the Mass Central Rail Trail coalition for its support of the project's proposed provision of $250,000 to the Town of Wayland for the creation of a bike path along the MBTA right-of-way that abuts the project site.

#13844 HJ

MASS CENTRAL RAIL TRAIL

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AUG 21 2006

MEPA

Mass Central Rail Trail Coalition
P.O. Box 60211
Florence, MA 01062
413-585-8559

Boston
—MassBike
—WalkBoston

Somerville
—Friends of the Community Path

Cambridge
—Cambridge Bike Committee

Belmont
—Friends of the Belmont Bikeway

Waltham, Weston, Wayland, Sudbury, Hudson, Berlin
—Wayside Trail

Clinton
—Clinton Greenway Conservation Trust

Sterling, West Boylston, Holden, Rutland, Oakham
—Wachusett Greenways

Barre, New Braintree, Hardwick
—East Quabbin Land Trust

Ware
—Ware River Valley Greenway Trail

Palmer
—Town of Palmer Trail

Belchertown
—Belchertown Land Trust

Amherst, Hadley, Northampton
—Norwottuck Rail Trail Advisory Committee
—MassBike Pioneer Valley
—Friends of Northampton Trails and Greenways

Stephen R. Pritchard, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street, 9th Floor
Boston, MA 02114

August 10, 2006

Re: Wayland Town Center

Dear Mr. Secretary:

After a recent vote of the Wayland Town Meeting granting its support, the project known as Wayland Town Center has begun to move forward with the submittal of the Environmental Notification Form (ENF).

On page 4 of the ENF, the following text appears. . . *"The applicant is providing $250,000 to the Town of Wayland for the creation of a bike path and possibly a historic interpretative railroad site along the current MBTA right-of-way that abuts the southeastern edge of the site. . . "*

We—the MassCentral Rail Trail Coalition—fully support this effort to build out the former railroad as a non-motorized trail open to pedestrians, bicyclists and others that would connect the Wayland Town Center project to existing commercial development in Wayland. This project already has a name—the Wayside Rail Trail, a key component of the MassCentral Rail Trail (MCRT)— the key east-west trail corridor in the state.
As you are undoubtedly aware, the MCRT is listed as a high priority project in ***"Commonwealth Connections—a greenway vision for Massachusetts"***—a DCR produced report—as one of the most significant east-west trails in the state.

Our coalition meets on a regular basis to develop strategies to:

- preserve this important corridor from further segmentation
- reassembling segments sold off—or routes around these sections
- encourage and support appropriate policies at the state and municipal level that benefit that MCRT
- strengthening the local groups actively working to improve the trail
- raise awareness of the importance of this corridor for future transportation, recreation, tourism and health benefits.

The Wayland Town Center project would be beneficial to the MCRT and the MCRT will be beneficial to the Wayland Town Center project. We urge you to also support this key project and comment favorably on it and their intent to donate $250,000 towards the construction of the trail.

Thank you,

Craig P Della Penna, coordinator

For the MassCentral Rail Trail coalition

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AUG 21 2006
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

Mass Central Rail Trail — 104 miles — connecting 25 communities — Boston to Northampton

WAYLAND PLANNING BOARD

WPB.01 This matter is not within the MEPA Scope.

WPB.02 The project's stormwater management system is described in Section 4.2.

WPB.03 Hazardous waste issues are discussed in Section 6.0.

WPB.04 The project's traffic study is found in Section 3.0 and addresses the north Wayland intersections.

WPB.05 The construction of the project will involve the use of designated routes, defined in coordination with Town of Wayland staff, prior to the start of construction. The project Proponent will require all contractors to access the site from Route 20. The use of local residential streets will be prohibited. The contractor will establish site trailers and staging areas to minimize impacts on traffic. Trucks will be required to wait in on-site staging areas and will be prohibited from waiting on Route 20.

WPB.06 The project Proponent has developed two conceptual plans for the site driveway to Route 20, with and without a potential driveway to Russell's Garden Center. The project Proponent has been, and continues to work with Russell's Garden Center to develop an access plan that will be suitable for both entities.

WPB.07 Sidewalks have been incorporated into the site design, and potential locations for connections to the potential rail trail (to be located within the adjacent MBTA right-or-way) have been identified.

WPB.08 Water supply is addressed in Section 5.2.

WPB.09 Water supply is addressed in Section 5.2.

WPB.10 Wastewater is addressed in Section 5.1.

HJ

TOWN OF WAYLAND

MASSACHUSETTS
01778

PLANNING BOARD

JOSEPH LAYDON
TOWN PLANNER
TOWN BUILDING
41 COCHITUATE ROAD
(508) 358-3615
www.wayland.ma.us

Via email and postal mail

August 16, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: Holly Johnson, MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: EOEA No. 13844 – Wayland Town Center, Wayland, MA

Dear Secretary Pritchard:

Thank you for the opportunity to comment on the Environmental Notification Form for the Proposed Wayland Town Center Project being proposed at 400-440 Boston Post Road, on the property locally known as the Former Raytheon Property. This letter is submitted in response to the potential impacts this development may have on the Town of Wayland.

Twenty Wayland, LLC proposes the construction of a 372,500 square foot mixed-use development in the center of Wayland. The proposal is a result of a recent Zoning Bylaw adopted by the Town for the redevelopment of the Former Raytheon Property into a mixed-use development and is comprised of up to 100 residential units (no more than 200 bedrooms) totaling approximately 167,500 g.s.f.; 156,700 g.s.f. of retail space; 8,250 g.s.f. of office space, and a to-be-determined municipal use of approximately 40,000 g.s.f.

As the project moves forward, its potential environmental impacts must be identified, examined and addressed. The Wayland Planning Board respectfully requests that the following impacts from the proposed development be included in the scope of the Environmental Impact Report.

Wetlands, Waterways and Stormwater

1. The Sudbury River has been designated a federal Wild and Scenic River Corridor. The Project Proponent should provide information regarding the visibility of the project from the river. Specific concern should be given to whether buildings will be visible to recreational users of the river. WPB.01

2. The close proximity of wetlands and the Sudbury River to the project creates a challenge in addressing stormwater. The Project Proponent should examine using innovative WPB.02

stormwater management techniques that protect water resources and treat to the highest level of contaminant removal practical.

3. The former Raytheon Property is currently undergoing cleanup activities under M.G.L. c.21.E and the Massachusetts Contingency Plan. The EIR should consider the location of contaminated areas in the design of the stormwater management system and take steps to ensure that clean-up activities are not impacted and that sensitive areas are avoided if deemed necessary. WPB.03

Traffic

1. The traffic information contained in the ENF mentions only the estimated increase of traffic on the adjacent roadways of Route 20 and Route 27. The Project Proponent should submit a comprehensive set of traffic studies regarding those roads, nearby intersections and the increased traffic impacts on neighboring roads and roads connecting to Routes 20 and 27. The EIR should require that the proponent conduct a comprehensive traffic study and expand the area of study to include surrounding residential streets such as but not limited to Bow Road, Glezen Lane, Moore Road, Training Field Road, Claypit Hill Road, Plain Road, Millbrook Road, Glen Road, and Pelham Island Road in Wayland. WPB.04

2. The Project Proponent should identify traffic routes to be used during the construction of the project and provide recommendations on restrictions for construction-related traffic to ensure that residential neighborhoods are not impacted. WPB.05

3. The Project Proponent has indicated that approval for a curb cut on to Route 20 will be required by Mass Highway. The EIR should examine the opportunities for coordinating access alignment and access management with the businesses across Route 20. WPB.06

4. The EIR should include information regarding how the proposed development will provide pedestrian connections to the existing businesses along (and especially across) Route 20, adjacent historic districts, residential and the other uses within the Wayland Center area. WPB.07

Water

1. The Project Proponent should include in the EIR, information detailing the availability of water for the project, impacts on the associated distribution system, including any needed upgrades. WPB.08

2. The Town is currently under an enforcement order by DEP for the reduction of its per capita water usage. The construction of the 100 units of residential will impact the Town's water usage and the ramifications of this increase and the DEP enforcement action should be examined. WPB.09

Wastewater

1. The Project Proponent proposes to utilize septic systems in order to accommodate any additional wastewater that cannot be accommodated by the Wastewater treatment facility. The subsurface soil conditions, including examination of whether soil contamination is present, should be examined. WPB.10

The proposed development will have a significant impact on the immediate area and on the Town as a whole. It is important that all potential impacts be identified. The Town of Wayland's

Planning Board will be following this project as it moves forward in the MEPA process and will provide additional information and comment as needed. Thank you for taking our concerns into account when preparing the scope for the Environmental Impact Report.

Sincerely

Joseph Laydon
Wayland Town Planner

CC: Wayland Board of Selectmen
Wayland Board of Health
Wayland Conservation Commission
Wayland Board of Road Commissioners
Wayland Conservation Commission
Wayland Historic District Commission
Wayland Historical Commission
MetroWest Growth Management Committee
Francis X. Dougherty, Twenty Wayland LLC

WAYLAND HIGHWAY DEPARTMENT

WHD.01 The transportation study is presented in Section 3.0. This effort focused on the identified study area requested by the town, MEPA and MassHighway.

WHD.02 Included within the transportation study is an assessment of two access alternatives. Access Alternative No. 1 reviewed a two driveway plan (access to Route 20 and to Route 27) and Access Alternative No. 2 reviewed a single access plan (access to Route 20 only).

WHD.03 Wetland resources areas on the project site are discussed in Section 4.0.

WHD.04 The construction of the project will involve the use of designated routes, defined in coordination with Town of Wayland staff, prior to the start of construction. The project Proponent will require all contractors to access the site from Route 20. The use of local residential streets will be prohibited. The contractor will establish site trailers and staging areas to minimize impacts on traffic. Trucks will be required to wait in on-site staging areas and will be prohibited from waiting on Route 20.

WAYLAND HIGHWAY DEPARTMENT
195 MAIN STREET
WAYLAND, MA 01778
email: highway@wayland.ma.us
via e-mail to holly.s.johnson@state.ma.us & facsimile 617/626-1181

Tel: (508) 653-4121
Fax: (508) 653-4476

HJ

August 15, 2006

RECEIVED
AUG 16 2006
MEPA

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: MEPA Office – Holly Johnson
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: EOEA No. 13844 – Wayland Town Center, Wayland, MA

Dear Secretary Pritchard:

Thank you for the opportunity to comment on the Environmental Notification Form submitted by Twenty Wayland, LLC (the "project Proponent") for the construction of a mixed-use development known as the Wayland Town Center Project being proposed at 400-440 Boston Post Road in Wayland.

The ENF indicates that the project will trigger the transportation/traffic generation-related "ENF and Mandatory EIR" thresholds. One of the thresholds is the generation of 3,000 or more new vehicle trips per day on roadways providing access to a single location. The project Proponent estimates that this project will result in an increase of over 7,834 vehicle trips per day and that it also will require a state-issued permit for access to Route 20.

It is respectfully requested that an examination of the full traffic impacts from this project be included in the scope of the Environmental Impact Report. Specifically, the project Proponent should, among other things, address the following:

1. Present a comprehensive traffic evaluation assessing the project's potential "worst case" impacts on roadways adjacent to the project site, nearby intersections, and neighborhood residential roads that are likely to be affected by the proposed development. WHD.01

2. Present an alternatives analysis concerning number of vehicular access points to the project site. Scenarios that should be addressed are: a) only one site access point (i.e., along Route 20); b) two site access points (i.e., one along Route 20 and the other along Route 27); c) any other possible scenarios. WHD.02

3. Present an analysis of the areas within both the State's and Town's rights-of-way where roadway widening and/or placement of new pavement may be considered or expected and assess the associated environmental impacts – consider especially

4. the impacts on wetlands, flood plain, parkland, conservation land, and the Town's Historic Districts. WHD.03

5. Identify the routes to be used: a) by construction vehicles during build-out; and b) by re-supply vehicles on an on-going basis. WHD.04

The evaluations should contain sufficient data so that the analyses can be replicated by others.

Currently, MassHighway is in the process of reconstructing the intersection of Route 20 with Routes 27/126, as more fully described in an ENF submitted to MEPA by letter of June 30, 2003 (EOEA No. 13072). As a condition of proceeding with that project, MassHighway required the Town of Wayland to enter into a Traffic Control Agreement that, in substance, states that no part of the project can be unilaterally changed by the Town without the prior written approval of MassHighway.

Thank you for considering these comments when drafting the scope for the Environmerntal Impact Report.

Very truly yours,

Stephen Kadlik/RRH

Stephen Kadlik
Director of Highway Operations

cc: Wayland Board of Selectmen
Wayland Board of Road Commissioners
Wayland Conservation Commission
Wayland Historic District Commission
Wayland Historic Commission
Wayland Park and Recreation Commission

WAYLAND CONSERVATION COMMISSION

WCC.01 Figure 4-1 illustrates resource area locations.

WCC.02 The Proponent is making every effort to avoid impacts to riverfront area, and, as shown on project plans, less than ten percent of the project site's riverfront area will be affected.

WCC.03 The project's wetland impacts will be mitigated as required under the Wetlands Protection Act and the Town of Wayland's Wetlands and Water Resources Bylaw.

WCC.04 As discussed in Section 4.2, the project's stormwater management plan will comply with DEP's Stormwater Management Policy.

WCC.05 The Proponent has begun consultation with the Natural Heritage and Endangered Species Program of the state's Division of Fisheries and Wildlife, and state-protected species occurring on or adjacent to the project site will be treated as required under the Massachusetts Endangered Species Act.

WCC.06 Low impact development techniques such as water quality swales, rain gardens, and bioretention basins, will be incorporated into the project.

WCC.07 The Town of Wayland's Municipal Wastewater Treatment Facility is discussed in Section 5.1.2.

TOWN OF WAYLAND

MASSACHUSETTS
01778

CONSERVATION COMMISSION

TOWN BUILDING
41 COCHITUATE ROAD
TELEPHONE: (508) 358-3669
FAX: (508) 358-3046

August 15, 2006

Secretary Stephen R. Pritchard
EOEA, Attn: MEPA Office
Attn: Holly Johnson, EOEA No. 13844
251 Causeway Street Suite 900
Boston, MA 02114

Dear Secretary Pritchard;

The following comments are being submitted on behalf of the Wayland Conservation Commission. There are many environmental factors to be considered in the redevelopment of the former Raytheon facility generally located at 430 Boston Post Road. However, a sensitive redevelopment, that incorporates low impact design considerations, should be based upon a definition of all of the wetlands and other resource areas on the site. The Conservation Commission has, for years, stated a need to define resource areas to both the current development team and to past project proponents at the site. To date there is not a plan that accurately shows resources areas – those areas defined by either the Wetlands Protection Act or Wayland's Wetlands and Water Resources Bylaw. This contributes to comments, input, and concepts based upon incomplete and inaccurate information.

The following items are the general areas in which should be considering in defining the scope of the EIR. Documentation for many of the items noted is available if desired however, the intent of this correspondence is to outline issues of concern relating to the areas reviewed by the Conservation Commission.

- The concept plan should properly define all of the resource areas including riverfront area (improperly shown on the existing conditions plan), floodplain, and all wetlands. WCC.01
- The concept plan should have a goal of avoiding the resource areas such as riverfront and floodplain. This not only reduces impact to the resource area but would also leave the potential for better protection of the Sudbury River – a wild and scenic river. WCC.02
- Off site traffic mitigation should not be considered as a limited project – impacts to wetlands should be fully mitigated. WCC.03
- Stormwater should be treated to high standards implicitly. The Conservation Commission has consistently sought upgrades and improvements to stormwater at this site. WCC.04

z'd

- The redevelopment should consider any rare and endangered species on or adjacent to the site. WCC.05
- Low Impact Development measures should be a standard for the redevelopment of the site and the EIR should clearly list each technique used to meet LID goals. WCC.06
- The existing wastewater treatment facility should not be ignored. While it is owned by the Town where it is located impacts wetlands resource areas and the overall redevelopment of the site. WCC.07

MEPA was involved in at least one previous project in which the Wayland Conservation Commission submitted comments relating to the definition of resource areas. From Correspondence to MEPA regarding Raytheon Clean-up (EOEA #12984) dated March 28, 2003 from Marylynn Gentry, Chair – Wayland Conservation Commission: "Finally, we have concerns over their definitions of resource areas, particularly the riverfront. Thank you for the opportunity to comment."

On July 29, 2005 a letter was sent to the Wayland Board of Selectmen on behalf of the Conservation Commission. This letter outlined the concerns of the Commission and resulted, in part, from a meeting with the project proponents on July 14, 2005. [A copy of that letter is attached to this correspondence.] This letter outlines issues that remain outstanding.

In conclusion the redevelopment of the site should have a primary goal of clearly defining environmentally sensitive areas and avoiding impacting them. The scope of the EIR should include this as a criterion for analysis of the impact of the redevelopment.

Thank you for the opportunity to present these comments.

Sincerely,

Brian J. Monahan,
Conservation Administrator

Enc. (1)
Cc Conservation Commissioners
File

c'd

TOWN OF WAYLAND

MASSACHUSETTS
01778

CONSERVATION COMMISSION

TOWN BUILDING
41 COCHITUATE ROAD
TELEPHONE: (508) 358-3669
FAX: (508) 358-3046

Memorandum

To: Board of Selectmen

From: Brian J. Monahan, Conservation Administrator

Re: Conservation Commission Input on the Town Center Project

Date: July 29, 2005

The Conservation Commission met with project proponents for the proposed redevelopment of the former Raytheon site on July 14, 2005. The Commission further discussed the matter at their meeting last night with respect to this correspondence to you. The following set of items highlight issues that the Conservation Commission feels requires further evaluation and assessment as the project proceeds. Some of the issues are of a concern that any Development Agreement should include some "ground rules" in order to be pro-active in avoiding adverse impacts to the site.

- There should be a **monetary penalty** for failure to comply with any requirement outlined in the Development Agreement. The Commission feels one of the shortcomings of the Greenways Project was that there was no penalty when components of the project were not met.
- Any wetlands, land remaining as open space to the north, and the 30'undisturbed buffer to the wetlands should be permanently protected by a Conservation Restriction.
- Impacts on resource areas (ie. Wetlands, the Riverfront, and buffer zone) should have a priority of avoidance first.
- All of the resource areas – areas that are defined and protected by Wayland's Wetlands and Water Resources Bylaw (Chapter 194) have to be identified. The Commission has no knowledge of the method being used to define some of the smaller areas within the site that are subject to review pursuant to Chapter 194.
- Where possible avoiding filling and/or altering wetlands, bordering vegetated wetlands, and land that floods should be the first order of site re-use. This would include, prior to seeking to alter a resource area, producing a meaningful alternatives analysis which documents that there is not a viable alternative.
- Wetlands should have an undisturbed area around them, to protect them of not less than 30'.
- Part of the proposal includes off-site work at the intersection of Routes 20, 126 & 27. This is a very sensitive area and any filling of wetlands would require wetland plant replication at a level on not less than a 1.5 to 1 ratio ,(area replicated to area filled), and

the creation of equal (at the same elevation and area that filling is proposed) flood storage in the same area where filling of floodplain isanticipated. The Commission spent many hours with Mass Highway's consultants to provide both the required wetlands replication and flood storage for the current work being done at this intersection. It was a challenge to find two separate compensation locations – one for wetlands replication at a ratio of 1.5 to 1 and one for flood storage all within the same area of impact.

- In looking at impacts, particularly at the intersection improvements, alternatives to filling should be explored. Any floodplain to be filled requires compensation at the same elevations filled in areas not previously flooded and within the same hydraulic reach as the area filled. As was noted already – this is very challenging to achieve along Mill Brook.
- A development agreement should include a requirement that stormwater will be treated to meet all Federal and State standards for new construction.
- There are questions about sewage and the outfall at the edge of the wetlands. There has been discussion of extending it this outfall further into the Sudbury River. The Commission feels this is not a desirable situation.
- The Commission is concerned with increased density next to the Cow Common Conservation Area. The increased use of the area is going to require more management and investment by the Commission on an extremely limited land management budget, which has not increased in years. Temporary personnel generally do land management seasonally. The increased density of land use at the Town Center will increase use of Cow Common – this is not negative if proper assistance and funding is provided to address the change in use.
- No information has been provided about the proposed zoning and some of that impacts the resource areas. The Commission would provide comments on any formal documents if provided..
- The Sudbury River is designated as a Wild and Scenic River. To that end the proposed Town Center should not encroach upon the values of the river.
- In the past the Commission has advocated for improvements to the bank of the river – that area of fill along the edge of the wetlands. The Commission has sought and will continue to advocate for improvements to the functions of the buffer zone where both flood storage and other value could be improved with nominal changes in grading in this area. The Commission has also explored creating a canoe landing along the Sudbury River.

The Commission did indicate to the project proponent's willingness and desire to review proposals informally and to continue to provide input on the project, as it is being conceptualized and thereafter designed.

Thank you.

Cc Conservation Commissioners
File

c:d

MAURICE ROCKETT

MR.01 Hazardous waste is address in Section 6.0.

MR.02 Water supply is addressed in Section 5.2.

Johnson, Holly (ENV)

From: Maurice Rockett [mrockett@COMCAST.NET]
Sent: Wednesday, August 02, 2006 10:42 AM
To: Johnson, Holly (ENV)
Subject: Wayland's Town Center Project

Regarding Wayland's town-center project, I am concerned over the developer's lack of concern about hazardous waste and impact on our water supply. MR.01 MR.02
Maurice Rockett

JOY VIOLA

JV.01 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

JV.02 State-protected species occurring on or near the project site are discussed in Section 7.0.

Johnson, Holly (ENV)

From: Joy Viola [AJViola@comcast.net]
Sent: Wednesday, August 02, 2006 9:36 AM
To: Johnson, Holly (ENV)
Subject: Wayland MEPA Visit/Town Center Site Review

Dear Ms. Johnson:

I'm sorry that a long-awaited doctor's appointment precludes my husband and I from attending the MEPA site visit at the proposed new town center scheduled in Wayland for Thursday morning, August 3 at 9:30 a.m. However, as a long-term town resident, I do wish to make some comments.

1) We here in Wayland take our wetlands and waterway protections VERY seriously. The Sudbury River, which abuts the proposed town center lands, is not only an important ecosystem in our town, it is of national significance inasmuch as it is part of the national wildlife refuge system. All of us who have lived in town for any length of time have seen the tendency of the Sudbury River in that area to exceed its flood plain and spill over across the roadways. The flood plain is in fact much larger than it might appear at first glance. This has great implications for large-scale septic system considerations, paving of large areas that would promote run-off into the flood plain and waste water in general. I ask you to pay very close attention to these matters as wetlands violations are frowned upon in our town! JV.01

2) Wayland residents are conservationists as evidenced by the number of times they have taxed themselves to preserve land from development and keep it in a natural state for recreational purposes that do not harm the environment. We are especially proud of the avian life in our town as recorded annually by the Concord Christmas Bird Count through which Wayland always shows high numbers of species. We patrol the Sudbury River monitoring those species, especially along the shorelines along the proposed town center development. Our citizenry includes large numbers of Massachusetts Audubon members and I'm sure you are aware of the extent to which the Audubon Society aggressively works to protect our local environment. What happens in one place along the River quickly impacts another, and just downstream lies a property that serves as headquarters of the Sudbury Valley Trustees, another local conservation group. Bottom line, we don't take kindly to developers messing with our environment and wildlife habitats. We ask that you review these factors with due diligence - and we are sure you will - if you know that they are important to the towns' people. JV.02

Bottom line - we care about our environment in Wayland and we will be monitoring the town center development carefully so that we are sure it is developed with the environmental respect it deserves. I'm sure this will be a long process and I look forward to meeting you on another occasion. At this point, I simply wanted to make the point that there are more citizens who care than may be present at tomorrow's meeting given summer vacations, excessive heat, and, yes, even doctor's appointments!

Thank you for your consideration.

Joy Viola
14 Glover Road
Wayland, MA 01778
AJVIOLA@Comcast.net

JUDITH CANTY GRAVES

JCG.01 The project's transportation study is found in Section 3.0.

JCG.02 The project will comply with applicable statutes and regulations intended to protect the Sudbury River and Great Meadows National Wildlife Refuge. The project's efforts to avoid and minimize impacts to wetland resource areas and state-protected species are discussed in Sections 4.0 and 7.0, respectively.

Judith Canty Graves

49 Orchard Lane • Wayland, MA 01778 (508) 358–0027

HS

August 8, 2006

Stephen R. Pritchard
Executive Office of Environmental Affairs
Attention: Holly Johnson
EOEA No. 13844
Wayland Town Center
100 Cambridge St. Suite 900
Boston, MA 02114

RECEIVED
AUG 11 2006
MEPA

Dear Mr. Pritchard and Ms. Johnson:

I am writing to express my concern about the Wayland Town Center project. As a resident of Wayland since 1990, I have enjoyed this small town with its semi-rural character very much. I live a mile north of Route 20 and about half a mile east of Route 27, so I am located near the Town Center property. The project is completely inappropriate for such a small town and for a location that is not near a major highway.

My main concern is the impact the Town Center will have on traffic in Wayland, especially the area north of Route 20. Development in the north part of town has escalated dramatically over the past ten years or so. I am horrified at how the Town Center will attract people from beyond Wayland and increase the number of cars on the road. I think the quality of life in our small town will deteriorate once this immense project is built. JCG.01

Too much traffic will especially impact the side roads off Route 27. These roads include Glezen Lane, Bow Road, and Training Field Road, all of which are near my street. These are narrow, twisting roads that already support a tremendous amount of commuter traffic. I can't imagine these roads having even more traffic.

In addition to traffic, I am also concerned that this project is being built so close to the Sudbury River and the Great Meadows National Wildlife Refuge. I am afraid that the wastewater treatment plant will not be able to handle the additional demands of the Town Center. JCG.02

Though I attended Town Meeting to vote against this project, many residents are unable to attend Town Meeting. There are 8,739 registered voters in Wayland but only 1,753 voters approved this project. Had this been a ballot vote I think the outcome would have been different.

I urge you to carefully consider these items as well as the traffic impact because once this project is built, our town will be changed forever. I am hoping wise choices will be made to protect the quality of life in Wayland.

Sincerely,

Judith Canty Graves

Judith Canty Graves

P.S. Please put me on your mailing list for all future correspondence. My e-mail address is jcanty-graves@juno.com or you can write to me at the above address. Thank you.

JEAN ANN SCHULTE

JAS.01 The project's water supply is described in Section 5.2.

JAS.02 The project's stormwater management system is described in Section 4.2.

JAS.03 The project's traffic study is found in Section 3.0.

Johnson, Holly (ENV)

From: Jean Anne Schulte [JSchulte@brighthorizons.com]
Sent: Thursday, August 10, 2006 3:12 PM
To: Johnson, Holly (ENV)
Subject: EOEA No. 13844 - Wayland Town Center

Dear Ms. Johnson:

I am writing as a homeowner in Wayland to express my serious environmental concerns about the size and scale of the proposed shopping center development in Wayland. Specifically, I am concerned about:

- Demand on a limited water supply, compromising water quality and pressure throughout the northern part of the town. North Wayland already experiences water challenges with muddy water and low pressure in ordinary rainfall years. My understanding is that the development will have first claim on a disproportionate amount of our limited fresh water supply and that the developers intend to build out the development to the full extent of their legal allocation. JAS.01

- Pollution and discharge into the sensitive Sudbury River and National Wildlife Refuge. My understanding is that the developer has sought to limit financial liability for an upgraded wastewater treatment facility. JAS.02

- Traffic is by far the most critical issue. The size and scale of the proposed development suggests that the developer seeks to attract vehicle traffic from well beyond Wayland. Wayland already suffers from substandard road capacity on Routes 27 and 126, and we are limited in potential mitigation by the presence of protected wetlands alongside major state roads. Clearly, the result will be increased vehicular traffic through residential neighborhoods and long lines of traffic, with accompanying air and noise pollution, at every intersection along Routes 27 and 126. JAS.03

I urge your agency to thoroughly investigate these environmental impacts on the town, resulting from the overscaled proposed development.

Sincerely,
Jean Ann Schulte
71 Moore Road
Wayland MA 01778

ALAN D. MANDL

ADM.01 The project's traffic study is found in Section 3.0.

ADM.02 The project's traffic study is found in Section 3.0.

ADM.03 The project's traffic study is found in Section 3.0.

ADM.04 Wastewater and water supply issues are discussed in Section 5.0.

Alan D. Mandl
90 Glezen Lane
Wayland, MA 01778

August 10, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn. Holly Johnson, MEPA Office
100 Cambridge St., Suite 900
Boston, MA 02114

Re: Wayland Town Center, File# 13844

Dear Secretary Pritchard and Ms. Johnson:

As a 12 year resident of Wayland who is very concerned about the multiple significant, long term adverse impacts of the above development project upon Wayland, I am submitting the following comments.

Background

MEPA should be aware that an earlier iteration of this same large project went down in defeat at Wayland Town Meeting in Fall 2005. At that time, our Planning Board issued a 5-0 negative report on the zoning amendment that would have allowed the creation of a mixed use overlay district.

In the first half of 2006, we residents were assaulted with a well-funded "astroturf" campaign to support this project, not on the merits, but through scare tactics and misinformation. Residents were told that the only alternative was a massive affordable housing project that the Town would be unable to control under Chapter 40B. Support of this project was also linked to a myth that it would "fund our future," even though the net revenue impact was projected as minimal by the Town's own fiscal impact consultant.

Parents of school age children who questioned this project found that their children were being ostracized. A number would not vote in public against this project for fear of social reprisals and simply stayed home. The lack of public knowledge about the many negative impacts associated with this project was palpable to those of us who attended many meetings and submitted many public comments. In this high-pressured context, our Planning Board did a 180 turnabout and voted 3-2 in favor of virtually the same zoning by-law amendment that it had previously rejected.

The Planning Board ignored its own July 7, 2005 memo, "Process for Coordination and Review," as it relates to the crafting of any zoning by-law amendment that would allow for a large development project. The Planning Board stated that it wanted traffic studies to include "the impact on side roads" (Wayland made this same request to Framingham regarding the Danforth development) for the reason that "the PB will be focusing on sizing of the project based on the traffic results." The Planning Board and the Board of Road Commissioners asked the site owner to study the following roads and make recommendations for mitigating traffic on them: Bow Road, Claypit Hill Road, Concord Road, Glen Road, Glezen Lane-East of 126, Glezen Lane-West of 126, Millbrook Road, Old Sudbury Road, Plain Road and Training Field Road. (See Town Center Proposal-Frequently Asked Questions, from Planning Board Website).

None of these studies were provided by the developer and our Planning Board caved in under pressure from the Board of Selectmen (which has among 5 members two real estate developers and a broker-one developer's firm has transacted business with a member of the LLC developing the project in question) and agreed to a minimum size project (the same as the maximum size) without benefit of the very traffic impact studies that it knew were necessary in order to determine a suitable project size from a traffic/public safety standpoint.

MEPA therefore cannot assume, as the developer implies in its ENF filing, that there is widespread local backing for any particular development plan or any public understanding of the many negative consequences of this large scale project on our community. Many residents were even unaware of the longstanding site contamination problems that have been under remediation and investigation over the past several years (see attached letter dated July 24, 2006, from CMG Environmental, Inc.), much less the new problems created by the proposed development.

My specific comments focus on traffic impacts, but also note concerns regarding wastewater and water supply impacts.

Excessive Traffic

The Proposed Project is Too Large for the Proposed Location and Conflicts with Traffic Findings and Conclusions in Wayland's Master Plan ADM.01

Over the past 10 years, projects of this size in Eastern Massachusetts have been built within 1 mile of a major highway. This project is being sited along an already well-traveled 2 lane road (Route 20) abutted by wetlands, an historic district and residential areas with narrow scenic roads.

The location of this project at the former Raytheon site conflicts with Wayland's 2004 Master Plan as it relates to traffic considerations. A large-scale, regional shopping destination in a village area of our Town flies in the face of our Master Plan (page 186):

> Wayland should demonstrate to its neighbors that the Town's village areas are a priority and should be protected from traffic impacts. Another way to address traffic impacts is to try to assist neighboring Towns to route traffic for large-scale commercial development away from Wayland's small villages.

This project must be downsized to protect the community from traffic impacts. Downsizing will reduce the impacts on Route 20 and its intersections and avoid or reduce cut through traffic volumes flowing into narrow scenic roads and residential neighborhoods frequented by walkers and bicyclers.

Significant reductions in the size and intensity of uses are needed to help mitigate traffic affecting other resident "experiences" on our roads. **I am very concerned about the lengthy queuing of traffic that would paralyze several already busy intersections and foul existing weekend traffic patterns, such as a Cochituate or North Waylander resident's trip to our landfill. This traffic would impair the ability of public safety officials to respond to emergencies, especially if their vehicles were blocked by traffic queued up past Millbrook. Queuing problems would be exacerbated by the addition of traffic lights that have been proposed near the library. Queuing problems have not been adequately addressed by the developer at any stage to date.**

By including an access driveway in the overlay district, the developers have all but guaranteed that excessive levels of traffic will flow into and endanger nearby residential areas (at least 10 roads, many of them designated as scenic roads). They told the public in a promotional DVD in 2005 that the even larger version of this project, which was defeated, could work without this access driveway. State officials must press the developer to reduce the size of this project and eliminate or restrict the volume of traffic that can utilize an access road: "Traffic cutting through residential neighborhoods creates safety, noise and speed problems." (2004 Wayland Master Plan at 89).

Our Master Plan counsels against simply shifting a traffic problem from one area to another. (page 186, 2004 Master Plan). Yet, this is precisely what will happen unless

the State requires that the size and intensity of use of this project be substantially reduced (Our bylaw does not allow the Planning Board to shrink the size of the project in order to mitigate against adverse traffic impacts-we are dependent upon the State for this form of mitigation).

Our Master Plan has made it clear that certain traffic calming measures, such as speed humps, are "looked upon unfavorably by the Highway Department, whose job it is to plow the Town's roads during the winter and by the Police and Fire Departments who need to safely deploy emergency vehicles." (Master Plan at 96). You cannot responsibly allow a magnet shopping center to go forward and create traffic problems that cannot be cured by speed bumps and the like. **Major mitigation measures-significant downsizing and elimination of or restrictions on use of the cut through into Old Sudbury Road-are needed to avoid serious traffic and related public safety problems.**

Our Master Plan (98,99) recognizes the importance of the very scenic roads that would be overrun by the traffic to and from the proposed development to the recreational needs of our community and the region:

> Many roads in Wayland are signed with Share the Road signs which encourage vehicles and bicycles to use the road together. In 1996, the MetroWest Growth Management Committee along with local bicycle enthusiast groups produced a map identifying the best routes for cyclists in the region. Several Wayland roads are recommended for bicycling, including...Glezen Lane,...Claypit Hill/Plain Road, Plain Road/Millbrook Road/Pelham Island Road...."

These scenic roads are right in the crosshairs of the traffic flows that the proposed development would generate and deposit on them as regional shoppers and delivery trucks rush to and from the Old Sudbury Road entrance/exit and avoid Route 20.

The developer has failed to identify the numerous traffic problems that its proposed project will generate and has understated these impacts in its ENF.

The determination of the size of the proposed project was never assessed in terms of the level of traffic that the project would generate or whether effective and achievable mitigation measures exist.[1] (See my comments above on our Planning Board's failure to

[1] "Preliminary" studies were badly flawed and did not examine impacts on affected residential areas. The effect on queuing was not adequately considered. No consideration was given to the effects of pedestrian and bicycle traffic upon the movement of automobiles, although the affected areas do experience foot and bicycle traffic and the Town has sought to encourage such access to the proposed project. Other major flaws resulted from the use of double standards regarding traffic measurement. The Town itself used more conservative approaches than used by the developer in its "preliminary" studies in making

consider traffic impacts in drafting a bylaw amendment that makes the maximum size of the development the same as the minimum that it can allow). Extreme vigilance by the State is therefore necessary to scrutinize this project in light of its traffic impacts and related environmental and public safety-related impacts.[2]

State guidelines enable Mass Highway to condition the grant of access permits to Route 20 upon a reduction in the size and intensity of use at the proposed site as a means of mitigating adverse traffic impacts upon our community.

I note that some of the traffic consultants (TEC, Faye Spofford and Thorndike) questioned whether the developer's remediation plans for the Routes 20/27 intersection would have any mitigation impacts. We know that this oversized project will require massive and lengthy dislocations during any process of widening Route 20. It would encroach on existing wetlands. Downsizing the project might reduce the amount of environmental damage that this project will cause.

Historic Limitations on Access From Old Sudbury Road Must be Respected ADM.02

For over 50 years, the site has operated under traffic restrictions that applied to Raytheon during its heyday. Access to the site from Route 27 (Old Sudbury Road) was restricted to a limited number of vehicles of Raytheon employees.

Prior to 1954, the land north of Boston Post Road and northeast of Old Sudbury Road was zoned as a Single Residence District. In 1954, the Town considered an application by Raytheon Manufacturing Company to zone a portion of the land as a Limited Commercial District. In the Town's decision approving Raytheon's application, the Town was explicit in expressing grave concerns with the commercial development of property in this area. The foremost concern identified even in 1954 was traffic. The Board of Selectmen was persuaded to approve Raytheon's application to create a Limited Commercial District as the proposed commercial use was to erect a laboratory which would employ about 1,500 people. The Town was careful to consider alternative uses in the event the building was abandoned for laboratory use. Specifically, the Town stated that, "[w]arehouses require few employees and cannot be objectionable unless used to

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recommendations to the Town of Framingham regarding the Danforth development and in studying the Route 30/27 intersection redesign project.

[2] It also is troublesome in the age of fiscal restraint that the Commonwealth has funded the cost of redesigning and reconstructing the intersection of Route 20/126/27 and that this very same intersection would need to be overhauled and redesigned (with the mitigation results questionable), making recent substantial State expenditures a complete waste of money. The developer should reimburse the State for its costs, not merely pay for "improvements" that enable its project and exacerbate traffic and public safety problems in Wayland.

offensive materials." It continued, "We also feel that offices are desirable provided the density of employees is controlled as we have provided in the permit."

Thus, even more than five decades ago, the Town was careful to restrict the number of people using the site and expressed serious concerns with traffic issues and the impact of traffic on the residences surrounding the property. The Town's initial careful decision transferring this land from a residential district to a limited commercial district reflects that traffic, density and the number of vehicles entering and exiting the site has always been of paramount concern.

Also in 1954, the Town permitted a driveway leading from Old Sudbury Road to the limited commercial district for the extremely limited purpose of fire protection. Any signs on the driveway were limited to only those of a type found at a residence and were intended to "warn off traffic which is not to use the driveway, prevent parking on the driveway, etc."

The Town never intended to permit the widespread use of this surface. In fact, the only type of emergency vehicles that were even authorized to pass were for fire protection. Since 1954, the Town has maintained great concern for use of this driveway and its implications to neighboring residents. Changes to the use of the driveway have been carefully monitored and extremely limited in scope.

In 1971, Raytheon sought to modify its Special Permit to permit use of the driveway only for use Monday through Fridays for access to and egress from certain parking areas by passenger vehicles of Raytheon employees living northwest of the plant (Application #71-8). The Town approved the application, but in significantly more limited manner than Raytheon sought. Specifically, the Town required that Raytheon limit use of the driveway to the following:

> "(a) those persons who are presently permitted to use it as provided under the permit as previously in effect [namely for fire protection] and (b) those employees of its Wayland facility who principally reside in the following 15 towns northwest of the Wayland plant: Acton, Bolton, Boxborough, Carlisle, Chelmsford, Clinton, Harvard, Hudson, Lancaster, Littleton, Maynard, Stowe, Sudbury (northern portion) Westford and West Concord."

The Town required that Raytheon follow a detailed system to enforce the above limitation. This included creating a separate parking area (known as Area # 3) able to hold a maximum of 350 cars which would be only available for those employees who met the aforementioned residency requirements and whose vehicles displayed a special identification sticker. Furthermore, Raytheon was required to carefully control and

monitor access to and from Area #3 through the use of gates manned by security personnel. The only other vehicles allowed to use the driveway were a limited number of management personnel and visitors and only for two hours per weekday. Finally, all vehicles authorized to park in Area #3 were required to turn left onto Old Sudbury Road when leaving Raytheon and had to remain on Old Sudbury Road until they reached the Wayland-Sudbury line.

Finally, the Town stated in 1971 that the modification to Raytheon's special permit would expire in two years unless extended by the Board of Selectmen upon application, notice and hearing, to give the Town an opportunity to review the plan's operation.

Thus, the authority Raytheon received to expand the use of the driveway was extremely limited and a careful and extensive system was put in place to ensure that the permitted use would not be abused. Furthermore, it appears that this limited use expired in 1973, as there is nothing in the Town's Building Department's files to indicate that Raytheon applied for a continuation of the 1971 modification to its Special Permit. Thus, apparently Raytheon's special permit reverted back to the its initial terms and conditions, namely that the driveway could only be used for fire protection.

Nevertheless, in 1976, Raytheon applied for a limited expansion of its use of the driveway (Application #76-1) to permit use of the driveway for access to or from Old Sudbury Road between 7:00 and 9:00 a.m. and 4:00 and 6:00 p.m. Monday through Friday for passenger vehicles of employees and visitors to specific parking areas. The Town did not grant Raytheon's request, however. Instead, the Town limited yet again the use of the driveway, only permitting its use for employees *entering* for work in the morning. Those same employees were required to depart from Area #3 in the afternoon through the main gate on Boston Post Road.

Finally, in 1998, Dean Stratouly, as Manager for Wayland Business Center, applied for permission to reinstitute use of the driveway for passenger vehicles of employees and visitors and for deliveries to said site. A number of town residents (including me) submitted a letter expressing concerns with the proposed driveway access as it would create a significant increase in vehicular traffic on Bow Road and Glezen Lane during morning and evening commuting hours, effectively making these ways extensions of the proposed roadway. The Town considered that the narrow, winding roads are without sidewalks, serve as bus stops for small children, attract walkers and bicyclists and already experience heavy cut-through traffic by commuters.

Following at least one Zoning Board of Appeals hearing, the applicant withdrew its request to gain access to the site from Old Sudbury Road and in Decision 98-34, the

Town recognized Wayland Business Center's request to withdraw its application for a variance to use the driveway.

In summary, the Town to date has been extremely vigilant in limiting any access from the former Raytheon site to Old Sudbury Road. It repeatedly denied Raytheon's requests to expand use of the driveway, recognizing the negative impact that such use will have on traffic in the area and on residents in the Town. Traffic in this area, and specifically use of nearby roads as cut-throughs, has always been a serious concern to the Town and use of the driveway has historically been limited extensively.

Please note that the developer's traffic consultant assumed in its preliminary traffic study that 44% of the traffic generated by this development would utilize the "cut through." Even with this assumption, this development seriously overburdens Route 20 and already failed intersections. Of course, this assumption would lead to enormous traffic and safety problems for scenic and neighborhood roads that will be overrun by thousands of additional trips every day.

<u>State Action is Needed to Mitigate Traffic Impacts</u>

ADM.03

The huge increase in traffic caused by this proposed project now requires major mitigation measures: (1) a meaningful reduction in the allowable size of the project as a condition for Mass. Highway approval of access to Route 20; and (2) outright elimination of the use of the so-called access road for commercial purposes (making it available for public safety and residential use) or, in the alternative, enforced limitations on the volume of traffic that can enter and exit the site by means of the access road.

Shrinking the size of this project is the only method of mitigation that addresses traffic impact problems on both Route 20 and on neighborhood roads.

Given the developer's public statements that it can carry out its project without commercial use of the access road, the State should require the developer to submit an alternative design that does not rely upon commercial use of the access road.

The developer should be required to analyze a 10 year planning horizon, not just 5 years, given the long term impacts of this project and potential delays in full build out conditions due to the need for Raytheon to complete its site remediation work. Wayland studied a 10 year window in evaluating improvement to the Route 30/27 intersection and a lesser standard should not be applied here.

Our semi-rural community will experience an increase in auto emissions. No mass transit measures have been included in this project to date as a means of reducing traffic impacts. The State should consider requiring the developer to submit a plan for integrating its development with mass transit facilities (we have a now abandoned rail line that fronts the development site along Route 20). Any development of this scale, given its traffic impacts, should be required to be integrated with mass transit, consistent with Governor Romney's "smart growth" initiatives. Given the ongoing environmental remediation occurring at the site, which we are told may take years, time exists for the State to require that this project be linked with mass transit improvements as a further means of mitigating unsafe and undesirable increases in traffic.

Wastewater and Water Impacts ADM.04

I am also very concerned about the effect of this oversized project on Wayland's wastewater system and water resources. We are not members of the MWRA system and depend upon municipal wells for our water supply. Construction on this site may threaten our water supply if it results in existing site contamination migrating toward our wells. In addition, increased demands from this project may limit the amount of water available to residents on a daily basis or cause the Town to incur costly improvements to support restaurants, supermarkets, hair salons and other large commercial water users.

The increased wastewater flow generated by this project would place unacceptable demands upon the old, existing municipal wastewater system and cause it to fail, resulting in exposure to the Town for fines, as well as extraordinary storage and transport costs, according to members of our Wastewater Management District Commission. Even if the Town is able to permit a new wastewater facility at the current capacity level, the end result would be a substantial increase in flow into the Sudbury River. These environmental impacts must be closely assessed and any major adverse impacts prevented from happening.

The developer's intention to create on site septic capacity in order to increase wastewater capacity must be closely monitored for environmental impacts, including impacts on the ongoing clean up of the site by Raytheon. If the project is reduced in size and intensity of use, such additional wastewater capacity will be unnecessary and the strain on the town's wastewater system would be reduced. Further, additional wastewater capacity would be freed up. As it stands, the wastewater system is currently oversubscribed. Our own Town Building is not yet hooked up, and a number of residents with failing septic systems are unable to tie in.

There also needs to be a factual inquiry into the level of flow to which the developer is entitled under its wastewater agreement with the WWMDC. At various

times, public officials have stated that the developer's actual permissible daily flow-as opposed to 45,000 gpd capacity entitlement-is, I believe, 80% of that figure, or 36,000 gpd. The project size and intensity of use must be limited accordingly.

I hope that these comments are helpful to MEPA in developing a scope of work for the developer to follow in its future environmental reporting on traffic, wastewater and water impacts.

I would appreciate your adding my name to any list of interested persons receiving future communications regarding this matter. In addition to my mailing address above, I can be reached by email at amandl@comcast.net

Very truly yours,

Alan D. Mandl

Enclosure
cc: Frank Dougherty, Twenty Wayland LLC
Laura Rome, Epsilon Associates
Corinne Snowden, Epsilon Associates

SUSAN REED

SR.01 The project's traffic study is found in Section 3.0.

SR.02 Wastewater and water supply issues are discussed in Section 5.0.

SR.03 Wastewater and water supply issues are discussed in Section 5.0.

SR.04 The project's stormwater management system is described in Section 4.2.

SR.05 State-protected species occurring on or near the project site are discussed in Section 7.0.

SR.06 Hazardous waste is address in Section 6.0.

HJ

Susan Reed
58 Glezen Lane, Wayland, MA, 01778, 508-358-5495, reededelman@comcast.net

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn. Holly Johnson, MEPA Office
100 Cambridge St., Suite 900
Boston, MA 02114

August 10, 2006

Re: Wayland Town Center, File# 13844

Dear Secretary Pritchard,

I am writing to express my concerns and submit questions about the environmental impact of the large shopping center/housing complex (Wayland Town Center) that Wayland Twenty LLC plans to erect on the former Raytheon site in Wayland—a contaminated site with current Activities And Use Limitations enforced by Raytheon.

During the past year, our Town leaders and the developer failed to assess the impact of this large project on traffic (neighborhoods, adjacent towns), wastewater and water, the Sudbury River and adjacent natural habitat and species, and Raytheon's current environmental clean-up/monitoring process, despite repeated requests by concerned citizens that they do so PRIOR to committing to a specific square footage. I hope my comments below will be useful as you determine the scope of the environmental impact studies to be conducted.

TRAFFIC

I have reviewed Wayland Twenty LLC's Environmental Notification Form recently submitted to your department and I believe **the developer has understated the adverse traffic impact in terms of the information that he has, and has not, provided.** SR.01

An independent traffic impact study commissioned by the Town from TEC, Inc. and submitted on April 19, 2006 to the Wayland Planning Board reported that the new development would increase evening commuter traffic on Route 20 by 66% (compared to a fully re-occupied office use...so the net effect would be even higher compared to our EXISTING traffic). Even more disturbingly, the TEC report tells us that Saturday daily and midday peak hour traffic will increase 1,000%, elevating "the traffic volume on the adjacent street during the Saturday peak intervals to a level that is closer to that of the typical weekday commuter peak hours." I have enclosed a copy of the TEC report for your information.

Based on TEC's report, it appears that the developer's ENF submission is incorrect or misleading on several counts: first, he lists 3,958 vehicle trips per day as the "existing" traffic. But the TEC report states that is the number of weekday daily trips that would occur IF the office were re-occupied, rather than those that actually "exist" today.

Further, the developer states the number of vehicle trips per day will change by 7,834 for a total of 11,792. But the TEC report showed a Saturday Daily count of 13,007, a significant impact that is simply not reported.

Unfortunately, the TEC report was not publicly released until 10 days before the Special Town Meeting, leaving many voters misinformed. Further, NO STUDIES were conducted on the project's impact on neighborhood roads (Glezen, Bow, Plain, Pelham Island, Training Field, Moore, Millbrook and others) —many of them narrow scenic ways —despite repeated requests by many citizens. Citizens also requested to no avail that the 50-year limited-use restriction on the Raytheon driveway onto Route 27 remain in force to protect the adjacent neighborhoods. **Serious concerns about the impact of this project on the safety and character of our neighborhood roads were simply ignored by the Board of Selectmen, the developers, and some members of the Planning Board**. In addition, the Town of Sudbury recently expressed concern about the project's impact on traffic further up Route 20. I hope MEPA can step into the breach, assess all these impacts, and recommend remediation that could include reducing the size of the project overall.

WASTEWATER AND WATER

Wayland's current Wastewater Treatment Plant is old and by all accounts likely to fail long before it reaches the 45,000 gpd the developer is entitled to use. My question to MEPA is, what role will you play in anticipating this failure rather than waiting for it, and how is this anticipated failure factored into your review process? Will you require certain steps to be taken to avoid a crisis? SR.02

Further, where will all the water needed to support restaurants, a hair salon, and other high-water usage businesses come from? Each summer Wayland institutes water-use restrictions. Who is responsible for ensuring the Town and the State's water resources are managed wisely? **And who is responsible for ensuring that this project does not jeopardize already fragile wells that supply Wayland's water (as you know, we are not part of the MWRA), particularly since this project is being built on and disturbing a seriously contaminated site.** SR.03

IMPACT ON SUDBURY RIVER, NATURAL HABITATS, ENDANGERED SPECIES

Are you responsible for evaluating the potential negative impacts on the Sudbury River directly or indirectly? **I am particularly concerned about the likely increase in eutrophication in the river.** SR.04

In terms of birds, I understand that the Mass Audubon Society has identified the Sudbury and Concord River Valley as an Important Bird Area (IBA). An IBA is defined as "a site that provides essential habitat to one or more species of breeding, wintering, or migrating birds. Important Bird Areas generally support high-priority species, large concentrations of birds, and exceptional bird habitat." In terms of endangered species, will you be contacting the Natural Heritage and Endangered Species Division directly or is this strictly the responsibility of the developer? And how will the public obtain this information? **If an endangered species is affected, what does MEPA do?** SR.05

CONTAMINATED SITE: IMPACT OF PROJECT ON CLEAN-UP, MONITORING PROCESS, SPREADING CONTAMINATION

I understand from a recent report to the Board of Selectmen by Ben Gould, the Town consultant hired by Wayland to monitor progress of the Raytheon clean-up, that **additional contamination has recently been identified beneath the existing office building slated for demolition, and that there also is a plume of contamination that has migrated across Route 20 towards Russell's Garden Center**. I also understand that it may take up to five years after treatment in the Southern area of the site to verify that contamination has dropped to acceptable levels, meaning remediation will not be complete until 2013, and possibly as late as 2018 or later. And I understand that clean-up in the Northern area will not be complete until anywhere between 2017 and 2035.

Further, Gould points out that the deed restriction "currently prohibits use of the property for residential, childcare, daycare, or recreational purposes." Gould also points out "the point of regulatory compliance is still many years in the future, particularly with regard to the Northern area of the Site." I am enclosing a copy of this letter, FYI.

What role will MEPA play in assessing the environmental impact of this project as it affects the clean-up/monitoring/and potential spreading of contamination? Gould himself states that "Wayland's concerns about choices between future redevelopment options have eclipsed the Town's ongoing concern to ensure that Raytheon is devoting sufficient effort to their environmental assessment and remediation." SR.06

IN CONCLUSION

Thank you for the opportunity to share my concerns/questions with MEPA about this project. I would appreciate being added to your mailing list (postal and e-mail) so that I can receive communications regarding this project as you move forward.

Sincerely,

Susan Reed

Susan Reed

SPENCER SHEARER

SS.01 The project's traffic study is found in Section 3.0.

SS.02 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

Johnson, Holly (ENV)

From: Spencer Shearer [svshearer@comcast.net]
Sent: Friday, August 11, 2006 1:32 PM
To: Johnson, Holly (ENV)
Subject: (EOEA No. 13844 - Wayland Town Center)

Hi Holly,

I hope that you have been to the former Raytheon site during high traffic hours including the weekends. Route 20 is not able to support the traffic demands that such a mall will impose. The only way traffic mitigation could be achieved would be to wide Route 20. This will of course negatively impact wetlands as well as compromise areas of historical significance. As we both know the area that has been chosen for the Wayland Mall is already suffering from toxic wastes. The area is fragile as it is next to wetlands and is within the aquifer zone for Wayland's public water supply. SS.01 SS.02

I hope that a critical look is applied to this project and allowing it to move forward unchecked. The damage that is allowed to occur today will be born by all who follow us.

Spencer
180 Boston Post Road
Wayland, MA

MOLLY UPTON (2 letters)

MU.01 The proposed building envelope is shown on Figure 1-3.

MU.02 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

MU.03 The project's traffic study is found in Section 3.0.

MU.04 The project's traffic study is found in Section 3.0.

MU.05 Wastewater issues are discussed in Section 5.1.

MU.06 The project's septic system is described in Section 5.1.2.

MU.07 Hazardous waste is addressed in Section 6.0.

MU.08 The project's stormwater management system is described in Section 4.2.

MU.09 The project's water supply is described in Section 5.2.

MU.10 Please see Section 7.0 for discussion of state-protected species occurring on or near the project site that have been identified by NHESP.

HS

Secretary Stephen R. Pritchard
EOEA Attn. MEPA Office
Holly Johnson
100 Cambridge St. #900
Boston, MA 01224

RECEIVED
AUG 11 2006
MEPA

File # 13844

Re: Wayland "Town Center"

Dear Ms. Johnson,

Thank you for your succinct and thorough review at your site visit in Wayland.

I'd like to call your attention to several, interrelated issues at this site, i.e. the proximity to the Scenic River, wastewater, wetlands, traffic and density, and water, although I realize the latter isn't on the Mepa list.

1) The building envelope has not been delineated, and some of what is outlined as buildable is clearly in the flood plain. This relates to the density/size of the project, which triggers most other concerns. MU.01
2) **Wetlands**. As you noted, the intersection of Rtes. 20 and 27 has wetlands on the northeast and southeast sides. In fact, the intersection roadway itself floods every decade or so. The road has been widened slightly, and the new public safety building on the northeast side has definite dampness penetration issues. I believe any further taking of land here for additional road widening (even if the town could find compensatory land) will have severe impact on the public safety building. That isn't any happenstance wetland there; it appears to be directly related to the height of the Sudbury River. At flood stage the river backs up Mill Brook, which flows under the intersection. The developer should be asked to define how the new development will affect this flooding. MU.02
3) **Traffic.** The northwest side and southeast side of the intersection have historic structures on them, including the Unitarian Church, which really is the principal focal point lending Wayland the air of a NE town. Widening Rte. 20 any further is fraught with issues and a diminished quality of the town. MU.03

   The proposal for additional traffic lights needs some very careful thought because of their proximity to the main intersection; already cars back up horrifically.

   The traffic studies seem to be drawn off initial studies that appeared to be skimpy at best. And, as I pointed out, Wayland is a ghost town in the summer. Not only do I guesstimate 20-40% of the Wayland population is away for the duration and another 40% or more for periods during the summer, the commuting/through traffic during the summer is also Significantly Reduced. This makes it problematic to estimate the potential impact on the northern streets that flow in an east/west direction, such as Glezen lane. MU.04

   One final point: No retail development of this size has been built in New England so far away from a major artery. If the size of the project cannot be supported by the

roads, could the developer be asked to define how much of the project would have to be downsized to fit the town infrastructure? Alas, the Town of Wayland did not do this diligence when it agreed to the size limit advocated by the developer.

4) **Wastewater**: the plant has been running on very low capacity (about 10,000 gal/day), and is quite old and ill-equipped to handle a sudden addition of 45,000 gallons. I would expect DEP and EPA to tighten the quality of the discharge as it goes to the river. MU.05

The proposal to put ANY septic on this property is inordinately worrisome, let alone 10,000 gallons. In fact, the treatment plant was built specifically to avoid use of septic systems in this area. The property is not far from the town's Baldwin wells, and I believe the bedrock hydrology runs toward the wells. The entire property is within zone II and I hope the state has strict regulations on large leaching fields in zone II. http://www.wayland.ma.us/surveying/images/overlay_bw_Dsize.pdf MU.06

In addition to the Zone II issues, the **site contamination** is also problematic although Raytheon is hard at work cleaning the site. The developer should be asked to define exactly how 10,000 gal/day added to the groundwater would alter the subsurface flows, and whether that would push any contaminants from Raytheon in the direction of the Baldwin wells. MU.07

Storm water: As you may gather from the other points in this letter, this site needs the best possible disposal of storm water, and the state could be of immense help in ensuring this development's storm water systems are to the highest standards. MU.08

5) **Water**. If one looks at the town's water quality report, one will see one or more wells are producing a higher than permitted concentration of sodium. In addition, the town has had several instances of violation of DEP standards because it is taking so much from the wells this causes the wells to draw from bacteria-laden sources. The town is also in violation of DEP guidelines for using more than 65 gallon/person/day. Some homes in higher elevations are said at times in the summer to lack water pressure to flush toilets. MU.09

But the larger issue is: does the town have enough water to support this development, and does development such as this impact the level and caliber of the Sudbury River.

The Sudbury River valley is truly beautiful from the north and west, and almost gives one the feeling of immense space so rare in Massachusetts. Placing three story buildings at the edge of the river will surely destroy that illusion of undisturbed distance.

Thank you for your work.

Molly Upton

Molly Upton
23B Bayfield Rd.
Wayland, MA 01778
mollyupton@yahoo.com

Johnson, Holly (ENV)

From: Molly Upton [mollyupton@yahoo.com]
Sent: Tuesday, August 15, 2006 3:03 PM
To: Johnson, Holly (ENV)
Subject: MEPA #13844 Wayland Town Center

<!--[if !supportEmptyParas]--> <!--[endif]-->
Re: Wayland Town Center
File 13844
Secretary Stephen R. Pritchard
EOEA attn. Mepa Office
Holly Johnson
100 Cambridge Street #900
Boston, MA 02114
Dear Ms. Johnson,
I have been told that parts of Wayland have the spade footed toad ***Scaphiopus holbrookii,*** which I believe may be an endangered species. I hope before allowing this large project the state investigates whether these critters are residents and should not be disturbed. MU.10
<!--[if !supportEmptyParas]--> <!--[endif]-->Thank you.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Molly Upton
23B Bayfield Rd.
Wayland MA 01778
mollyupton@yahoo.com

RICHARD PAYNE

RP.01 The project's traffic study is found in Section 3.0.

HJ
13844

15 Thoreau Way
Sudbury, MA 01776
13 August, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston MA 02114

Re: Wayland Town Center Project

Dear Secretary Pritchard:

As a long time resident of Sudbury I would like to weigh in with some comments on the above project insofar as it directly affects my town. There are many reasons why this project should not go forward but the one that concerns me most is the traffic situation on Route 20.

Anyone who has the misfortune to use Route 20 to commute knows that the highway is at or beyond capacity during the morning and evening rush hours. The congestion eastbound in the morning begins at the intersection with Route 27/126 at the Wayland Center traffic lights and continues most of the way to I-95. It is an impossible situation that already obliges motorists heading east from Sudbury to divert through residential areas like Glezen Lane in order to circumvent Wayland Center.

The Wayland Town Center Project proposes a 370,000 square foot development that according to projections will increase the eastbound traffic from the center by 17.6 percent and the southbound traffic on Route 27/126 by 23.5 percent. Much of that increase is expected to pass through Sudbury via Route 20 and Landham Road. It will render disastrous an already critical situation.

Various proposals have been surfaced from time to time for increasing the traffic flow on Route 20 from local 'improvements' in the way of widening and traffic lights to conversion of the Sudbury section to a 6-lane highway. Aside from the undesirability, not to say cost, of such an outlandish proposal it will merely shift the bottleneck somewhere else. Route 20 is basically beyond capacity. To allow major new commercial development on Route 20 anywhere between Marlborough and I-95 for the profit of a few is unconscionable and unacceptable. The project should be abandoned. RP.01

Yours sincerely,

Richard Payne

WILLIAM J. MURPHY

WM.01 The project's stormwater management system is described in Section 4.2.

August 13, 2006
85 Oxbow Road
Wayland, MA 01778

Ms Holly Johnson
Environmental Analyst
MEPA Office
Executive Office of Environmental Affairs
100 Cambridge Street
Suite 900
Boston, MA 02114

Dear Ms. Johnson,

This letter is written to the Executive Office of Environmental Affairs in regard to the proposed property development at Boston Post Road, (Rt. 20), in Wayland, MA by the Twenty Wayland LLC organization.

The proposed development is located within the Sudbury River watershed and flood plain. Additionally, the proposed development is located within the aquifer protection district for the Town of Wayland Baldwin's well public water supply site.

Environmentally, the site is also located within the site designation NHESP 2005 Priority Habitat for State Protected Species.

Physically, the proposed site is located between several very constricting river dikes. The Boston Post Road, (RT20), causeway forms a constricting dike with a single river channel inlet flow from the southerly direction. Further north along the Sudbury River, at the Old Sudbury Road, (RT27), roadway, the Sudbury River is confined and restricted again into a single river channel outlet flow pattern. Again, further north along the Sudbury River, the same restrictive river flow pattern is present at Shermans Bridge Road in Wayland and at South Great Road, (RT117), in Lincoln. These causeways constrict, restrict and limit the natural flow of water along the Sudbury River floodplain and marshland.

The Sudbury River has a documented history of periodic flooding. Generally, in the spring of each year, the Sudbury River will be in some stage of flooding. Typically, the only question shall be the extent of the flooding water level elevation and the resultant closure of abutting roadways. For example very recent sever flooding has resulted in closure of River Road, Shermans Bridge Road, Pelham Island Road, Old Sudbury Road, (RT27), and portions of Boston Post Road, (RT20). There have also been flood waters located easterly within the

intersection of RT20 and RT27/RT126 in Wayland. When the sever flooding does occur, the normal passageways to westerly homes may be impassable and access denied and restricted to very large National Guard trucks. As an aside, the neighboring community of Framingham installed massive Sudbury River flood control gates and channels along the Sudbury River in Saxonville in the 1970s. This was in response to the periodic flooding and loss of industry and resultant loss of accessibility.

The very heavy and excessive rain precipitation this past year focuses the attention of providing protection and safety margins for all inhabitants of the floodplain.

A slight shift of only a few tens of miles would have placed all of this years devastating precipitation within the vicinity of the Sudbury River and Wayland.

A century or so ago, the state and local governments did not provide guidance, specifications and/or safety limitations for constructions within the Merrimack River floodplain and watershed. The results of the then inadequate preparation, planning and safety restrictions have cost the peoples of Massachusetts millions of dollars today.

The present proposal to construct and build within the Sudbury River floodplain is ignoring the compromising environmental hazards and the public safety risks. The property of the proposed construction is within the typical floodplain of the Sudbury River. The characteristic of this floodplain marshland is to absorb the periodic excess water and slowly
WM.01 balance the release of the water into the environment. Constructing impervious materials into this already dike contained and restricted surroundings will aggravate an unnatural condition.

Reflecting upon the construction of an engineering facility, at this site, after the conclusion of World War II probably seemed acceptable and justifiable just as the construction of the dams, canals and dikes of the Merrimac River a century earlier.

However, given the information available today, (population density, water management, nitrogen removal, resource allocation, risk assignment, traffic density, habitat protection), the present proposal to continue construction within a known floodplain hazard does not seem acceptable.

The Town of Wayland does not presently have the capacity and infrastructure requirements for temporary public or private housing for thousands of people for an extended period of time.

Finally, as a note the former elevated railroad bed track and ties structure located parallel with Boston Post Road, (RT20), provides a compelling view of exactly the elevation required for the safe operation of a railroad a century ago. Obviously, the railroad industry did not want to compromise the safety of any passengers and the transport and viability of its customer's product cargo. The community of New Orleans, Louisiana, has now, as a result of

the recent flooding, has placed restrictions on the minimum property elevation level requirements within certain floodplain areas.

An acceptable conclusion for this property site development is the removal of all construction from the site and the return of this area to the natural environment.

Thank you very much for your attention.

Respectively,

William J. Murphy, Jr.
85 Oxbow Road
Wayland, MA. 01778
508-358-2885
clancy856@comcast.net

FRANK KENNEDY

FK.01 Hazardous waste is addressed in Section 6.0.

FK.02 The project's stormwater management system is described in Section 4.2.

FK.03 The project's water supply is described in Section 5.2.

FK.04 The project's traffic study is found in Section 3.0.

H-J

RECEIVED
AUG 15 2006
MEPA

August 13, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn. MEPA Office, Holly Johnson
100 Cambridge St., Suite 900
Boston, MA 02114

Re: Wayland Town Center, EQEA No. 13844

Dear Secretary Pritchard:

I was pleased to have the opportunity to attend the MEPA meeting of August 3rd chaired by Ms. Johnson. This letter is an attempt to further record some of my concerns. Your consideration of these concerns would be appreciated.

I have felt from the outset that there are critical environmental areas that are impacted by this development. These include:

1.) Site Contamination - It being a contaminated site, what impact will the contamination have both on the planned site and on the adjacent areas. FK.01

2.) Aquifer Impact - The development is sited on the aquifer for the Baldwin town wells water supply. These wells are currently highly stressed and recent water tests will attest to the water problems. FK.02

3.) Water Supply - Dramatic increased water consumption from the development may lead to further deterioration of the water, already not drinkable by those of us on the water line feeding that development. FK.03

4.) Traffic - The developer's ENF regarding traffic is incomplete and misleading regarding its environmental impact. The April 2006 study by a traffic consultant (TEC, Inc.) on Page 3 of its report to the Wayland Planning Board, compares Trip Generations between a fully reoccupied use of the existing but unoccupied office building with the proposed MUOD development. The TEC study breaks down the trip generations into Time Period categories. In summary, it concludes that Weekday Daily is approximately 3X greater under the proposed development, Saturday Daily is almost 16X greater, and Saturday Midday Peak is 11X greater. Sunday is not included but it is reasonable to assume that the multiple will be even greater than Saturday. A copy of Page 3 of the TEC study is attached. The impact of this traffic increase on the surrounding neighborhoods has not, to my knowledge, been studied. Particularly onerous to the neighborhood environment will be the weekend traffic from a retail development – traffic which was essentially non-existent when used as an office building. FK.04

Thank you very much for this opportunity to express my concerns and I look forward to your comments.

Sincerely,

Frank Kennedy

Frank Kennedy

84 Old Sudbury Road
Wayland, MA 01778
508-358-7684
fkennedy@mindspring.com

KIM REICHELT

KR.01 As requested, the commenter's address has been added to the project's mailing list.

KR.02 The Proponent is providing $250,000 to the Town of Wayland for the creation of a bike path and possibly a historic interpretative railroad site along the current MBTA right-of-way that abuts the southeastern edge of the site. This project is being undertaken separately by the Town and, if the bike path and interpretative railroad site are not constructed, the Town may use the $250,000 for other purposes.

Johnson, Holly (ENV)

From: Kim Reichelt [reichelt@comcast.net]
Sent: Monday, August 14, 2006 11:40 AM
To: Johnson, Holly (ENV)
Subject: Wayland Town Center, File #13844

Holly,

I am writing regarding the Wayland Town Center project for two reasons:

(1) If you have a list of people you keep informed about upcoming meetings regarding the project, I would very much like to be on it. You can reach me via email at kreichelt@alum.mit.edu, and via snail mail at: Kim Reichelt, 11 Coolidge Rd., Wayland, MA 01778 KR.01

(2) To the extent it is not already in the planning and review process, I hope that whatever review is done of the property will consider the future rail trail project (the Wayside Rail Trail) that would abut the property. KR.02

Thanks and best regards,
Kim Reichelt

SHERRE GREENBAUM

SG.01 Wetland resource areas and the project's efforts to avoid and minimize impacts to these resource areas are discussed in Section 4.0.

SG.02 The project's stormwater management system is described in Section 4.2.

SG.03 Please see Sections 3.0 and 4.0.

SG.04 The project's water supply is described in Section 5.2.

SG.05 The project's water supply is described in Section 5.2.

SG.06 The project's water supply is described in Section 5.2.

SG.07 Hazardous waste is addressed in Section 6.0.

SG.08 The project's stormwater management system is described in Section 4.2.

SG.09 Wastewater issues are discussed in Section 5.1.

SG.10 Wastewater issues are discussed in Section 5.1.

SG.11 Wastewater issues are discussed in Section 5.1.

SG.12 Wastewater issues are discussed in Section 5.1.

SG.13 Wastewater issues are discussed in Section 5.1.

SG.14 Wastewater issues are discussed in Section 5.1.

HJ

161 Plain Road
Wayland, MA 01778
August 14, 2006

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: MEPA Office, Holly Johnson, EOEA No. 13844
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Secretary Pritchard:

I am writing to comment on the potential environmental impacts of the proposed Wayland Town Center project, EOEA No. 13844, on the Town of Wayland.

The ENF indicates that the proposed project will meet or exceed the review thresholds for transportation and wetlands, waterways, and tidelands. I intend to address the issue of wetlands and the impacts of this project on the Town's water resources and wastewater capacity.

Wetlands

Comments by the Conservation Commission of the Town on the proposed Town Center Project in July 2005 indicate its concern as to various impacts both on and off site (Attachment 1). I request that the proponent address all the points in this memo so that MEPA can determine the issues to be included in its review.

On site I am particularly concerned that there is identification of all the resource areas protected by Wayland's Wetlands and Water Resources Bylaw (chapter 194) and a meaningful analysis of alternatives to filling and/or altering wetlands, bordering vegetated wetlands and land that floods. SG.01

With respect to stormwater, the proponent should be required to demonstrate the controls that will be in place, and that MEPA ensure these controls will meet all standards for new construction. Since the area of impervious surface is significant and is anticipated to increase, the proponent must be required to have a highly effective system(s) for collection of runoff from water and soluble chemicals as well as collection of non-solubles. The proponent must also be required to have an integrated plan in place for maintenance of the stormwater system(s). SG.02

With respect to impacts off site, the proponent indicated in the ENF that it anticipates "widening of the westbound lanes of Route 20 at the intersection with Route 27." The Conservation Commission indicates that this is a "very sensitive area." Any filling requires wetland plant replication of not less that a 1.5 to1 ratio and the creation of equal flood storage in the same area where the filling of the floodplain is proposed. The

Commission spent many hours working with MassHighway on the challenging task of providing both the requisite wetlands replication and flood storage for the extensive work currently being done at this intersection. The Commission stressed in its memo that such compensation is "very challenging" in the area contemplated by the proponent (Conservation Commission's emphasis). The Board of Road Commissioners has also stated that in its opinion the "area is currently 'maxed out'" so that widening combined with replication near this intersection is virtually impossible (Attachment 2). The proponent should be required to demonstrate how it intends to widen the intersection while providing for the requisite replication and flood storage. These issues need to be carefully analyzed before the proponent is allowed to proceed with this project. SG.03

Water

The proponent stated on page 2 of the ENF that its gallons/day (GPD) of water use and its GPD wastewater generation/treatment are the same: 45,000 existing, 9,900 change and 54,900 total. It states that GPD water withdrawal is and will remain at "0." Although the proposed project is in the planning stages, it is the stated intent of the proponent to build the maximum square footage approved at the second Special Town Meeting: 167,500 square feet of residential use (100 units), 156,750 square feet of retail space and 8,250 square feet of office space. A parcel is being set aside for the Town's future construction of a 40,000 square foot building for an as yet undetermined use.

The proponent has not specified what type of commercial uses other that the 45,000 square foot supermarket will be included in this project, although it has mentioned numerous cafes and restaurants, various sized stores, and a health club. The water required for these businesses in combination with the 100 residences will dramatically increase the usage of the Town's water resources, whether the public water system and/or private wells drawing from the same aquifer are used. Various uses for the municipal space have been suggested, and the Town could decide to fund a library or a facility such as a community center with a swimming pool which would require more GPD. Irrigation of the green spaces including a 2 acre Town Green could also be significant. Based on the highest uses that could be implemented, it is my belief that withdrawal from a water source in Wayland could reach the threshold of 301 CMR 11.03 (4)(b). SG.04

The Water Department is currently working under a DEP Consent Order to limit its water usage, measured at 1.87 million GPD or 80 GDP per capita in 2001. According to Wayland's Master Plan (page 178), by 2004 Wayland's public water system supplied an average of about 2 million GPD, continuing to exceed its permitted withdrawal limit. Although some growth is allowable under the Consent Order, the Town's water resources are in danger of being overstressed by this development. SG.05

The proponent should be required to conduct an evaluation to realistically determine the anticipated GPD of water that would be allocated to this project based on its size and potential alternative uses as well as the true impacts on the Town's water supply. The proponent should further be required to compare the project's anticipated water usage to the actual water usage over the last five years according to Water Department records. SG.06

Contamination of the Wayland water supply is also of primary concern, particularly in view of the findings of Benson Gould, the technical advisor to the Town regarding Raytheon's continuing activities at the site. He pointed out in his letter that there are areas of significant onsite environmental contamination (Attachment 3). This is most disturbing since the entire site is designated as Zone II, the primary recharge area for the aquifer. It is his opinion that hydrology must be a consideration for any future development. SG.07

With respect to potential contamination of the Wayland water supply, the proponent should be required to demonstrate that there are no aspects of the development, including but not limited to demolition of existing structures, removal or reuse of construction materials, removal of trees, changes in impervious surface, or construction of on site systems to handle septic system effluent or stormwater runoff, that could negatively affect groundwater characteristics. SG.08

As MEPA may be aware, the Source Water Assessment and Protection (SWAP) Report for the Wayland Water Department indicates that Wayland does not have a Wellhead Protection Plan. Wayland does not have a superintendent per se to oversee the Water Department and coordinate the Town's response to water-related environmental issues. I request that MEPA take into account the Town's omissions and conduct the degree of analysis required to protect Wayland's water resources.

Wastewater

The amount of wastewater to be discharged, the limited capacities of the collection system and wastewater disposal facility, as well as the impacts of increased sludge to be generated and disposed of all need to be carefully analyzed. SG.09

The existing project site has been essentially vacant for years. Thus the figure used in the ENF for discharge to the Wastewater Management District Commission's wastewater treatment facility needs to be revised to reflect what the actual discharges currently are or have been over the last five years. SG.10

EPA Discharge Monitoring Reports for the period January 2002 through November 2004 show that although the permitted monthly average flow was 52,000 GPD for the Wastewater Management District Commission's plant, the actual monthly average flow throughout that period was only 10,344 GPD (which includes treatment of wastewater from the system's total of 27 users). In assessing the impacts of this project, the proponent should be asked to compare the true impacts based on actual existing conditions and largest permissible project build-out. SG.11

The proponent should state what percent of current Wastewater Management District Commission treatment plant capacity the proposed project will consume. SG.12

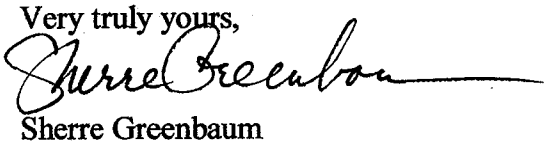
The Wastewater Management District Commission's wastewater treatment facility is small, antiquated, and its ability to discharge effluent is subject to receipt of an EPA

has yet to issue a new permit. Moreover, even if a new five-year permit is issued, it is not a foregone conclusion that the Wastewater Management District Commission facility will be able to meet more stringent discharge limitations or that EPA will continue to issue such permits forever. Thus, the proponent should assess its capability to handle wastewater in the absence of a Wastewater Management District Commission facility. SG.13

The MEPA Office and the Proponent should be mindful that the State statute that created the Wayland Wastewater Management District Commission (i.e., the Town body that oversees and operates the Wayland Wastewater Treatment Plant), states at Chapter 461 of the 1996 Acts and Resolves of Massachusetts that "the commission shall not provide service to: (2) a new facility's system or for an increase in design flow to an existing facility's system if that new system or increase in design flow could not have been permitted in the absence of this act . . . ." That is, Wayland should not be relying on the NPDES Permit and discharges to the Sudbury River to promote new growth. Rather, all of the regulatory agencies involved should be attempting to curtail new or increased discharges to the River. SG.14

I appreciate the opportunity to comment on the ENF and to address the particular issues of concern to me. Please add my name to your mailing list (postal and e-mail) so that I can receive communications regarding this project as the process moves forward.

Very truly yours,



Sherre Greenbaum
161 Plain Road
Wayland, MA 01778
gardenimps@aol.com

THOMAS SCIACCA

TS.01 Wastewater issues are discussed in Section 5.1, and the project's stormwater management plan is discussed in Section 4.2.

TS.02 The project's traffic study is found in Section 3.0.

TS.03 The project's water supply is described in Section 5.2.

TS.04 The project's stormwater management system is described in Section 4.2.

TS.05 The project's traffic study is found in Section 3.0.

Johnson, Holly (ENV)

From: Tom Sciacca [tsciacca@comcast.net]
Sent: Monday, August 14, 2006 9:21 PM
To: Johnson, Holly (ENV)
Subject: Comments, Wayland Town Center, # 13844

August 15, 2006

Stephen R. Pritchard
Executive Office of Environmental Affairs
ATTN: MEPA Office
Holly Johnson, EOEA # 13844
100 Cambridge Street, Suite 900
Boston, MA 02114

Dear Mr. Pritchard,

Thank you for the opportunity to comment on the Wayland Town Center Project, MEPA # 13844.

To reiterate comments I made at the meeting on August 3 in Wayland , nutrient loading on the Sudbury is a major problem in Wayland. The Wild and Scenic Study report found that the river is nitrogen limited, although EPA and DEP advise that phosphorus controls also deserve continued emphasis as generally more practical in most situations.
However, the developer should be asked to show the impact of loading from both nutrients and from all sources related to the development, whether through the Wayland WWTP, groundwater discharge, stormwater, particulate emissions from venting of proposed restaurants, or any other mechanism. Consideration should be given to the fact that some of these sources are removable, i.e., the developer has stated that elimination of the proposed septic system would merely change some proposed uses, not downsize the proposal. TS.01

In evaluating the impact of additional traffic and parking area, in contrast to the historical use as an office building, consideration should be given to the effect of short term parking of warm vehicles and the attendant increased leakage of fluids versus leakage rates from vehicles parked for an entire day. The effects of particulate emissions from tire and brake dust on the wetlands and the river should also be included. TS.02

Water use of the development from Wayland town wells, all of which are located in the aquifer that provides river base flow, should be included. The effect on late summer river flow and higher nutrient concentration due to lower dilution should be studied. TS.03

The effects on the proliferation of troublesome exotic species in the river, such as water chestnut, resulting from flow and nutrient alterations caused by the development should be examined. TS.04

Effects on extent of flooding, including the 100 year flood events which appear to occur about once a decade, should be studied. During floods water backs up from the river, up Mill Brook just south of the Pelham Island Bridge, and into the intersection of Route 20 and 27/126. Any increase in the frequency with which this intersection is entirely blocked should be calculated. Conversely, when the intersection is even partially flooded traffic disruptions are severe under current conditions, and increased traffic will clearly be even more heavily affected. This should be quantified. TS.05

Regarding traffic, calculations should be provided as to the increased number of minutes or hours per year that the average current user of Wayland Center roads will spend traversing the area as a result of this development. TS.05

Very truly yours,
Thomas Sciacca
31 Rolling Lane

Wayland, MA 01778
508-358-2980
tsciacca@comcast.net

JULIA AND KEVIN LENEY

JKL.01 Hazardous waste is addressed in Section 6.0.

JKL.02 Hazardous waste is addressed in Section 6.0.

JKL.03 The project's water supply is described in Section 5.2.

JKL.04 The project's water supply is described in Section 5.2.

JKL.05 The project's stormwater management system is described in Section 4.2, and wastewater issues are discussed in Section 5.1.

Johnson, Holly (ENV)

From: Julia Leney [jaleney@hotmail.com]
Sent: Tuesday, August 15, 2006 12:46 PM
To: Johnson, Holly (ENV)
Cc: jaleney@hotmail.com
Subject: Wayland Town Center, File#13844

Dear Ms. Johnson;

As residents of Wayland, we are sending you our comments and concerns regarding the scope of the environmental impact review by the MEPA office.

We request that the impact review should be of the greatest and widest scope possible order to analyze all the significant issues that are involved in this project.

Issues that concern us are the following:

- The **extensive pollution** by Raytheon that is still on the property: Even after Raytheon cleans up some of the pollution, there will still be significant environmental damage due to this pollution. What will be the environmental effect when the parking lot is torn up? The recharging areas for the Town wells and the aquifers could be seriously impacted. JKL.01
- Another concern is what will be the environmental impacts from contamination that may exist beneath the large office building that will be demolished on this property. Raython won't be able to test under this building until the building is torn down. JKL.02
- We wonder whether there is enough water supply for this project. We are concerned that a project of this magnitude will drain the aquifers in this area to the detriment of Wayland's water supply. JKL.03
- We would like to specify that you ADD DRINKING WATER as a category of required analysis for the scope of work for the Town Center Project. JKL.04

- Another concern is the negative environmental impacts caused by the destruction and subsequent run-off from the Raytheon Property into the federally protected Sudbury River. Also, what will be the effect of the efflluent that will be discharged into the river? JKL.05

Thank you for listening to our comments and concerns.

Please keep us on your mailing list.

Sincerely,

Julia Leney jaleney@hotmail.com
Kevin Leney

PHIL KLING

PK.01 The project's traffic study is found in Section 3.0.

PK.02 The project's traffic study is found in Section 3.0.

PK.03 As required in the Secretary's Certificate on the ENF, project alternatives are discussed in Section 2.0.

Phil Kling – 99 Glezen Lane – Wayland, Ma. (508) 358-2661

I have been in the shopping center industry for 30 years, as Director of Real Estate for Saks Fifth Avenue and Kohl's department stores. I have been qualified to testify as an expert witness in shopping center litigation. I am used to endorsing shopping centers. In this instance, I am opposed. Why? Because I've traveled through that intersection more than 10,000 times in the last 22 years.

During the last decade, **no** Massachusetts town has built a shopping center this size more than 1 mile away from a major highway. Centers this large are built near interstates so customers can travel distances easily to shop there. There have been 10 shopping centers this size or larger built in the last ten years. Nine were within 1/2 mile of a major interstate. One, a mile away. Shopping Centers this size are designed to attract traffic from a distance, thus they need to locate near major thoroughfares – ours will be 5 miles from 128. Our traffic will come from local roads – and will strain local resources. No one knows the actual local impact because no one has built a lifestyle center this far from a major interstate before. PK.01

You can build in towns like ours. Medway and Groton, Ma. are each located 3 miles from 495, they are about the same size as Wayland, and each has a new 110,000 s.f. shopping center. Traffic impact has been minimized because the projects don't draw from great distances.

Every developer says it's project won't impact traffic. Those 10,000 trips tell me otherwise. The independent traffic consultants have recently released their report. They predict a traffic tsunami in Wayland. PK.02

If they build it smaller, we'll have a little less tax revenue. A small price to pay to avoid the congestion this larger development is sure to bring.

We could have a shopping center that serves the community and isn't regional. Traffic won't be significantly affected yet people in Wayland can have a local alternative. Medway chose that path, so did Groton.

Supermarkets tend to draw from short distances. Add a drug store. Add another 20 small shops that can prosper catering to the community. A couple of restaurants. You have a 110,000 s.f. shopping center that can be financed, will serve the town and won't disrupt our lives.

What's on the table now is too big for Wayland. Logic dictates building it smaller, and if subsequent studies show the roads can absorb the traffic and the town wants more retail - **allow expansion**. It's how every other community in the Commonwealth approaches this issue - why is Wayland different? The PK.03

independent financial consultant believes it's in our best interest to have a residential/shopping center ratio of 70/30 at this site. That would give us an 110,000 s.f. shopping center.

STAN ROBINSON

SR.01 The project's water supply is described in Section 5.2.

SR.02 The project's water supply is described in Section 5.2.

SR.03 These matters are not within the MEPA Scope.

SR.04 These matters are not within the MEPA Scope.

SR.05 The project's air quality impacts are discussed in Section 3.0.

SR.06 These matters are not within the MEPA Scope.

Johnson, Holly (ENV)

From: Stan Robinson [stanrob@bluebottle.com]
Sent: Tuesday, August 15, 2006 3:05 PM
To: Johnson, Holly (ENV)
Subject: Comments: so-called "Wayland Town Center," File # 13844

Dear Ms. Johnson:

Here are my comments on the project known as "Wayland Town Center" (this is the developer's pretentious designation, not to be taken as descriptive of the actual project), your File # 13844.

This project appears to be essentially a major retail shopping center, with just a bit of housing and public space tacked on, sited quite close to the Sudbury River and its wetlands, and apparently on land notoriously poisoned by many years of military-industrial research and development activity.

Scope of review should include the following areas in addition to those I've seen mentioned:

(1) Effect on community drinking water, from the point of view of additional usage demands. SR.01

(2) Effect on community drinking water, from the point of view of discharges into the ground or river which ultimately affect the cleanliness and/or availability of water in the Town's wells which are geologically downstream from the site. SR.02

(3) Effect on the community's electrical and natural gas infrastructure and supply. SR.03

(4) Effect on local small and family-owned businesses, along with their owners, employees, and customers, within a ten-mile radius. Clearly, some businesses will be threatened with extinction. You might call this threats to rare species. SR.04

(5) Effect on local and global climate. Clearly, tenants of the project will be consuming energy, giving off heat, and producing air, water, and ground emissions with climate effects. SR.05

(6) Effect on the wage income and cost of living of working people in the local community. SR.06

A special concern for me is the possibility of dismissal for nonsensical reasons, e.g. "below regulatory concern." Let us see whether your office can help us avoid that plight.

Sincerely,
Stan Robinson
9 Wheelock Road
Wayland, MA 01778
508-358-2282
--

LINDA L. SEGAL

LS.01 Wetland resource areas and riverfront area are identified in Section 4.0.

LS.02 The building envelope is shown on Figure 1-6.

LS.03 AULs are discussed in Section 6.2.

LS.04 Wastewater issues are discussed in Section 5.1.

LS.05 Floodplain is discussed in Section 4.0.

LS.06 Wastewater issues are discussed in Section 5.1.

LS.07 The project's water supply is described in Section 5.2.

LS.08 The potential use of the municipal pad evaluated was selected to provide conservative estimates of water use and traffic generation.

LS.09 Mitigation is discussed in Section 10.0.

LS.10 The project's stormwater management system is described in Section 4.2, and wastewater issues are discussed in Section 5.1.

LS.11 The project's water supply is described in Section 5.2.

LS.12 These matters are not within the MEPA Scope.

LS.13 The project's stormwater management system is described in Section 4.2.

LS.14 Wastewater issues are discussed in Section 5.1.

LS.15 Rare species are discussed in Section 7.0.

LS.16 Hazardous waste is addressed in Section 6.0.

LS.17 The project's stormwater management system is described in Section 4.2.

LS.18 The project's traffic study is found in Section 3.0.

LS.19 The project's traffic study is found in Section 3.0.

LS.20 The project's water supply is described in Section 5.2.

LS.21 The project's traffic study is found in Section 3.0. Public safety issues are not within the MEPA Scope.

LS.22 The Proponent is granting a Conservation Restriction and Easement for a portion of the property consisting of 10 acres to either the Sudbury Valley Trustees, Inc. or another non-profit corporation.

LS.23 This matter is not within the MEPA Scope.

LS.24 The project's traffic study is found in Section 3.0.

LS.25 Hazardous waste is addressed in Section 6.0.

LS.26 Riverfront area is described in Section 4.0.

LS.27 Project impacts are calculated in accordance with the requirements of the MEPA regulations.

LS.28 The project's stormwater management system is described in Section 4.2.

Linda L. Segal
9 Aqueduct Road
Wayland, MA 01778-4605
phone: 508 655 0724 email: lmlsegal@comcast.net

Secretary Stephen R. Pritchard
Executive Office of Environmental Affairs
Attn: MEPA Office
Holly Johnson, EOEA #13844
100 Cambridge Street, Suite 900
Boston, MA 02114

Hand-delivered

August 15, 2006

RE: **WAYLAND TOWN CENTER, EOEA #13844**

Dear Secretary Pritchard and Ms. Johnson:

Thank you for this opportunity to submit written public comment for the proposed project titled "Wayland Town Center," EOEA #13844, located at 400-440 Boston Post Road, Wayland, MA.

The redevelopment of the former Raytheon research facility into a mixed-use (retail and residential) project is desireable for many reasons. The property is environmentally sensitive, so great care must be taken to ensure the protection of precious resources on which we all depend. It is imperative that this MEPA review be detailed, fact-based, comprehensive and require the project proponent to prevent environmental harm.

I disclose to you that I have served in Wayland town government since 1993, but the content of this submittal is solely my personal opinion filed as a private citizen and a 29-year resident of Wayland.

In contrast to projects proposed in other towns, the rezoning that enables this project was approved by voters a few months ago without knowing what the project would look like. After the proponent filed the ENF on July 17, they submitted a Concept Plan to the Planning Board on August 1, which is already different from what is shown in the ENF.

There are now 4 new garage buildings located on what seems to be open space on the ENF site plan. Ms. Johnson hopefully will recall that I asked about the garages at the August 3 scoping session, concerned about the height and riverview impacts. Unfortunately, the proponent's answer was vague, not disclosing the latest information submitted two days earlier to the Planning Board.

In my view, the critical resources we need to protect are our drinking water and the adjacent Sudbury River. Wayland derives 100% of our drinking water from town wells, and this property is located in the Aquifer Protection District and Zone II for our Baldwin Wellfield. This property is also located in the floodplain. Wayland is occasionally featured on network television news because of spring flooding that blocks our roadways abutting and near the proposed project, including Route 20, Pelham Island Road, and the town center intersection of Routes 20, 27 and 126.

Therefore, the proponent should be required to show the FEMA floodplain in relation to the finished ground level elevations of their proposed structures and relate that information to actual documented and anecdotal flood levels.

Please Require the Proponent to Address All Critical Unknowns

The moving target nature of this project and the persistent "unknowns" have been a chronic problem during public meetings and hearings held in Wayland for more than a year now, which makes it more challenging to identify and evaluate environmental impacts.

A list of "unknowns" associated with the proposed project include the following thirty (30) items. For each one, please require the project proponent to include "delivering" on these key items of information and analyses of environmental impacts as part of the Scope of Work to be issued by EOEA on August 25:

1) wetlands and other resource areas under the purview of the Wayland Conservation Commission have NOT been delineated LS.01

2) the riverfront has not been delineated LS.02

3) the building envelope has not been defined LS.03

4) existing deed restrictions imposed because of the presence of hazardous waste have not been modified, and without Raytheon's agreement on new deed restrictions, the proposed mixed-use project cannot be built LS.04

5) whether or not the existing antiquated and underutilized wastewater treatment plant located on the subject property can operate at the full capacity desired by the project proponent. I understand that engineers who have checked out the plant believe it will fail to operate at even 50% capacity. If/when the existing plant fails, how and where will a new plant get built and would EPA ever grant it a permit If not, and if the town and other users cannot afford plant upgrade or replacement, and if Wayland voters refuse to fund it by increased local taxation, how will the proposed project handle its waste? LS.05

6) how this proposed project relates to the floodplain, the documented history of flooding in this area and with that information how traffic flow issues should be addressed and where else compensatory flood storage can be found LS.06

7) the EPA is currently holding up renewing the NPDES permit for the wastewater treatment plant, so we do not know what conditions and limitations will be imposed on the existing facility and how they will affect the proposed project, impacts to our drinking water supply and discharges to the groundwater and Sudbury River. LS.07

8) whether or not additional hazardous waste will be found underneath the existing large office building in soils and/or groundwater when it is demolished and how that would impact the proposed project and our environment LS.08

9) the increased amount of town drinking water the proponent will need/use – for example, the unknown number of businesses with high water use (restaurants, cafes, spas, hair salons, athletic/exercise facilities, medical facilities, ice rink, etc.) to be located at this mixed-use project as well as overall project turf maintenance LS.09

10) exactly what use will occur in the municipal pad, which will affect traffic volumes and water use, e.g. a community center/pool will increase both those impacts LS.10

11) whether or not the cash gift included in the development agreement will be enough to mitigate all project impacts. I fear it will not. LS.11

12) TMDL impacts to the Sudbury River, amount of additional water drawdown and eutrification this project will add, putting this Wild and Scenic River at increased peril LS.12

13) at full project buildout, whether or not there will be enough town water pressure to drink, do laundry, provide for medical needs, fight fires & flush toilets at higher elevations

14) why the developer is not willing to include the much touted amenities - rail trail and canoe landing - as part of their project

15) what green design elements and principles of Low Impact Development will be included in this project to lessen environmental impacts LS.13

16) how the proponent adding new septic system on top of the existing wastewater treatment plant will impact the river LS.14

17) how the proponent plans to protect rare species LS.15

18) how the proponent plans to protect the many existing monitoring wells associated with the ongoing hazardous waste cleanup scattered all over the property LS.16

19) the level of stormwater treatment since no calculations are included in the ENF LS.17

20) what kind of safe pedestrian and bike connections will be included in the project LS.18

21) whether or not the Route 27 access driveway and entrance will be used for emergencies only. The ENF application inaccurately identifies this Old Sudbury Road driveway as the project's primary entrance. The primary entrance is on Route 20. LS.19

22) status of town compliance with 2002 DEP consent order re drinking water and how the town's failure to comply with various listed past deadlines negatively impacts our environment and threatens our permit, which will be further exacerbated by allowing the largest project in the town's history to draw more water from our fragile water supply LS.20

23) how the town will provide vital protective public safety services when the north/south route 27 is clogged with traffic gridlock caused by this project, a roadway for which the traffic consultants already admitted in a public hearing there is no mitigation or alternative route LS.21

24) the land to be protected under a conservation restriction remains undefined LS.22

25) the possibility that archaeological artifacts are present on the site, similar to those already known to exist at the Lord parcel at our landfill entrance, indian burial grounds elsewhere in Wayland, and other known indian villages along the river's edge such as at the Danforth site not far "up" the river. LS.23

26) how traffic mitigation can be cogently planned without having an origin/destination study to know what traffic will actually be generated by this project LS.24

27) what contamination lurks on the MBTA right of way where the proponent has offered the town some cash towards building a rail trail to provide connectivity LS.25

28) how the Massachusetts Rivers Protection Act applies to this property and can be used to lessen environmental impacts at this sensitive location LS.26

29) the baseline calculations for environmental resources under existing conditions (not the research facility old office use data from 10+ years ago) against which the proposed project impacts should be calculated LS.27

30) a stormwater treatment plan is not included in the ENF, so it is not known how the proponent will implement the recommendation made at the August 3 scoping session that the proponent design and treat stormwater to the highest EPA level instead of following less rigorous redevelopment guidelines, if the goal is to provide best possible environmental protection at this sensitive location LS.28

What follows are additional information and concerns about some of the above-listed items, with some related documents attached.

Water

- In my view, it is imperative to include protection of our drinking water resrouces as part of the Scope of Work for this project. Attached please find the DEP 2002 consent decree ACO-NE-02-F001, the latest townwide mailing to households from the Wayland Water Department and pertinent part of the DEP SWAP report. The DEP, EOEA, and other state agencies should have on record a more recent consent decree issued against the Town for repeated hits of fecal coliform found in our drinking water.

Former Water Superintendent Don Hollender made some headway on addressing the issues in the 2002 consent order. For example, efforts were made to greatly reduce the percentage of unaccounted for (lost) water. It is not clear to me how many of the other compliance deadlines have been met.

The Wayland Water Department apparently was NOT copied on this ENF application, so while I do not presume to steal their thunder, I have no idea what kind of input they are having at this critical stage of the MEPA review process. And unfortunately, simillar to the Conservation Commissioners, the Water Commissioners do not meet as a board for me to discuss these matters with them before the deadline for filing these comments.

Please also be aware that since December 2004, when Mr. Hollender left his job, we have had no Water Superintendent hired to replace him, although a department employee has been filling in as an acting superintendent. In response to the second consent decree issued because of water quality compliance failures, town residents recently approved funding for a water filtration plant at Baldwin, which is hoped to address the coliform hits.

Since 2002, the town voted into effect a local lawn water irrigation ordinance to help control wasteful abuses/uses of drinking water for lawn watering. I am aware of no additional legislative action the town has taken to regulate the installation of private water wells. I understand many continue to be installed each year, drawing more and more water from the aquifer and Sudbury River. Perhaps the largest impact that has had on our water department "numbers" is the recently installed well now used by the Wayland Country Club & Golf Course. So while taking that large water user off the Wayland Water Dept. books, the reality is that user is still drawing large amounts of water out of our shared aquifer.

It was stated by concerned residents and officials at the August 3 MEPA scoping session that despite these efforts to comply with state regulatons, it is more than embarassing how Wayland still exceeds other towns in its per capita water useage. It was also stated by a town official at our spring 2006 annual town meeting that Wayland continues to draw more water out of the ground than allowed by our state permit.

Ultimately, if adding the proposed project to our system further compromises our town's ability to fight fires, deliver adequate amounts and good quality drinking water and to be able to flush toilets during seasonal maximum water drawdown, then water MUST be added to the scope of this MEPA review. Please require the proponent to evaluate the hydologic impact of their proposed water uses which are likely to exceed Raytheon's water uses decades ago at the former research facility. Please also require the proponent to include clear maps showing the proximity of their proposed project to well-protection Zones I and II.

In addition, if one looks at the SWAP report, it is not clear to me what progress has been made towards eliminating illegal land uses within our Zone I areas and enforcing the suggested protective measures within our Zone II at various wellhead locations. I am aware of no local legislative action taken to ensure that the water department has full care and custody of the Zone I areas to be able to terminate illegal land uses. The most obvious example are the high school facility uses still occurring within and nearby enough to impact the Zone I for the Happy Hollow wells (parking lot, overflow parking on the grass, parking storage of the town's school buses, stormwater runoff, athletic activities, etc.).

Hazardous Waste

Since year 2000, Raytheon has been conducting its cleanup of hazardous waste at its former Wayland facility under the MCP's PIP (Public Involvement Plan) regulations. Raytheon also has funded the town's independent LSP (Licensed Site Professional), Ben Gould, CMG Environmental, Inc., who has provided technical expertise, guidance and written comments on behalf of the Town as the cleanup has progressed.

On two recent occasions, the Board of Selectmen invited Ben Gould to meet with them to provide updates. Attached are the two letters Ben submitted to the board at the time of those public meetings. They address the current deed restrictions on the property and the current status of the cleanup in each of the areas where Raytheon has identified the need to remediate. Also attached is the figure/map showing the deed restrictions as found attached to the deed, which varies slightly from the figure Raytheon's LSP created several years ago as part of the draft Phase II report.

Raytheon holds PIP meetings several times a year to inform the public of their cleanup activities and public comment periods as milestone documents are generated. Attached is an example of the fact sheet they distribute at these meetings as well as a brochure that explains how to access all the cleanup project documents they have posted on their extranet website.

While it has been a complex cleanup effort, it is commonly understood that this property can and would be redeveloped. It is listed as a DEP Tier 1B site, with various RTN case numbers. Based on the MCP numerical ranking scoring system applied to such hazardous waste sites, the high concerntrations of VOCs found by chance in more recent years in the so-called "Northern Area" more than qualify this to be a Tier 1A site. Presumably the DEP's view is that based on Raytheon's reliable cleanup performance to date and the good communications they have established with the Town during this process, that department has not seen the need to up the tier classification and assign a project manager.

Developer Dean Stratouly (Congress Group) has had a financial interest in this property on and off for about a decade. In more recent years, Wayland resident and developer Charles Irving (Great Island Development & KGI Properties) has partnered with Mr. Stratouly. The property has changed hands several times, so the paper trail shows several changes of ownership. It is my understanding the current project proponent, Twenty Wayland LLC, and its agent, Frank Dougherty, still represent Mr. Stratouly, Mr. Irving and various other investors.

Within the last 18 months or so, there have been several occasions when the factual representation of the hazardous waste issues on this property has not been accurately stated, in my personal opinion. That has prompted me to make statements at public meetings and to submit written public comment letters to various parties (copying DEP's PIP Coordinator, Karen Stromberg, at NERO's Bureau of Waste Site Cleanup) in order to set the record straight. I have taken care to check my information with Raytheon and other technical experts. I do not enjoy having to do this, but it is important that the cleanup issues be accurately portrayed.

At the August 3 scoping session, I commented that the wording used on the ENF on page 5 to respond to the 21E question can be misleading. Completing a remedial action does NOT mean that the site has been cleaned up and is ready for redevelopment. And it is inaccurate to state that with the exception of RTN 3-22408 that Raytheon has completed the remediation of contaminated areas. If you read Ben Gould's July 24, 2006 letter, that becomes quite clear. Remediation has not been completed in the southern area where VOCs and MTBE are still open issues.

In the February, 2006 application that Twenty Wayland, LLC filed with MassHousing for the 40B housing project they proposed at that time, they chose to answer question 5 by saying NO in answer to whether or not there was a hazardous waste site within a half mile of their property. Not only is their own property a listed hazmat site, so are several businesses along route 20 (gas stations and a dry cleaners). There was no explanation offered by the proponent for this unfortunate inaccuracy.

Please require the project proponent to provide clear overlay maps/visuals showing how their proposed project relates to the various RTN case locations as well as the need to protect already existing montoring wells that Raytheon will continue to need to use as their hazmat cleanup progresses.

In their August 1 Concept Plan filed with the Wayland Planning Board, the proponent includes a figure shaded to indicate where they hope Raytheon will eventually allow them to build the housing portion of the mixed-use project. We understand that Raytheon and Twenty Wayland LLC have been attempting to negotiate new deed restrictions to enable the proposed project to move forward. Despite multiple requests by our Selectmen at public meetings during the preparation of the Development Agreement between the Town and the developers, the proponent had repeatedly refused to disclose the status of those negotiations.

Please require the proponent to disclose where Raytheon will allow them to build on this property for each of the intended uses allowed under the recently approved mixed-use zoning. Please require them to conclude their deed restrictions renegotiations with Raytheon and publicly disclose the new provisions and accompanying site map. The real building envelope for this proposed project begs to be defined. Achieving clarity at this point will avoid the time-consuming need to reopen this EIR and MEPA review process at a later date.

Please also require the proponent to provide a clear, complete and accurate description of the past, current and future hazardous waste cleanup program on and adjacent to their project site, including the estimated time frame for achieving a Class A RAO (Response Action Outcome) that would be needed in order to safely build housing and the municipal facility. They should also be required to provide their site development phasing plan so it is clear their activities will not interfere or conflict in any way with Raytheon conducting its on-site remediation activities under the MCP.

Proposed Rail Trail along the MBTA Right of Way

Attached please find two items that underscore the logic to including the proposed rail trail in the Scope of Work for this MEPA review. The project proponent makes numerous references to it in the ENF form. They have also used it and other amenities in a heavy media campaign as enticements for voters to approve the new mixed-use zoning this past spring. While they have made a donation in the Development Agreement towards the Town achieving the connectivity to be enjoyed by such an amenity, which may help mitigate traffic and pedestrian

flow to some degree, it is not clear to me that the cash amount they have offered will be enough.

The impetus for recently passed state legislation to help towns address liability issues associated with building new rail trails along such rights of way is because of the high likelihood, based on actual experience, that such land unfortunately tends to contain soil contamination dating back to the former railway uses. In oder to provide safe pedestrian and bicycle use of such corridors, someone has to pay to characterize and clean up whatever contamination may lurk in the soils. In this case, that would be totally separate from anything Raytheon has been required to address under the MCP.

Please require the project proponent to include an action plan and real cost estimates that will arise from negotiating leasing rights and developing such a rail trail. While the new legislation intends to protect towns against exorbitant liability costs, it is prudent to understand early on exactly what will be required in order to make this wonderful amenity a reality at this location and what environmental impact it will have to this project.

It was mentioned at the August 3 MEPA scoping session that this particular rail corridor is part of the Wayside Rail Trail for which neighboring towns have appointed volunteers serving on a committee. And a number of towns have expressed their support for developing such a rail trail. It was also mentioned that the Town seeks to establish a living museum of sorts to showcase the railroad artifacts located along the rail corridor near Route 126/27. There is at least one historic building dating back to 1881. Since they have offered money towards such an amenity, please require the proponent to show how it can be integrated into this rail trail corridor.

Please also be aware that Nextel has a permit to install a wireless communications facility attached to an existing BECO/NSTAR utility tower along this same corridor. That means that a separate utility structure/building to support such a facility will be built by Nextel. I understand it will be located along the same MBTA right of way, so how that integrates with and affects a proposed rail trail project needs to be understood. Please require the proponent to provide that information with a clear illustrative map.

MEPA Scoping Session and Site Walk

Pursuant to the July 20 legal notice that appeared in the Wayland Town Crier, MEPA analysit Holly Johnson conducted a scoping session and site walk on August 3. The meeting held in the unoccupied former Raytheon building (without the benefit of air conditioning while it was about 100 degrees outside) lasted about two hours and the site walk lasted about another hour. A great deal of information was shared during that time, particularly given how well-prepared and clear Ms. Johnson was in managing the consultation and by the number of officials, town employees, and concerned citizens who attended during the workday.

Attached please find a newspaper article that appeared in August 6 MetroWest Daily News. Please note one inadvertent error of attribution in the article. The resident Molly Upton, not Molly Reed, provided comments during the Q&A portion of the meeting.

Attached also please find the pertinent pages of an August 8 electronic newsletter from the Wayland Voters Network that circulates among many hundreds of Wayland households and other readers. Newsletter number 178 includes a summary review of the August 3 MEPA scoping session.

Wastewater

It is my personal view that the proposed project NOT be allowed to exceed the limits of generating wastewater defined under their existing use of the town's treatment plant (45,000 gallons/day). I say that because of the Town's intent and long-range planning when we acted to acquire the plant about a decade ago. When town meeting voters approved acquisition and the state legislation that was required to enable the existing operations, it was with the stated intent that the use of the plant was to serve existing businesses, municipal facilities and private residences who were experiencing sewage disposal problems in this sensitive high water table, aquifer protection district and floodplain area. The plant is not supposed to enable or encourage new growth that will further strain and erode our natural resources and damage the adjacent Sudbury River.

In my understanding the proposed mixed-use project can be downsized and still be financially viable. I strongly support redevelopment of this abandoned property, and I am relying on this MEPA process to ensure that a win-win project is environmentally sound and protective of our sensitive resources.

The State statute that created the Wayland Wastewater Management District Commission, an independent entity that operates the existing treatment plant whose EPA permit is long overdue (2003) for renewal, states at Chapter 461 of the 1996 Acts and Resolves of Massachusetts that "commission shall not provide service to (2) a new facility's system or for an increase in design flow to an existing facility's system if that new system or increase in design flow could not have been permitted in the absence of this act....."

I respectfully request that all agencies reviewing this ENF not allow new or increased discharges to the Sudbury River. In my opinion Wayland should not rely on the NPDES permit and discharges to the river that promote new commercial growth at this location.

At the August 3 scoping session, a number of concerned people representing official entities tasked with protecting the river provided a great deal of testimony that appear to support this view. This is not the only wastewater plant along the river, more are being permitted as time goes on, alternative separate septic systems can result in less-treated effluent reaching the river, EPA discharge limits are becoming more restrictive, and it is not clear who is doing short and long-term evaluations of the combined impacts to our natural resources.

The proponent has offered to do a study and provided some dollars towards upgrading, replacing and/or possibly relocating the plant. The unknowns associated with all of the above need to be fully evaluated and impacts clarified within this scope of work to prevent increased flow from causing irreparable harm to our water supply as well as to the groundwater and river.

Suggested Corrections/Modifications to the July 17 ENF Document

1) Please require the proponent to update this ENF filing so that it is consistent with the August 1 Concept Plan they filed with the Wayland Planning Board. It is hard to imagine that within just two weeks time, a better effort could not have been made to have these two documents contain the same information. I am mindful of the MEPA analyst's remark at the August 3 scoping session that studies that relate to the local permitting process and the separate MEPA process can be coordinated to avoid needing to duplicate or repeat efforts.

By the same token, as documents are generated for these parallel processes, all parties should make every effort to provide consistent information. At this point the site plan in the ENF and the one submitted two weeks later to the Planning Board are not the same. How are state officials and others doing this MEPA review supposed to know and track such changes?

2) page 3 – Project Description - the other unoccupied building was supposed to be a day care center, not an office building. Apparently it got built not so long ago without someone realizing there were deed restrictions preventing such use. During the site walk, we were told it is unfinished inside. It has potential for future use and I personally hope it will not be demolished.

3) page 5 – Land Section – I have already commented how the answer to the 21E question under subsection I needs to be corrected

4) page 6 – III. Consistency – the proposed project did NOT receive approval at the spring 2006 special town meeting. A new mixed-use zoning district was approved but without a concept plan disclosed at that time, the statement written in the ENF is misleading and should be required to be changed.

It also seems misleading to say that significant acreage in the western area that abuts the river will be left undisturbed as if to imply they have a choice to do otherwise. If and when the environmental contraints on this property are ever documented by the proponent, it should become clear that it is not likely legal to develop much of that so-called undisturbed area.

5) page 9 – Wetlands and Tidelands Impacts – subsection D – I expect that the answer that "no impacts to waterways or tidelands" will be questioned by others during this public comment period. Please require the proponent to change their answer accordingly and acknowledge the kinds of impacts I heard expressed at the August 3 scoping session.

6) page 9 – Water – subsection A, question 1. While it is beyond my layperson skill set to know whether the answer to this question is technically yes or no, I have explained already why I believe the proposed project will impact our drinking water resources, aquifer and river.

Please require the applicant to demonstrate, by completing all parts of this Water section and responding to public comments, the impacts they will cause to our town's water supply with regard to quality and quanity. This ENF shows no calculations. Please require the applicant to publicly provide them and demonstrate the impacts they will cause, using the existing abandoned building numbers as the baseline.

7) pages 15-16: Historical and Archaeological Resources – as I stated earlier, please require the proponent to demonstrate that there are no artifacts on the proposed project site that need to be protected. And on page 16, please require them to correct the main entrance to read along Route 20, not the Old Sudbury Road emergency access driveway.

8) Figure 2 – I have already explained why I believe the MBTA right of way should be included in the blue boundary line for this project. In the August 1 Concept Plan, they have incorrectly identified the property owner of the rectangle on the western side. It is my understanding that it is no longer owned by Devens Hamlen but rather the Raytheon Company. Please require them to properly identify the owners of all abutting parcels to their project.

9) Circulation List – Please require the proponent to add the following Town of Wayland governmental bodies to this Circulation List: Wayland Board of Road Commissioners, Wayland Historic District Commission, Wayland Historical Commission, Water Water Commissioners, Wayland Town Surveyor, Wayland Town Clerk, Wayland Wastewater District Commissioners, all at the same 41 Cochituate Road address. The complete contact information of all parties submitting public comment should also be added to this circulation list.

Concluding Remarks

At the August 3 scoping session, I asked about consideration of an extension to today's filing deadline. I cited the timing of the ENF in the summertime when a number of town boards meet perhaps as rarely as once a month and for whom meeting this deadline is a hardship, if not impossible because of vacation schedules, family plans, etc. I understand the Conservation Administrator expected to submit comments; the ConCom is not scheduled to meet until tomorrow evening, the example I mentioned at the scoping session. I note that the Water Commissioners are not scheduled to meet until tomorrow evening as well. I very much regret the lack of opportunity for me to discuss my comments about drinking water before today's deadline. I have no way of knowing what other town boards find themselves similarly constrained.

When I asked my time extension question, no modest time extension was offered by the proponent. Instead, he indicated that one can file comments during future comment periods. As the MEPA analyst noted, however, the only way to influence the scope of work to be issued on August 25 is to file comments by today's deadline.

Given that backdrop, and recalling hearing at the scoping session that extensions are not commonly granted, I have not attempted to seek a time extension for my personal comments submitted today. I disclose that there has been an untimely death in my immediate family in the past week so you are aware that I have generated these MEPA comments in less than two days time. I have tried my best to be accurate. If I had more time, my list of 30 "unknowns" would be more organized and described in greater detail. Right now, this is the best I can do. I also beg your indulgence for any unintended errors on my part.

Thank you again for this opportunity and your attention and consideration of my comments for your MEPA environmental review. If you have any questions, please do not hesitate to contact me directly.

Sincerely,

Linda L. Segal

Linda L. Segal

Appendix A Transportation Data

Appendix A, Transportation Data, is available upon request

Appendix B Stormwater Management Study

R.J. O'Connell & Associates, Inc. dated November 13, 2006

Stormwater Management Study

Wayland Town Center
Wayland, MA

Applicant:
Twenty Wayland, LLC
45 Broad Street
4th Floor
Boston, MA 02109

Prepared by:
R.J. O'Connell & Associates, Inc.
600 Unicorn Park Drive
Woburn, MA 01801

Date: November 13, 2006

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Proiect Location and Description

The project site has an area of approximately 56.9 acres and is located at 400 Boston Post Road, in Wayland, MA (See Figure 1 - Locus Map). The site is bound by Route 20 (Boston Post Road) to the south, the Wayland Business Center property to the North, Sudbury River to the west and the Wayland meadows property and Route 27 (Old Sudbury Road) to the East. There are wetland areas on the site. The larger wetland is located at the western portion of the site adjacent to Sudbury River, two smaller wetland areas are at the north east portion of the site adjacent to the Wayland Business Center property, and on the south east portion of site adjacent to Route 20.

Approximately 25 acres of the site is currently developed. The existing development contains a building formerly occupied by Raytheon with a footprint area of ±272,700 square feet and a ±10,500 square foot building formerly utilized as a daycare center and associated parking. There is a Wastewater Treatment facility on site which is owned and operated by the Town of Wayland. The existing topography of the project site generally slopes east to west and ranges from elevation ±146 at the eastern property line adjacent to the Wayland Meadows Property to elevation ±116 at the western side of the site in the large wetland area adjacent to Sudbury River.

The proposed development program consists of demolishing the existing 272,700 square foot building and constructing a mixed use development consisting of residential, municipal and retail use buildings, with associated parking facilities, utilities, and stormwater collection system (See Figure 2 - Site Plan). The stormwater management system for the proposed project has been designed in accordance with the MADEP's Stormwater Management Policy and Standards and the Town of Wayland's Wetlands and Water Resources Bylaw Chapter 194 Rules and Regulations.

Stormwater quality control will be achieved through a program of Best Management Practices (BMP's). The proposed stormwater management system will significantly improve the quality of the stormwater runoff. The existing pavement runoff drains to catch basins which direct runoff to wetland resource areas without additional water quality treatment. The proposed stormwater management system for the project will include new catch basins with deep sumps and hoods, and the use of innovative low impact development (LID) techniques.

Low Impact Development is a stormwater management approach with the goal to mimic the site's pre-development hydrology. This is done by using design techniques that infiltrate, filter, store, and detain water throughout the site using decentralized micro-scale controls. LID includes structural and non-structural strategies such as retention areas, reduction of impervious surfaces, lengthening of flow paths, and the preservation of existing vegetation and landscape features. Redevelopment and improving stormwater quality of existing sites, and energy and water conservation are also examples of LID techniques.

LID techniques proposed for the project include the use of water quality swales, rain gardens, and bio-retention basins to increase times of concentration, promote groundwater recharge, and enhance water quality. The water quality swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. The rain gardens and bio-retention basins will be planted with a combination of grasses, perennials, shrubs, and small trees. The clean stormwater runoff from the building rooftops will be directed to the water quality swales and bio-retention basins to provide additional groundwater recharge.

Based on a review of The National Flood Hazard Insurance Rate Map for the Town of Wayland, Massachusetts, Community Panel No 250224 0002 C, Dated (Revised) February 19,1986, the project site is located within the following zones:

Zone A - Area of 100 year flood
Zone B – Area between 100 year and 500 year floods
Zone C - Area of Minimal Flooding

Design Obiectives and Methodologies

The stormwater management system was designed to control post-development peak runoff from the site by keeping it at or below the levels of pre-development. This was done by analyzing the 2-year, 10-year, and 100-year 24-hour storm events using the Hydraflow Hydrographs 2004 computer program. Hydraflow uses TR-20, the SCS Unit Hydrograph method (an industry accepted method) capable of developing runoff hydrographs for both simple and complex drainage basins. Hydraflow computes SCS Method Runoff Hydrographs by convoluting a rainfall hyetograph through a unit hydrograph.

Utilizing the TR-20 method in Hydraflow, the following data is necessary for input:

Watershed Area: Areas of each watershed are calculated and expressed in acres for these calculations.
SCS Curve Number (CN): Based on the cover type and hydrologic soil group, a weighted curve number (CN) was determined for each of the existing watersheds utilizing Table 2-2a- ***Runoff Curve Numbers For Urban Areas*** and ***Worksheet 2, Runoff Curve Number and Runoff*** from the Soil Conservation Service Technical Release 55 – Urban Hydrology for Small Watersheds
Time Interval (Minutes): For the most compatible results with the existing conditions, this value is defined at 2 minutes.
Time of Concentration, Tc (Minutes): The time of concentration for each watershed was determined by finding the time necessary for runoff to travel from the hydraulically most distant point in the watershed to the point of concentration. Time of concentrations were calculated using TR-55 worksheets with a minimum recommended time of concentration of 6 minutes.
SCS 24-Hour Storm Type: For the greater New England region, a Type III storm is recommended for drainage calculations.
Rainfall Precipitation: Rainfall precipitations for the 2, 10, and 25 year, 24-hour storm events were obtained using Figure B-1 from Technical Paper No. 40 (TP-40) Rainfall Frequency Atlas of the United States and are as follows for Wayland, MA:

2-year storm event:	3.1 inches
10-year storm event:	4.5 inches
25-year storm event:	5.3 inches

As per Town of Wayland Wetland regulations, a 24 hour storm event with a depth of 1 inch will be required as part of the analysis. The minimum depth for a 24 hour 100 year storm depth will be 7 inches as per the Town of Wayland Wetland Regulations.

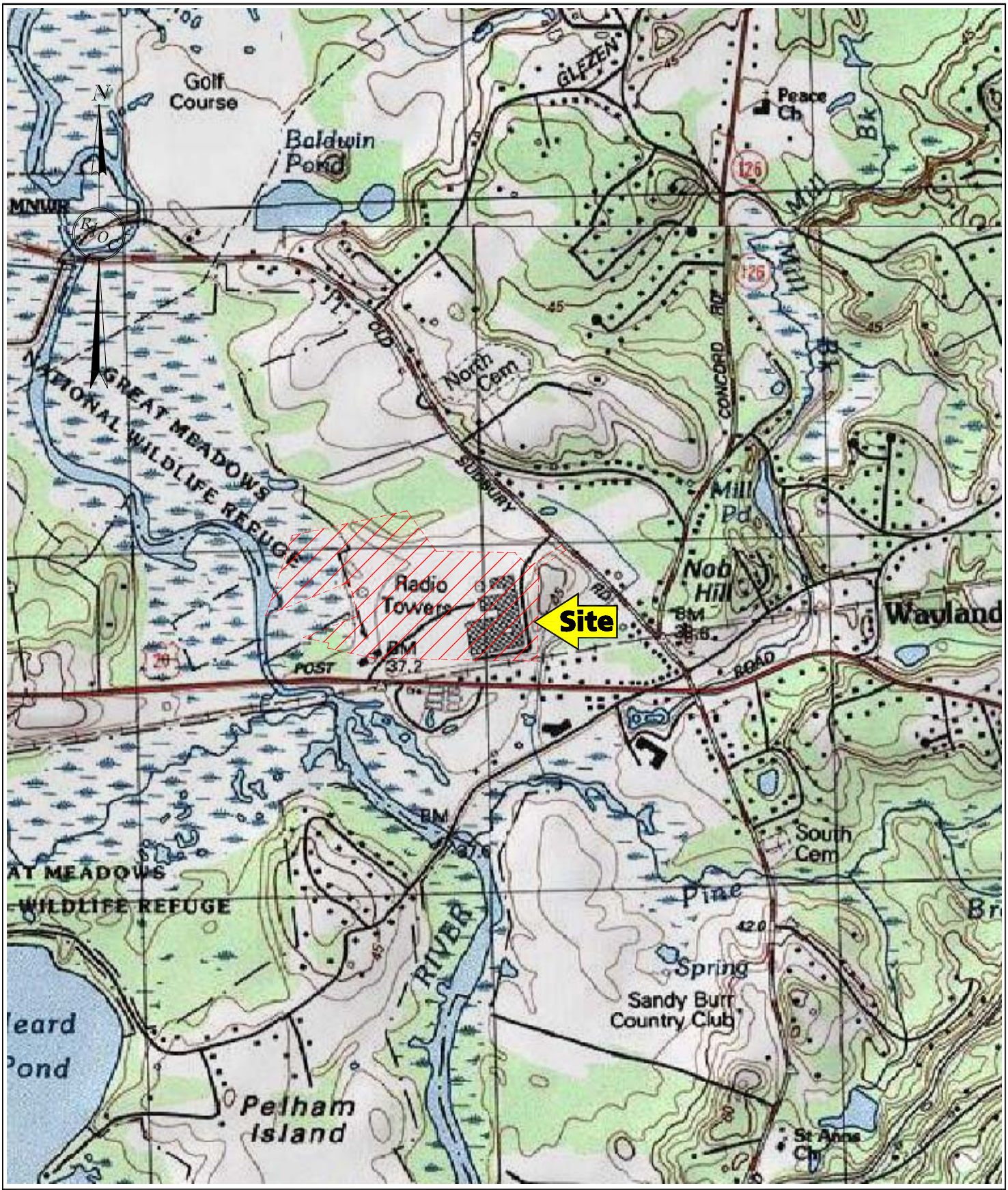
An on-site subsurface storm drainage collection system was designed to carry a minimum 10-year storm event through the site using the Hydraflow Storm Sewers Program. This program uses the Rational Method for estimating runoff and storm drainage pipes are sized based on calculated flows using Manning's Equation (See Appendix D for Storm Sewer Sizing Calculations).

The site was divided into sub-areas, each contributing runoff to an individual catch basin inlet or roof drain. A value for area, time of concentration, and a runoff coefficient were calculated for each contributing sub-area. Rainfall intensities are calculated based on regional precipitation values provided in Technical Memorandum Hydro-35.

Existing Soils

The Soil Survey of Middlesex County, Massachusetts, completed by the National Resource Conservation Service (NRCS, formerly the Soil Conservation Service), was reviewed for general information on the soils within the site area (See Figure 3 - Soil Map). The mapped soils shown within the site limits are identified as follows:

Soil Number	Soil Type	Hydrologic Group
255A	Windsor Loamy Sand, 0 to 3 percent slopes	A
602	Urban Land	Null
36A	Saco Mucky Silt Loam, 0 to 1 percent slopes	D



Designed by:	
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Date:	09/18/2006

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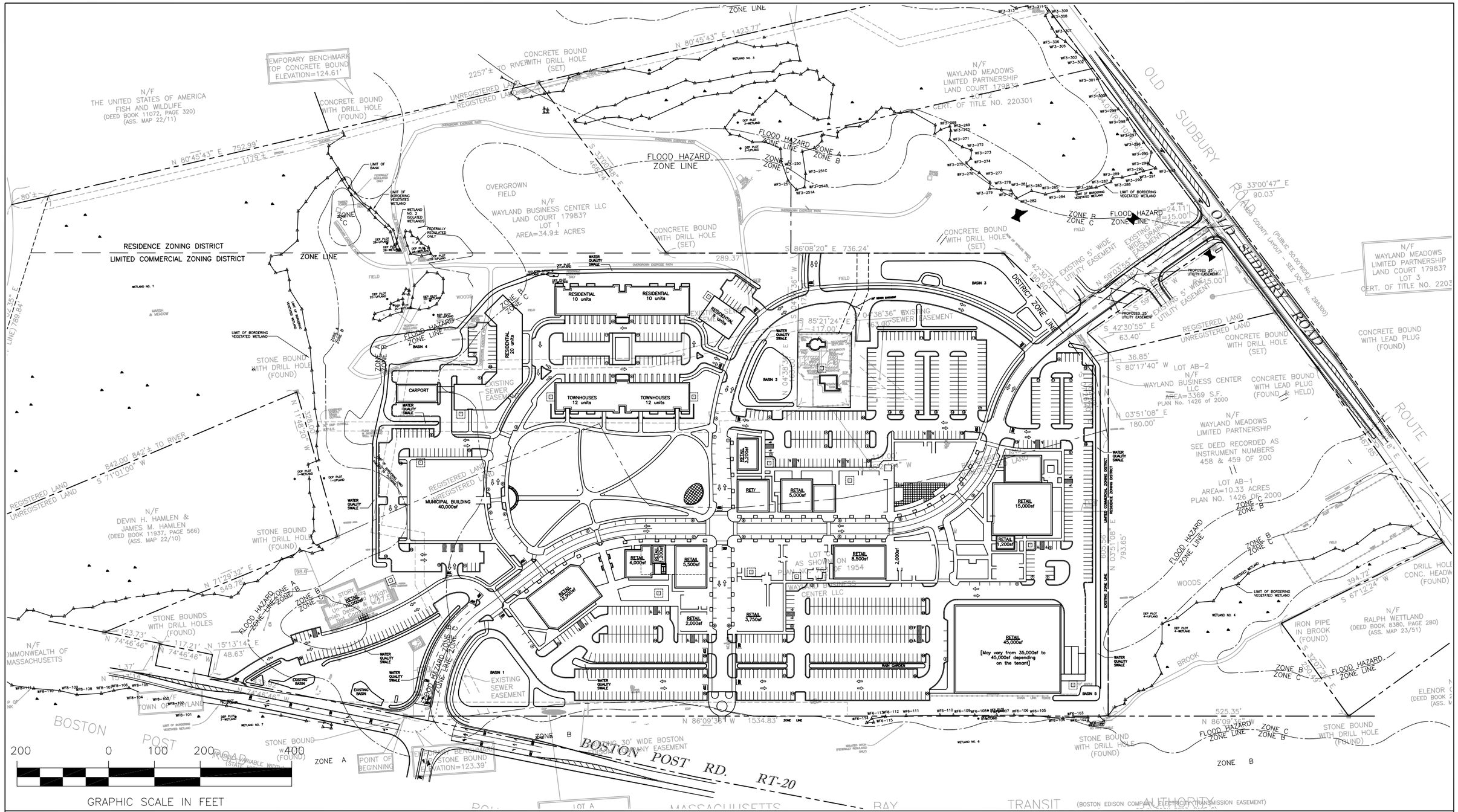
Project Name:
WAYLAND TOWN CENTER
WAYLAND, MA

Drawing Name:
SITE LOCUS MAP
WAYLAND, MA QUADRANGLE
MAP DATE: 1977

Drawing No.:
FIG. 1

Project No.: 06032



No.	Revision	Date

Designed by:	SS
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Checked by:	SS
Scale:	1"=200'
Date:	10/31/2006

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Project Name:

WAYLAND TOWN CENTER
WAYLAND, MA

Drawing Name:

SITE PLAN

Drawing No.:

FIG.-2

Project No.: 06032

Drawing name: G:\MA\Wayland\Great Island\Town Center\Engineer\Fig-2 Site Plan.dwg
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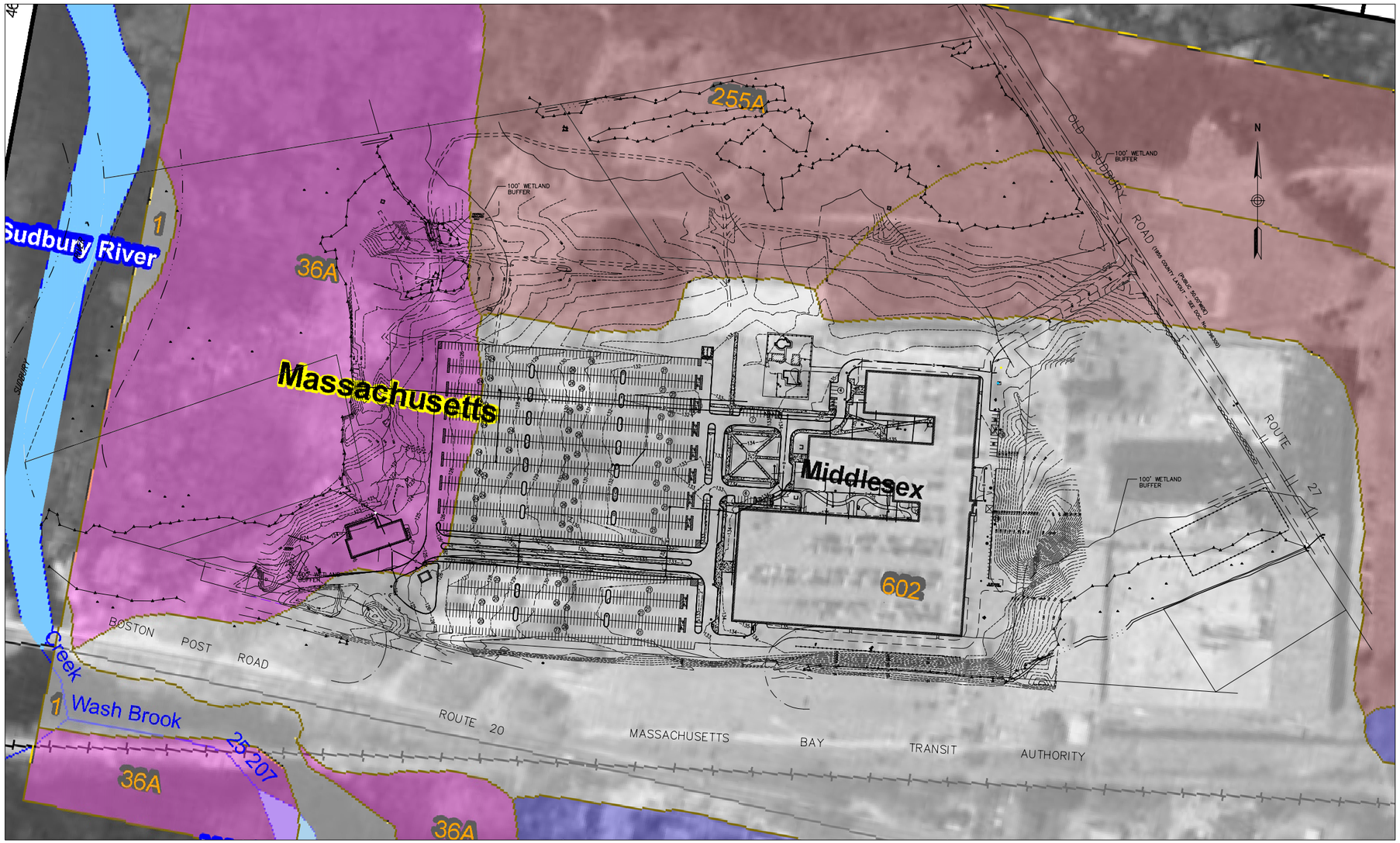

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Seal:

Designed by:	SS
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Checked by:	SS
Scale:	1"=300'
Date:	09/18/2006

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Project Name:

WAYLAND TOWN CENTER
WAYLAND, MA

Drawing Name:

SOIL MAP PLAN

Drawing No.:

FIG-3

Project No.: 06032

Existing Conditions Runoff

The existing topography and land cover has been analyzed and 6 watershed areas were delineated with a combined area of ±43 acres for stormwater runoff. The watershed areas consist of the project site as well as any contributing off-site areas that direct runoff onto the project site. Six analysis points corresponding to the watersheds were used for determining the existing runoff leaving the site. The same points were used for the proposed runoff leaving the site to ensure that there will be no increase in peak runoff rates for the 2, 10, 25, and 100 year, 24 hour design storms (see Figure 4 – Pre-development watershed).

EW-1 is 17.42 acres and is predominantly impervious, consisting of the 6.26 acres of roof area of the existing Raytheon building, sidewalks and landscaped islands, a small area of runoff from offsite and a large portion of the existing parking lot. Runoff currently travels east to west and is captured by a number of catch basins and piped to a 36"combined sewer and storm pipe which discharges into the large wetland.

EW-2 has an area of 4.11 acres and consists mainly of paved areas with a small portion of a landscaped island and the roof runoff from the existing 10,500 square foot building. Runoff sheet flows northwest and is collected by catch basins and discharges directly into the wetland through an existing 18" storm pipe.

EW-3 is 12.27 acres in size and groundcover is predominantly previous consisting of grass, brush, woods and a small portion of the existing paved area. Runoff from this watershed is overland flow, which travels east to west directly into the existing wetland without any stormwater collection system capturing the runoff.

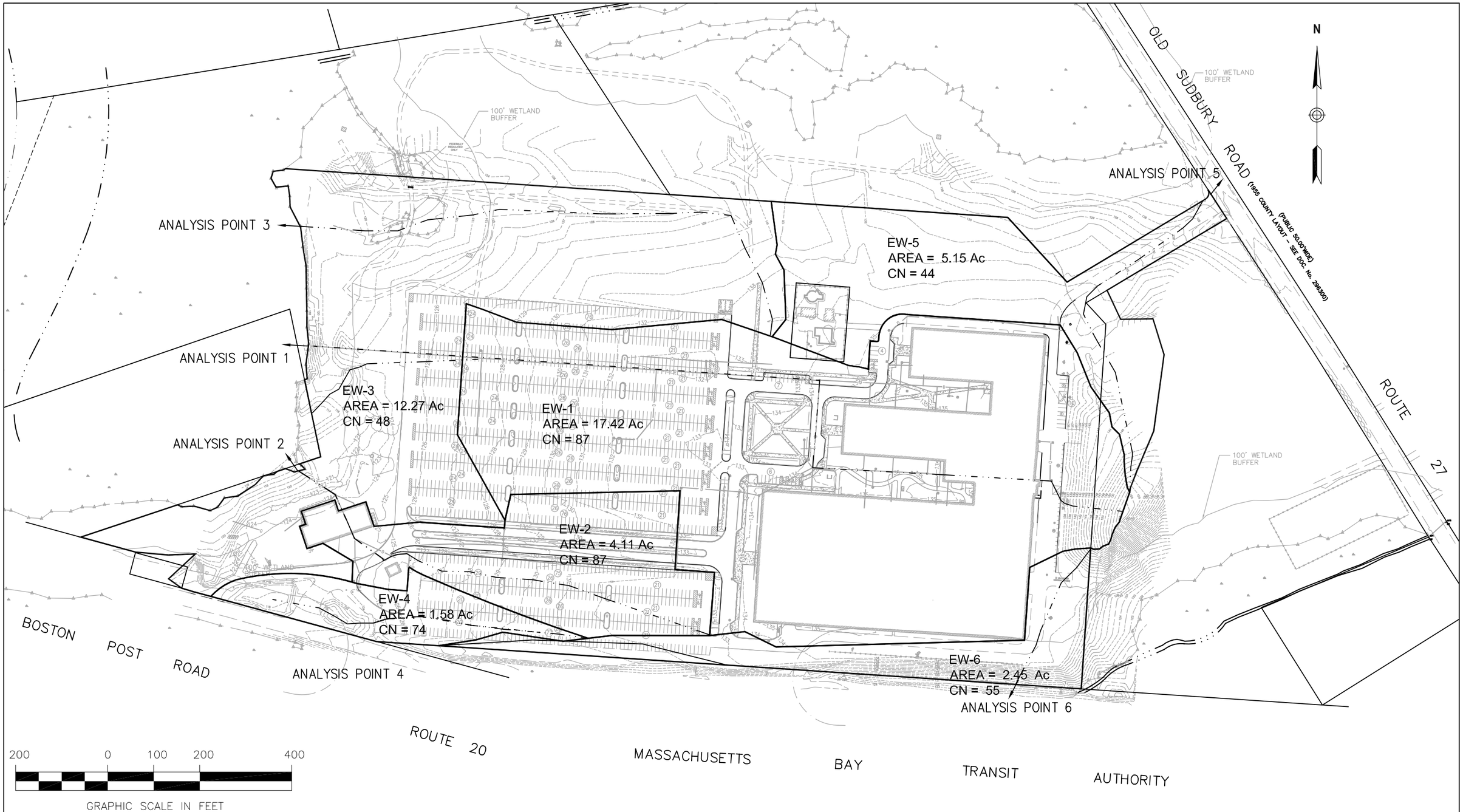
EW-4 has an area of 1.58 acres and is made up of the existing paved area and grass lawn area. Runoff currently sheet flows southwest into two ponds which are separated by the existing driveway entrance from Route 20 (Boston Post Road). These two ponds are connected by a culvert under the driveway and have no outlet, therefore during a large storm event, the ponds will overflow into Route 20.

EW-5 is 5.15 acres in size and is predominately pervious, consisting of light brush and lawn area. The existing Wayland Wastewater treatment plant is part of this watershed and a small portion of runoff from off site contributes to this area. Runoff from this watershed is overland flow, which travels north east towards Old Sudbury Road, down the existing entrance from Old Sudbury Road and discharges at a low point before Old Sudbury Road into the Wayland Meadows property.

EW-6 has an area of 2.45 acres, and is made up of the existing access driveway at the south east corner of the Raytheon Building and thick brush along the south east corner of the property. Runoff sheet flows south directly into the existing wetland located at the south-east corner of the property.

The existing peak rates of stormwater runoff leaving the site are summarized as follows:

Analysis Point	Contributing Watersheds	1-inch (CFS)	2-YEAR (CFS	10-YEAR (CFS)	25-YEAR (CFS)	100-YEAR (CFS)	Receiving Watershed
Analysis Point 1 Existing 36" CMP combined storm/sewer culvert at Wetland	EW-1 (17.42 Acres)	3.37	32.36	54.24	66.82	93.47	Existing Large wetland
Analysis Point 2 Existing Culvert at Wetland	EW-2 (4.11 Acres)	0.86	8.25	13.82	17.03	23.83	
Analysis Point 3	EW-1, EW2, EW-3 (33.8 Acres)	4.17	40.12	67.46	83.67	119.93	
Analysis Point 4 Overland flow southeast to Boston Post Road	EW-4 (1.58 Acres)	0.00	1.37	2.93	3.90	6.07	Boston Post Road
Analysis Point 5 Overland flow north to Wayland Meadows	EW-5 (5.15 Acres)	0.00	0.02	0.42	1.18	4.40	Wayland Meadows
Analysis Point 6 Overland flow southeast to existing wetland	EW-6 (2.45 Acres)	0.00	0.27	2.03	3.47	7.07	Existing small Wetland



No.	Revision	Date

Designed by:	SS
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Checked by:	SS
Scale:	1"=200'
Date:	09/18/2006

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Project Name:

WAYLAND TOWN CENTER
WAYLAND, MA

Drawing Name:

PRE-DEVELOPMENT WATERSHED PLAN

Drawing No.:

FIG.-4

Project No.: 06032

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Proposed Conditions Runoff

The proposed site was also broken up into six watersheds with a combined area of ±43 acres (See Figure 5 – Proposed Watershed Plan). Catch basins and water quality swales and rain gardens have been designed to collect runoff and discharge into bio-retention basins which will discharge the runoff at a controlled rate. Six analysis points corresponding to the watersheds were used for determining the proposed runoff that will leave the site. The same points were used for the existing runoff leaving the site to ensure that there will be no increase in runoff rates for the 2, 10, 25, and 100 year, 24 hour design storms. A curve number and time of concentration were calculated for each watershed using Soil Conservation Service TR-55 methods (See Appendix C for Proposed Conditions Hydrology Calculations). The recommended minimum time of concentration of 6 minutes was used for watersheds PW-1, PW-2B, PW-5B, and PW-6B.

Watershed PW-1 is made up of the proposed paved areas, sidewalks, landscaped islands, roof areas and the existing Wayland Wastewater treatment plant. The area of PW-1 is 7.71 acres and is located in the center of the site. The runoff from this watershed is collected in catch basins and water quality swales and directed to Bio-retention Basin 2.. Runoff from Basin 2 and is discharged through a 24" diameter pipe into the existing drain pipe which outlets into the large wetland located at the western portion of the site (Analysis Point 1).

Watershed PW-2 (PW-2A and PW-2B) is made up of paved areas, sidewalks, roof areas and landscaped areas located at the southern portion of the site. The total area of all watersheds in PW-2 is 8.90 acres. Majority of the runoff from PW-2 is collected in rain gardens and discharge into Bio-retention Basin 1. Runoff is discharged via an outlet control structure at a controlled rate into an existing drain pipe which discharges into the large wetland located at the western portion of the site (Analysis Point 2).

Watershed PW-3 (PW-3A and 3B) is made up of the proposed paved areas, landscaped islands, roof areas and a large undisturbed area consisting of grass, brush, and woods. The total area of all watersheds in PW-3 is 15.85 acres and is located in the western portion of the site. Runoff from the undisturbed area (PW-3B) will continue to runoff as it does presently, which is overland flow into the large wetland. All runoff in the developed areas (PW-3A) is collected in catch basins and water quality swales and directed to Bio-Retention Basin-4. Bio-retention basin 4 will contain a wide level spreader to allow the runoff to overflow at a slow rate into the large wetland and has been analyzed as part of Analysis Point 3.

Watershed PW-4 has a total area of 2.28 Acres and is located at the South Western portion of the site. PW-4 consists of paved areas and landscaped islands. Runoff is predominately sheet flow into water quality swales which outlet into two existing ponds. Currently the two ponds will overflow during a large storm event onto Boston Post Road. An over flow structure will be added to the ponds which is designed to allow the overflow during a large storm to discharge into the large wetland area on the western portion of the site. This overflow runoff is included in drainage calculations at Analysis Point 2.

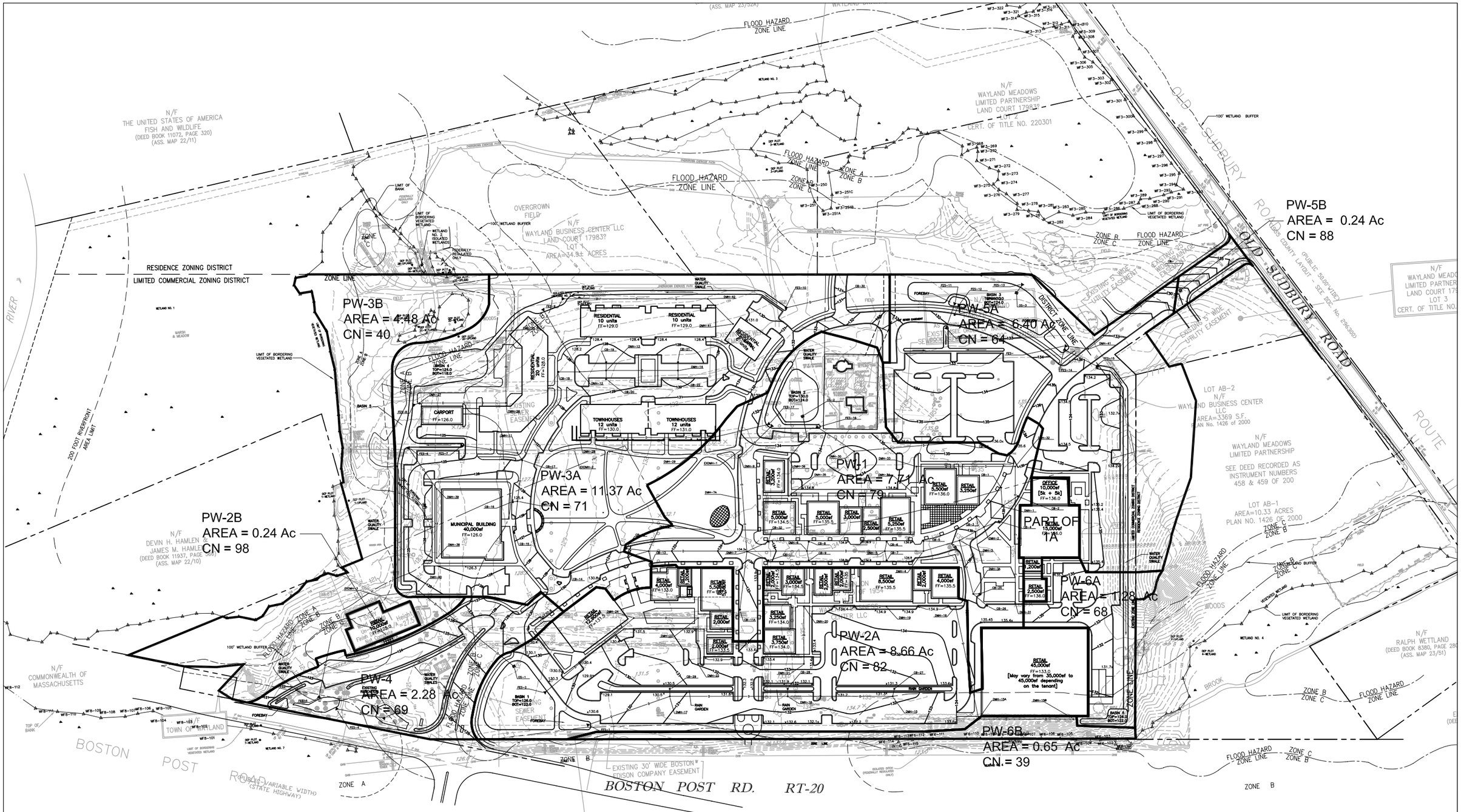
Watershed PW-5 (PW-5A and 5B) is made up of paved areas and landscaped islands. The total area of all watersheds in PW-5 is 6.64 acres and is located at the north-eastern portion of the site. Runoff is predominately sheet flow into water quality swales which outlets into Bio-retention Basin 3. Overflow from Basin 3 will be discharged north to the Wayland Meadows Property.

Watershed PW-6 (PW-6A and PW-6B) is made up of paved areas, landscaped islands, sidewalks and a small undisturbed area consisting of grass, and brush. The total area of all watersheds in PW-6 is 1.93 and located at the south eastern portion of the site. Runoff from the developed area (PW-6A) is sheet runoff into a water quality swale which outlets into Bio-retention basin 6. Runoff from the undisturbed area (PW-

6B) will continue to runoff as it does presently, which is overland flow into the small wetland located at the south eastern corner of the property.

The peak rates of stormwater runoff leaving the site from the proposed development are summarized as follows:

Analysis Point	Contributing Watersheds	1 inch (CFS)	2-YEAR (CFS)	10-YEAR (CFS)	25-YEAR (CFS)	100-YEAR (CFS)	Receiving Watershed
Analysis Point 1 Existing CMP combined storm/sewer culvert at Wetland	PW-1	0.00	4.59	12.64	17.58	24.93	Existing Large wetland
Analysis Point 2 Existing Culvert at Wetland	PW-2	0.22	0.90	6.17	9.25	14.29	
Analysis Point 3 Wetlands West of Site	PW-1, PW2, PW-3	0.22	5.19	13.73	20.38	42.36	
Analysis Point 4 Overland flow southeast to Boston Post Road	PW-4	0.00	0.00	0.00	0.00	0.00	Boston Post Road
Analysis Point 5 Overland flow north to Wayland Meadows	PW-5	0.07	0.56	0.93	1.16	1.67	Wayland Meadows
Analysis Point 6 Overland flow southeast to existing wetland	PW-6	0.00	0.00	0.00	0.83	2.72	Existing small Wetland



No.	Revision	Date

Designed by:	SS
Drawn by:	LT/WJH
Checked by:	SS
Scale:	1"=200'
Date:	10/27/2006

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Project Name:

WAYLAND TOWN CENTER
WAYLAND, MA

Drawing Name:

POST-DEVELOPMENT WATERSHED PLAN

Drawing No.:

FIG.-5

Project No.: 06032

Water Quality

Stormwater quality control will be achieved through a program of Best Management Practices (BMP's). The proposed development is designed to achieve a minimum 80% total suspended solids (TSS) removal in accordance with the MA DEP Stormwater Management Standards. Effective stormwater management practices include the use of curbing along all pavement edges, catch basins with deep sumps and hoods, and detention/infiltration devices, which will treat stormwater runoff from the proposed development and minimize potential indirect, long term impacts to down gradient resources. In addition, a sediment and erosion control plan will be implemented to protect these areas during and after construction of the proposed development.

Catch Basins:

The proposed catch basins will be equipped with deep sumps and hoods. The sumps capture sediments and coarse particles, and the hoods prevent hydrocarbons and other floatable debris from entering the drainage system, which will improve the performance of subsequent BMP's. The sump will be no less than 4' in depth and a regular maintenance schedule will be followed. A regular inspection and cleaning will ensure optimal effectiveness.

Water Quality Swales:

Water quality swales are used to provide peak runoff control as well as enhanced water quality. The swales will be planted with grass on the bottom and sides to slow the runoff velocity and filter pollutants. Runoff volume is controlled by reducing runoff velocity and promoting infiltration. Pollutant removal is achieved through sedimentation, filtration, nutrient uptake, and infiltration.

Bioretention Basins and Rain Gardens:

Bioretention basins and rain gardens are low impact development techniques that serve to promote groundwater recharge, and enhance water quality. They will be planted with a combination of grasses, perennials, shrubs, and wetland plantings and are designed to maximize the removal of pollutants from stormwater runoff through vegetation uptake, retention, and settling.

The following tables provide the Design Rates of Removal as set forth in the Massachusetts Stormwater Management Policy for the various BMP's utilized in this project:

Runoff collected in water quality swales and rain gardens:

BMP	Design Rate	Cumulative TSS Removal
Parking Lot Sweeping	10%	10%
Water Quality Swale / Rain Garden	70%	73%
Bio-retention Basin	80%	95%

Runoff collected in catch basins:

BMP	Design Rate	Cumulative TSS Removal
Parking Lot Sweeping	10%	10%
Catch Basin w/ Deep Sumps & Hooded Outlet	25%	33%
Forebay / Water Quality Swale	25%	49%
Bio-retention Basin	80%	90%

Groundwater Recharge

Groundwater recharge for the proposed development will be provided in accordance with the MA DEP Stormwater Management Standards. These standards require that the annual recharge from the post-development site shall approximate the annual recharge from pre-development site conditions based on soil types. For hydrologic group A soil types, the volume that is required to be recharged is equal to 0.40 inches multiplied by the increase in impervious area. The proposed development is located entirely within hydrologic group A soils, therefore the volume required to be recharged is as follows:

Existing impervious area: ±21.8 acres
Proposed impervious area: ±22.2 acres
Increase in impervious area: ±0.4 acres

$$V = 0.4\ \textit{acres} \times 0.40\ \textit{inches} \times \frac{43{,}560\ \textit{s.f.}}{1\ \textit{acre}} \times \frac{1\ \textit{ft.}}{12\ \textit{inches}} = 580\ \textit{cubic ft.}$$

The stormwater management system will provide the required groundwater recharge through the use of water quality swales, rain gardens, and bio-retention basins.

Summary

The stormwater collection and management system for the proposed development will provide mitigation of post-development stormwater runoff conditions utilizing a combination of detention basins and Low Impact Development techniques and "Best Management Practices" to reduce pollutant loadings within the stormwater prior to discharging it off site.

As shown in the following summary, the proposed stormwater management system has been designed to match or reduce post development peak discharges to less than the existing rates for all modeled storms.

Analysis Point 1 - Existing 36" CMP

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	3.37	0.00
2-year	32.36	4.59
10-year	54.24	12.64.
25-year	66.82	17.58
100-year	93.47	24.93

Analysis Point 2 – Existing Culvert

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	0.86	0.22
2-year	8.25	0.90
10-year	13.82	6.17
25-year	17.03	9.25
100-year	23.83	14.29

Analysis Point 3 –Wetlands West of Site

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	4.17	0.22
2-year	40.12	5.19
10-year	67.46	13.73
25-year	83.67	20.38
100-year	119.93	42.36

Analysis Point 4 - Boston Post Road

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	0.00	0.00
2-year	1.37	0.00
10-year	2.93	0.00
25-year	3.90	0.00
100-year	6.07	0.00

Analysis Point 5 – Wayland Meadows

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	0.00	0.07
2-year	0.02	0.56
10-year	0.42	0.93
25-year	1.18	1.16
100-year	4.40	1.67

Analysis Point 6 – Wetlands South of Site

Summary Existing vs. Proposed Peak Discharge Rates

Storm Event:	Existing Flow (CFS)	Proposed Flow (CFS)
1-inch	0.00	0.00
2-year	0.27	0.00
10-year	2.03	0.00
25-year	3.47	0.83
100-year	7.07	2.72

Stormwater Management Operation And Maintenance Plan

1. For inspection and maintenance schedule during and immediately following construction, see General and Erosion Control Notes included with Site Plans. The NPDES general permit will also include schedule information for inspection and maintenance of erosion controls during construction.

2. A checklist of all maintenance items will be developed and used for each stormwater treatment component. Each time an inspection is completed or a maintenance procedure is performed, it will be documented on the checklist. The checklist will be kept on the project site.

3. The property owner will be financially responsible for the implementation of this plan and for future system repairs as needed.

4. Sweep parking lot and driveway areas to remove sediments before they can enter the catch basins, twice annually, in the early spring and late fall, and on an as needed basis at other times.

5. Inspect and clean deep sump catch basins including the oil/grease traps to prevent blockage and to remove accumulated sediments on an annual basis in the spring.

6. Inspect and clean water quality swales and rain gardens an annual basis in the spring and on an as needed basis at other times.

7. Inspect and clean bio-retention basins on an annual basis in the spring and on an as needed basis at other times.

8. Inspect dumpster and compactor areas for spillage and clean as necessary.

9. Inspect landscape areas and edges of paved areas for any signs of erosion. Perform any necessary curb replacement, earth repair, reseeding or mulching upon identification.

10. Routinely pick up and remove litter from the parking areas and perimeter landscape areas. Clean leaves or trash from catch basin grates when observed.

APPENDIX A: EXISTING CONDITIONS HYDROLOGY

Runoff Curve Numbers and Runoff
Time of Concentration
Pond Reports
Hydrograph Plots (2, 10, 25, 100 year storm events)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 1 (EW-1)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN			Area	Product of CN x Area
		Table 2-2	Figure	Figure	X acres / mi² / %	
A	Grass - good	39			3.24	126.36
A	Impervious (pavement, roof)	98			14.18	1389.64
A						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			**17.42**	**1516**

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **87.0264** Use CN= **87**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	2.00	3.29	5.38	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 2 (EW-2)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			0.80	31.20
A	Impervious (pavement, roof)	98			3.31	324.38
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.				Totals =	4.11	355.58

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **86.5158** Use CN= **87**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	2.00	3.29	5.38	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 3 (EW-3)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			14.09	549.51
A	Impervious (pavement, roof)	98			2.28	223.44
A	Gravel	76			0.44	33.44
A	Wetland	83			0.13	10.79
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one **CN** source per line.		Totals =			16.94	817.18

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **48.2397** Use **CN=** **48**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, *Q*	in.	0.11	0.48	1.44	

(Use P and **CN** with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 4 (EW-4)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			0.63	24.57
A	Impervious (pavement, roof)	98			0.95	93.10
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.				Totals =	1.58	117.67

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **74.4747** Use CN= **74**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	1.10	2.13	3.96	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 5 (EW-5)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres mi² %	Product of CN x Area
A	Grass - good	39			4.75	185.25
A	Impervious (pavement, roof)	98			0.40	39.20
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			5.15	224.45

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **43.5825** Use CN= **44**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (**24** hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.04	0.31	1.11	

(Use P and CN with table **2-1,** fig. 2-1, or eqs. **2-3** and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **Existing Watershed 6 (EW-6)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			1.79	69.81
A	Impervious (pavement, roof)	98			0.66	64.68
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			2.45	134.49

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **54.8939** Use CN= **55**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.28	0.83	2.06	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

EW-1 (PT. 1)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	136.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	14.70		0.00		0.00		
Travel Time (min)	=	**7.22**	+	**0.00**	+	**0.00**	=	**7.22**
Shallow Concentrated Flow								
Flow length (ft)	=	60.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ftfs)	=	1.44		0.00		0.00		
Travel Time (min)	=	**0.70**	+	**0.00**	+	**0.00**	=	**0.70**
Channel Flow								
X sectional flow area (sqft)	=	7.00		0.00		0.00		
Wetted perimeter (ft)	=	4.71		0.00		0.00		
Channel slope (%)	=	1.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ftfs)	=	12.95		0.00		0.00		
Flow length (ft)	=	1800.0		0.0		0.0		
Travel Time (min)	=	**2.32**	+	**0.00**	+	**0.00**	=	**2.32**

Total Travel Time, Tc ..... 10.23 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

EW-2 (PT. 2)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**2.14**	**+**	**0.00**	**+**	**0.00**	**=**	**2.14**
Shallow Concentrated Flow								
Flow length (ft)	=	673.00		0.00		0.00		
Watercourse slope (%)	=	1.20		0.00		0.00		
Surface description	=	Paved		Paved		Paved		
Average velocity (ft/s)	=	2.23		0.00		0.00		
Travel Time (min)	**=**	**5.04**	**+**	**0.00**	**+**	**0.00**	**=**	**5.04**
Channel Flow								
X sectional flow area (sqft)	=	1.22		0.00		0.00		
Wetted perimeter (ft)	=	1.96		0.00		0.00		
Channel slope (%)	=	1.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	7.23		0.00		0.00		
Flow length (ft)	=	275.0		0.0		0.0		
Travel Time (min)	=	**0.63**	**+**	**0.00**	**+**	**0.00**	**=**	**0.63**

Total Travel Time, Tc ..... 7.81 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

EW-3

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	=	**21.82**	+	**0.00**	+	**0.00**	=	**21.82**
Shallow Concentrated Flow								
Flow length (ft)	=	972.00		148.00		0.00		
Watercourse slope (%)	=	1.30		2.70		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (Ws)	=	1.84		2.65		0.00		
Travel Time (min)	=	**8.81**	+	**0.93**	+	**0.00**	=	**9.74**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (Ws)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	+	**0.00**	=	**0.00**

Total Travel Time, Tc ..... 31.55 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 5

EW-4 (PT. 4)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	2.50		0.00		0.00		
Travel Time (min)	=	**11.46**	+	**0.00**	+	**0.00**	=	**11.46**
Shallow Concentrated Flow								
Flow length (ft)	=	100.00		0.00		0.00		
Watercourse slope (%)	=	3.50		0.00		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	3.02		0.00		0.00		
Travel Time (min)	=	**0.55**	+	**0.00**	+	**0.00**	=	**0.55**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	+	**0.00**	=	**0.00**

Total Travel Time, Tc ..... **12.01** min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 9

EW-5 (PT. 5)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	8.50		0.00		0.00		
Travel Time (min)	**=**	**7.02**	+	**0.00**	**+**	**0.00**	**=**	**7.02**
Shallow Concentrated Flow								
Flow length (ft)	=	678.00		0.00		0.00		
Watercourse slope (%)	=	3.31		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (Ws)	=	2.94		0.00		0.00		
Travel Time (min)	**=**	**3.85**	+	**0.00**	**+**	**0.00**	**=**	**3.85**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 10.87 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 10

EW-6 (PT. 6)

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	6.00		0.00		0.00		
Travel Time (min)	**=**	**9.34**	+	**0.00**	**+**	**0.00**	**=**	**9.34**
Shallow Concentrated Flow								
Flow length (ft)	=	240.00		0.00		0.00		
Watercourse slope (%)	=	0.85		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.49		0.00		0.00		
Travel Time (min)	=	**2.69**	+	**0.00**	**+**	**0.00**	**=**	**2.69**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	+	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 12.03 min

Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 9:57 AM

Pond No. 7 - EX. BASIN

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.00	1,828	0	0
1.00	119.00	5,668	3,748	3,748
2.00	120.00	8,193	6,931	10,679

Culvert / Orifice Structures

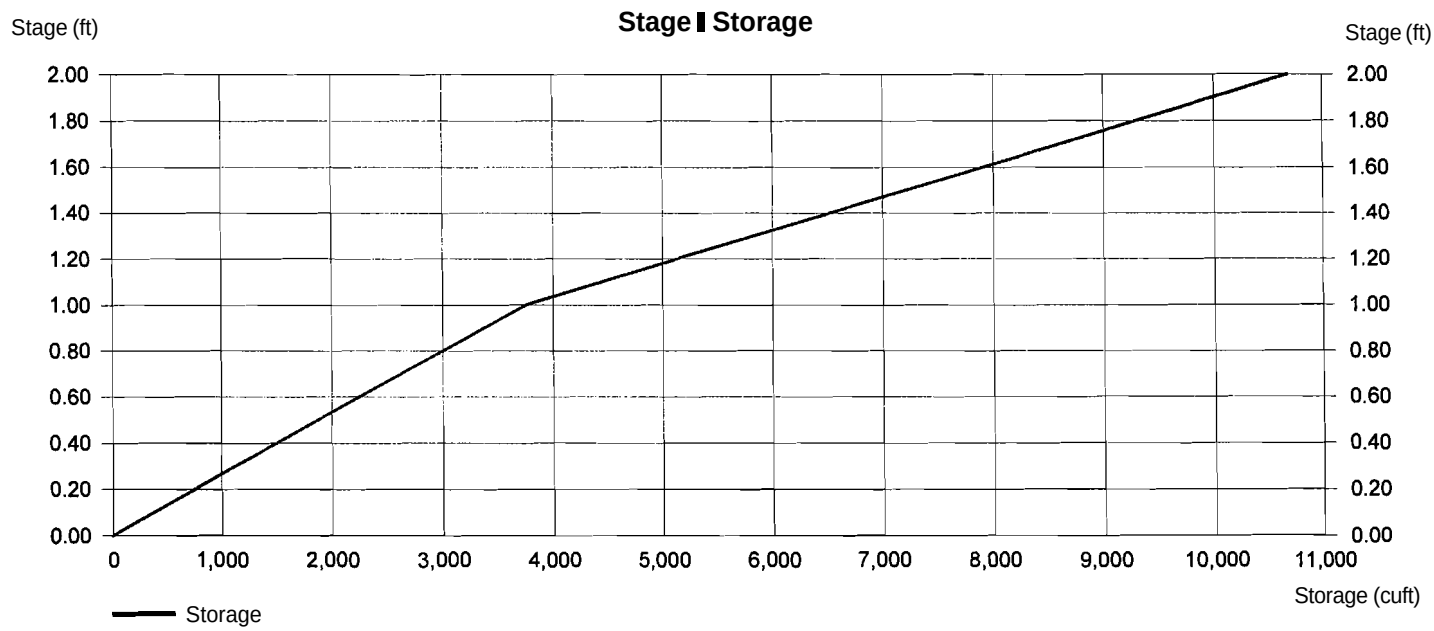
	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 50.00	0.00	0.00	0.00
Crest El. (ft)	= 119.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuff)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.37	1	730	14,413	----			EW-1 (PT. 1)
2	SCS Runoff	0.86	1	727	3,257	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	0.00	1	0	0	----		------	EW-3
4	Combine	4.17	1	729	17,670	1, 2, 3	------		EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	0.00	1	890	131	----		------	EW-4 (PT. 4)
6	Reservoir	0.00	1	1015	124	5	118.01	26	EXIST. BASIN
7	Diversion1	0.00	1	1015	124	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	859	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.00	1	0	0		------		EW-5 (PT. 5)
10	SCS Runoff	0.00	1	0	0	----	------		EW-6 (PT. 6)
12	SCS Runoff	0.21	1	740	2,025		------	------	PW-1
13	Reservoir	0.04	1	999	2,006	12	124.20	772	BASIN 2
14	Diversion1	0.04	1	999	2,006	13	------		BASIN 2 INFILTRATION
15	Diversion2	0.00	1	798	0	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	0.46	1	748	3,557	----	------	------	PW-2A
17	Reservoir	0.08	1	963	3,538	16	122.14	1,468	BASIN 1
18	Diversion1	0.04	1	963	1,693	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	0.04	1	963	1,845	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	0.22	1	724	711	----	------	------	PW-2B
21	SCS Runoff	0.01	1	1337	322	----		------	PW-3A
22	Reservoir	0.01	1	1446	304	21	118.02	143	BASIN 4
23	Diversion1	0.01	1	1446	304	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	1191	0	22	------		BASIN 4 OUTFLOW
25	SCS Runoff	0.00	1	0	0	----	------	------	PW-3B
26	SCS Runoff	0.00	1	1335	19	----			PW-4
27	Reservoir	0.00	1	1355	11	26	118.00	7	EXIST. BASIN
28	Diversion1	0.00	1	1355	11	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.00	1	0	0	27	------	------	EX. BASIN OUTFLOW
30	Combine	0.22	1	724	2,555	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	0.22	1	724	2,555	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	0.00	1	0	0	----	------	------	PW-5A
33	Reservoir	0.00	1	0	0	32	124.00	0	BASIN 3
34	Diversion1	0.00	1	0	0	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.00	1	0	0	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.07	1	725	227	----	------	------	PW-5B
37	Combine	0.07	1	725	227	35, 36	------		TOTAL TO PT. 5
38	SCS Runoff	0.00	1	1440	3	----	------		PW-6A
39	Reservoir	0.00	1	0	0	38	122.00	3	BASIN 5
40	Diversion1	0.00	1	0	0	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	0	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.00	1	0	0	----	------	------	PW-6B
43	Combine	0.00	1	0	0	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	32.36	1	728	117,574	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	8.25	1	726	26,572	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	0.12	1	902	3,319	----	------	------	EW-3
4	Combine	40.12	1	727	147,465	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	1.37	1	730	5,489	----	------		EW-4 (PT. 4)
6	Reservoir	0.28	1	766	5,482	5	118.53	1,969	EXIST. BASIN
7	Diversion1	0.28	1	766	5,482	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	743	0	6	----	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.02	1	1327	441	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	0.27	1	726	1,943	----		------	EW-6 (PT. 6)
12	SCS Runoff	11.65	1	725	36,426	----	----	------	PW-1
13	Reservoir	5.05	1	739	36,388	12	126.56	10,614	BASIN 2
14	Diversion1	0.46	1	739	18,849	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	4.59	1	739	17,540	13		------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	9.65	1	736	45,428	----	------	------	PW-2A
17	Reservoir	1.23	1	821	45,325	16	124.11	22,713	BASIN 1
18	Diversion1	0.54	1	821	21,382	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	0.69	1	821	23,943	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	0.75	1	724	2,577	----		------	PW-2B
21	SCS Runoff	5.95	1	743	33,538		------	------	PW-3A
22	Reservoir	0.80	1	885	33,478	21	120.09	15,154	BASIN 4
23	Diversion1	0.80	1	885	33,478	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	748	0	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.00	1	1441	11	----		------	PW-3B
26	SCS Runoff	1.08	1	741	5,992	----	------	------	PW-4
27	Reservoir	0.27	1	785	5,985	26	118.52	1,950	EXIST. BASIN
28	Diversion1	0.27	1	785	5,985	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.00	1	783	0	27	------	------	EX. BASIN OUTFLOW
30	Combine	0.90	1	725	26,519	19, 20, 29	------	----	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	5.19	1	739	44,070	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	1.77	1	748	11,836	----	------	------	PW-5A
33	Reservoir	0.28	1	921	11,819	32	124.72	4,860	BASIN 3
34	Diversion1	0.19	1	921	7,946	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.09	1	921	3,872	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.55	1	725	1,714	----	------	------	PW-5B
37	Combine	0.56	1	725	5,586	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	0.56	1	742	3,154	----	------	------	PW-6A
39	Reservoir	0.08	1	871	3,141	38	124.35	1,288	BASIN 5
40	Diversion1	0.57	1	871	24,728	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	-21,587	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.00	1	0	0	----	------	------	PW-6B
43	Combine	0.00	1	0	-21,587	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	54.24	1	728	199,459	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	13.82	1	725	45,078	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	1.81	1	758	18,539	----	------	------	EW-3
4	Combine	67.46	1	727	263,076	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	2.93	1	729	11,135	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.55	1	763	11,128	5	119.10	4,411	EXIST. BASIN
7	Diversion1	0.55	1	763	11,128	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	729	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.42	1	747	4,951	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	2.03	1	723	6,500	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	22.27	1	725	68,589	----	------	------	PW-1
13	Reservoir	13.19	1	731	68,541	12	127.77	17,137	BASIN 2
14	Diversion1	0.56	1	731	22,713	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	12.64	1	731	45,828	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	17.57	1	736	82,127	----	------	------	PW-2A
17	Reservoir	6.17	1	762	81,984	16	125.10	35,728	BASIN 1
18	Diversion1	0.65	1	762	27,428	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	5.52	1	762	54,556	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.09	1	724	3,831	----	------	------	PW-2B
21	SCS Runoff	13.71	1	741	71,549	----	------	------	PW-3A
22	Reservoir	1.13	1	946	71,290	21	122.48	40,410	BASIN 4
23	Diversion1	1.13	1	946	71,290	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	1808	0	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.08	1	844	2,232	----	------	------	PW-3B
26	SCS Runoff	2.64	1	739	13,262	----	------	------	PW-4
27	Reservoir	1.08	1	764	13,255	26	119.09	4,359	EXIST. BASIN
28	Diversion1	0.55	1	764	11,473	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.53	1	764	1,782	27	------	------	EX. BASIN OUTFLOW
30	Combine	6.17	1	762	60,169	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	13.73	1	731	108,229	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	5.26	1	743	29,187		------	------	PW-5A
33	Reservoir	0.76	1	859	29,150	32	125.94	13,018	BASIN 3
34	Diversion1	0.51	1	859	19,599	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.25	1	859	9,551	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.91	1	724	2,872	----	------	------	PW-5B
37	Combine	0.93	1	725	12,422	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	1.41	1	739	7,120	----	------	------	PW-6A
39	Reservoir	0.45	1	771	7,107	38	125.52	2,837	BASIN 5
40	Diversion1	0.70	1	771	37,165	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	-30,059	39		------	BASIN 6 OUTFLOW
42	SCS Runoff	0.01	1	881	269	----	------	------	PW-6B
43	Combine	0.00	1	0	-29,790	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	66.82	1	728	247,842	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	17.03	1	725	56,013	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	3.95	1	753	31,515	----	------	------	EW-3
4	Combine	83.67	1	727	335,370	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	3.90	1	729	14,712	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.61	1	771	14,705	5	119.35	6,207	EXIST. BASIN
7	Diversion1	0.61	1	771	14,705	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	952	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	1.18	1	739	9,326	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	3.47	1	722	9,920	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	28.65	1	725	88,363	----	------	------	PW-1
13	Reservoir	18.17	1	730	88,312	12	128.24	20,023	BASIN 2
14	Diversion1	0.59	1	730	24,316	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	17.58	1	730	63,996	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	22.26	1	736	104,331	----	------	------	PW-2A
17	Reservoir	8.60	1	760	104,169	16	125.66	43.154	BASIN 1
18	Diversion1	0.72	1	760	29,948	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	7.89	1	760	74,221	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.29	1	724	4,548	----	------	------	PW-2B
21	SCS Runoff	18.70	1	740	96,108	----	------	------	PW-3A
22	Reservoir	2.71	1	820	95,697	21	123.21	49,892	BASIN 4
23	Diversion1	1.24	1	820	84,639	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	1.48	1	820	11,058	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.32	1	766	5,005	----	------	------	PW-3B
26	SCS Runoff	3.66	1	738	18,027	----	------	------	PW-4
27	Reservoir	1.81	1	760	18,020	26	119.28	5,664	EXIST. BASIN
28	Diversion1	0.59	1	760	13,544	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	1.22	1	760	4,476	27	------	------	EX. BASIN OUTFLOW
30	Combine	9.25	1	760	83,246	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	20.38	1	741	163,304	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	7.68	1	741	41,017	----	------	------	PW-5A
33	Reservoir	0.90	1	886	40,962	32	126.62	19,997	BASIN 3
34	Diversion1	0.60	1	886	27,415	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.30	1	886	13,546	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	1.12	1	724	3,553	----	------	------	PW-5B
37	Combine	1.16	1	725	17,099	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	1.97	1	738	9,739	----	------	------	PW-6A
39	Reservoir	1.51	1	752	9,725	38	125.68	3,055	BASIN 5
40	Diversion1	0.72	1	752	40,058	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.79	1	752	-30,333	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.05	1	744	644	----	------	------	PW-6B
43	Combine	0.83	1	751	-29,689	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	93.47	1	728	352,671	----	------	------	EW-I (PT. I)
2	SCS Runoff	23.83	1	725	79,704	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	10.49	1	748	66,852	----	------	------	EW-3
4	Combine	119.93	1	727	499,227	1.2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	6.07	1	729	22,821	----	------	------	EW-4 (PT. 4)
6	Reservoir	3.68	1	740	22,814	5	119.57	7,722	EXIST. BASIN
7	Diversion1	0.66	1	740	19,287	6	------	------	BASIN INFILTRATION
8	Diversion2	3.02	1	740	3,526	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	4.40	1	731	21,975		------	------	EW-5 (PT. 5)
10	SCS Runoff	7.07	1	722	18,593	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	42.51	1	725	132,314	----	------	------	PW-1
13	Reservoir	25.61	1	731	132,260	12	129.22	27,000	BASIN 2
14	Diversion1	0.68	1	731	26,924	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	24.93	1	731	105,336	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	32.37	1	735	153.164	----	------	------	PW-2A
17	Reservoir	11.50	1	761	152,968	16	126.95	62,833	BASIN 1
18	Diversion1	0.76	1	738	33,860	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	11.10	1	761	119,108	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.71	1	724	6,074	----	------	------	PW-2B
21	SCS Runoff	30.02	1	740	152,548	----	------	------	PW-3A
22	Reservoir	16.94	1	760	151,991	21	124.00	60,230	BASIN 4
23	Diversion1	1.35	1	760	94,166	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	15.59	1	760	57,825	22		------	BASIN 4 OUTFLOW
25	SCS Runoff	1.63	1	754	13,784	----	------	------	PW-3B
26	SCS Runoff	6.00	1	737	29,083	----	------	------	PW-4
27	Reservoir	3.71	1	755	29,076	26	119.65	8,228	EXIST. BASIN
28	Diversion1	0.68	1	755	17,288	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	3.04	1	755	11,788	27	------	------	EX. BASIN OUTFLOW
30	Combine	14.29	1	757	136,971	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	42.36	1	754	313,916	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	13.42	1	740	69,215	----	------	------	PW-5A
33	Reservoir	1.37	1	889	69,070	32	128.20	37,352	BASIN 3
34	Diversion1	0.76	1	1041	43,495	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.69	1	889	25,574	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	1.56	1	724	5,025	----	------	------	PW-5B
37	Combine	1.67	1	725	30,600	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	3.26	1	738	15,845	----	------	------	PW-6A
39	Reservoir	3.21	1	740	15,831	38	125.83	3,254	BASIN 5
40	Diversion1	0.74	1	740	45,274	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	2.47	1	740	-29,443	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.30	1	728	1,869	----	------	------	PW-6B
43	Combine	2.72	1	740	-27,574	41, 42	------	------	TOTAL TO PT. 6

APPENDIX B: PROPOSED CONDITIONS HYDROLOGY

Runoff Curve Numbers and Runoff
Time of Concentration
Pond Reports
Hydrograph Plots (2, 10, 25, 100 year storm events)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 1 (PW-1)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			2.47	96.33
A	Impervious (pavement, roof)	98			5.24	513.52
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			**7.71**	**609.85**

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **79.0986** Use CN= **79**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	1.41	2.55	4.49	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 2A (PW-2A)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			2.32	90.48
A	Impervious (pavement, roof)	98			6.34	621.32
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			**8.66**	**711.8**

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **82.1940** Use CN= **82**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	1.62	2.81	4.82	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 2B (PW-2B)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnectedlconnected impervious area ratio)	CN Table 2-2	CN Figre	CN Figure	Area X acres mi² %	Product of CN x Area
A	Grass - good	39			0.00	0.00
A	Impervious (pavement, roof)	98			0.24	23.52
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			0.24	23.52

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **98.0000** Use CN= **98**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	3.07	4.46	6.66	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 3A (PW-3A)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnectedlconnected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			5.23	203.97
A	Impervious (pavement, roof)	98			6.14	601.72
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			11.37	805.69

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **70.8610** Use CN= **71**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.94	1.89	3.64	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** **PROPOSED WATERSHED 3B (PW-3B)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres mi² %	Product of CN x Area
A	Grass - good	39			4.35	169.65
A	Wetland	83			0.13	10.79
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.				Totals =	4.48	180.44

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **40.2768** Use CN= **40**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.01	0.17	0.80	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 4 (PW-4)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			1.13	44.07
A	Impervious (pavement, roof)	98			1.15	112.70
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			**2.28**	**156.77**

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **68.7588** Use CN= **69**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.84	1.74	3.43	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 5A (PW-5A)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnectedlconnectedimpervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres mi² %	Product of CN x Area
A	Grass - good	39			3.67	143.13
A	Impervious (pavement, roof)	98			2.73	267.54
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			6.4	410.67

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **64.1672** Use CN= **64**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.61	1.39	2.93	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 5B (PW-5B)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	**Grass** - good	39			0.04	1.56
A	**Impervious (pavement,** roof)	98			0.20	19.60
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			0.24	21.16

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **88.1667** Use CN= **88**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	2.09	3.38	5.50	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10124106**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 6A (PW-6A)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure 2-3	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			0.65	25.35
A	Impervious (pavement, roof)	98			0.63	61.74
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN source per line.		Totals =			1.28	87.09

CN (weighted) = $\frac{\text{total product}}{\text{total area}}$ **68.0391** Use CN= **68**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	yr.	2	10	100	
Rainfall, P (24 hour)	in.	3.30	4.70	6.90	
Runoff, Q	in.	0.79	1.67	3.33	

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 2: Runoff curve number and runoff

Project: **Wayland Town Center** By: **LT** Date **10/24/06**

Location: **Wayland, MA** Checked: Date

Check One: **Present** Developed **PROPOSED WATERSHED 6B (PW-6B)**

1. Runoff curve number (CN)

Soil Name and Hydrologic Group (appendix A)	Cover Description (cover type, treatment, and hydrologic conditions percent impervious unconnected/connected impervious area ratio)	CN Table 2-2	CN Figure	CN Figure 2-4	Area X acres / mi² / %	Product of CN x Area
A	Grass - good	39			0.65	25.35
A	Impervious (pavement, roof)	98				0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
Use only one CN **source per line.**		**Totals** =			0.65	25.35

CN **(weighted)** = $\frac{\text{total product}}{\text{total area}}$ **39.0000** **Use** CN= **39**

2. Runoff

		Storm #1	Storm #2	Storm #3	
Frequency	**yr.**	2	10	100	
Rainfall, P (24 hour)	**in.**	3.30	4.70	6.90	
Runoff, Q	**in.**	0.00	0.14	0.73	

(Use P and CN **with table** 2-1, **fig. 2-1, or eqs. 2-3 and 2-4.)**

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 16

PW-2A

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	=	**21.82**	+	**0.00**	+	**0.00**	=	**21.82**
Shallow Concentrated Flow								
Flow length (ft)	=	75.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	=	**1.10**	+	**0.00**	+	**0.00**	=	**1.10**
Channel Flow								
X sectional flow area (sqft)	=	1.76		0.00		0.00		
Wetted perimeter (ft)	=	2.35		0.00		0.00		
Channel slope (%)	=	0.50		0.00		0.00		
Manning's n-value	=	0.012		0.015		0.015		
Velocity (ft/s)	=	7.23		0.00		0.00		
Flow length (ft)	=	205.0		0.0		0.0		
Travel Time (min)	=	**0.47**	+	**0.00**	+	**0.00**	=	**0.47**

Total Travel Time, Tc ..... 23.39 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 21

PW-3A

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	=	**21.82**	+	**0.00**	+	**0.00**	=	**21.82**
Shallow Concentrated Flow								
Flow length (ft)	=	400.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Unpaved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	=	**5.84**	+	**0.00**	+	**0.00**	=	**5.84**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	+	**0.00**	=	**0.00**

Total Travel Time, Tc ..... 27.66 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 25

PW-3B

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	=	**12.53**	+	**0.00**	+	**0.00**	=	**12.53**
Shallow Concentrated Flow								
Flow length (ft)	=	430.00		370.00		0.00		
Watercourse slope (%)	=	0.50		0.10		0.00		
Surface description	=	Unpaved		Unpaved		Paved		
Average velocity (ft/s)	=	1.14		0.51		0.00		
Travel Time (min)	=	**6.28**	+	**12.09**	+	**0.00**	=	**18.37**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	+	**0.00**	=	**0.00**

Total Travel Time, Tc ..... **30.90** min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 26

PW-4

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	**=**	**21.82**	+	**0.00**	+	**0.00**	=	**21.82**
Shallow Concentrated Flow								
Flow length (ft)	=	180.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	**=**	**2.63**	+	**0.00**	+	**0.00**	**=**	**2.63**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	**0.00**	+	**0.00**	+	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 24.45 min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 32

PW-5A

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	=	**21.82**	+	**0.00**	+	**0.00**	=	**21.82**
Shallow Concentrated Flow								
Flow length (ft)	=	360.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (Ws)	=	1.14		0.00		0.00		
Travel Time (min)	=	**5.26**	+	**0.00**	+	**0.00**	=	**5.26**
Channel Flow								
X sectional flow area (sqft)	=	1.76		0.00		0.00		
Wetted perimeter (ft)	=	2.36		0.00		0.00		
Channel slope (%)	=	0.50		0.00		0.00		
Manning's n-value	=	0.012		0.015		0.015		
Velocity (Ws)	=	7.21		0.00		0.00		
Flow length (ft)	=	80.0		0.0		0.0		
Travel Time (min)	=	**0.18**	+	**0.00**	+	**0.00**	=	**0.18**

Total Travel Time, Tc ..... **27.26** min

TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 38

PW-6A

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.200		0.011		0.011		
Flow length (ft)	=	100.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.10		0.00		0.00		
Land slope (%)	=	0.50		0.00		0.00		
Travel Time (min)	=	21.82	+	0.00	+	0.00	=	21.82
Shallow Concentrated Flow								
Flow length (ft)	=	200.00		0.00		0.00		
Watercourse slope (%)	=	0.50		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	1.14		0.00		0.00		
Travel Time (min)	=	2.92	+	0.00	+	0.00	=	2.92
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	=	0.00	+	0.00	+	0.00	=	0.00

Total Travel Time, Tc ..... 24.74 min

Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 9:54 AM

Pond No. 1 - BASIN 1

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.00	9,422	0	0
2.00	124.00	11,844	21,266	21,266
4.00	126.00	14,507	26,351	47,617
6.00	128.00	17,404	31,911	79,528

Culvert / Orifice Structures

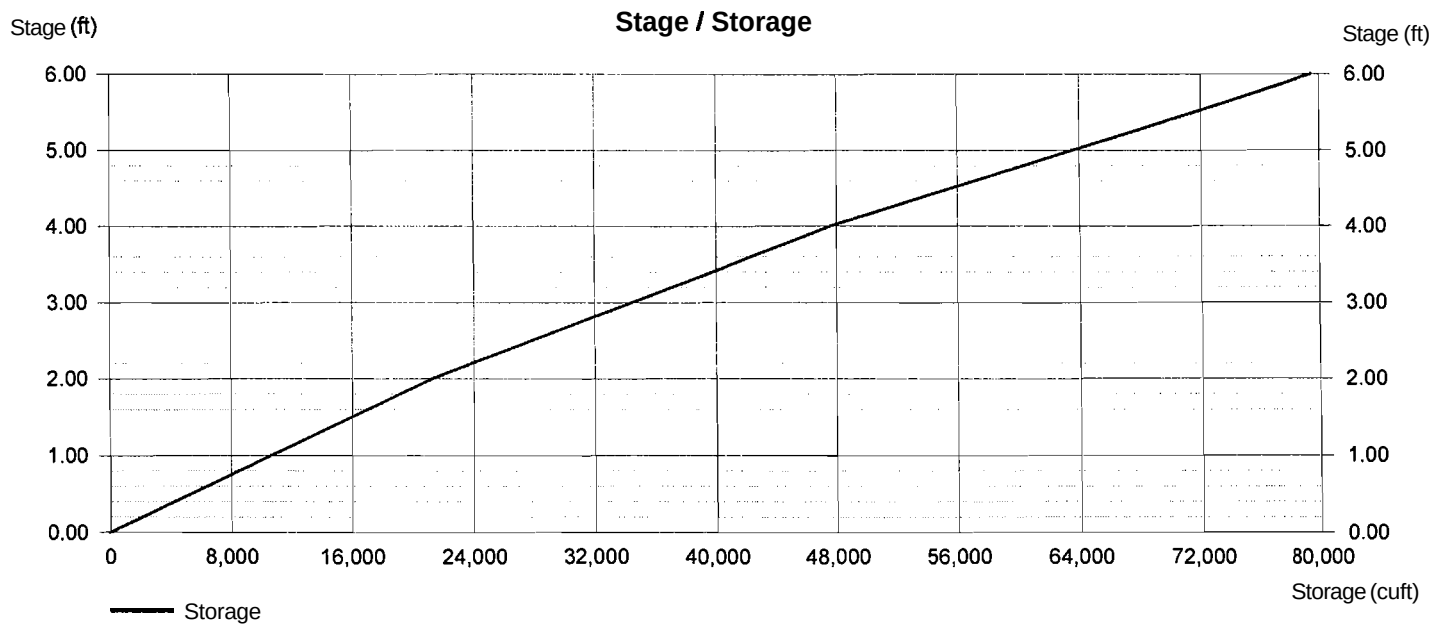
	[A]	[B]	[C]	[D]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 124.00	0.00	0.00	0.00
Length (ft)	= 260.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	0.00
N-Value	= .012	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000in/hr (Contour) Tailwater Elev. = 0.00ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond Report

Hydraflow Hydrographs by Intelisolve

Tuesday, Oct 31 2006, 9:55 AM

Pond No. 2 - BASIN 2

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage **(cuft)**	Total storage **(cuft)**
0.00	124.00	3,108	0	0
2.00	126.00	4,529	7,637	7,637
4.00	128.00	6,184	10,713	18,350
6.00	130.00	8,020	14,204	32,554

Culvert / Orifice Structures

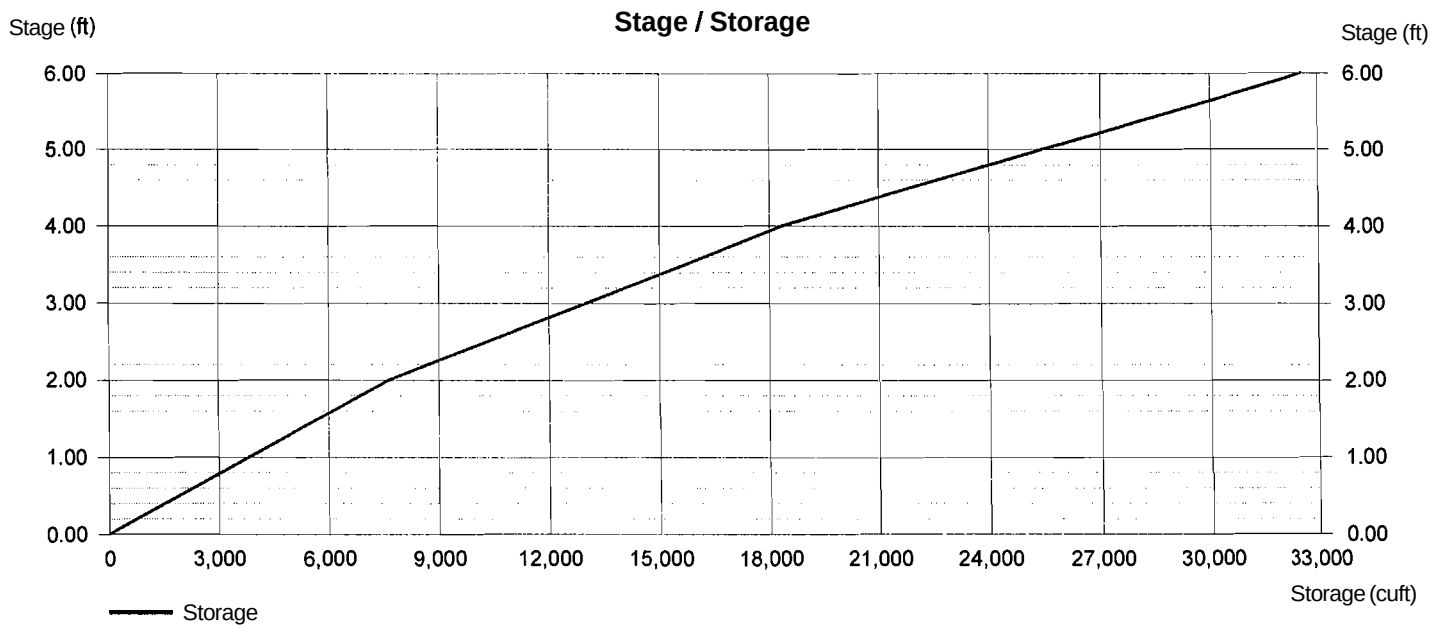
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 126.00	0.00	0.00	0.00
Length (ft)	= 45.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	0.00
N-Value	= .012	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 9:55 AM

Pond No. 3 - BASIN 3

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	124.00	5,017	0	0
2.00	126.00	8,430	13,447	13,447
4.00	128.00	12,552	20,982	34,429
6.00	130.00	16,918	29,470	63,899

Culvert / Orifice Structures

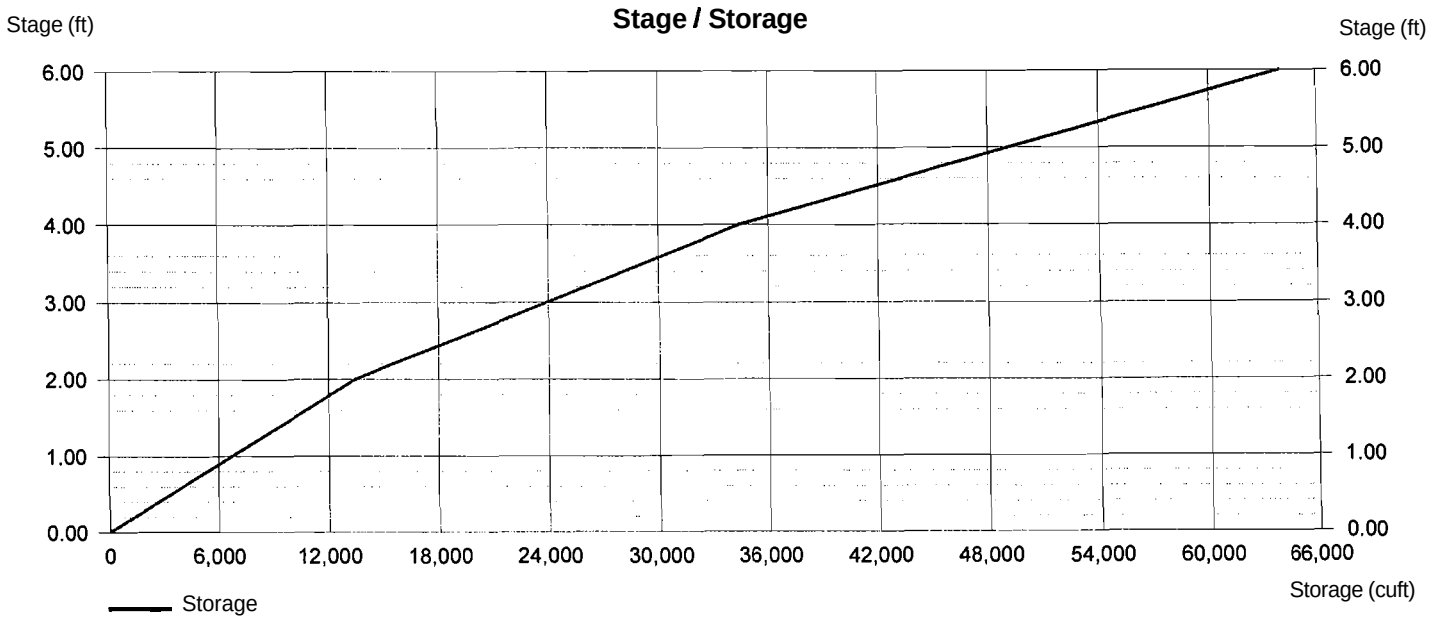
	[A]	[B]	[C]	[D]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 128.00	0.00	0.00	0.00
Length (ft)	= 24.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	0.00
N-Value	= .012	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 9:55 AM

Pond No. 4 - BASIN 4

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.00	5,768	0	0
2.00	120.00	8,480	14,248	14,248
4.00	122.00	11,440	19,920	34,168
6.00	124.00	14,630	26,070	60,238

Culvert / Orifice Structures

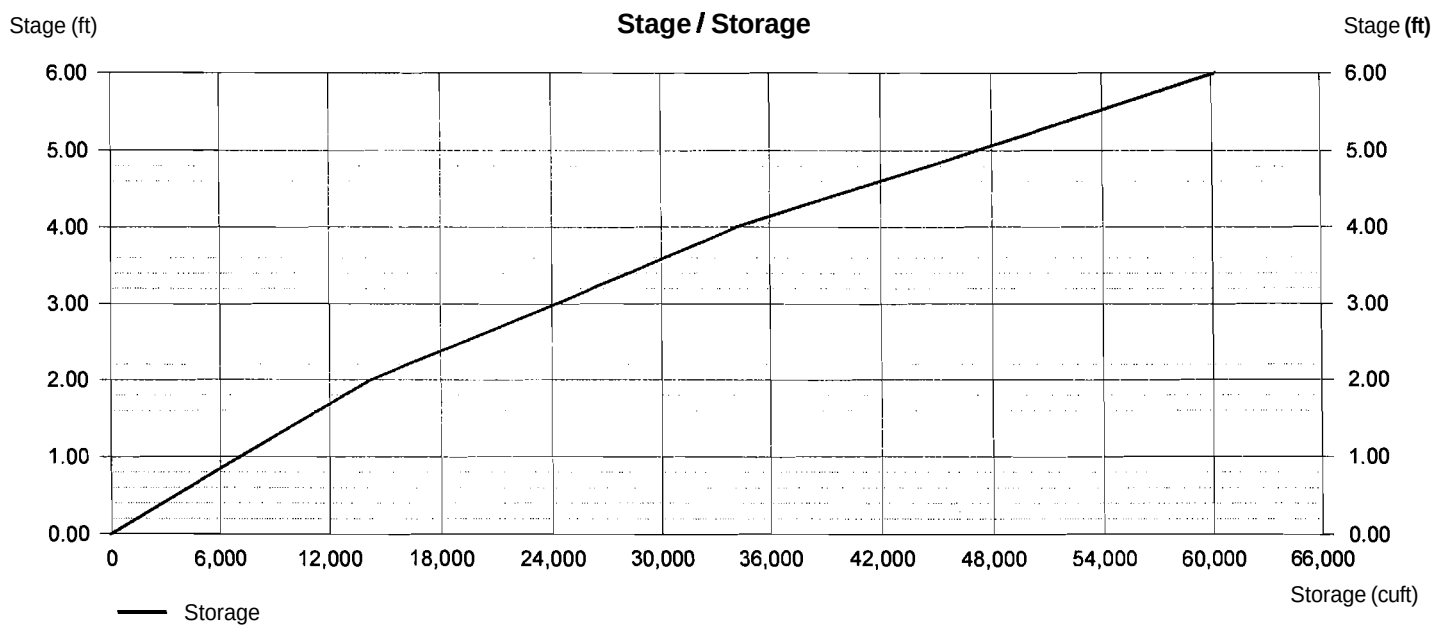
	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	0.00	0.00	0.00
Crest El. (ft)	= 123.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 9:56 AM

Pond No. 5 - BASIN 5

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	122.00	164	0	0
2.00	124.00	655	819	819
4.00	126.00	2,003	2,658	3,477

Culvert / Orifice Structures

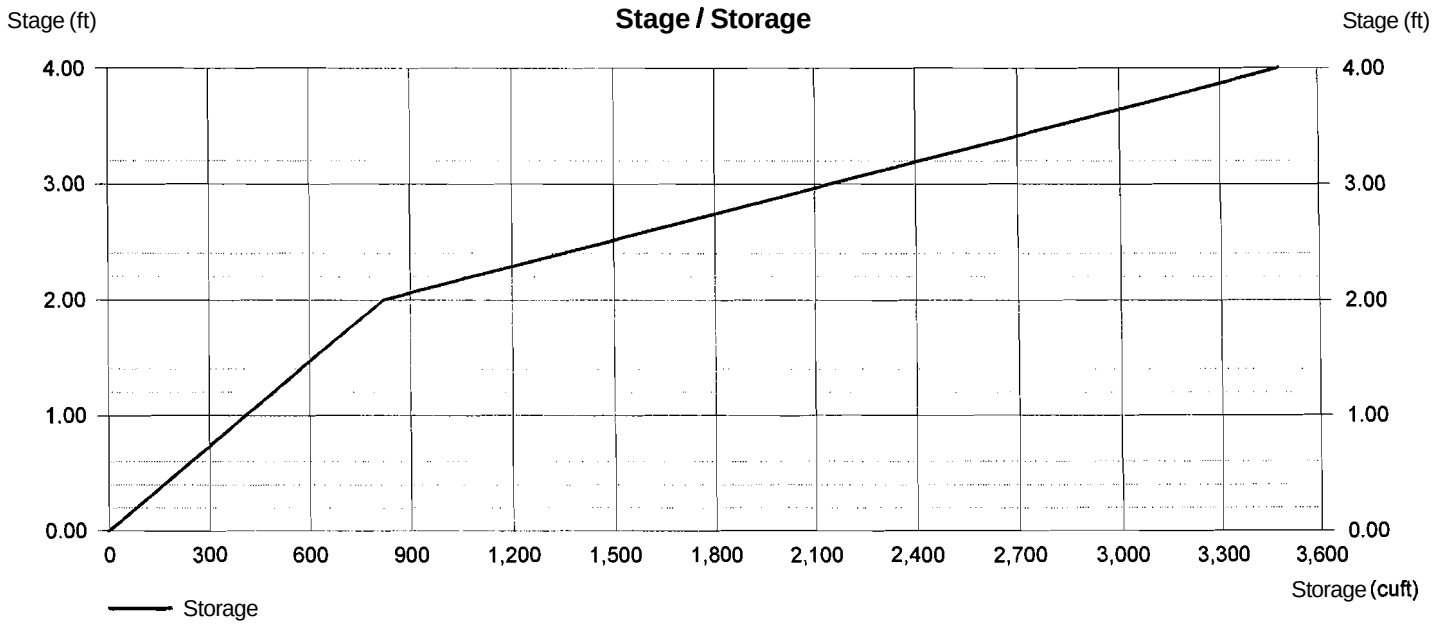
	[A]	[B]	[C]	[D]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .000	.000	.000	.000
Orif. Coeff.	= 0.00	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	0.00	0.00	0.00
Crest El. (ft)	= 125.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	0.00	0.00	0.00
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Pond Report

Hydraflow Hydrographs by Intelisolve — Tuesday, Oct 31 2006, 12:38 PM

Pond No. 8 - UPGRADED BASIN

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	118.00	1,828	0	0
1.00	119.00	5,668	3,748	3,748
2.00	120.00	8,193	6,931	10,679

Culvert / Orifice Structures

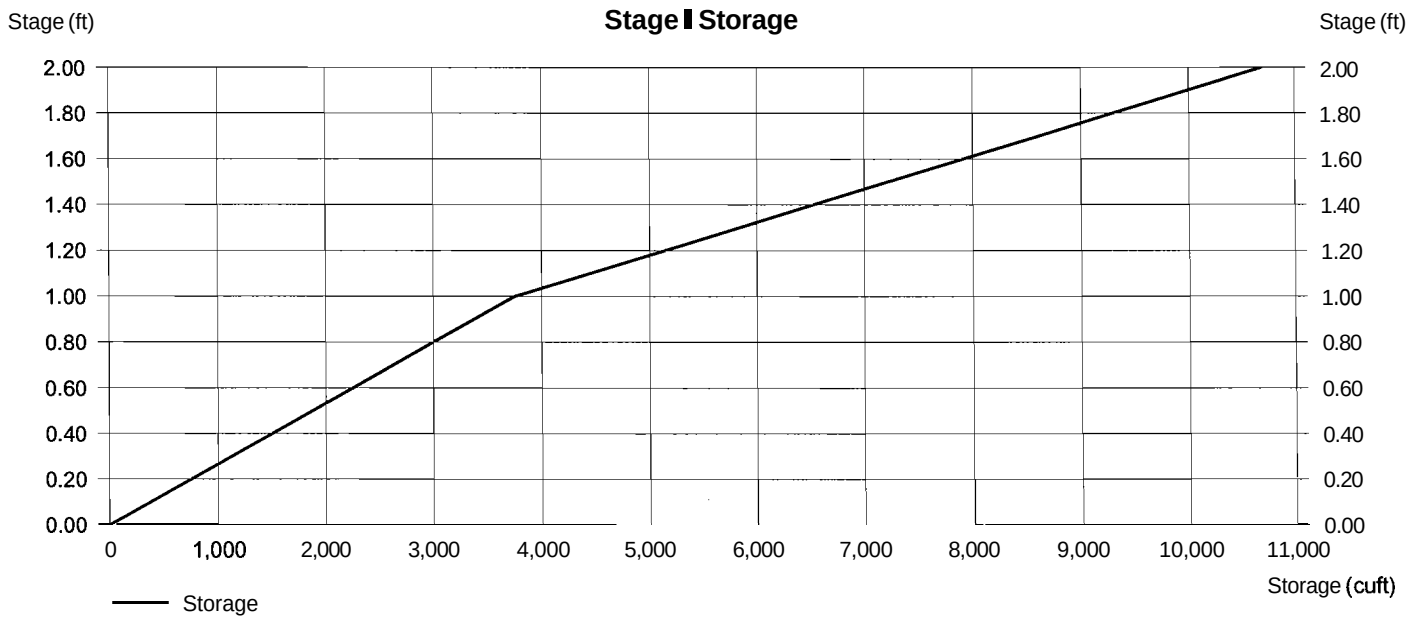
	[A]	[B]	[C]	[D]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 118.75	0.00	0.00	0.00
Length (ft)	= 130.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	0.00
N-Value	= .012	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= nla	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	0.00	0.00	0.00
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfiltration = 4.000 inlhr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control.



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.37	1	730	14,413	----	------	------	EW-I (PT. I)
2	SCS Runoff	0.86	1	727	3,257	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	0.00	1	0	0	----	------	------	EW-3
4	Combine	4.17	1	729	17,670	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	0.00	1	890	131	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.00	1	1015	124	5	118.01	26	EXIST. BASIN
7	Diversionl	0.00	1	1015	124	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	859	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.00	1	0	0	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	0.00	1	0	0	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	0.21	1	740	2,025	----	------	------	PW-1
13	Reservoir	0.04	1	999	2,006	12	124.20	772	BASIN 2
14	Diversionl	0.04	1	999	2,006	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	0.00	1	798	0	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	0.46	1	748	3,557	----	------	------	PW-2A'
17	Reservoir	0.08	1	963	3,538	16	122.14	1,468	BASIN 1
18	Diversionl	0.04	1	963	1,693	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	0.04	1	963	1,845	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	0.22	1	724	711	----	------	------	PW-2B
21	SCS Runoff	0.01	1	1337	322	----	------	------	PW-3A
22	Reservoir	0.01	1	1446	304	21	118.02	143	BASIN 4
23	Diversionl	0.01	1	1446	304	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	1191	0	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.00	1	0	0	----	------	------	PW-3B
26	SCS Runoff	0.00	1	1335	19	----	------	------	PW-4
27	Reservoir	0.00	1	1355	11	26	118.00	7	EXIST. BASIN
28	Diversionl	0.00	1	1355	11	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.00	1	0	0	27	------	------	EX. BASIN OUTFLOW
30	Combine	0.22	1	724	2,555	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	0.22	1	724	2,555	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	0.00	1	0	0	----	------	------	PW-5A
33	Reservoir	0.00	1	0	0	32	124.00	0	BASIN 3
34	Diversion1	0.00	1	0	0	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.00	1	0	0	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.07	1	725	227	----	------	------	PW-5B
37	Combine	0.07	1	725	227	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	0.00	1	1440	3	----	------	------	PW-6A
39	Reservoir	0.00	1	0	0	38	122.00	3	BASIN 5
40	Diversion1	0.00	1	0	0	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	0	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.00	1	0	0	----	------	------	PW-6B
43	Combine	0.00	1	0	0	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	32.36	1	728	117,574	----	------	------	EW-I (PT. I)
2	SCS Runoff	8.25	1	726	26,572	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	0.12	1	902	3,319	----	------	------	EW-3
4	Combine	40.12	1	727	147,465	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	1.37	1	730	5,489	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.28	1	766	5,482	5	118.53	1,969	EXIST. BASIN
7	Diversion1	0.28	1	766	5,482	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	743	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.02	1	1327	441	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	0.27	1	726	1,943	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	11.65	1	725	36,426	----	------	------	PW-1
13	Reservoir	5.05	1	739	36,388	12	126.56	10,614	BASIN 2
14	Diversion1	0.46	1	739	18,849	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	4.59	1	739	17,540	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	9.65	1	736	45,428	----	------	------	PW-2A
17	Reservoir	1.23	1	821	45,325	16	124.11	22,713	BASIN 1
18	Diversion1	0.54	1	821	21,382	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	0.69	1	821	23,943	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	0.75	1	724	2,577	----	------	------	PW-2B
21	SCS Runoff	5.95	1	743	33,538	----	------	------	PW-3A
22	Reservoir	0.80	1	885	33,478	21	120.09	15,154	BASIN 4
23	Diversion1	0.80	1	885	33,478	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	748	0	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.00	1	1441	11	----	------	------	PW-3B
26	SCS Runoff	1.08	1	741	5,992	----	------	------	PW-4
27	Reservoir	0.27	1	785	5,985	26	118.52	1,950	EXIST. BASIN
28	Diversion1	0.27	1	785	5,985	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.00	1	783	0	27	------	------	EX. BASIN OUTFLOW
30	Combine	0.90	1	725	26,519	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	5.19	1	739	44,070	15, 24, 25, 30	------		PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	1.77	1	748	11,836	----	------		PW-5A
33	Reservoir	0.28	1	921	11,819	32	124.72	4,860	BASIN 3
34	Diversion1	0.19	1	921	7,946	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.09	1	921	3,872	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.55	1	725	1,714	----	------	------	PW-5B
37	Combine	0.56	1	725	5,586	35, 36	------		TOTAL TO PT. 5
38	SCS Runoff	0.56	1	742	3,154	----	------		PW-6A
39	Reservoir	0.08	1	871	3,141	38	124.35	1,288	BASIN 5
40	Diversion1	0.57	1	871	24,728	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	-21,587	39	------		BASIN 6 OUTFLOW
42	SCS Runoff	0.00	1	0	0	----	------	------	PW-6B
43	Combine	0.00	1	0	-21,587	41.42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	54.24	1	728	199,459	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	13.82	1	725	45,078	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	1.81	1	758	18,539	----	------	------	EW-3
4	Combine	67.46	1	727	263,076	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	2.93	1	729	11,135	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.55	1	763	11,128	5	119.10	4,411	EXIST. BASIN
7	Diversionl	0.55	1	763	11,128	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	729	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	0.42	1	747	4,951	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	2.03	1	723	6,500	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	22.27	1	725	68,589	----	------	------	PW-1
13	Reservoir	13.19	1	731	68,541	12	127.77	17,137	BASIN 2
14	Diversionl	0.56	1	731	22,713	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	12.64	1	731	45,828	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	17.57	1	736	82,127	----	------	------	PW-2A
17	Reservoir	6.17	1	762	81,984	16	125.10	35,728	BASIN 1
18	Diversionl	0.65	1	762	27,428	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	5.52	1	762	54,556	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.09	1	724	3,831	----	------	------	PW-2B
21	SCS Runoff	13.71	1	741	71,549	----	------	------	PW-3A
22	Reservoir	1.13	1	946	71,290	21	122.48	40,410	BASIN 4
23	Diversionl	1.13	1	946	71,290	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	0.00	1	1808	0	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.08	1	844	2,232	----	------	------	PW-3B
26	SCS Runoff	2.64	1	739	13,262	----	------	------	PW-4
27	Reservoir	1.08	1	764	13,255	26	119.09	4,359	EXIST. BASIN
28	Diversionl	0.55	1	764	11,473	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	0.53	1	764	1,782	27	------	------	EX. BASIN OUTFLOW
30	Combine	6.17	1	762	60,169	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	13.73	1	731	108,229	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	5.26	1	743	29,187	----	------	------	PW-5A
33	Reservoir	0.76	1	859	29,150	32	125.94	13,018	BASIN 3
34	Diversionl	0.51	1	859	19,599	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.25	1	859	9,551	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	0.91	1	724	2,872	----	------	------	PW-5B
37	Combine	0.93	1	725	12,422	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	1.41	1	739	7,120	----	------	------	PW-6A
39	Reservoir	0.45	1	771	7,107	38	125.52	2,837	BASIN 5
40	Diversion1	0.70	1	771	37,165	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.00	1	0	-30,059	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.01	1	881	269	----	------	------	PW-6B
43	Combine	0.00	1	0	-29,790	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	66.82	1	728	247,842	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	17.03	1	725	56,013	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	3.95	1	753	31,515	----	------	------	EW-3
4	Combine	83.67	1	727	335,370	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	3.90	1	729	14,712	----	------	------	EW-4 (PT. 4)
6	Reservoir	0.61	1	771	14,705	5	119.35	6,207	EXIST. BASIN
7	Diversion1	0.61	1	771	14,705	6	------	------	BASIN INFILTRATION
8	Diversion2	0.00	1	952	0	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	1.18	1	739	9,326	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	3.47	1	722	9,920	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	28.65	1	725	88,363	----	------	------	PW-1
13	Reservoir	18.17	1	730	88,312	12	128.24	20,023	BASIN 2
14	Diversion1	0.59	1	730	24,316	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	17.58	1	730	63,996	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	22.26	1	736	104,331	----	------	------	PW-2A
17	Reservoir	8.60	1	760	104,169	16	125.66	43,154	BASIN 1
18	Diversion1	0.72	1	760	29,948	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	7.89	1	760	74,221	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.29	1	724	4,548	----	------	------	PW-2B
21	SCS Runoff	18.70	1	740	96,108	----	------	------	PW-3A
22	Reservoir	2.71	1	820	95,697	21	123.21	49,892	BASIN 4
23	Diversion1	1.24	1	820	84,639	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	1.48	1	820	11,058	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	0.32	1	766	5,005	----	------	------	PW-3B
26	SCS Runoff	3.66	1	738	18,027	----	------	------	PW-4
27	Reservoir	1.81	1	760	18,020	26	119.28	5,664	EXIST. BASIN
28	Diversion1	0.59	1	760	13,544	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	1.22	1	760	4,476	27	------	------	EX. BASIN OUTFLOW
30	Combine	9.25	1	760	83,246	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	20.38	1	741	163,304	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	7.68	1	741	41,017	----	------	------	PW-5A
33	Reservoir	0.90	1	886	40,962	32	126.62	19,997	BASIN 3
34	Diversion1	0.60	1	886	27,415	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.30	1	886	13,546	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	1.12	1	724	3,553	----	------	------	PW-5B
37	Combine	1.16	1	725	17,099	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	1.97	1	738	9,739	----	------	------	PW-6A
39	Reservoir	1.51	1	752	9,725	38	125.68	3,055	BASIN 5
40	Diversion1	0.72	1	752	40,058	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	0.79	1	752	-30,333	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.05	1	744	644	----	------	------	PW-6B
43	Combine	0.83	1	751	-29,689	41, 42	------	------	TOTAL TO PT. 6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	93.47	1	728	352,671	----	------	------	EW-1 (PT. 1)
2	SCS Runoff	23.83	1	725	79,704	----	------	------	EW-2 (PT. 2)
3	SCS Runoff	10.49	1	748	66,852	----	------	------	EW-3
4	Combine	119.93	1	727	499,227	1, 2, 3	------	------	EXIST. TOTAL TO RIVER (PT. 3)
5	SCS Runoff	6.07	1	729	22,821	----	------	------	EW-4 (PT. 4)
6	Reservoir	3.68	1	740	22,814	5	119.57	7,722	EXIST. BASIN
7	Diversionl	0.66	1	740	19,287	6	------	------	BASIN INFILTRATION
8	Diversion2	3.02	1	740	3,526	6	------	------	BASIN OUTFLOW (PT. 4)
9	SCS Runoff	4.40	1	731	21,975	----	------	------	EW-5 (PT. 5)
10	SCS Runoff	7.07	1	722	18,593	----	------	------	EW-6 (PT. 6)
12	SCS Runoff	42.51	1	725	132,314	----	------	------	PW-1
13	Reservoir	25.61	1	731	132,260	12	129.22	27,000	BASIN 2
14	Diversionl	0.68	1	731	26,924	13	------	------	BASIN 2 INFILTRATION
15	Diversion2	24.93	1	731	105,336	13	------	------	BASIN 2 OUTFLOW (PT. 1)
16	SCS Runoff	32.37	1	735	153,164	----	------	------	PW-2A
17	Reservoir	11.50	1	761	152,968	16	126.95	62,833	BASIN 1
18	Diversionl	0.76	1	738	33,860	17	------	------	BASIN 1 INFILTRATION
19	Diversion2	11.10	1	761	119,108	17	------	------	BASIN 1 OUTFLOW
20	SCS Runoff	1.71	1	724	6,074	----	------	------	PW-2B
21	SCS Runoff	30.02	1	740	152,548	----	------	------	PW-3A
22	Reservoir	16.94	1	760	151,991	21	124.00	60,230	BASIN 4
23	Diversionl	1.35	1	760	94,166	22	------	------	BASIN 4 INFILTRATION
24	Diversion2	15.59	1	760	57,825	22	------	------	BASIN 4 OUTFLOW
25	SCS Runoff	1.63	1	754	13,784	----	------	------	PW-3B
26	SCS Runoff	6.00	1	737	29,083	----	------	------	PW-4
27	Reservoir	3.71	1	755	29,076	26	119.65	8,228	EXIST. BASIN
28	Diversionl	0.68	1	755	17,288	27	------	------	EX. BASIN INFILTRATION
29	Diversion2	3.04	1	755	11,788	27	------	------	EX. BASIN OUTFLOW
30	Combine	14.29	1	757	136,971	19, 20, 29	------	------	PROP. TOTAL TO PT. 2

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
31	Combine	42.36	1	754	313,916	15, 24, 25, 30	------	------	PROP. TOTAL TO RIVER (PT. 3)
32	SCS Runoff	13.42	1	740	69,215	----	------	------	PW-5A
33	Reservoir	1.37	1	889	69,070	32	128.20	37,352	BASIN 3
34	Diversion1	0.76	1	1041	43,495	33	------	------	BASIN 3 INFILTRATION
35	Diversion2	0.69	1	889	25,574	33	------	------	BASIN 3 OUTFLOW
36	SCS Runoff	1.56	1	724	5,025	----	------	------	PW-5B
37	Combine	1.67	1	725	30,600	35, 36	------	------	TOTAL TO PT. 5
38	SCS Runoff	3.26	1	738	15,845	----	------	------	PW-6A
39	Reservoir	3.21	1	740	15,831	38	125.83	3,254	BASIN 5
40	Diversion1	0.74	1	740	45,274	39	------	------	BASIN 6 INFILTRATION
41	Diversion2	2.47	1	740	-29,443	39	------	------	BASIN 6 OUTFLOW
42	SCS Runoff	0.30	1	728	1,869	----	------	------	PW-6B
43	Combine	2.72	1	740	-27,574	41, 42	------	------	TOTAL TO PT. 6

APPENDIX C: STORM SEWER SIZING CALCULATIONS

Consultants in Engineering, Architecture. Planning, and the Environment
23 East Street Cambridge, MA 02141-1215
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Project ~~WAYLAND TOWN CENTER~~
I-D-F CURVE COMPUTATION
Job No. 6032

Prepared By DTB Date 10/30/2006
Checked By _____ Date _____

I-D-F CURVE COMPUTATION

Proceedure: Establish intensity-duration-frequency curve for the above referenced town using the proceedure outlined in NOAA NWS Hydrc-35 for 5 minutes to 60 minutes precipitation frequencies. Referenced page numbers on this sheet are from Hydrc-35.

1. Interpolate precipitation (in.) from partial duration series (pg.1525) as follows:

2yr 60min	1.1
100yr 60 mi	2.5
2yr 5min	0.35
100yr 5min	0.65
2yr 15min	0.67
100yr 15min	1.35

2. Using equations (pg. 28), compute precipitation for intermediate return periods and frequencies. Convert rainfall values (in.) to corresponding intensity (in./hr.)

10 min. value =	0.59(15 min value) + 0.41(5min value)
30 min. value =	0.49(60min value) + 0.51(15min value)
5yr =	0.278(100yr) + 0.674(2yr)
10 yr =	0.449(100yr) + 0.496(2yr)
25 yr=	0.669(100yr) + 0.293(2yr)
50 yr =	0.835(100yr) + 0.146(2yr)

	5min	10min	15min	30min	60min
2yr	4.20	3.24	2.68	1.76	1.10
5yr	5.04	3.96	3.32	2.24	1.44
10yr	5.64	4.44	3.76	2.58	1.67
25yr	6.48	5.22	4.40	3.08	1.99
50yr	7.08	5.76	4.92	3.44	2.25
100yr	7.80	6.36	5.40	3.82	2.50

3. Plot values computed on IDF chart for 5 to 30 min. duration.

Tc (min.)	2 year (in./hr.)	5 year (in./hr.)	10 year (in./hr.)	25 year (in./hr.)	50 year (in./hr.)	100 year (in./hr.)
5.00	4.20	5.04	5.64	6.48	7.08	7.80
5.50	4.10	4.93	5.52	6.35	6.95	7.66
6.00	4.01	4.82	5.40	6.23	6.82	7.51
6.50	3.91	4.72	5.28	6.10	6.68	7.37
7.00	3.82	4.61	5.16	5.98	6.55	7.22
7.50	3.72	4.50	5.04	5.85	6.42	7.08
8.00	3.62	4.39	4.92	5.72	6.29	6.94
8.50	3.53	4.28	4.80	5.60	6.16	6.79
9.00	3.43	4.18	4.68	5.47	6.02	6.65
9.50	3.34	4.07	4.56	5.35	5.89	6.50
10.00	3.24	3.96	4.44	5.22	5.76	6.36
10.50	3.18	3.90	4.37	5.14	5.68	6.26
11.00	3.13	3.83	4.30	5.06	5.59	6.17
11.50	3.07	3.77	4.24	4.97	5.51	6.07
12.00	3.02	3.70	4.17	4.89	5.42	5.98
12.50	2.96	3.64	4.10	4.81	5.34	5.88
13.00	2.90	3.58	4.03	4.73	5.26	5.78
13.50	2.85	3.51	3.96	4.65	5.17	5.69
14.00	2.79	3.45	3.90	4.56	5.09	5.59
14.50	2.74	3.38	3.83	4.48	5.00	5.50
15.00	2.68	3.32	3.76	4.40	4.92	5.40
15.50	2.65	3.28	3.72	4.36	4.87	5.35
16.00	2.62	3.25	3.68	4.31	4.82	5.29
16.50	2.59	3.21	3.64	4.27	4.77	5.24
17.00	2.56	3.18	3.60	4.22	4.72	5.19
17.50	2.53	3.14	3.56	4.18	4.67	5.14

Tc (min.)	2 year (in./hr.)	5 year (in./hr.)	10 year (in./hr.)	25 year (in./hr.)	50 year (in./hr.)	100 year (in./hr.)
18.00	2.50	3.10	3.52	4.14	4.62	5.08
18.50	2.47	3.07	3.48	4.09	4.57	5.03
19.00	2.43	3.03	3.45	4.05	4.53	4.98
19.50	2.40	3.00	3.41	4.00	4.48	4.93
20.00	2.37	2.96	3.37	3.96	4.43	4.87
20.50	2.34	2.92	3.33	3.92	4.38	4.82
21.00	2.31	2.89	3.29	3.87	4.33	4.77
21.50	2.28	2.85	3.25	3.83	4.28	4.72
22.00	2.25	2.82	3.21	3.78	4.23	4.66
22.50	2.22	2.78	3.17	3.74	4.18	4.61
23.00	2.19	2.74	3.13	3.70	4.13	4.56
23.50	2.16	2.71	3.09	3.65	4.08	4.50
24.00	2.13	2.67	3.05	3.61	4.03	4.45
24.50	2.10	2.64	3.01	3.56	3.98	4.40
25.00	2.07	2.60	2.97	3.52	3.93	4.35
25.50	2.04	2.56	2.93	3.48	3.88	4.29
26.00	2.01	2.53	2.89	3.43	3.83	4.24
26.50	1.97	2.49	2.86	3.39	3.79	4.19
27.00	1.94	2.46	2.82	3.34	3.74	4.14
27.50	1.91	2.42	2.78	3.30	3.69	4.08
28.00	1.88	2.38	2.74	3.26	3.64	4.03
28.50	1.85	2.35	2.70	3.21	3.59	3.98
29.00	1.82	2.31	2.66	3.17	3.54	3.93
29.50	1.79	2.28	2.62	3.12	3.49	3.87
30.00	1.76	2.24	2.58	3.08	3.44	3.82

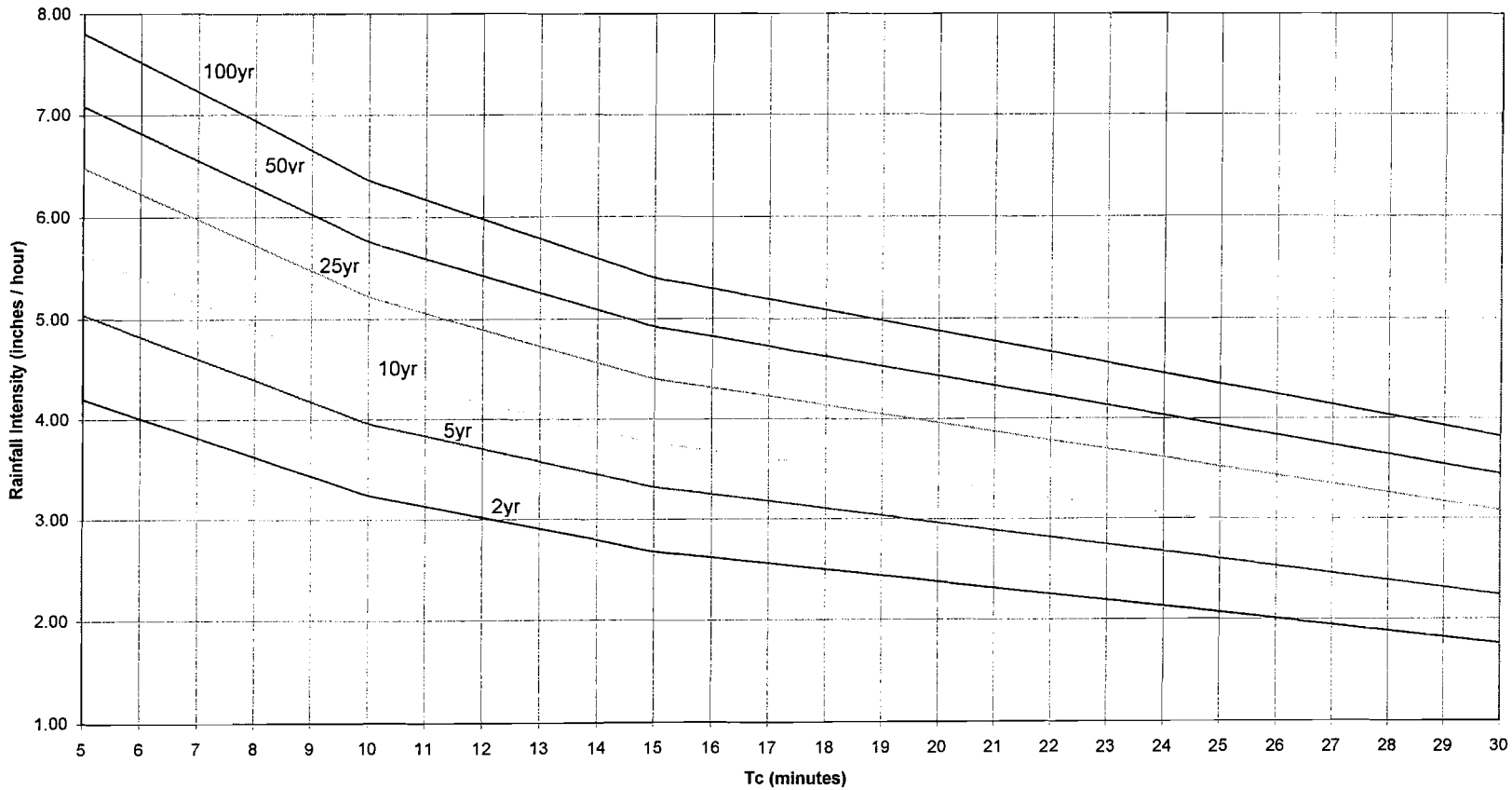
Consultants in Engineering, Architecture, Planning, and the Environment
23 East Street Cambridge, MA 02141-1215
T 617 225-0200 F 617 225-0216

Project WAYLAND TOWN CENTER
I-D-F CURVE COMPUTATION

Job No. 6032

Prepared By DTB Date 10/30/2006
Checked By _____ Date _____

Intensity-Duration-Frequency (I-D-F) Chart



Project WAYLAND TOWN CENTER
RATIONAL DESIGN COMPUTATION

Job No.

Prepared By DTB Date 10/30/2006 Revised
Checked By Date Revised

Design Storm 10 Year

STRUCTURE		IMPERVIOUS			PERVIOUS			Sum	Total	I	Q	D	S	n	Q	V	Length	Time	Total	Inv.	Inv.	Rim	Rim	Remarks
Upper	Lower	A (ac)	C	CA	A (ac)	C	CA	of CA's	Tc (min)	(in/hr)	I x CA's (cfs)	(in)	(ft/ft)		Full (cfs)	Full (fps)	of Pipe (ft)	in pipe (min)	Fall (ft)	Elev. Upper End	Elev. Lower End	Elev. Upper End	Elev. Lower End	
CB-1	DMH-1	0.16	0.90	0.14	0.09	0.30	0.03	0.17	6.00	5.40	0.92	12	0.008	0.012	3.45	4.40	41	0.16	0.60	131.30	130.70	134.30	134.70	
CB-2	DMH-1	0.15	0.90	0.14	0.03	0.30	0.01	0.15	6.00	5.40	0.81	12	0.015	0.012	4.73	6.02	40	0.11	0.60	131.30	130.70	134.30	134.70	
DMH-1	DMH-2							0.32	6.16	5.40	1.73	12	0.005	0.012	2.73	3.47	60	0.29	0.30	130.70	130.40	134.70	134.80	
CB-3	DMH-2	0.10	0.90	0.09				0.09	6.00	5.40	0.49	12	0.041	0.012	7.79	9.92	27	0.05	1.10	131.50	130.40	134.90	134.80	
CB-4	DMH-2	0.07	0.90	0.06	0.05	0.30	0.02	0.08	6.00	5.40	0.43	12	0.032	0.012	6.94	8.84	34	0.06	1.10	131.50	130.40	134.80	134.80	
DMH-2	DMH-3							0.49	6.44	5.40	2.65	12	0.005	0.012	2.73	3.47	60	0.29	0.30	130.40	130.10	134.80	135.20	
CB-25	DMH-3A	0.23	0.90	0.21	0.19	0.30	0.06	0.08	6.00	5.40	0.43	12	0.008	0.012	3.39	4.31	13	0.05	0.10	131.70	131.60	134.70	134.80	
CB-26	DMH-3A	0.08	0.90	0.07				0.08	6.00	5.40	0.43	12	0.005	0.012	2.73	3.47	40	0.19	0.20	131.80	131.60	134.80	134.80	
DMH-3A	DMH-3							0.16	6.19	5.40	0.86	12	0.013	0.012	4.46	5.67	120	0.35	1.60	131.70	130.10	134.80	135.20	
DMH-3	DMH-4							0.65	6.54	5.28	3.43	15	0.005	0.012	4.95	4.03	80	0.33	0.40	130.10	129.70	135.20	134.80	
CB-5	DMH-4	0.13	0.90	0.12	0.03	0.30	0.01	0.08	6.00	5.40	0.43	12	0.036	0.012	7.36	9.37	22	0.04	0.80	130.50	129.70	134.70	134.80	
DMH-4	DMH-5							0.73	6.87	5.28	3.85	15	0.005	0.012	4.71	3.84	84	0.37	0.38	129.70	129.32	134.80	134.60	
CB-6	DMH-5	0.10	0.90	0.09	0.01	0.30	0.00	0.11	6.00	5.40	0.59	12	0.032	0.012	6.95	8.84	21	0.04	0.68	130.00	129.32	134.30	134.60	
CB-7	DMH-5	0.13	0.90	0.12	0.02	0.30	0.01	0.08	7.24	5.16	0.41	12	0.034	0.012	7.12	9.06	20	0.04	0.68	130.00	129.32	134.30	134.60	
DMH-5	DMH-6							0.92	7.24	5.16	4.75	15	0.006	0.012	5.38	4.39	169	0.64	1.00	129.32	128.32	134.60	134.50	
CB-8	DMH-6	0.15	0.90	0.14				0.08	6.00	5.40	0.43	12	0.029	0.012	6.57	8.37	20	0.04	0.58	129.00	128.42	134.40	134.50	
CB-9	DMH-6	0.14	0.90	0.13				0.08	6.00	5.40	0.43	12	0.029	0.012	6.6	8.37	20	0.04	0.58	129.00	128.42	134.40	134.50	
DMH-6	DMH-7							1.08	7.88	5.04	5.44	18	0.006	0.012	8.5	4.79	130	0.45	0.72	128.42	127.70	134.50	134.40	
CB-10	DMH-7	0.10	0.90	0.09				0.08	6.00	5.40	0.43	12	0.025	0.012	6.16	7.85	51	0.11	1.30	129.00	127.70	133.90	134.40	
CB-11	DMH-7	0.09	0.90	0.08				0.08	6.00	5.40	0.43	12	0.026	0.012	6.22	7.92	50	0.11	1.30	129.00	127.70	133.90	134.40	
CB-11A	DMH-7	0.19	0.90	0.17				0.08	6.00	5.40	0.43	12	0.008	0.012	3.42	4.36	127	0.49	1.00	129.00	128.00	132.00	134.40	
CB-14	DMH-8	0.29	0.90	0.26	0.44	0.30	0.13	0.08	6.00	5.40	0.43	12	0.005	0.012	2.77	3.52	175	0.83	0.90	127.00	126.10	130.00	132.50	
CB-12	DMH-8	0.25	0.90	0.23	0.25	0.30	0.08	0.08	6.00	5.40	0.43	12	0.040	0.012	7.68	9.78	48	0.08	1.90	128.00	126.10	131.90	132.50	
CB-13	DMH-8	0.16	0.90	0.14				0.08	6.00	5.40	0.43	12	0.038	0.012	7.47	9.52	24	0.04	0.90	127.00	126.10	132.40	132.50	
DMH-8	DMH-7							0.24	6.83	5.28	1.27	12	0.005	0.012	2.77	3.53	213	1.01	1.10	126.10	125.00	132.50	134.30	
DMH-7	DMH-9							1.56	7.83	5.04	7.86	18	0.006	0.012	9.00	5.09	240	0.79	1.50	125.40	123.90	134.30	134.00	
DMH-9	FES-17A							1.56	8.62	4.80	7.49	18	0.005	0.012	8.05	4.55	60	0.22	0.30	123.90	123.60	134.00		
CB-27	DMH-15	2.16	0.90	1.94	0.24	0.30	0.07	2.01	6.00	5.40	10.85	18	0.013	0.012	13.14	7.44	15	0.03	0.20	127.50	127.30	131.20	131.70	
DMH-15	DMH-16							2.01	6.03	5.40	10.85	24	0.005	0.012	16.95	5.39	230	0.71	1.10	127.40	126.30	134.30	133.00	
CB-28	DMH-16	0.54	0.90	0.49	0.08	0.30	0.02	0.51	6.00	5.40	2.75	12	0.014	0.012	4.61	5.87	14	0.04	0.20	128.00	127.80	132.20	131.00	
DMH-16	DMH-17							2.52	6.74	5.28	13.31	24	0.005	0.012	16.59	5.28	262	0.83	1.20	126.30	125.10	134.30	131.30	
CB-29	DMH-17	1.71	0.90	1.54	0.43	0.30	0.13	1.67	6.00	5.40	9.02	15	0.033	0.012	12.78	10.41	15	0.02	0.50	127.50	127.00	130.70	131.30	
DMH-17	FES-1							4.19	7.57	5.04	21.12	24	0.008	0.012	21.38	6.80	184	0.45	1.40	125.10	123.70	131.30	0.00	
CB-24	DMH-30	0.23	0.90	0.21	0.06	0.30	0.02	0.23	6.00	5.40	1.24	12	0.005	0.012	2.74	3.49	214	1.02	1.08	131.50	130.42	134.50	133.80	
CB-23	DMH-30	0.66	0.90	0.59	0.16	0.30	0.05	0.64	6.00	5.40	3.46	15	0.006	0.012	5.22	4.25	18	0.07	0.10	130.15	130.05	133.50	133.80	
DMH-30	FES-16							0.87	7.02	5.16	4.49	15	0.005	0.012	4.89	3.99	92	0.38	0.45	130.05	129.60	133.80		
CB-21	DMH-14	0.46	0.90	0.41	0.11	0.30	0.03	0.44	6.00	5.40	2.38	12	0.006	0.012	2.88	3.66	18	0.08	0.10	124.60	124.50	127.60	129.00	
CB-22	DMH-14	0.17	0.90	0.15	0.07	0.30	0.02	0.17	6.00	5.40	0.92	12	0.033	0.012	7.05	8.97	18	0.03	0.60	126.60	126.00	129.80	129.00	
DMH-14	DMH-13							0.61	6.08	5.40	3.29	15	0.005	0.012	5.01	4.08	156	0.64	0.80	124.50	123.70	129.00	128.70	
CB-19	DMH-13	0.16	0.90	0.14	0.07	0.30	0.02	0.16	6.00	5.40	0.86	12	0.011	0.012	4.07	5.18	18	0.06	0.20	124.60	124.40	127.60	128.70	
CB-20	DMH-13	0.17	0.90	0.15	0.07	0.30	0.02	0.17	6.00	5.40	0.92	12	0.011	0.012	4.07	5.18	18	0.06	0.20	125.80	125.60	128.80	128.70	
DMH-13	DMH-12							0.94	6.06	5.40	5.08	18	0.005	0.012	7.89	4.47	104	0.39	0.50	123.70	123.20	128.70	128.40	
CB-18	DMH-12	0.07	0.90	0.06	0.08	0.30	0.02	0.08	6.00	5.40	0.43	12	0.009	0.012	3.60	4.58	46	0.17	0.40	124.40	124.00	127.40	128.40	
DMH-12	FES-9A							1.02	6.45	5.40	5.51	18	0.005	0.012	8.05	4.55	120	0.44	0.60	123.20	122.60	128.40	128.00	
CB-15	DMH-10	0.27	0.90	0.24				1.02	6.00	5.40	5.51	12	0.022	0.012	5.68	7.23	60	0.14	1.30	123.70	122.40	126.70	125.60	
CB-16	DMH-10	0.22	0.90	0.19	0.22	0.30	0.06	1.02	6.00	5.40	5.51	15	0.020	0.012	9.90	8.06	10	0.02	0.20	122.50	122.30	125.50	125.60	
DMH-10	CB-17							2.04	6.14	5.40	11.02	18	0.010	0.012	11.38	6.44	90	0.23	0.90	122.40	121.50	125.60	126.40	
CB-17	DMH-11	0.32	0.90	0.29	0.32	0.30	0.10	2.43	6.37	5.40	13.12	18	0.017	0.012	14.69	8.31	18	0.04	0.30	121.50	121.20	126.40	127.00	
DMH-11	FES-7							2.43	6.41	5.40	13.12	18	0.014	0.012	13.54	7.66	120	0.26	1.70	121.20	119.50	127.00	128.00	

Appendix C Development Agreement between the Town of Wayland and the Project Proponent

APPENDIX F

MEMORANDUM OF AGREEMENT

This Agreement, dated as of March 28, 2006, is entered into by and between the Town of Wayland, a Massachusetts municipal corporation, acting by and through its Board of Selectmen ("Wayland") and Twenty Wayland, LLC, a Massachusetts limited liability company (the "Developer"), with a principal place of business located at 45 Broad Street, Boston, MA 02109.

RECITALS

The Developer has asked Wayland to consider amending the Wayland Zoning Bylaw ("Zoning Bylaw") by adopting Article 23 "Mixed Use Overlay District" ("MUOD Amendment"), a copy of which is attached as **Exhibit A**, at a Special Town Meeting to be held May 3, 2006, including all adjourned sessions thereof, ("Special Town Meeting") and to include in the Mixed Use Overlay District ("MUOD") a parcel of land consisting of approximately 56.5 acres, more or less, (the "Property") owned by Developer and more particularly shown on the plan attached hereto as **Exhibit B** and incorporated by reference. Wayland has called such Special Town Meeting and included said Article 23 in the Special Town Meeting Warrant as Special Town Meeting Warrant Article 2. The adoption of the MUOD Amendment and the inclusion of the Property within the MUOD would enable the Developer to apply to the Wayland Planning Board ("Planning Board") for special permits and Site Plan Approvals required under the proposed amendment to the Zoning Bylaw for development of an MUP on the Property (the "Development").

AGREEMENT

Now, therefore, for mutual consideration, the receipt and sufficiency of which are hereby acknowledged, Wayland and Developer agree that, if, and only if, the MUOD Amendment is adopted at the Special Town Meeting in the form attached hereto as Exhibit A, without modification which materially affects Developer's rights as set forth herein and Developer applies for and is issued a building permit in accordance with a Master Special Permit granted by the Planning Board for an MUP ("MUP") as described in the MUOD Amendment, then Wayland and Developer shall each perform the actions as set forth herein; provided, however, that with respect to the actions described in Sections B(1), B(2), and B(3), Developer shall perform its obligation regardless of the action of such Special Town Meeting, or the status of any building permit application; furthermore, with regard to the actions described in Sections B(4), B(5), B(6) and J(1) Developer shall perform its obligation at the time of the application for Concept Plan approval, Master Special Permit and Site Plan approval and when the Master Special Permit becomes effective, respectively. If Developer proceeds to develop a mixed-use project on the Property under any modified version of the MUOD Amendment or any other provision of the Zoning Bylaw adopted after the date of this Agreement which allows a mixed use project to be constructed on the Property within five (5) years after the date of this Agreement, Developer shall perform its obligations under this Agreement, except where modified by express written agreement of Wayland and Developer.

A. CONSERVATION RESTRICTION AND EASEMENT AND WETLANDS

1. Developer will execute, acknowledge and record a perpetual Conservation Restriction and Easement on a portion of the Property consisting of at least 10 acres (which may or may not be contiguous) subject to Developer's retained rights (i) to install, maintain, repair, and replace pedestrian and bicycle walkways and trails, and underground utility wires, lines, pipes, and conduits for all purposes necessary for development, maintenance, and operation of an MUP and (ii) to construct any improvements required under any permit for construction of an MUP. The holder of the Conservation Restriction and Easement shall be the Sudbury Valley Trustees, Inc., a Massachusetts non-profit corporation, or another entity designated by Wayland, which may be the Wayland Conservation Commission. Developer and the Holder will execute, acknowledge and submit the Conservation Restriction and Easement to the Massachusetts Executive Office of Environmental Affairs for approval and execution. In addition to the other remedies available to the holder of the Conservation Restriction and Easement for enforcement and violations thereof, the Developer, its heirs, successors, and assigns shall be liable to Wayland for civil fines of $300.00 per day. Each day that any such violation occurs or continues shall constitute a separate offense. Prior to taking any action to enforce any violation of the Conservation Restriction

and Easement, the holder thereof shall send or deliver a written notice describing the violation to the Developer, who shall cure any such violation within thirty (30) days after receipt of such notice. The exact configuration of the Land which will be encumbered by the Conservation Restriction and Easement shall be determined as part of the Master Special Permit process described in the MUOD Amendment.

2. Prior to filing an application for the Master Special Permit, the Developer shall file with the Wayland Conservation Commission an Abbreviated Notice of Resource Area Delineation ("ANRAD") seeking a determination of the existence and location of resource areas subject to protection under M.G.L. c. 131, §40 (the Wetland Protection Act), 310 C.M.R. 10.00, et seq. and Wayland's Wetlands and Water Resource Protection By-Law on the Property. The location of all such resource areas determined pursuant to said ANRAD shall be shown on the plans filed with the Master Special Permit application.

3. At the time that the Master Special Permit becomes effective, Developer agrees to deposit with the Wayland Treasurer the amount of $35,000.00, as a gift pursuant to M.G.L. c. 44, §53A, to be used for the improvement, management and maintenance of the Town-owned conservation land abutting the Property known as "Cow Common".

B. ENGAGEMENT OF CONSULTANTS; REIMBURSEMENT FOR COSTS

1. Payment of Consultants during the Rezoning Process. Within 30 days after the Attorney General approves the MUOD Amendment, , Developer agrees to replenish the existing escrow account(s) in the office of the Wayland Treasurer in an amount sufficient to pay for all documented costs of Wayland's consultants in the rezoning process up to and including the conclusion of the Special Town Meeting at which the MUOD Amendment is considered up to an aggregate maximum of $30,000.00 for these and the costs under paragraphs (2) and (3) of this Section B.

2. Payment of Legal Counsel during the Rezoning Process. Within 30 days after the Attorney General approves the MUOD Amendment, , Developer agrees to replenish the existing escrow account(s) in the office of the Wayland Treasurer in an amount sufficient to pay for all documented costs of Wayland's special legal counsel and/or Town Counsel in the rezoning process and in the preparation of this Agreement up to and including the conclusion of the Special Town Meeting at which the MUOD Amendment is considered up to an aggregate maximum of $30,000.00 for these and the costs under paragraphs (1) and (3) of this Section B.

3. Payment for Special Town Meeting. All documented costs incurred by Wayland associated with conducting the Special Town Meeting shall be paid by Developer provided that the MUOD Amendment has been approved by Attorney General. , Within 30 days of receipt of an itemized invoice for such costs, Developer shall reimburse Wayland for such costs, up to an aggregate maximum of $30,000.00 for these and the costs under paragraphs (1) and (2) of this Section B.

4. Payment for Review of Concept Plan. At the time of the submittal of the Concept Plan required by the MUOD Amendment, Developer shall deposit with the Wayland Treasurer the amount of $10,000.00, (the "Concept Plan Escrow Account") which shall be used pursuant to M.G.L.c. 44, §53G by the Planning Board to engage a landscape architect, architect, and/or urban designer to provide technical assistance during the review of the Concept Plan. The Concept Plan Escrow Account shall be replenished by Developer at the request of the Planning Board when the balance falls to $2,500.00. Such person shall assist the Planning Board in evaluating the Developer's Concept Plan and in determining whether such Concept Plan is consistent with the MUOD Amendment.

5. Payment for Review of Plans and Documents Accompanying the Application for a Master Special Permit. At the time of the submittal of the application for the Master Special Permit required by the MUOD Amendment, Developer shall deposit with the Wayland Treasurer the amount of $25,000.00, (the "Special Permit Escrow Account") which shall be used pursuant to M.G.L.c. 44, §53G by the Planning Board and any boards, committees or officials whose input or recommendations are sought pursuant to the MUOD Amendment by the Planning Board relative to said application to engage a landscape architect, architect, urban designer, civil engineer, traffic engineer, attorney, and other reasonably necessary consultants to provide technical assistance during the review of said application, except for a Licensed Site Professional. The Special Permit Escrow Account shall be replenished by Developer at the request of the Planning Board when the balance therein falls to $5,000.00.

6. Payment for Review of Plans and Documents Accompanying the Application for Site Plan Review Phase I or Phase II. At the time of the submittal of the application for site plan review (Phase I or Phase II) required by the MUOD Amendment, Developer shall deposit with the Wayland Treasurer the amount of $15,000.00, (the "Site Plan Escrow Account") which shall be used pursuant to M.G.L. c. 44, §53G by the Planning Board to engage a landscape architect, architect, urban designer, civil engineer, traffic engineer, attorney, and other reasonably necessary consultants to provide technical assistance during the review of said application, except for a License Site Professional. The Site Plan Escrow Account shall be replenished by Developer at the request of the Planning Board when the balance falls to $3,000.00.

7. Payment for Review of Plans and Documents Before and during Construction. At the time the Developer submits its first application for a building permit with respect to an MUP, Developer shall deposit with the Wayland Treasurer a gift the amount of $150,000.00, (the "Construction Escrow Account") which shall be used pursuant to M.G.L. c. 44, § 53A by Wayland to engage a landscape architect, architect, code consultant, building inspector, civil engineer, wastewater engineer, conservation consultant, traffic engineer, attorney, fire protection engineer, structural engineer, and other reasonably necessary consultants to provide technical assistance and inspections before and during the construction of an MUP, except for a Licensed Site Professional. Such account shall be used to pay for reasonably necessary outside consultant costs and expenses associated with document or plan review and inspections required by the Planning Board, Building Commissioner, Board of Selectmen, Board of Road Commissioners, Fire Department, Police Department, and Board of Health to review building permit applications and to conduct conformance review during and following the completion of construction in connection with the development of an MUP.

8. Management and Allocation of Escrow Accounts.

a. With respect to the escrow accounts anticipated in Sections B(4), B(5), B(6), and B(7), in the event that actual costs for a specific budgeted item are not expended, at the time such escrow account is terminated, any funds allocated for such costs which remain in an escrow account must be used to replenish other required escrows before requesting additional funding from Developer.

b. Wayland agrees that prior to engaging any consultant or incurring any costs which will be paid for by Developer, Wayland will: (i) consult with Developer; (ii) provide a budget for the anticipated consultant contract; (iii) not incur any such cost, or enter into any such contract, without prior notice to Developer; and (iv) upon request from Developer, provide a periodic accounting for each of the specific escrow accounts referenced in this section. Nothing herein shall be construed as granting Developer any rights not provided in M.G.L. c. 44, § 53G to contest or challenge consultants selected by Wayland or any of its boards, committees or officials.

c. Upon final payment of invoices for the various costs and consultant fees required of Developer pursuant to this Section, Wayland will provide a final accounting of all such expenses and payments, pursuant to statute. Unless Developer objects to such reconciliation within 30 days following receipt of same, the reconciliation will be deemed acceptable to both Wayland and Developer. Wayland will provide Developer a release from any further obligations with respect to the payments required from Developer under this Section. Any funds remaining in any escrow account at that time will be disposed of in accordance with the provisions of Section J (2) below.

C. MUNICIPAL WATER SUPPLY

1. Prior to the issuance of any certificate of occupancy, Developer shall cause the existing eight inch (8") diameter on-site water mains on the Property to be abandoned, cut and capped. Such water lines shall be replaced with water lines or other lines acceptable to the Wayland Board of Water Commissioners and the Wayland Fire Department.

2. All fire service lines, domestic water lines and lateral connections from the new water main to the individual buildings within the MUP shall comply with the requirements of both the Wayland Board of Water Commissioners and the Wayland Fire Department.

D. MUNICIPAL SEWER FACILITY

1. **Definitions** - For purposes of this section D the following definitions shall apply:
   a. **"EPA"** - United States Environmental Protection Agency.

b. **"New Plant"** – The new wastewater treatment, collection, and disposal systems, all as permitted and built pursuant to this Section, to the extent located on the Property or on the parcel of land presently owned by Wayland, together with any appurtenant easements held or to be held by Wayland..

c. **"New Plant Permits"** - All local, state and federal approvals and permits required for construction of the New Plant, as well as all approvals and permits necessary to allow the Developer, WWMDC, or Wayland to connect to the New Plant.

d. **"Assessment Study"** - A study to be conducted by Developer's consultants (who shall be reasonably acceptable to Wayland) within thirty (30) days after the Attorney General approves the MUOD Amendment, to be shared with the WWMDC, to assess the necessity of replacing the Plant with the New Plant or upgrading the Plant.

e. **"MDEP"** - Massachusetts Department of Environmental Protection.

f. **"Plant"** - The existing wastewater treatment, collection and disposal systems, to the extent located on the Property or on the parcel of land presently owned by Wayland, together with any appurtenant easements presently held by Wayland.

g. **"Wayland"** - shall mean the Wayland Board of Selectmen or the WWMDC if designated by the Wayland Board of Selectmen.

h. **"WWMDC"** - the Wayland Wastewater Management District Commission.

2. All studies, assessments, investigations, design, permit applications, wastewater capacity allocations and construction on any component of the Plant or the New Plant and amendments to the MOA are subject to review and approval by the WWMDC, except as otherwise provided in this Section D.

3. Developer and Wayland hereby acknowledge and confirm that each has certain rights and obligations under a August 30, 1999 Memorandum of Agreement by and between Wayland and WWMDC and Wayland Business Center, LLC (Developer's predecessor in interest), as modified by a Supplemental Agreement dated September 24, 1999 (collectively the "MOA"), including, without limitation, regarding gallons per day of maximum daily design flow (as defined in 310 CMR 15.000) of 20,000 for Wayland and WWMDC and 45,000 for Developer.

4. Developer will initially conduct the Assessment Study to assess the necessity of replacing the Plant with the New Plant or upgrading the Plant, based on public health and environmental considerations and legal requirements of EPA and MDEP. Wayland and WWMDC shall, as a precondition of Developer's obligation to conduct the Assessment Study, provide a license or other authorization to allow Developer and its consultants access to the Plant and any records relating to the design, construction or operation thereof. Upon completion of the Assessment Study, Developer will provide WWMDC and Wayland with a technical memorandum describing the study and its conclusions and recommendations. Developer will review the recommendations with WWMDC and Wayland to enable them to determine whether to proceed toward developing the New Plant.

5. Wayland and Developer agree that the WWMDC will undertake the responsibility of permitting, designing, and constructing the New Plant or any upgrade of the Plant.

6. Wayland and WWMDC may choose not to proceed with design, permitting or construction of the New Plant, even if the Assessment Study so recommends, but Wayland and WWMDC shall in such event indemnify Developer from any cost or loss that arises from this choice.

7. If Wayland or WWMDC elects or is ordered to undertake design, permitting and construction of the New Plant or any upgrade of the Plant, then Wayland will prepare all applications necessary to obtain the New Plant Permits, in consultation with Developer. WWMDC and/or Wayland, as applicant, will execute these applications, which will then be submitted to the appropriate agencies. Once the necessary permits are obtained, then Wayland or WWMDC will proceed with construction of the New Plant or upgrade of the Plant.

8. Notwithstanding anything set forth in this Section D, Developer will be allowed to proceed with construction and occupancy of an MUP pursuant to a Master Special Permit and all other required approvals, prior to Wayland's or the WWMDC's completing construction of the New Plant, provided construction and occupancy of the MUP does not materially and unreasonably interfere with construction of the New Plant.

9. Ownership of the land under the New Plant shall be conveyed to Wayland, to be placed in the custody of the WWMDC, in fee simple immediately before construction is commenced, provided Wayland simultaneously conveys ownership of the land under the Plant to Developer, in fee simple, subject to the provisions of M.G.L. c. 40, §§ 3 and 15A and M.G.L. c. 30B. In recognition of the necessity for Wayland Town

Meeting approval for such a land exchange, the Developer and Wayland agree to execute a License Agreement effecting the land exchange, with a mutual termination clause, which shall remain in effect until such Town Meeting Approval can be obtained. Developer recognizes that a New Plant may reasonably require a larger parcel than the parcel on which the Plant is now located. If the assessment study recommends a New Plant, then Developer agrees to license and/or convey a parcel up to fifty percent (50%) larger than the size of the current parcel of land on which the Plant is located.

10. Developer can be charged any connection, betterment, improvement, or similar fees by Wayland or WWMDC, but only as authorized pursuant to Massachusetts general or special law ("Developer's Share"). In addition, pursuant to its offer, Developer hereby agrees to make a gift to Wayland pursuant to M.G.L. c. 44, §53A, within 90 days after construction of the New Plant or upgrade to the Plant is completed, subject to the following terms and conditions:

a. The amount of this gift shall be equal to seven percent (7%) the total construction cost of the New Plant or upgrade to the Plant but shall not exceed $175,000.00; and

b. The Assessment Study recommends the construction of the New Plant or upgrade to the Plant.

11. Nothing in this Agreement shall be construed as limiting the Developer's and the WWMDC's rights to enter into a separate and independent agreement modifying the MOA to provide for the construction of a new wastewater treatment, collection, and disposal system on the Property or on the parcel of land presently owned by Wayland with a capacity which is greater than the current capacity of the Plant.

E. TRAFFIC IMPROVEMENTS

1. Developer shall pay for planning, permitting, and design, and shall install and construct at its sole expense, such off-site traffic improvements and mitigation as may be required by Massachusetts Highway Department ("MHD") with respect to U.S. Route 20, Boston Post Road (the "MHD Traffic Improvements"). Developer agrees to pursue the approval by the MHD for the MHD Traffic Improvements and Wayland agrees that it will reasonably cooperate with Developer in its efforts to obtain MHD approval, including the execution of any documents required therewith. At least 14 days prior to the submittal of any design for such traffic improvements to MHD, Developer shall provide copies of the proposed design to the Town of Wayland Board of Road Commissioners ("BORC") for their review. Developer shall obtain approval from the MHD for the MHD Traffic Improvements and substantially complete construction of the MHD Traffic Improvements prior to the issuance of the first certificate of occupancy for the construction of any building on the Property which is part of the MUP.

2. Developer shall pay for planning, permitting, and design, and shall install and construct at its sole expense such off-site traffic improvements and mitigation as may be required by BORC with respect to Route 27 (Old Sudbury Road), Route 126 (Concord Road) and the intersection of Routes 20, 27 and 126, except to the extent under the jurisdiction of MHD, (the "BORC Traffic Improvements") in accordance with the design plans, methods and means of construction and the Town Way Physical Alteration Permit approved by the BORC. Any contractor hired or engaged by the Developer to construct the BORC Traffic Improvement shall be pre-qualified by the Commonwealth of Massachusetts in accordance with procedures established to pre-qualify such contractors to perform construction work on highways owned by the Commonwealth. The BORC's designated representative shall be given reasonable prior notice of all pre-construction and construction work meetings relative to the BORC Traffic Improvements and shall have the right to attend and participate in all such meetings and periodically inspect the work. Construction of the BORC Traffic Improvements shall be completed as required in the construction phasing schedules established by BORC, or MHD, or as established during the MEPA permitting process (if applicable) and as approved by the BORC prior to the issuance of the first certificate of occupancy for any building constructed in the MUP. The BORC's approval of the BORC Traffic Improvements shall not be unreasonably withheld or delayed. Traffic control equipment provided as part of the BORC Traffic Improvements shall be as per BORC specifications, including, without limitation, ornamental, post-mounted signal poles painted as prescribed by BORC; and shall include control preemption equipment for emergency vehicles.

3. During the Planning Board's review of the Master Special Permit, Developer shall be required to perform new traffic analyses, including, but not limited to, quantifying the number of trips expected to use cut-through routes along Bow Road, Glezen Lane, Moore Road, Training Field Road, Claypit Hill Road, Plain Road, Millbrook Road, Glen Road, and Pelham Island Road considering travel time assessments between the proposed primary route and the established neighborhood streets. After the issuance of the first certificate of occupancy for any building constructed on the Property as part of the MUP, Developer agrees to donate to

Wayland the sum of $75,000.00 in accordance with M.G.L. c. 44, § 53A, to be expended by the BORC for analyses, studies, planning, permitting, design, installation and construction such off-site traffic improvements and mitigation as may be required by BORC with respect to said roads (the "Neighborhood Roads Traffic Improvements"). If said funds are not expended by Wayland for the Neighborhood Roads Traffic Improvements within five years after final completion of the MUP, any remaining funds may be expended by Wayland for general municipal purposes.

4. Developer shall construct and maintain streets and parking areas within the MUP, except for the Municipal Parcel as defined in Section K below, at its sole cost and expense, it being the intention that all such streets and parking areas shall remain privately owned. Developer's obligations to construct a parking area within the Parking Parcel are set forth in Section K below.

5. It is anticipated by and between the parties that some MHD Traffic Improvements and BORC Traffic Improvements may not be completed prior to the issuance of a certificate of occupancy for any building constructed as part of an MUP on the Property. To the extent that for any reason the MHD Traffic Improvements or the BORC Traffic Improvements are not completed prior to Developer's application for a certificate of occupancy, Developer agrees that the Planning Board may require, as a condition for the issuance of any such certificate of occupancy, security for such incomplete work in the manner provided for securing construction of ways and the installation of municipal services set forth in M.G.L.c. 41, §81U, paragraphs (1) and (2). The amount of such security shall be determined by Wayland, through the Planning Board, after consultation with Developer and shall be sufficient to cover the design and construction of any such incomplete work whether required under the Master Special Permit, any BORC permit, or any MHD permit. Wayland agrees that any incomplete work secured pursuant to the provisions of this Section relative to the BORC Traffic Improvements shall be deemed complete for the purpose of approval of any certificate of occupancy.

6. Prior to the issuance of any certificate of occupancy for a building in an MUP, Developer agrees to donate to Wayland the sum of $30,000.00 in accordance with M.G.L. c. 44, §53A, to be expended by the BORC for the maintenance and replacement of traffic lights and associated equipment and signs installed and constructed as part of the MHD Traffic Improvements, the BORC Traffic Improvements and the Neighborhood Roads Traffic Improvements.

7. Developer shall be allowed to construct any improvements or utility connections as may be required within public ways, provided road opening or curb cut permits, and waivers from any road or street opening moratorium are obtained from all appropriate agencies, commissions, or boards.

8. To the extent authorized by vote of a town meeting where necessary, Wayland agrees to secure and grant, at no cost to the Developer, all temporary construction easements or licenses on any land owned or controlled by Wayland that may be necessary to allow construction of the MHD Traffic Improvements and/or the BORC Traffic Improvements. Additionally, to the extent authorized by vote of a town meeting where necessary, Wayland agrees to secure all temporary construction easements on any other land that may be necessary to allow construction of the MHD Traffic Improvements and/or the BORC Traffic Improvements, provided that Developer will indemnify Wayland against all costs (including, without limitation, appraisals, engineering, surveying, legal, court costs and landowner compensation and/or damage awards and interest thereon) incurred by Wayland in securing such temporary construction easements.

9. In the event that the Master Special Permit includes a condition restricting access to the Property from Route 27 to residential vehicles and emergency access vehicles only, Developer agrees that it will not appeal the imposition of such condition and if the MUP is built, will comply with such condition.

10. In the event that the Wayland Conservation Commission or MDEP requires replication of wetlands to compensate for any land used for any required widenings or other work associated with the MHD Traffic Improvements or the BORC Traffic Improvements, Wayland agrees to grant a license to Developer for any such replication on a reasonable area of Town-owned land designated by Wayland, provided that such replication does not materially interfere with Wayland's use of such Town-owned land.

F. DESIGN

1. Aggregate Limits. Developer's application for Concept Plan review, for a Master Special Permit, and for Phase I and Phase II Site Plan Approval pursuant to the MOUD Amendment shall propose an MUP consisting of a combination of retail, office, municipal, service establishments and uses in buildings and a

setting designed in a traditional, small New England village style with multiple non-residential uses and a mix of buildings containing single or multiple establishments with the following aggregate limits:

a. The residential component of the MUP shall contain not more than 167,500 square feet of Gross Floor Area. There shall be not more than 100dwelling units of which 25% shall be affordable units, as defined and set forth in the MUOD Amendment, with no more than 200 bedrooms in the aggregate. Not more than 15 dwelling units shall contain three bedrooms. No dwelling unit shall contain more than three bedrooms. In the event that Developer creates a condominium or condominiums pursuant to the provisions of M.G.L. c. 183A for the residential component of the MUP, the master deed(s) shall incorporate said limitations on Gross Floor Area, number of dwelling units and number of bedrooms. In any event, prior to the issuance of the first certificate of occupancy for any such dwelling unit, Developer shall execute and deliver to Wayland, in a form reasonably acceptable to Town Counsel, a perpetual covenant or restriction running with the Property and running to the benefit of the adjoining Town-owned land known as "Cow Common" which contains, at a minimum, said limitation on number of bedrooms. In the MUP, Developer shall not apply for or obtain a comprehensive permit pursuant to the provisions of M.G.L. c. 40B to permit the construction of a greater number of dwelling units or dwelling units with a greater number of bedrooms;

b. The non-residential component of the MUP, exclusive of municipal uses and any uses related to the wastewater treatment facility, shall contain not more than 165,000 square feet of Gross Floor Area , with not more than 156,750 square feet Gross Floor Area dedicated to retail uses and not more than 10,000 square feet Gross Floor Area dedicated to office uses.; and

c. 40,000 square feet of Gross Floor Area for municipal purposes.

2. Developer shall install all utilities serving the MUP underground, including, but not limited to, water, sewer, gas, electric, and cable.

3. In designing its Concept Plan, and any plans submitted with an application for a Master Special Permit, Developer will use reasonable efforts to cooperate with the developer of the "Wayland Commons" affordable housing M.G.L. c. 40B development, to coordinate site development, utilities and landscaping plans and to develop complementary building designs for their respective developments in a manner which is complementary of and appropriate to the existing Town Center.

4. Developer shall cooperate with Wayland and take all reasonable actions required so that the MUP or any part thereof, separately, or in conjunction with adjoining property may qualify for approval as a smart growth zoning district under the provisions of M.G.L. c. 40R, provided that such actions do not unreasonably delay or adversely impact the MUP.

5. No application for Concept Plan review shall be submitted to the Planning Board pursuant to the MUOD Amendment until at least ninety (90) days have elapsed after the MUOD Amendment has been adopted by the Special Town Meeting. No Master Special Permit application or application for any special permit pursuant to the MUOD Amendment shall be submitted to the Planning Board or filed with the Town Clerk until at least ninety (90) days have elapsed after the Developer has filed an application for Concept Plan review.

G. SITE CONTAMINATION AND REMEDIATION

1. Developer's Obligation. Developer shall not be obligated to proceed with any submittal or application for approval of an MUP, or subsequently for construction of such an MUP, until Developer has received any and all permits, approvals, waivers, and clearances to construct the proposed MUP, within the aggregate limits set forth in Section F above, from Raytheon Company and MDEP, including, without limitation, release or modification by Raytheon Company and MDEP of the Activity Use Limitation ("AUL") (collectively the "Raytheon Approvals") restricting the development of residential uses and open space on the Property. In the event that Developer does not receive the Raytheon Approvals, in form and substance satisfactory to Developer, then at Developer's option, Developer may terminate this Agreement in which case any obligation of the Developer under this Agreement, with the exception of the obligations described in Sections B(1), B(2) and B(3), and the obligations with respect to consulting fees incurred pursuant to Sections B(4), B(5), and B(6) prior to such termination, shall terminate.

2. Identification and Disposition of AUL. Developer shall identify any AUL on the Property on all relevant plans submitted with applications for Concept Plan, Master Special Permit, and Site Plan Approval.

Developer shall advise the Planning Board, Wayland Board of Health, and Wayland Board of Selectmen, in writing, of the disposition of any AUL currently encumbering the Property and other terms of any site remediation agreement negotiated with Raytheon Corporation.

3. Site Development. Developer's site development activities shall not impinge upon planned, ongoing and potential new site contamination investigations, assessments and soil and groundwater remediation activities.

H. MUOD SITE SERVICES

Developer shall be solely responsible for the maintenance and operation, including but not limited to refuse and trash removal, snow removal, road and sidewalk maintenance, lighting, landscape maintenance and similar activities of the MUP to be built on the Property, including any town common, but excluding the Municipal Parcel and Parking Parcel, both as defined in Section K below.

I. PUBLIC SAFETY

1. Developer shall prepare and submit detailed fire suppression and detection plans for review by an independent fire protection engineer selected by the Wayland Fire Department, The cost of this review shall be paid by the Developer through an escrow account, as set forth in Section B(7) of this Agreement.

2. Each building built as part of an MUP shall contain an alarm for smoke or fire detection connected to the Wayland Fire Department via wireless technology.

3. Developer shall provide a Security Plan for review and approval by the Chief of Police, prior to implementation. To the extent permissible under law, for security reasons, such plan shall not be considered a public document.

4. Developer shall be responsible for site security during and following construction. The Developer shall pay for public safety details when required during the construction period when site equipment and material deliveries affect public roadways adjacent to the Property, as well as during particularly busy periods when the development has been completed and is in operation, such as holiday shopping seasons.

5. Pursuant to its offer, Developer shall donate $50,000.00 to Wayland to be held in a gift account in accordance with M.G.L. c. 44, § 53A and used by Wayland for the purchase and installation of a wireless municipal fire alarm system to serve buildings located on the Property and Town-owned buildings, including public school buildings. Said funds will be so donated when the Master Special Permit becomes effective.

J. FINANCIAL GIFTS AND CONSULTANT REVIEW FEES

1. Pursuant to Developer's offer, Developer shall donate to Wayland, Three Million Thirty Thousand ($3,030,000.00) Dollars as a gift pursuant to M.G.L.c. 44, §53A (the "Financial Gift"), of which amount Two Hundred Thousand ($230,000.00) Dollars shall be contributed when the Master Special Permit becomes effective and the balance shall be contributed within 90 days following the issuance of the first building permit for a building in an MUP. Wayland will use the Financial Gift to mitigate impacts of the MUP, to complete certain public improvements, and for other valid public purposes, therefore, the Developer shall not be required to (i) construct any sidewalks outside the boundaries of the Property or (ii) conduct any periodic traffic monitoring, except as required under the terms of Section E above and Section J 3 below. It is agreed that funding for such off site improvements are included in the Financial Gift.

2. Wayland and Developer agree that a reasonable budget for the consultant reviews funded by Developer pursuant to Section B, paragraphs (4) through (7) is approximately $400,000.00 In the event that actual costs are less than $400,000.00, Developer will donate the difference between $400,000.00 and such actual costs to Wayland pursuant to M.G.L.c. 44, §53A, as a gift, and which Developer shall not otherwise be obligated to pay. Wayland shall spend such funds to mitigate impacts of the MUP or any other valid public purposes in accordance with statute.

3. Pursuant to its offer, Developer will, following issuance of the first building permit for construction of a building in an MUP on the Property, donate the sum of $250,000.00 pursuant to M.G.L.c. 44, §53A to fund Wayland's efforts to acquire in fee or by easement or license rights for, and to develop or improve a bicycle trail along the existing MBTA easement, adjacent to the Property, from Route 20 to Route 27, for use by the public.

Any funds remaining in the account established for said gift at the completion of said bicycle trail may be used for the planning, design and construction of an historic railroad interpretive site within or along said portion of the MBTA easement. If Wayland does not acquire the necessary land, rights or license for and to develop or improve said bicycle trail within twenty four (24) months following issuance of the first building permit for construction of a building in an MUP on the Property, the unexpended balance of said gift of $250,000.00 will be returned to Developer, after which Wayland will grant any licenses required for, and use best efforts to facilitate Developer's development or improvement of said bicycle trail.

K. LAND AND EASEMENTS DONATION

1. Developer shall provide a 99 year ground lease, with an option to renew in favor of Wayland, or shall grant Wayland a fee interest in a parcel of land, for the sum of one dollar ($1.00), for a municipal "pad" (the "Municipal Parcel"), together with land proximate to the Municipal Parcel sufficient for construction of a parking lot for 100 vehicles (the "Parking Parcel"), as well as any appurtenant green space, for use by Wayland as a public municipal facility, and shall construct all utility connections up to the leasehold or ownership property line, and shall grant such permanent utility easements (which shall include the right to connect to existing utilities and/or construct and install utilities therein) on, over, across, through and under the Property, in locations determined by Developer in Developer's sole discretion, necessary for Wayland to build and operate a municipal building. Developer shall not be obligated to extend utilities onto the Municipal Parcel or the Parking Parcel, but only to extend those utilities otherwise serving the MUP to stubs at the boundary of the Municipal Parcel or the Parking Parcel. The total land area of the Municipal Parcel, Parking Parcel and appurtenant green space shall be approximately 70,000 square feet. Additionally, Developer shall grant to Wayland, for the sum of one dollar ($1.00), permanent access and egress easements for pedestrian and vehicular traffic over roads, ways and walkways of the MUP to allow reasonable public access to the Municipal Parcel and Parking Parcel and appurtenant green space and to allow reasonable access by authorized Wayland officials, employees, agents and contactors to the land subject to the Conservation Restriction and Easement described in Section A above. Wayland's acquisition of said leasehold or fee interest and easements (except for the Conservation Restriction and Easement) is subject to town meeting authorization. Wayland shall not use the Municipal Parcel for the storage of municipal public works vehicles or equipment or deicing materials or other uses inconsistent with the uses allowed under the MUOD Amendment. Wayland shall, at its sole cost and expense, maintain the Municipal Parcel, Parking Parcel and appurtenant green space. In the event that Wayland fails to maintain either the Municipal Parcel or the Parking Parcel or the appurtenant green space the Developer may, at its election, following notice to Wayland, enter onto and maintain such parcels. Any such entry and/or maintenance shall be at Developer's sole cost and risk and by doing so Developer agrees to release and indemnify Wayland from any and all liability arising from Developer's entry onto the parcels and the maintenance work performed thereon. Except as set forth in the immediately preceding sentence, such entry and/or maintenance shall not create any obligation of Developer with respect to the maintenance of such parcels.

2. Wayland may, within forty-five (45) days following notice from Developer that Developer has received a Master Special Permit, notify Developer of its election to require Developer to construct a parking lot ("Parking Lot Election Notice") with up to 100 parking spaces on the Parking Parcel. Such notice shall include complete construction specifications which shall not exceed the parking design criteria set forth in the Zoning Bylaw. Developer shall then be obligated to construct such parking lot no later than one year following the issuance of the first certificate of occupancy for a building within the MUP. If Wayland does not send a Parking Lot Election Notice, as specified above, Developer shall at the same time it contributes the Financial Gift donate, pursuant to M.G.L.c. 44, §53A, $120,000.00 to Wayland to assist Wayland with costs of future construction of such parking lot and Developer will have no obligation to construct such parking lot.

3. (a) the Developer shall notify Wayland of Wayland's option to require the Developer to design, permit and build an on-site septic system ("Septic System") in compliance with Title 5 (310 CMR 15.000) of the State Environmental Code, with a capacity of 3000 GPD to service the Municipal Parcel; and

(b) Wayland shall, within 90 days following receipt of such notice, either direct Developer to proceed with such design, permitting and construction, or notify Developer that Wayland will not accept a Septic System, in which case Developer will transfer to Wayland 3,000 GPD from Developer's existing 45,000 GPD capacity in the Plant.

4. Developer's obligations under this Section, except as otherwise provided with respect to the parking lot construction, shall be completed on or before issuance of the first certificate of occupancy for any building in the MUP unless Wayland elects to defer connection to the Plant or New Plant, or construction of the on site

Septic System until a later date, in which event Developer shall, at Developer's election, either deposit money or negotiable securities, or post a bond, as security for completion of such work. The amount of such security shall be determined by Wayland after consultation with Developer and shall be sufficient to either provide for future connection to the Plant or New Plant, or for design, permit and construction of the Septic System.

5. Developer and Wayland shall use their best efforts to investigate the feasibility of locating and constructing a skating pond on the Property. In the event that Developer has an ownership interest in, operates or maintains any such skating pond, Wayland agrees to enter into an indemnification agreement with the Developer.

L. SUPPLEMENTAL TAX AGREEMENT

1. Developer understands that Wayland supports adoption by Special Town Meeting of the MUOD Amendment, in part, because the proposed MUP will generate significant real property and personal property tax revenue not otherwise anticipated by the current permitted use of the Property. In order to assure Wayland of the continuation of real property tax revenue to Wayland in an amount proportional to the tax revenue anticipated from an MUP, in the event that an MUP is built on the Property and any building or land within the MUP is sold to an entity or organization that is exempt from paying local real estate property taxes, (and such organization converts such building or land to an exempt purpose), Developer will enter into a Supplemental Agreement with Wayland, in the form attached as Exhibit C. The Supplemental Agreement (a) shall be recorded as set forth therein with the Middlesex South District Registry of Deeds; (b) shall bind subsequent owners of the Property; and (c) shall terminate ninety-nine (99) years after the execution thereof. This Section shall not apply to any sale or transfer of any land subject to the Conservation Restriction and Easement referenced in Section A, to a tax exempt entity.

2. In the event that the Developer's demolition and removal of the existing building(s) on the Property results in a reduction in the assessed value of the Property in any fiscal year, Developer shall pay to Wayland an amount calculated by multiplying the tax rate for the then current fiscal year by the assessed value of said building (s) in the most recent fiscal year in which property taxes were assessed on said building(s) (the "PILOT"). In any fiscal year that any such PILOT is payable, payment thereof shall be received by Wayland when property tax payments are ordinarily due. From and after the time that property taxes have been assessed on buildings and improvements constructed as part of the MUP (the "New Building Taxes"), Developer's annual payment obligation shall be the greater of the PILOT or the New Building Taxes, until such time as the New Building Taxes exceed the PILOT for two consecutive fiscal years, after which Developer's obligations under this paragraph 2 and paragraph 3 of this Section L shall cease.

3. When and if the MUOD Amendment is approved by the Attorney General, Developer shall withdraw its petition to the Appellate Tax Board appealing the Wayland Board of Assessors denial of its application for an abatement of the property taxes assessed on the Property for Fiscal Year 2006 and consents to an assessed value on the Property for property tax purposes of not less than $23,422,800.00 for Fiscal Year 2006 and each fiscal year thereafter, except as hereinafter provided. In the event that the Planning Board does not issue an MSP for an MUP on the Property by January 31, 2009, then Developer may contest the assessed value of the Property for Fiscal Year 2010 and any fiscal year thereafter in which an MSP for an MUP has not been issued by July 1st.

M. MISCELLANEOUS PROVISIONS

1. Cell Tower Prohibition. Developer agrees that it will not allow siting of a wireless communications tower or any wireless antennas, receivers, transmitters, or the like, with the exception such equipment owned or leased by tenants for the operation of their businesses, within any MUP constructed within the MUOD. Nothing in this paragraph shall be construed as prohibiting municipal public safety wireless communications or short range wireless computer or intercomputer communications.

2. Invalidity. Wayland and Developer agree that if the Town's adoption of the proposed zoning amendment is determined to be invalid, illegal, or unconstitutional by the Attorney General of the Commonwealth of Massachusetts or by a court of competent jurisdiction prior to the performing of the actions described herein, then the provisions of this Memorandum and each of the agreements and documents referenced herein shall be null and void; provided, however, that the provisions of Sections B(1), B(2), and B(3) shall survive any such determination and shall continue to be in full force and effect.

3. Compliance; Master Special Permit. Developer agrees that the master special permit process shall include the submission of evidence, to the satisfaction of the Planning Board, of compliance with the terms of this Agreement.

4. Other Regulatory Approvals. At the time of filing, Developer shall send or deliver to the Planning Board a copy of all applications and supporting materials (studies, plans, etc.) for approvals by federal, state and regional regulatory authorities (including but not limited to EPA, MHD, MDEP and MEPA) necessary for the development of the MUP.

5. Intent to Bind Successors, Heirs and Assigns. The foregoing obligations shall run with the Property, and shall be binding upon and inure to the benefit and burden of Developer, its heirs, successors, and assigns. A notice thereof in the form attached hereto as **Exhibit D** shall be executed by Developer and recorded with said Registry of Deeds and registered with the Land Registration Office at said Registry of Deeds upon approval of the MUOD Amendment by the Attorney General, without modification.

6. Effect; Amendment. This Agreement shall not take effect until approved and executed by the Board of Selectmen of the Town of Wayland. Upon such approval, this Agreement shall not be amended in any material respect except by a further approval of the Board of Selectmen.

7. Required Notices. Unless otherwise specified in this Agreement, any notice to be given under this Agreement shall be in writing and signed by the party (or the party's attorney) and shall be deemed to have been given (a) when delivered, if delivered by hand, or (b) two business days after the date mailed, if mailed by registered or certified mail, all charges prepaid, in either event addressed as follows:

in the case of the Town, to:

Wayland Board of Selectmen
Wayland Town Building
41 Cochituate Road
Wayland, MA 01778-2614
Attn: Frederic E. Turkington, Jr. (Town Administrator)
FAX 508-358-3627

with copy to Town Counsel:

Mark J. Lanza, Esq.
9 Damonmill Square
Concord, MA 01742
FAX 978-369-9916

and in the case of the Developer to:

Twenty Wayland, LLC
c/o KGI Properties, LLC
45 Broad Street, 4th Floor
Boston, MA 02109
Attn: Charles R. Irving, III
FAX 617-357-9900

with a copy to:

Dean F. Stratouly
c/o The Congress Group, Inc.
33 Arch Street
Boston, MA 02110
Tel No. (617) 897-7200
Fax No. (617) 789-77201

and a copy to:

Adam N. Weisenberg, Esq.
Goodwin Procter LLP
Exchange Place
Boston, MA 02109
Tel. No. (617) 570-1473
Fax No. (617) 227-8591

By such notice, either party (or such party's attorney) may specify a new address, which thereafter shall be used for subsequent notices.

8. Default and Notice.

a. **By Developer.** If Developer shall default in the performance of any term, covenant or condition of this Development Agreement, which default shall continue for more than thirty (30) days after written notice to Developer (or if such default shall be reasonably expected to take more than thirty (30) days to cure, said longer period of time), Wayland shall have the right to (i) terminate this Development Agreement; (ii) withhold any Approvals issued by Wayland; or (iii) exercise any other remedy available at law or in equity, including commencing an action for specific performance. Wayland agrees that if, within ten (10) days after Developer's receipt of a notice of a claim of default, Developer shall give notice to Wayland that Developer contests the same, then Wayland shall not have the right to exercise any of the foregoing rights in respect thereto until such claim shall have been finally adjudicated in such contest. Developer agrees to diligently prosecute any such contest and if such adjudication is in favor of Developer, then Developer shall be reimbursed its reasonable legal fees and other expenses in prosecuting such contest by Wayland; if such matter is determined adversely to Developer, Developer shall have thirty (30) days (or such longer period of time as shall be reasonable under the circumstances) to effect such cure and in addition thereto, Developer shall reimburse Wayland its reasonable legal fees and other expenses in defending any such contest.

b. **By Wayland.** If Wayland shall default in the performance of any term, covenant or condition of this Development Agreement, which default shall continue for more than thirty (30) days after written notice to Wayland (or if such default shall be reasonably expected to take more than thirty (30) days to cure, said longer period of time), Developer shall have the right to (i) terminate this Development Agreement; or (ii) exercise any other remedy available at law or in equity, including commencing an action for specific performance.

9. Effective Date of Agreement. This Development Agreement shall be effective as of the date it shall be executed by both Developer and Wayland.

10. Dispute Resolution. Prior to the initiation of any court proceeding regarding the terms of this Agreement or performance thereunder, Wayland and the Developer agree that such disputes shall be first subject to nonbinding arbitration or mediation, for a period not longer than ninety (90) days.

11. Applicable Law; Construction.

a. This Development Agreement shall be deemed to have been executed within the Commonwealth of Massachusetts, and the rights and obligations of the parties hereto shall be construed and enforced in accordance with, and governed by, the laws of the Commonwealth of Massachusetts.

b. This Development Agreement is the entire agreement among the parties with respect to the subject matter hereof and supersedes all prior and contemporaneous oral and written agreements and discussions.

Executed under seal as of the date first above written.

Appendix D 1997 Activity and Use Limitation and 1999 Activity and Use Limitation

1997 Activity and Use Limitation

Form 1075

NOTICE OF ACTIVITY AND USE LIMITATION

M.G.L. c. 21E, §6 and 310 CMR 40.0000

Disposal Site Name: Raytheon Company (FMR), 430 Boston Post Road, Wayland, MA
DEP Release Tracking Nos.: 3-13302, 3-13574 & 3-14042

This Notice of Activity and Use Limitation ("**Notice**") is made as of this 21 day of October, 1997, by Wayland Meadows Limited Partnership, a Massachusetts Limited Partnership with an address at 145 Rosemary Street, Suite E, Needham, MA 02194 together with his/her/its/their successors and assigns (collectively "**Owner**").

WITNESSETH:

WHEREAS, Wayland Meadows Limited Partnership, of Needham, Norfolk County, Massachusetts is the owner in fee simple of those certain parcels of land located at 430 Boston Post Road, in Wayland, Middlesex County, Massachusetts, with the buildings and improvements thereon ("**Property**").

WHEREAS, said parcels of land, which is more particularly bounded and described in **Exhibit A**, attached hereto and made a part hereof ("Property") is subject to this Notice of Activity and Use Limitation. The Property is shown on a plan to be recorded herewith in the Middlesex County (South) Registry of Deeds and/ or on a sketch plan attached hereto and filed herewith for registration with the Middlesex County (South) Registry District of the Land Court.

WHEREAS, a portion of the Property ("**Portion of the Property**") is subject to this Notice of Activity and Use Limitation. The Portion of the Property is more particularly bounded and described in **Exhibit A-1**, attached hereto and made part hereof. The Portion of the Property is shown on a plan to be recorded herewith and/or on a sketch plan attached hereto and filed herewith for registration;

A-1 SURVEY

WHEREAS, the Portion of the Property comprises part of a disposal site as the result of a release of oil and/or hazardous material. **Exhibit B** is a sketch plan showing the relationship of the Portion of the Property subject to this Notice of Activity and Use Limitation to the boundaries of said disposal site (to the extent such boundaries have been established to date). Exhibit B is attached hereto and made part hereof; and

WHEREAS, one or more response actions have been selected for the Portion of the Disposal Site in accordance with M.G.L. c.21E ("**Chapter 21E**") and the Massachusetts Contingency Plan, 310 CMR 40.0000 ("**MCP**"). Said response actions are based upon (a) the restriction of human access to and contact with oil and/or hazardous material in soil and/

or groundwater and/or (b) the restriction of certain activities occurring in, on, through, over or under the Portion of the Property. The basis for such restrictions is set forth in an Activity and Use Limitation Opinion ("**AUL Opinion**"), dated 21 October 1997, (which is attached hereto as **Exhibit C** and made a part hereof); and

WHEREAS, this Notice of Activity and Use Limitation is recorded in advance of completion of Comprehensive Response Actions (pursuant to 310 CMR 40.0800) including both investigative, Phase II-Comprehensive Site Assessment, and remedial phases (i.e., Phases III, IV and V) necessary to achieve a Response Action Outcome for the Portion of the Property, and, therefore, approvals and Opinions required by a Licensed Site Professional (LSP) to maintain compliance with conditions and obligations set forth in this Activity and Use Limitation shall be restricted to those of the **LSP-of-Record** for Comprehensive Response Actions pursuant to 310 CMR 40.0000 (henceforth referred to herein as the **LSP**); and

WHEREAS, to the extent that achievement of a Response Action Outcome for the Portion of the Property warrants release, termination or amendment of this Activity and Use Limitation, implementation of such a release, termination or amendment shall be subject to the approval of the LSP;

NOW, THEREFORE, notice is hereby given that the activity and use limitations set forth in said AUL Opinion are as follows:

1. Permitted Activities and Uses Set Forth in the AUL Opinion. The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare and the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as any of the following activities and uses occur on the Portion of the Property:

(i) The Portion of the Property may be used for commercial or industrial activities with uses that may include office space, wholesale, retail, manufacturing, storage/warehousing, and assembly of goods; and

(ii) The vertical expansion of, or interior reconstruction of, the buildings existing on the Portion of the Property as of the date of this Notice, provided that such expansion, or reconstruction, does not, in the Opinion of the LSP, limit performance of Comprehensive Response Actions, is consistent with the activities and uses set forth in this Paragraph and is not expressly prohibited by this Notice; and

(iii) Such other activities or uses which, in the Opinion of the LSP, shall present no greater risk of harm to health, safety, public welfare and the environment than the activities and uses set forth in this Paragraph; and

(iv) All activities and uses consistent with those set forth in this Paragraph and not expressly prohibited by this Notice.

2. Activities and Uses Inconsistent with the AUL Opinion. Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Portion of the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:

REDUNDANT?

(i) Residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities; or for public access purposes, unless previously approved by the LSP in accordance with the obligations and conditions set forth in the AUL Opinion;

(ii) Groundwater use except for assessment or remedial purposes;

(iii) Subsurface activities that could render contaminated media, waste or debris accessible to exposure including; excavation, new construction below grade, reconstruction of existing buildings below grade, or maintenance of subsurface utilities unless certified by the LSP that such activities:

a) would not pose a substantial hazard or a significant risk of harm to health, safety, public welfare or the environment; and

b) are unlikely to result in generation of contaminated waste, debris or media pursuant to 310 CMR 40.0000.

(iv) Activities and uses that, in the Opinion of the LSP, limit access to, or performance of, Comprehensive Response Actions at the Portion of the Property; and

(v) Other activities or uses that, in the Opinion of the LSP, would likely result in significant, risk from exposures to oil and/or hazardous material if site activities or uses were to take place on the Portion of the Property.

3. Obligations and Conditions Set Forth in the AUL Opinion. If applicable, obligations and/or conditions to be undertaken and/or maintained at the Portion of the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

(i) Certification in the form of documentation bearing the original signature, date and Seal of the LSP must be obtained by the Owner prior to implementation of the following activities and uses:

a) expansion or relocation of existing buildings laterally or vertically;

b) use of the Portion of the Property for residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities, or for unrestricted public access;
c) subsurface activities including; excavation, new construction below grade, reconstruction of existing buildings below grade, or maintenance of subsurface utilities; and
d) land development or construction involving changes in surface conditions (i.e., topography, surface cover, etc.) including installation or removal of pavement, building foundations, drainage structures or vegetative cover.

(ii) Parties conducting activities and uses described in 3(i), above, that, in the Opinion of the LSP, may include disturbance of contaminated media, waste or debris, or that could render subsurface contaminated media, waste or debris accessible to exposure, shall submit, for approval by the LSP, a contingency plan for the management of contaminated media, waste or debris, if encountered, including:

a) procedures for monitoring of contaminated media, waste or debris;
b) procedures for notification to the LSP of the discovery of contaminated media, waste or debris;
c) a certification that all response actions will be conducted under the supervision of the LSP;
d) a soils management plan including contingencies for handling contaminated soil and/or groundwater if activities may extend below the water table;
e) a certification that response personnel will comply with applicable safety regulations, including 29 CFR 1910.120;
f) a certification that contaminated waste, debris or media or remediation waste (pursuant to 310 CMR 40.0000) generated by such activities shall be handled, stored, transported and disposed in accordance with the applicable federal, state and local regulations.

(iii) The responsible parties and their representatives shall be granted unrestricted assess to the Portion of the Property in order to conduct any and all activities associated with the performance of response actions as defined under the MCP, or any other applicable regulation.

(iv) The integrity of all building foundations and all paved surfaces existing on the Portion of the Property will be maintained in order to eliminate direct access to subsurface contaminated media.

4. Proposed Changes in Activities and Uses. Any proposed changes in activities and uses at the Portion of the Property which may result in higher levels of exposure to oil and/or hazardous material than currently exist shall be evaluated by the LSP who shall render an Opinion, in accordance with 310 CMR 40.1080 *et seq.*, as to whether the proposed changes will present a significant risk of harm to health, safety, public welfare and the environment. Any and all requirements set forth in the Opinion to meet the objective of this Notice shall be satisfied before any such activity or use is commenced.

5. Violation of a Response Action Outcome. The activities, uses and/or exposures upon which this Notice is based shall not change at any time to cause a significant risk of harm to health, safety, public welfare, and the environment, or to create substantial hazards due to exposure to oil and/or hazardous material without the prior evaluation by the LSP in accordance with 310 CMR 40.1080 *et seq.*, and without additional response actions, if necessary, to achieve or maintain a condition of No Significant Risk or to eliminate substantial hazards.

If the activities, uses, and/or exposures upon which this Notice is based change without the prior evaluation and additional response actions determined to be necessary by the LSP in accordance with 310 CMR 40.1080 *et seq.*, the owner or operator of the Portion of the Property subject to this Notice at the time that the activities, uses and/or exposures change, shall comply with the requirements set forth in 310 CMR 40.0020.

6. Incorporation Into Deeds, Mortgages, Leases, and Instruments of Transfer. This Notice shall be incorporated either in full or by reference into all deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed.

Owner hereby authorizes and consents to the filing and recordation and/or registration of this Notice, said Notice to become effective when executed under seal by the undersigned LSP, and recorded and/or registered with the appropriate Registry of Deeds and/or Land Registration Office(s).

WITNESS the execution hereof under seal this 21st day of October, 1997.

Owner: Wayland Meadows Limited Partnership

By: Wayland Meadows Corporation, its General Partner

By: _____
Donald A. Levine, President

By: _____
Lewis Heartz, Treasurer

(See Continuation of Signature Page attached)

Continuation of Signature Page

By: 90 Salem Corporation, its General Partner

By: _____
Donald A. Levine, President

By: _____
Lewis Heafitz, Treasurer

COMMONWEALTH OF MASSACHUSETTS

Suffolk, ss 10/21, 1997

Then personally appeared the above named Donald A. Levine and Lewis Heafitz as President and Treasurer of Wayland Meadows Corporation, as General Partner of Wayland Meadows Limited Partnership, and acknowledged the foregoing to be their free act and deed, and the free act and deed of said corporation as said general partner, before me,

Notary Public
My Commission Expires: 8/25/2000

(See Continuation of Acknowledgment Page attached)

The undersigned LSP-of-Record hereby certifies that he executed the aforesaid Activity and Use Limitation Opinion attached hereto as Exhibit C and made a part hereof and that in his Opinion this Notice of Activity and Use Limitation is consistent with the terms set forth in said Activity and Use Limitation Opinion.

Date: 10/21/97

John C. Drobinski, LSP Reg. No. 2196
[LSP SEAL]

WILLIAM H. O'CONNELL
Notary Public
My Commission Expires Jan. 22, 2004

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, ss 10/21, 1997.

Then personally appeared the above named John C. Drobinski, and acknowledged the foregoing to be his free act and deed before me,

Notary Public
My Commission Expires: 1/22/04

Upon recording, return to:

Continuation of Acknowledgment Page

COMMONWEALTH OF MASSACHUSETTS

Suffolk, ss 10/21, 1997

Then personally appeared the above named Donald A. Levine and Lewis Heafitz as President and Treasurer of 90 Salem Corporation, as General Partner of Wayland Meadows Limited Partnership, and acknowledged the foregoing to be their ~~free~~ act and deed, and the free act and deed of said corporation as said general partner, before me,

Notary Public
My Commission Expires: 8/25/2000

EXHIBIT A

(To include metes and bounds description of Property and Registered Property Plan).

VHB

Legal Description

A certain parcel of land being comprised partly of registered land and partly of un-registered land, situated on the northerly side of Boston Post Road (Route 20) and on the westerly side of Old Sudbury Road (Route 27) in the Town of Wayland, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows:

Beginning at a point in the northerly line of Route 20 at the intersection of the northerly line of land now or formerly of the MBTA; thence

N 74° 45' 30" W	a distance of four hundred thirty-eight and ninety-two hundredths feet (438.92') by the said northerly line of Route 20 to a point; thence
N 15° 14' 30" E	a distance of forty-eight and sixty-three hundredths feet (48.63') to a point; thence
N 74° 45' 30" W	a distance of one hundred seventeen and twenty-one hundredths feet (117.21') to a point; thence
N 15° 14' 30" E	a distance of one and thirty-seven hundredths feet (1.37') to a point; thence
N 74° 45' 30" W	a distance of one hundred twenty-three and seventy-three hundredths feet (123.73') to a point, the previous four (4) courses bounding on land now or formerly of the Town of Wayland and of the Commonwealth of Massachusetts; thence
N 71° 34' 28" E	a distance of five hundred forty-nine and fifty-one hundredths feet (549.51') to a point; thence
N 11° 48' 20" W	a distance of three hundred twenty-eight and no hundredths feet (328.00') to a point; thence
S 71° 01' 00" W	a distance of eight hundred forty-two feet, more or less (842'±) to a point at the Sudbury River, the previous three (3) courses bounding on land now or formerly of Dennis Hamlen; thence
Northerly	by the Sudbury River, a distance of eight hundred and one feet, more or less (801'±) to a point; thence
S 86° 08' 20" E	a distance of two thousand one hundred seventy-seven feet, more or less (2,177'±) by land now or formerly of the U.S. Fish and Wildlife Service and the Town of Wayland to a point in the Westerly line of Route 27; thence

VHB

S 32° 59' 09" E	a distance of one thousand eighty-six and twenty-seven hundredths feet (1086.27') to a point; thence
S 31° 52' 50" E	a distance of four hundred sixty-seven and sixty-six hundredths feet (467.66') to a point, the previous (2) courses bounding on the said westerly line of Route 27; thence
S 67° 13' 40" W	a distance of three hundred ninety-four and seventy four hundredths feet (394.74') by a brook to a point; thence
S 32° 06' 10" E	a distance of two hundred fifty and forty-nine hundredths feet (250.49') to a point in the northerly line of land now or formerly of the MBTA, the previous two (2) courses bounding on land now or formerly of Ralph Wetland; thence
N 86° 08' 20" W	a distance of two thousand sixty and eighteen hundredths feet (2060.18') by the said northerly line of land of the MBTA to the point of beginning.

The above described parcel of land contains an area of 82.53± acres and is more particularly shown on a plan entitled "Wayland Meadows Corporation - #430 Boston Post Road (Raytheon Site) - Wayland, MA, ALTA ACSM land Title Survey" dated August 18, 1997, prepared by Vanasse Hangen Brustlin, Inc. 101 Walnut Street, Watertown, MA.*

COMMONWEALTH OF MASSACHUSETTS
DANA J. STANDLEY
No. 38044
REGISTERED PROFESSIONAL LAND SURVEYOR
10-21-97

*, and is also shown as the cross hatched and the non-cross hatched areas on a plan entitled "Wayland Meadows L.P., 430 Boston Post Road, Wayland, Massachuseets - ERM - New England, Inc. - Sketch Plan of Activity & Use Limitation Plan" prepared by Vanasse Hangen Brustlin, Inc. to be recorded herewith as part of Exhibit A.

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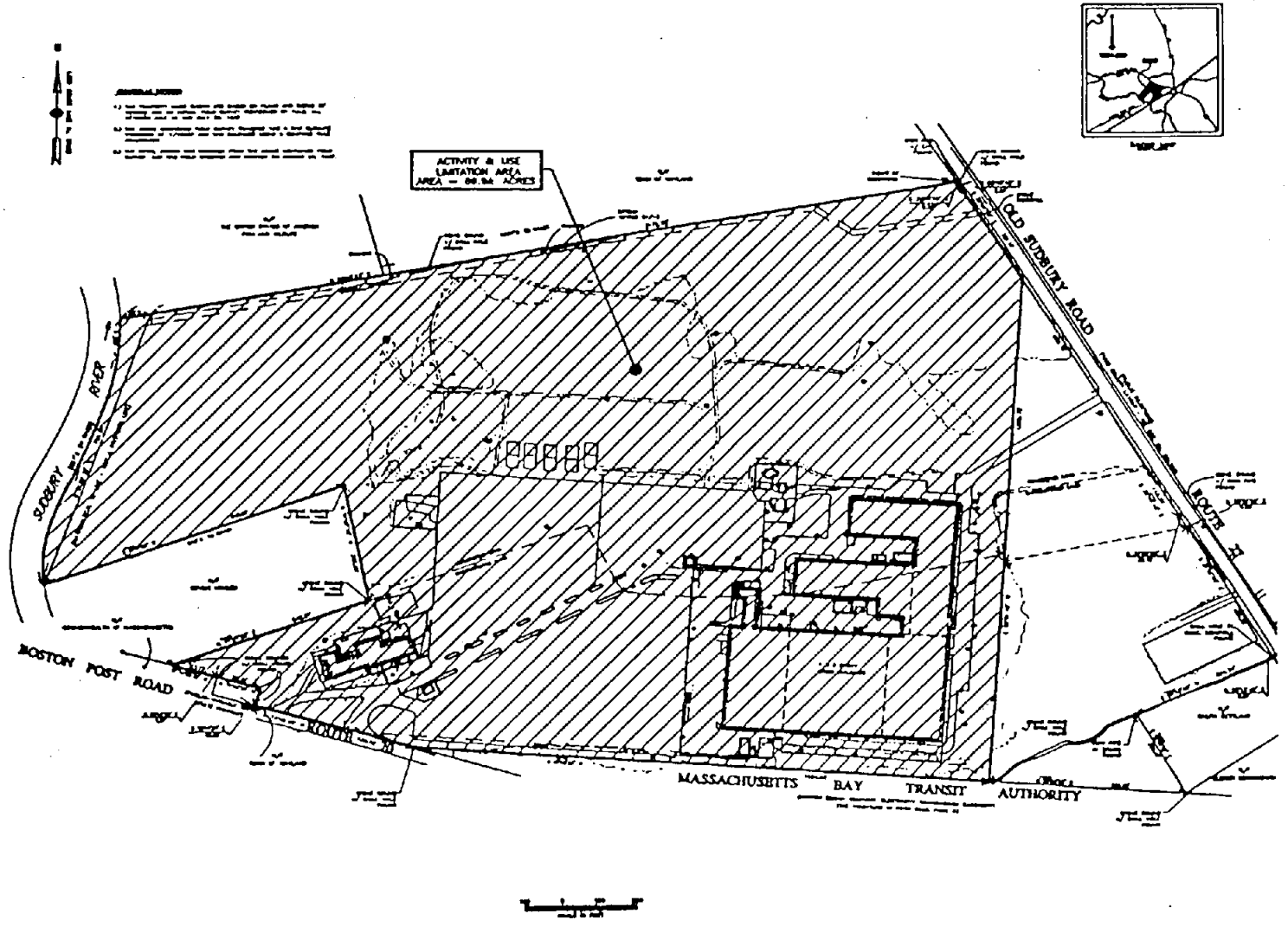

VHB

Wayland Meadows L.P.
6430 Boston Post Road
(Raytheon Site)
Wayland, Massachusetts

Sketch Plan Of
Activity & Use
Limitation Area

EXHIBIT A-1

(To include metes and bounds description of the Portion of the Property and Registered Portion of the Property Plan).

VHB

LEGAL DESCRIPTION
ACTIVITY & USE LIMITATION AREA

A certain parcel of land situated on the northerly side of Boston Post Road (Route 20) and on the westerly side of Old Sudbury road (Route 27) in the Town of Wayland, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows.

Beginning at a point in the westerly line of Old Sudbury Road at the southeasterly corner of land owned by the Town of Wayland, said point being the most northerly corner of the herein described premises: thence

S 31° 32' 10" E	a distance of two and twenty hundredths feet (2.20') to a point: thence
S 32° 59' 20" E	a distance of three hundred twenty one and eleven hundredths feet (321.11') to a point, the previous two (2) courses bounding on the said westerly line of Old Sudbury road: thence
S 03° 51' 46" W	a distance of one thousand three hundred sixty nine and seventy two hundredths feet (1369.72') to a point: thence
N 86° 08' 20" W	a distance of one thousand five hundred thirty four and eighty three hundredths feet (1534.83') to a point in the northerly line of Boston Post Road: thence
N 74° 45' 30" W	a distance of four hundred thirty eight and ninety two hundredths feet (438.92') by the said northerly line of Boston Post Road to a point: thence
N 15° 14' 30" E	a distance of forty eight and sixty three hundredths feet (48.63') to a point: thence
N 74° 45' 30" W	a distance of one hundred seventeen and twenty one hundredths feet (117.21') to a point: thence
N 15° 14' 30" E	a distance of one and thirty seven hundredths feet (1.37') to a point: thence
N 74° 45' 30" W	a distance of one hundred twenty three and seventy three hundredths feet (123.73') to a point: thence
N 71° 34' 28" E	a distance of five hundred forty nine and fifty one hundredths feet (549.51') to a point: thence
N 11° 48' 20" W	a distance of three hundred twenty eight and no hundredths feet (328.00') to a point: thence
S 71° 01' 00" W	a distance of eight hundred forty two feet, more or less (842') to a point at the Sudbury River: thence
Northerly	by the said Sudbury River a distance of eight hundred fifty seven feet, more or less (857') by the said Sudbury River to a point: thence
N 80° 45' 43" E	a distance of two thousand two hundred fifty seven feet, more or less (2257') to the point of beginning.

The above described parcel of land contains an area of 69.9 acres more or less, and is more particularly shown on a plan entitled "Wayland Meadows L.P., 430 Boston Post Road, Wayland, Massachusetts - ERM-New England, Inc. - Sketch Plan of Activity & Use Limitation Plan" prepared by Vanasse Hangen Brustlin, Inc. to be recorded herewith. (See Plan Attached as Exhibit A)

EXHIBIT B

(To include a sketch displaying the boundaries of the disposal site (to the extent such boundaries have been established as of the date of this Notice) in relation to the boundaries of the Portion of the Property subject to the Notice of AUL).

(See Plan Attached as Exhibit A)

EXHIBIT C
(To include LSP-of-Record Notice of AUL Opinion).

EXHIBIT C

ACTIVITY & USE LIMITATION OPINION

430 BOSTON POST ROAD, WAYLAND, MASSACHUSETTS

This Activity & Use Limitation Opinion (AUL) Opinion is issued in support of the Notice of Activity and Use Limitation (Notice) filed on a Portion of the Property located at 430 Boston Post Road, Wayland Massachusetts. Pursuant to 310 CMR 40.0000, this AUL Opinion describes the basis for restrictions in activities on, and uses of, the Portion of the Property subject to this Notice and obligations and conditions to be undertaken and/or maintained to ensure protection of health, safety, public welfare and the environment. This AUL Opinion is certified by the Licensed Site Professional (LSP)-of-Record for Comprehensive Response Actions being conducted in accordance with Permit No. 133939 issued under the authority of the Massachusetts Department of Environmental Protection (MA DEP), Bureau of Waste Site Cleanup.

1.0 PHYSICAL DESCRIPTION AND LAND USE

The subject Property is an approximately 83 acre parcel located at 430 Boston Post Road in Wayland, Massachusetts (Exhibit A). Approximately 6 acres are occupied by building and structures, 16 acres are paved and 60 acres are undeveloped meadow, woodland and wetland. The Property is bounded to the west by the Sudbury River, to north by undeveloped land including the Great Meadows National Wildlife Refuge, to the east by Route 27 and to the South by Route 20.

Prior to 1955 the Property was utilized for residential and agricultural purposes. Subsequent to development in 1955, the Property was utilized as an engineering research and development facility until decommissioning in 1995. The Property is currently vacant and zoned for limited commercial and residential use.

2.0 *BACKGROUND*

Releases of oil and hazardous materials to soil and groundwater were discovered on the Property during decommissioning of the former manufacturing facility. Massachusetts General Law, Chapter 21E, requires assessment and, if necessary, remedial actions in accordance with requirements of the Massachusetts Contingency Plan (MCP) 310 CMR 40.0000.

The MCP process allows up to five years for completion of those phases of assessment and/or remediation that are necessary to achieve regulatory closure. Assessment and/or remediation activities are conducted as "Comprehensive Response Actions" under the direction of the Licensed Site Professional -of-Record (LSP). Upon satisfying all applicable MCP requirements, a Response Action Outcome (RAO) Statement, certified by the LSP, is filed with the MA DEP Bureau of Waste Site Cleanup, officially closing the site out of the MCP process. Once closure is obtained it is binding, subject however, to DEP audit for up to five years from the date of filing.

3.0 *PURPOSE AND APPLICABILITY OF THE NOTICE OF ACTIVITY AND USE LIMITATION*

The purpose of the Notice is to record on the registered property deed those activities and land uses that are consistent with continued protection of health, safety, public welfare and the environment, those that are specifically prohibited and obligations and conditions necessary to ensure continued protection.

This Notice is applicable to the Portion of the Property as defined in Exhibit A-1. This Notice is being filed prior to completion of assessment and, as necessary, remedial actions required to achieve an RAO. The Portion of the Property includes the Disposal Site, as defined under MGL Chapter 21E, to the extent that Disposal Site boundaries have been established to date (Exhibit B). The remaining Portion of the Property surrounding the Disposal Site is selected as a conservatively large area pending additional assessment to fully define final Disposal Site boundaries in accordance with MCP requirements.

This Notice of AUL is recorded by the Property owner as a precautionary measure to ensure appropriate use of the Portion of the Property during completion of Comprehensive Response Actions, including further assessment to fully define final Disposal Site boundaries. In so far as assessment and/or remediation further define the boundaries of the Disposal Site, as referred to above, this Notice of AUL may, in the Opinion of the LSP, be terminated or amended. In all cases, the LSP shall review this Notice of AUL, and if appropriate, terminate or amend this Notice of AUL prior to approval and filing of a RAO for the Portion of the Property, or any portion thereof. Because this Notice is being filed prior to completion of assessment and remedial actions required to achieve an RAO, all approvals and opinions required by a Licensed Site Professional to maintain compliance with this Notice and AUL Opinion shall be restricted to the Licensed Site Professional of Record for Comprehensive Response Actions, and any termination or amendment of this Notice of AUL pursuant to the prior sentence shall be based upon an opinion of the LSP of Record, only.

4.0 *PERMITTED ACTIVITIES AND USES SET FORTH IN THE AUL OPINION*

The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare and the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as any of the following activities and uses occur on the Portion of the Property:

(i) The Portion of the Property may be used for commercial or industrial activities with uses that may include office space, wholesale, retail, manufacturing, storage/warehousing, and assembly of goods; and

(ii) The vertical expansion of, or interior reconstruction of, the buildings existing on the Portion of the Property as of the date of this Notice, provided that such expansion, or reconstruction, does not, in the Opinion of the LSP, limit performance of Comprehensive Response Actions, is consistent with the activities and uses set forth in this Paragraph and is not expressly prohibited by this Notice; and

(iii) Such other activities or uses which, in the Opinion of the LSP, shall present no greater risk of harm to health, safety, public welfare and the environment than the activities and uses set forth in this Paragraph; and

(iv) All activities and uses consistent with those set forth in this Paragraph and not expressly prohibited by this Notice.

5.0 *ACTIVITIES AND USES INCONSISTENT WITH THE AUL OPINION*

Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Portion of the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:

(i) Residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities; or for public access purposes, unless previously approved by the LSP in accordance with the obligations and conditions set forth in the AUL Opinion;

(ii) Groundwater use except for assessment or remedial purposes;

(iii) Subsurface activities that could render contaminated media, waste or debris accessible to exposure including; excavation, new construction below grade, reconstruction of existing buildings below grade, or maintenance of subsurface utilities unless certified by the LSP that such activities:

(a) would not pose a substantial hazard or a significant risk of harm to health, safety, public welfare or the environment; and

(b) are unlikely to result in generation of contaminated waste, debris or media pursuant to 310 CMR 40.0000.

(iv) Activities and uses that, in the Opinion of the LSP, limit access to, or performance of, Comprehensive Response Actions at the Portion of the Property; and

(v) Other activities or uses that, in the Opinion of the LSP, would likely result in significant, risk from exposures to oil and/or hazardous material if site activities or uses were to take place on the Portion of the Property.

6.0 *OBLIGATIONS AND CONDITIONS SET FORTH IN THE AUL OPINION*

If applicable, obligations and/or conditions to be undertaken and/or maintained at the Portion of the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

(i) Certification in the form of documentation bearing the original signature, date and Seal of the LSP must be obtained by the Owner prior to implementation of the following activities and uses:

a) expansion or relocation of existing buildings laterally or vertically;

b) use of the Portion of the Property for residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities, or for unrestricted public access;

c) subsurface activities including; excavation, new construction below grade, reconstruction of existing buildings below grade, or maintenance of subsurface utilities; and

d) land development or construction involving changes in surface conditions (i.e., topography, surface cover, etc.) including installation or removal of pavement, building foundations, drainage structures or vegetative cover.

(ii) Parties conducting activities and uses described in 6.0(i) above, that, in the Opinion of the LSP, may include disturbance of contaminated media, waste or debris, or that could render subsurface contaminated media, waste or debris accessible to exposure, shall submit, for approval by the LSP, a contingency plan for the management of

contaminated media, waste or debris, if encountered, including:

a) procedures for monitoring of contaminated media, waste or debris;
b) procedures for notification to the LSP of the discovery of contaminated media, waste or debris;
c) a certification that all response actions will be conducted under the supervision of the LSP;
d) a soils management plan including contingencies for handling contaminated soil and/or groundwater if activities may extend below the water table;
e) a certification that response personnel will comply with applicable safety regulations, including 29 CFR 1910.120;
f) a certification that contaminated waste, debris or media or remediation waste (pursuant to 310 CMR 40.0000) generated by such activities shall be handled, stored, transported and disposed in accordance with the applicable federal, state and local regulations.

(iii) The responsible parties and their representatives shall be granted unrestricted assess to the Portion of the Property in order to conduct any and all activities associated with the performance of response actions as defined under the MCP, or any other applicable regulation.

The integrity of all building foundations and all paved surfaces existing on the Portion of the Property will be maintained in order to eliminate direct access to subsurface contaminated media.

7.0 *CERTIFICATION*

The undersigned LSP-of-Record hereby certifies that the terms of this Activity and Use Limitation Opinion are consistent with those of the Notice for the subject Portion of Property located at 430 Boston Post Road, Wayland, Massachusetts.

Date: October 21, 1997

John C. Drobinski, LSP Reg. No. 2196

[LSP SEAL]

EXHIBIT D
(BWSC Form 114, AUL Transmittal Form)

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-114

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 - 13302

COMPLETE THIS FORM AND ATTACH AS AN EXHIBIT TO THE AUL DOCUMENT TO BE RECORDED AND/OR REGISTERED WITH THE REGISTRY OF DEEDS AND/OR LAND REGISTRATION OFFICE.

A. LOCATION OF DISPOSAL SITE AND PROPERTY SUBJECT TO AUL:

Disposal Site Name: Raytheon Company (FMR)

Street: 430 Boston Post Road Location Aid:

City/Town: Wayland, MA ZIP Code: 01778-0000

Address of property subject to AUL, if different than above. Street:

City/Town: ZIP Code:

B. THIS FORM IS BEING USED TO: (check one)

- [x] Provide the LSP Opinion for a **Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1074 (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amended Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1081(4) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Termination of a Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1083(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Grant of Environmental Restriction**, pursuant to 310 CMR 40.1071, (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amendment of Environmental Restriction**, pursuant to 310 CMR 40.1081(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Release of Environmental Restriction**, pursuant to 310 CMR 40.1083(2) (complete all sections of this form).

C. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this submittal, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B indicates that a **Notice of Activity and Use Limitation** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1074(1)(b);

> *if Section B indicates that an **Amended Notice of Activity and Use Limitation** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Termination of a Notice of Activity and Use Limitation** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1083(3)(a);

> *if Section B indicates that a **Grant of Environmental Restriction** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1071(1)(b);

> *if Section B indicates that an **Amendment to a Grant of Environmental Restriction** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Release of Grant of Environmental Restriction** is being registered and/or recorded,* the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1083(3)(a).

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

- [ ] Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

SECTION C IS CONTINUED ON THE NEXT PAGE.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-114

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 - 13302

C. LSP OPINION: **(continued)**

LSP Name: John C. Drobinski LSP #: 2196 Stamp:

Telephone: 617-267-8377 Ext.: 150

FAX: 617-267-6447

LSP Signature:

Date: 10/21/97

JOHN C. DROBINSKI NO. 2196 REGISTERED LICENSED SITE PROFESSIONAL

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY FIND THE DOCUMENT TO BE INCOMPLETE.

1999 Activity and Use Limitation

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-113

ACTIVITY & USE LIMITATION (AUL) TRANSMITTAL FORM

Pursuant to 310 CMR 40.1056 and 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 | 13302

A. LOCATION OF DISPOSAL SITE AND PROPERTY SUBJECT TO AUL:

Disposal Site Name: Former Raytheon Facility

Street: 430 Boston Post Road Location Aid:

City/Town: Wayland ZIP Code: 01778-1824

Address of property subject to AUL, if different than above. Street: 400 to 440 Boston Post Road

City/Town: Wayland ZIP Code: 01778-1824

☑ Check here if this Disposal Site is Tier Classified.

If the Disposal Site subject to the AUL is also subject to a Tier I Permit, provide the Permit Number: 133939

Related Release Tracking Numbers affected by this AUL: 3-13574

B. THIS FORM IS BEING USED TO: (check one)

☑ Submit a certified copy of a **Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1074 (complete all sections of this form).

☐ Submit a certified copy of an **Amended Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1081(4) (complete all sections of this form).

☐ Submit a certified copy of a **Termination of a Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1083(3) (complete all sections of this form).

☐ Submit a certified copy of a **Grant of Environmental Restriction**, pursuant to 310 CMR 40.1071, (complete all sections of this form).

☐ Submit a certified copy of an **Amendment of Environmental Restriction**, pursuant to 310 CMR 40.1081(3) (complete all sections of this form).

☐ Submit a certified copy of a **Release of Environmental Restriction**, pursuant to 310 CMR 40.1083(2) (complete all sections of this form).

You must attach all supporting documentation for the use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

C. AUL INFORMATION:

Date AUL was recorded and/or registered with Registry of Deeds and/or Land Registration Office: 04/13/99

Name of Registry of Deeds and/or Land Registration Office where AUL was recorded and/or registered: Middlesex County Registry

Book and Page Number and/or Document Number of recorded and/or registered AUL: Book 1181, Page 99

D. PERSON SUBMITTING AUL TRANSMITTAL FORM:

Name of Organization: Wayland Business Center, LLC

Name of Contact: Dean F. Stratouly Title: Pres. Wayland Business Center Inc.

Street: c/o Congress Group Ventures, One Memorial Dr

City/Town: Cambridge State: MA ZIP Code: 02142-1313

Telephone: 617-494-1111 Ext.: FAX: (optional) 617-494-0002

E. OWNER OF PROPERTY, IF NOT PERSON SUBMITTING AUL TRANSMITTAL FORM:

Provide a mailing address for the owner of the property if that person is not submitting the AUL Transmittal Form. Provide addresses for additional owners on an attachment.

Name of Organization:

Name of Contact: Title:

Street:

City/Town: State: ZIP Code:

Telephone: Ext.: FAX: (optional)

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-113

ACTIVITY & USE LIMITATION (AUL) TRANSMITTAL FORM

Pursuant to 310 CMR 40.1056 and 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 | 13302

F. RELATIONSHIP TO DISPOSAL SITE OF PERSON SUBMITTING AUL TRANSMITTAL FORM: (check one)

☐ RP or PRP Specify: ◯ Owner ◯ Operator ◯ Generator ◯ Transporter Other RP or PRP: _____

☐ Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☑ Any Other Person Submitting AUL Specify Relationship: Property Owner

G. CERTIFICATION OF PERSON SUBMITTING AUL TRANSMITTAL FORM:

I, Dean F. Stratouly, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: _____ Title: Pres. Wayland Business Center Inc.
(signature)

For: Wayland Business Center, LLC Date: _____
(print name of person or entity recorded in Section D)

Enter address of person providing certification, if different from address recorded in Section D:

Street: _____

City/Town: _____ State: _____ ZIP Code: _____

Telephone: _____ Ext.: _____ FAX: (optional) _____

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE, AND YOU MAY INCUR ADDITIONAL COMPLIANCE FEES.

UNDERGROUND
ENGINEERING &
ENVIRONMENTAL
SOLUTIONS

Haley & Aldrich, Inc.
465 Medford Street
Suite 2200
Boston, MA 02129-1400
Tel: 617.886.7400
Fax: 617.886.7600
Email: BOS@HaleyAldrich.com

HALEY & ALDRICH

4 May 1999
File No. 12069-044

Wayland Chief Municipal Officer
41 Cochituate Road
Wayland, Massachusetts 01778

Attention: Mr. Jeff Ritter
Executive Secretary

Subject: Notice of an Activity and Use Limitation
Former Raytheon Facility
430 Boston Post Road
Wayland, Massachusetts
RTN 3-13302

Gentlemen:

On behalf of our client, Wayland Business Center, LLC, and in accordance with the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 and 310 CMR 40.1400, Haley & Aldrich, Inc. is informing you that a Notice of Activity and Use Limitation (AUL) for the former Raytheon Facility, 430 Boston Post Road, Wayland has been recorded with the Middlesex Registry of Deeds on 13 April 1999, Document No. 1103685.

This notification to the Chief Municipal Officer, Board of Health, Zoning Official, and Building Code Enforcement Official is in accordance with the MCP 40.1403(7). Enclosed is a copy of the registered Notice of Activity and Use Limitation and a copy of a legal notice to be published in the Wayland Town Crier.

Please contact the undersigned at (617) 886-7341, if you have any questions.

Sincerely yours,
HALEY & ALDRICH, INC.

Cole E. Worthy III
Senior Engineer

Enclosure

Cc: Wayland Business Center, LLC; Attn: Mr. Dean Stratouly
Massachusetts Department of Environmental Protection
Town of Wayland Building Department; Attn: Mr. Dan Bennett
Town of Wayland Board of Health; Attn: Mr. Andrew Wheelock

Document2

OFFICES
Cleveland *Ohio*
Denver *Colorado*
Hartford *Connecticut*
Los Angeles *California*
Manchester *New Hampshire*
Newark *New Jersey*
Portland *Maine*
Rochester *New York*
San Diego *California*
San Francisco *California*
Washington *District of Columbia*

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Email: BOS@HaleyAldrich.com

HALEY & ALDRICH

4 May 1999
File No. 12069-044

Wayland Board of Health
41 Cochituate Road
Wayland, Massachusetts 01778

Attention: Mr. Andrew Wheelock
Chairman of Board of Health

Subject: Notice of an Activity and Use Limitation
Former Raytheon Facility
430 Boston Post Road
Wayland, Massachusetts
RTN 3-13302

Gentlemen:

On behalf of our client, Wayland Business Center, LLC, and in accordance with the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 and 310 CMR 40.1400, Haley & Aldrich, Inc. is informing you that a Notice of Activity and Use Limitation (AUL) for the former Raytheon Facility, 430 Boston Post Road, Wayland has been recorded with the Middlesex Registry of Deeds on 13 April 1999, Document No. 1103685.

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Please contact the undersigned at (617) 886-7341, if you have any questions.

Sincerely yours,
HALEY & ALDRICH, INC.

Cole E. Worthy III
Senior Engineer

Enclosure

Cc: Wayland Business Center, LLC; Attn: Mr. Dean Stratouly
Massachusetts Department of Environmental Protection
Town of Wayland Building Department; Attn: Mr. Dan Bennett
Town of Wayland Executive Secretary; Attn: Mr. Jeff Ritter

Document2

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Email: BOS@HaleyAldrich.com

HALEY & ALDRICH

4 May 1999
File No. 12069-044

Wayland Building Department
41 Cochituate Road
Wayland, Massachusetts 01778

Attention: Mr. Andrew Bennett
Building Commissioner and Zoning Enforcer

Subject: Notice of an Activity and Use Limitation
Former Raytheon Facility
430 Boston Post Road
Wayland, Massachusetts
RTN 3-13302

Gentlemen:

On behalf of our client, Wayland Business Center, LLC, and in accordance with the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 and 310 CMR 40.1400, Haley & Aldrich, Inc. is informing you that a Notice of Activity and Use Limitation (AUL) for the former Raytheon Facility, 430 Boston Post Road, Wayland has been recorded with the Middlesex Registry of Deeds on 13 April 1999, Document No. 1103685.

This notification to the Chief Municipal Officer, Board of Health, Zoning Official, and Building Code Enforcement Official is in accordance with the MCP 40.1403(7). Enclosed is a copy of the registered Notice of Activity and Use Limitation and a copy of a legal notice to be published in the Wayland Town Crier.

Please contact the undersigned at (617) 886-7341, if you have any questions.

Sincerely yours,
HALEY & ALDRICH, INC.

Cole E. Worthy III
Senior Engineer

Enclosure

Cc: Wayland Business Center, LLC; Attn: Mr. Dean Stratouly
Massachusetts Department of Environmental Protection
Town of Wayland Executive Officer; Attn: Mr. Jeff Ritter
Town of Wayland Board of Health; Attn: Mr. Andrew Wheelock

Document2

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Portland *Maine*
Rochester *New York*
San Diego *California*
San Francisco *California*
Washington *District of Columbia*

NOTICE OF AN ACTIVITY AND USE LIMITATION

FORMER RAYTHEON FACILITY

430 BOSTON POST ROAD, WAYLAND, MA

DEP RELEASE TRACKING NUMBER 3-13302

Pursuant to Massachusetts Contingency Plan (310 CMR 40.1074), a **NOTICE OF ACTIVITY AND USE LIMITATION** on the above disposal site has been recorded with the **Middlesex Registry of Deeds** on **13 April 1999, Document No. 1103685.**

The **NOTICE OF ACTIVITY AND USE LIMITATION** will limit the following site activities and uses on the above property:

i) Residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities and uses, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP;

ii) Subsurface activities, including, but not limited to, excavation which may result in direct contact with, disturbance, or relocation of the petroleum-impacted soil located greater than six feet below grade, which are not conducted in accordance with Section I of this Notice of AUL;

iii) Relocation of the petroleum-impacted soil currently located greater than six feet below grade to a shallower depth, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP; and

iv) Placement of wells for the withdrawal of groundwater for uses other than assessment or remediation.

Any person interested in obtaining additional information or reviewing the **NOTICE OF ACTIVITY AND USE LIMITATION** and the disposal site file may contact **DEAN F. STRATOULY** of the **WAYLAND BUSINESS CENTER, LLC, ONE MEMORIAL DRIVE, CAMBRIDGE, MASSACHUSETTS** at **617-494-1111.**

F:\12069\044\frm08aul.wpf

GOODWIN, PROCTER & HOAR LLP

COUNSELLORS AT LAW
EXCHANGE PLACE
BOSTON, MASSACHUSETTS 02109-2881

TELEPHONE (617) 570-1000
TELECOPIER (617) 227-8591

April 21, 1999

Chris Lane
Congress Group Ventures
One Memorial Drive
Cambridge, MA 02142

Re: Wayland Business Center

Dear Chris:

Enclosed is a recorded copy of the AUL for Wayland Business Center. It was filed on April 13, 1999 as Document 1103685 (Certificate of Good Standing and AUL were filed as one Document). The Certificate of Good Standing was recorded on the same day as Instrument No. 1036, followed by the AUL as Instrument No. 1037.

The plan references were left blank on the first page because the plan was recorded with Instrument No. 1037. When that instrument receives a Book and Page number (this will take a few weeks), the plan (numbered 397 of 1999) will receive the identical Book and Page number. A reduced copy of the entire plan will be bound in the book alongside the AUL and a reference to the recorded plan will be made on the first page of the AUL. (The mylar will be available in the Plan Room for anyone who requires a full sized copy.)

Note also that the Land Court required that I attach to the AUL a copy of a portion of the plan showing the AUL area.

Sincerely,

Anya Wittenborg
Senior Legal Assistant

cc: Bill Beck (w/enc)

The Commonwealth of Massachusetts

Secretary of the Commonwealth

State House, Boston, Massachusetts 02133

ı Francis Galvin
ɜtary of the
ımonwealth

April 2, 1999

TO WHOM IT MAY CONCERN:

I hereby certify that a certificate of registration of a Foreign Limited Liability Company was filed in this office by

WAYLAND BUSINESS CENTER LLC

in accordance with the provisions of Massachusetts General Laws Chapter 156C on **December 5, 1997**.

I further certify that said Limited Liability Company has filed all annual reports due and paid all fees with respect to such reports; that said Limited Liability Company has not filed a certificate of cancellation or withdrawal; and that, said Limited Liability Company is in good standing with this office.

I also certify that the names of all managers listed in the most recent filing are: **WAYLAND BUSINESS CENTER, INC.**

I further certify that the name of persons authorized to act with respect to real property instruments listed in the most recent filings are: **DEAN F. STRATOULY**

In testimony of which,
I have hereunto affixed the
Great Seal of the Commonwealth
on the date first above written.

William Francis Galvin

Secretary of the Commonwealth

FORM 1075

310 CMR 40.1099

Wayland Business Center, Wayland, Massachusetts

NOTICE OF ACTIVITY AND USE LIMITATION
M.G.L. c. 21E, §6 and 310 CMR 40.0000

SEE PLAN IN RECORD BOOK ___ PAGE ___

Disposal Site Name: Former Raytheon Facility
DEP Release Tracking Nos.: 3-13302

This Notice of Activity and Use Limitation ("Notice") is made as of this 16th day of February, 1999, by Wayland Business Center, LLC with an address at 400-440 Boston Post Road, Wayland, MA 01778 together with his/her/its/their successors and assigns (collectively "**Owner**").

WITNESSETH:

WHEREAS, Wayland Business Center, LLC, of Wayland, Middlesex County, Massachusetts is the owner in fee simple of that certain parcel of land located at 430 Boston Post Road, in Wayland, Middlesex County, Massachusetts, with the buildings and improvements thereon ("**Property**");

WHEREAS, said parcel of land, which is more particularly bounded and described in **Exhibit A**, attached hereto and made a part hereof ("Property") is subject to this Notice of Activity and Use Limitation. The Property is shown on a plan recorded and/or registered in Middlesex County Registry of Deeds/Land Registration Office in Plan Book ____, Plan _____;

WHEREAS, a portion of the Property ("**Portion of the Property**") is subject to this Notice of Activity and Use Limitation. The Portion of the Property consists of 36,360± square feet and is more particularly bounded and described in **Exhibit A-1**, attached hereto and made part hereof. The Portion of the Property is shown as a cross-hatched area labeled Activity and Use Limitation Area on a plan recorded with Middlesex County Registry of Deeds/Land Registration Office in Plan Book _____, Plan _____;

WHEREAS, the Portion of the Property comprises a disposal site as the result of a release of oil and/or hazardous material. **Exhibit B** is a sketch plan showing the relationship of the Portion of the Property subject to this Notice of Activity and Use Limitation to the boundaries of said disposal site (to the extent such boundaries have been established). Exhibit B is attached hereto and made part hereof; and

WHEREAS, one or more response actions have been selected for the Portion of the Disposal Site in accordance with M.G.L. c.21E ("**Chapter 21E**") and the Massachusetts Contingency Plan, 310 CMR 40.0000 ("**MCP**"). Said response actions are based upon (a) the restriction of human access to and contact with oil and/or hazardous material in soil and/or groundwater and/or (b) the restriction of certain activities occurring in, on, through, over or under the Portion of the Property. The basis for such restrictions is set forth in an Activity

and Use Limitation Opinion ("**AUL Opinion**"), dated February 16, 1999, (which is attached hereto as **Exhibit C** and made a part hereof);

NOW, THEREFORE, notice is hereby given that the activity and use limitations set forth in said AUL Opinion are as follows:

1. Permitted Activities and Uses Set Forth in the AUL Opinion. The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare and the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as any of the following activities and uses occur on the Portion of the Property:

(i) Commercial or industrial activities and uses, including, but not limited to, vehicular parking, pedestrian and vehicular traffic, and landscaping, which do not cause and/or result in direct contact, disturbance of, and/or relocation of, the petroleum-impacted soil currently located greater than six feet below grade;

(ii) Shallow (less than six feet below grade) excavation activities associated with subsurface utility or construction work;

(iii) Deep (greater than six feet below grade) excavation activities associated with subsurface utility or construction work, provided that the activities are conducted in accordance with a Soil Management Plan, and if appropriate, a Health and Safety Plan, developed in accordance with Obligation (i) of Paragraph 3 below by a Licensed Site Professional ("**LSP**") prior to the initiation of such activities, the soil management procedures of the MCP cited at 310 CMR 40.0030, and all applicable worker health and safety practices pursuant to 310 CMR 40.0018;

(iv) Activities and uses which are not prohibited by this Notice of AUL; and

(v) Such other activities or uses which, in the Opinion of the LSP, shall present no greater risk of harm to health, safety, public welfare and the environment than the activities and uses set forth in this Paragraph.

2. Activities and Uses Inconsistent with the AUL Opinion. Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Portion of the Property, may result in a significant risk of harm to health, safety, public welfare or the environment or in a substantial hazard, are as follows:

(i) Residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities and uses, unless such activity is first evaluated by an LSP who renders an Opinion that attests

that a condition of no significant risk is maintained, consistent with the provisions of the MCP;

(ii) Subsurface activities, including, but not limited to, excavation which may result in direct contact with, disturbance, or relocation of the petroleum-impacted soil located greater than six feet below grade, which are not conducted in accordance with Section 1 of this Notice of AUL;

(iii) Relocation of the petroleum-impacted soil currently located greater than six feet below grade to a shallower depth, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP; and

(iv) Placement of wells for the withdrawal of groundwater for uses other than assessment or remediation.

3. Obligations and Conditions Set Forth in the AUL Opinion. If applicable, obligations and/or conditions to be undertaken and/or maintained at the Portion of the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

(i) A Soil Management Plan, and if appropriate, a Health and Safety Plan, must be prepared by an LSP prior to initiation of any subsurface activity that may disturb petroleum-impacted soil located greater than six feet below grade within the Portion of the Property;

(ii) The petroleum-impacted soil located greater than six feet below grade within the Portion of the Property subject to this AUL may not be relocated to a shallower depth within the Portion of the Property, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP; and

4. Proposed Changes in Activities and Uses. Any proposed changes in activities and uses, except for purposes allowed by Section 1, at the Portion of the Property which may result in higher levels of exposure to oil and/or hazardous material than currently exist shall be evaluated by the LSP who shall render an Opinion, in accordance with 310 CMR 40.1080 *et seq.*, as to whether the proposed changes will present a significant risk of harm to health, safety, public welfare and the environment. Any and all requirements set forth in the Opinion to meet the objective of this Notice shall be satisfied before any such activity or use is commenced.

5. Violation of a Response Action Outcome. Except as provided in Section 1, the activities, uses and/or exposures upon which this Notice is based shall not change at any

time to cause a significant risk of harm to health, safety, public welfare, and the environment, or to create substantial hazards due to exposure to oil and/or hazardous material without the prior evaluation by the LSP in accordance with 310 CMR 40.1080 *et seq.*, and without additional response actions, if necessary, to achieve or maintain a condition of No Significant Risk or to eliminate substantial hazards.

If the activities, uses, and/or exposures upon which this Notice is based change without the prior evaluation and additional response actions determined to be necessary by the LSP in accordance with 310 CMR 40.1080 *et seq.*, the owner or operator of the Portion of the Property subject to this Notice at the time that the activities, uses and/or exposures change, shall comply with the requirements set forth in 310 CMR 40.0020.

6. Incorporation Into Deeds, Mortgages, Leases, and Instruments of Transfer. This Notice shall be incorporated either in full or by reference into all deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Portion of the Property or a portion thereof is conveyed.

Owner hereby authorizes and consents to the filing and recordation and/or registration of this Notice, said Notice to become effective when executed under seal by the undersigned LSP, and recorded and/or registered with the appropriate Registry of Deeds and/or Land Registration Office(s).

WITNESS the execution hereof under seal this 16 day of February, 1999.

Owner: Wayland Business Center, LLC

By: _____

Dean F. Stratouly, President
~~Congress Group Ventures, Inc.~~
Wayland Business Center, Inc.

FORM 1075

310 CMR 40.1099

COMMONWEALTH OF MASSACHUSETTS

Middlesex, ss

February 23, 1999

Then personally appeared the above named Dean Stratoulas and acknowledged the foregoing to be their free act and deed, and the free act and deed of said corporation as said general partner, before me,

Notary Public
My Commission Expires: 2/16/2001

The undersigned LSP hereby certifies that he executed the aforesaid Activity and Use Limitation Opinion attached hereto as Exhibit C and made a part hereof and that in his Opinion this Notice of Activity and Use Limitation is consistent with the terms set forth in said Activity and Use Limitation Opinion.

Date: 2/16/99

John C. Drobinski, LSP Reg. No. 2196
[LSP SEAL]

COMMONWEALTH OF MASSACHUSETTS

Suffolk Co, ss

February 16, 1999

Then personally appeared the above named John C. Drobinski, and acknowledged the foregoing to be his free act and deed before me,

Notary Public
My Commission Expires:

WILLIAM H. O'CONNELL
Notary Public
My Commission Expires Jan. 22, 2004

Upon recording, return to:

Mr. Christopher Lane
Congress Group Ventures
One Memorial Drive
Cambridge, MA 02142

EXHIBIT A

A certain parcel of land situated in Wayland, Middlesex County, Massachusetts, shown as land of Wayland Business Center, LLC on a plan entitled, "Plan of Land Located on Boston Post Road, Wayland, Massachusetts Owned by Wayland Business Center, LLC" dated January 18, 1999, Scale 1" = 40', by Varnesse Hansen Brustlin, Inc. ~~bounded and described as~~ follows: recorded herewith

Included in the parcel is a parcel of registered land shown as Lot A on L.C. Plan # 17983 A

Current Cert. of Title : 210249 Book 1181, Page 99

EXHIBIT A-1

Containing 36,360 square feet of land, more or less, according to the plan recorded herewith entitled "Plan of Land Located on Boston Post Road, Wayland, Massachusetts Owned by Wayland Business Center, LLC", dated January 18, 1999, Scale 1" = 40', by Vanasse Hangen Brustlin, Inc.

Vanasse Hangen Brustlin, Inc.

Transportation
Land Development
Environmental Services

VHB

101 Walnut Street
Post Office Box 9151
Watertown
Massachusetts 02272
617 924 1770
FAX 617 924 2286

LEGAL DESCRIPTION
Activity and Use Limitation area

A certain parcel of land located on the property owned now or formerly by Wayland Business Center LLC situated northerly of Boston Post Road (Route 20) and westerly of Old Sudbury Road (Route 27) in the Town of Waylaid, County of Middlesex, Commonwealth of Massachusetts, bounded and described as follows.

(Reference is made to Buildings #3 & #4 which are a portion of the buildings that comprise the former Raytheon Manufacturing Corporation's complex) The northwest corner of Building #3 is located approximately seven hundred sixty five feet (765') northerly from the northerly line of Route 20, and approximately nine hundred fifteen feet (915') westerly from the westerly line of Route 27.

Beginning at a point in the northerly line of Building #3, said point being located approximately sixty feet (60') easterly from the above mentioned northwesterly corner of Building #3: thence

Easterly a distance of one hundred eighty five feet (185') by the said northerly line of Building #3 to a point: thence

Southerly a distance of one hundred ninety eight feet (198') more or less to a point in the northerly line of Building #4, said course is perpendicular to the last mentioned course: thence

Westerly a distance of one hundred eighty five feet (185') by the said northerly line of Building #4 to a point: thence

Northerly a distance of one hundred ninety eight feet (198') more or less to the point of beginning, said course is perpendicular to the last mentioned course.

The above-described parcel of land contains an area of 36,630 square feet, more or less (0.841 Acres).

EXHIBIT B

(To include a sketch displaying the boundaries of the disposal site (to the extent such boundaries have been established as of the date of this Notice) in relation to the boundaries of the Portion of the Property subject to this Notice of AUL).

EXHIBIT C
ACTIVITY AND USE LIMITATION OPINION

This Licensed Site Professional (LSP) Opinion has been prepared in accordance with the requirements of 310 CMR 40.1074(1)(B) to support a Notice of Activity and Use Limitation (AUL) for a property located at 400-440 Boston Post Road in Wayland, Massachusetts.

Site History

On 2 January 1996, Raytheon Electronic Systems Inc. (RES) discovered a release during the installation of MW-11 downgradient of an abandoned UST that required a 72-hour notification to the Massachusetts Department of Environmental Protection (DEP).

Raytheon requested DEP approval to implement an assessment Immediate Response Action (IRA). The results of the IRA were reported in an IRA completion report and amendment dated 4 and 28 March 1998 and recommended that additional response actions be completed as a Release Abatement Measure (RAM). The RAM was conducted during the period May through July 1998 and resulted in the removal and off-site treatment (at MTS of Chichester, NH) of approximately 3,300 cubic yards of petroleum-impacted soil. In addition, approximately 2,240 gallons of a mixture of water and #6 oil were removed from the excavation and transported off-site for treatment under a Hazardous Waste Manifest.

Reason for Activity and Use Limitation

Within the portion of the Property subject to this Notice of AUL, petroleum-impacted soil remained in-place at depths greater than 15 feet below grade and beneath the existing building following the completion of remedial activities at the site. No utilities exist at depths greater than six feet. The area has been backfilled with clean soil and the contaminated soil is not considered accessible.

A Method 3 Risk Characterization was conducted to support the filing of a Class A-3 Response Action Outcome for the site. The concentrations of petroleum-related compounds meet the risk criteria for current and foreseeable site use, but exceeded the residential standard, which would permit unrestricted future use.

There is no Significant Risk of harm to human health public welfare, safety or the environment for anticipated exposures to a construction worker, building occupant, visitor, nearby resident or tresspasser that may be exposed to Disposal-Site related constituents under current/foreseeable or unrestricted site usage. However, since the residual levels of petroleum-related compounds in soil exceed residential criteria, an Activity and Use Limitation is required to prevent activities which could pose a future risk. The intent of the AUL is to restrict activities in the area of soil contamination so that any disruption is controlled and that the soil does not become accessible.

Prohibited or Limited Activities and Uses

The following Activities and Uses are prohibited or limited in the designated portion of the Property subject to this Notice of AUL:

(i) Residential, childcare, daycare, recreational, agricultural, horticultural, or gardening activities and uses, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP;

(ii) Subsurface activities, including, but not limited to, excavation which may result in direct contact with, disturbance, or relocation of the petroleum-impacted soil located greater than six feet below grade, which are not consistent with Section (i) of this Notice of AUL;

(iii) Relocation of the petroleum-impacted soil currently located greater than six feet below grade to a shallower depth, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP; and

(iv) Placement of wells for the withdrawal of groundwater for non-MCP purposes.

Permitted Activities and Uses

The following Activity and Uses are permitted in the designated portion of the Property subject to this Notice of AUL:

(i) Commercial or industrial activities and uses, including, but not limited to, vehicular parking, pedestrian and vehicular traffic, and landscaping, which do not cause and/or result in direct contact, disturbance of, and/or relocation of, the petroleum-impacted soil currently located greater than six feet below grade;

(ii) Shallow (less than six feet below grade) excavation activities associated with subsurface utility or construction work;

(iii) Deep (greater than six feet below grade) excavation activities associated with subsurface utility or construction work, provided that the activities are conducted in accordance with a Soil Management Plan, and if appropriate, a Health and Safety Plan, developed in accordance with Obligation (i) by an LSP prior to the initiation of such activities, the soil management procedures of the MCP cited at 310 CMR 40.0030, and all applicable worker health and safety practices pursuant to 310 CMR 40.0018;

(iv) Activities and uses which are not prohibited by this Notice of AUL; and

(v) Such other activities or uses which, in the Opinion of the LSP, shall present no greater risk of harm to health, safety, public welfare and the environment than the activities and uses set forth in this Paragraph.

Obligations and Conditions Set Forth in the AUL Opinion

The obligations and conditions associated with this AUL are described below:

(i) A Soil Management Plan, and if appropriate, a Health and Safety Plan, must be prepared by an LSP prior to initiation of any subsurface activity that may disturb petroleum-impacted soil located greater than six feet below grade within the portion of the Property subject to this Notice of AUL; and

(ii) The petroleum-impacted soil located greater than six feet below grade within the portion of the Property subject to this Notice of AUL may not be relocated to a shallower depth with the AUL area, unless such activity is first evaluated by an LSP who renders an Opinion that attests that a condition of no significant risk is maintained, consistent with the provisions of the MCP.

Certification

This AUL Opinion was prepared by:

Signature

2196
License Number

JOHN C. DROBINSKI No. 2196 REGISTERED

(Seal)

9/16/99
Date

(DEED BOOK 11072, PAGE 320)
(ASS. MAP 22 / 11)

CONC. BOUND W/DRILL HOLE FOUND

2257'± TO RIVER

N 80°45'43" E 1423.77

S 31°33'38" E 2.24'

N 80°45'43" E 752.99'

2176.76'

80'±

105'±

130'±

26'±

LIMIT OF REGISTERED LAND

(MATHEMATICAL TIE LINE)
(NOT A PROPERTY LINE)

N/F
WAYLAND BUSINESS CENTER LLC
L.C. CERT NO. 210249
& DEED BOOK 27977, PAGE 52

TOTAL AREA
82.8± ACRES

TOWN OF WAYLAND
DRAIN EASEMENT
(SEE DOC. No. 294238)

OLD SUDBURY ROAD
(1955 COUNTY LAYOUT - SEE DOC. No. 296300)
(PUBLIC 50.00' WIDE)

S 33°00'48" E
(R) 1087.07'
(F) 1084.36'
930.92

LAND COURT CASE No. 17983A
LOT A
AREA = 50.15± ACRES

LOT A
AS SHOWN ON
PLAN #763 OF 1954
AREA REMAINING = 81,747 SF (1.877 AC)
AFTER 1995 TAKING FOR
OLD SUDBURY ROAD

842.00' S 71°01'00" W LIMIT OF REGISTERED LAND

842'± TO RIVER

N 11°48'20" W 328.00'

N/F
DEVINS H. HAMLEN &
JAMES M. HAMLEN
(DEED BOOK 11937, PAGE 566)
(ASS. MAP 22 / 10)

STONE BOUND w/ DRILL HOLE FOUND

REGISTERED LAND
UNREGISTERED LAND

A.U.L. AREA
(SEE DETAIL)

915'±

REGISTERED LAND
UNREGISTERED LAND

CONC. BOUND w/ LEAD PLUG FOUND

153.15'
38.14'

ROUTE 27

N/F
TOWN OF WAYLAND

N 71°29'32" E 549.78'

N 74°46'46" W 117.21'

123.73'
N 74°46'46" W

N 15°13'14" E
48.63'

N 74°46'46" W

438.92'

135.01'

STONE BOUND w/ DRILL HOLE FOUND

ROUTE 20

627.48'
N 86°09'36" W

2060.18'

772.34'

290.0'
186.7'
315.0'
225.0'
68.0'
42.7'
383.0'
289.5'
765'±
663.4'
590.0'

LOT C
AS SHOWN ON PLAN No. 763 OF 1954
AREA = 944,626 S.F. (21.686 ACRES)

LOT B
AS SHOWN ON
PLAN #763 OF 1954
AREA REMAINING = 371,398 SF (8.526 AC)
AFTER 1995 TAKING FOR
OLD SUDBURY ROAD

S 31°54'18" E
429.50'

DRILL HOLE
CONC. HEAD
FOUND

IRON PIPE IN BROOK FOUND

394.72' S 67°12'24" W

N/F
RALPH WETTLAND
(DEED BOOK 8380, PAGE 280)
(ASS. MAP 23 / 51)

S 32°07'26" E
250.49'

525.35'
N 86°09'36" W

MASSACHUSETTS BAY TRANSIT AUTHORITY

(BOSTON EDISON COMPANY, ELECTRICITY TRANSMISSION EASEMENT)
(SEE INDENTURE IN BOOK 8023, PAGE 6)

LOT "A"
AS SHOWN ON PLAN No. 1721 OF 1955
AREA = 12,811 S.F. (0.294 ACRES)
(SEE DEED BOOK 8562, PAGE 316)

30' WIDE BOSTON EDISON COMPANY
EASEMENT
(SEE DEED BOOK 8611, PAGE 436
AND PLAN No. 2121 OF 1955)

STONE BOUND w/ DRILL HOLE FOUND

N/F
ELENOR CUNNINGHAM
(DEED BOOK 21390, PAGE 202)
(ASS. MAP 23 / 50)

EXHIBIT D
(BWSC Form 114, AUL Opinion Form)

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-114

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 | 13302

COMPLETE THIS FORM AND ATTACH AS AN EXHIBIT TO THE AUL DOCUMENT TO BE RECORDED AND/OR REGISTERED WITH THE REGISTRY OF DEEDS AND/OR LAND REGISTRATION OFFICE.

A. LOCATION OF DISPOSAL SITE AND PROPERTY SUBJECT TO AUL:

Disposal Site Name: Former Raytheon Facility

Street: 430 Boston Post Road Location Aid:

City/Town: Wayland ZIP Code: 01778-1824

Address of property subject to AUL, if different than above. Street: 400 to 440 Boston Post Road

City/Town: Wayland ZIP Code: 01778-1824

B. THIS FORM IS BEING USED TO: (check one)

- [x] Provide the LSP Opinion for a **Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1074 (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amended Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1081(4) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Termination of a Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1083(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Grant of Environmental Restriction**, pursuant to 310 CMR 40.1071, (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amendment of Environmental Restriction**, pursuant to 310 CMR 40.1081(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Release of Environmental Restriction**, pursuant to 310 CMR 40.1083(2) (complete all sections of this form).

C. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this submittal, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B indicates that a **Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1074(1)(b);

> *if Section B indicates that an **Amended Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Termination of a Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1083(3)(a);

> *if Section B indicates that a **Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1071(1)(b);

> *if Section B indicates that an **Amendment to a Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Release of Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1083(3)(a).

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

- [ ] Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

SECTION C IS CONTINUED ON THE NEXT PAGE.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-114

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 | 13302

C. LSP OPINION: (continued)

LSP Name: John C. Drobinski LSP #: 2196 Stamp:

Telephone: 617-267-8377 Ext.: 150

FAX: 617-267-6447

LSP Signature:

Date: 5/7/99

COMMONWEALTH OF MASSACHUSETTS
JOHN C. DROBINSKI
No. 2196
REGISTERED
LICENSED SITE PROFESSIONAL

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY FIND THE DOCUMENT TO BE INCOMPLETE.

DOCUMENT 1103685

[illegible] WATKS

RECEIVED & ENTERED
MIDDLESEX COUNTY
REGISTRY OF DEEDS
SOUTHERN DISTRICT
ATTEST:
REGISTER

SO. MIDDLESEX LAND COURT
REGISTRY DISTRICT
RECEIVED FOR REGISTRATION

ON 04/13/99 AT 03:47:41 60.00 CAD

NOTED ON:
CERT 0210249 BK 1181 PG 99

Aurea Wittenberg 570-1000
Q&S 11
Boston

Appendix E Natural Heritage and Endangered Species Letter dated 10/10/06

and State-Listed Rare Species Fact Sheets

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

October 10, 2006

Jesse Cadigan
Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, MA 01754

Re: Wayland Town Center
Wayland, MA
NHESP Tracking No. 06-20298

Dear Jesse Cardigan:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-protected rare species in the vicinity of the above referenced site. We have reviewed the site and would like to offer the following comments.

This project site, or a portion thereof, is located **within** *Priority Habitat 107* (PH 107) and *Estimated Habitat 765* (EH 765) as indicated in the 12th Edition of the Massachusetts Natural Heritage Atlas (effective October 1, 2006). Our database indicates that the following state-listed rare species have been found in PH 107 and WH 765:

Scientific name	Common Name	Taxonomic Group	State Status
Ixobrychus exilis	Least Bittern	Bird	Endangered
Botaurus lentiginosus	American Bittern	Bird	Endangered
Podilymbus podiceps	Pied-Billed Grebe	Bird	Endangered
Gallinula chloropus	Common Moorhen	Bird	Special Concern

The species listed above are protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.37 and 10.59). Fact sheets for most state-listed rare species can be found on our website http://www.nhesp.org.

Please note that projects or activities located within Priority and/or Estimated Habitat **must** be reviewed by the NHESP for compliance with the state-listed rare species protection provisions of MESA (321 CMR 10.00) and/or the WPA (310 CMR 10.00). If the project site is within Estimated Habitat for Rare Wildlife and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the NHESP in a timely manner, so that it is received at the same time as the local conservation commission. If the proposed project is located within a Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, a rare species habitat assessment, and other required filing materials must

be sent to NHESP Environmental Review to determine whether a probable "take" under the MA Endangered Species Act would occur (321 CMR 10.18). Please note that all proposed and anticipated development must be disclosed, as MESA does not allow project segmentation (321 CMR 10.16). For a MESA filing checklist and additional information about the MESA review process, please see our website: www.nhesp.org under the "Regulatory Review" tab. On a case by case basis, field surveys may be required as part of the MESA review process in order to locate rare species on the project site, and to determine their patterns of distribution and habitat use.

The rare species habitat assessment must follow the NHESP guidelines, which can be found at our website under "Regulatory Review" and "Species Survey Protocols". The assessment must be performed by qualified individuals who are familiar with the habitat requirements of the above-listed rare species. Resumes should be included in the assessment report. As part of the habitat assessment, vegetation cover types should be described and mapped. In addition, if the rare species list provided above includes one or more plant species, then suitable habitat that meets the growing requirements of those rare plant species should be described and mapped. If the rare species list provided above includes one or more wildlife species, then, depending upon the life history characteristics of those species, suitable feeding, breeding, migrating, nesting, overwintering, and estivating habitat should be described and mapped. Finally, the habitat assessment should include a detailed evaluation of the potential impacts of the proposed project on state-listed rare species and their habitats.

We recommend that rare species habitat concerns be addressed during the project design phase prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

MA Endangered Species Act (M.G.L. c. 131A)
If NHESP determines that the proposed project would "take" a rare species, then it may be possible to redesign the project to avoid a "take." If such revisions are not possible, the applicant should note that projects resulting in the "take" of state-protected wildlife may only be permitted if they meet the performance standards for a "Conservation and Management Permit" under MESA (321 CMR 10.23). Please note that projects resulting in a "take" may require submission of an Environmental Notification Form, pursuant to the MA Environmental Policy Act regulations (301 CMR 11.00).

Wetlands Protection Act
If the NHESP determines that the proposed project will adversely affect the actual Resource Area habitat of state-protected wildlife, than the proposed project may not be permitted (310 CMR 10.37, 10.58(4)(b) & 10.59). In such a case, the project proponent may request a consultation with the NHESP to discuss potential project design modifications that would avoid adverse effects to rare wildlife habitat.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. Should your site plans change, or new rare species information become available, this evaluation may be reconsidered. If you have any questions regarding this review please call Rebecca Skowron, Endangered Species Review Assistant, at (508) 792-7270, ext. 148.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

Massachusetts Natural Heritage Program

Natural Heritage & Endangered Species Program
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508)792-7270, ext. 200

MASSACHUSETTS RARE AND ENDANGERED WILDLIFE

LEAST BITTERN (*Ixobrychus exilis*)

DESCRIPTION

The Least Bittern is 11-14" long with a wingspan of 16-18", making it the smallest member of the Heron Family. It has a black and green head and back with buff and chestnut wing patches, distinguishing it from the larger, dark-winged green heron. The Least Bittern has a slightly crested head and a yellow bill. It also has a rare dark phase which is a rich chestnut color. It is a weak flier and usually walks or climbs through wetland vegetation.

Golden Field Guide Series

RANGE

Southern Canada and northern United States to southern Texas and the West Indies. Winters from the Gulf Coast south.

STATE OCCURRENCES

Suspected breeding at less than 20 wetland sites scattered throughout Massachusetts.

HABITAT

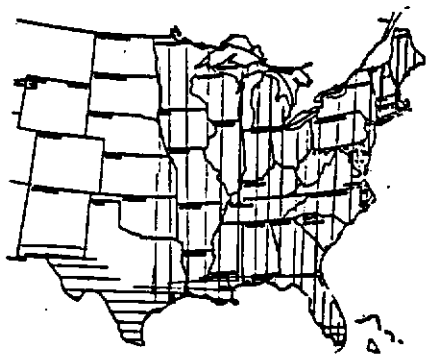
Freshwater marshes where cattails and reeds predominate.

POPULATION STATUS

Considered rare and vulnerable in Massachusetts; believed declining throughout its range.

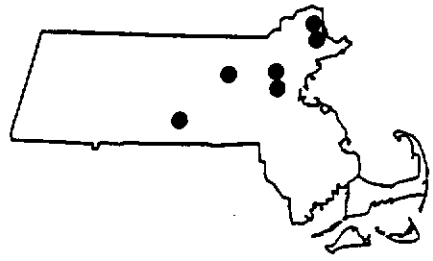
LIMITING FACTORS

Primary cause of rarity is the destruction of wetland habitat.



Breeding Range

Winter Range



● Verified since 1978

Breeding Distribution in Massachusetts by Town

Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
www.nhesp.org
(508) 792-7270 ext. 200/fax (508)792-7821

American Bittern
(Botaurus lentiginosus)

State Status: **Endangered**

By Bill Fournier

DESCRIPTION: The American Bittern is a medium-sized (23-34 in. 58-68 cm long) brown, streaked ground-dwelling heron which spends most of its time hidden among marshland vegetation. Its upper parts are mottled with brown and buff, while the under parts are streaked with brown and white. The short thick neck has a black stripe or patch on each side, and the throat is white with thick black streaks. The top of the head is usually darker than the body, or sometimes rusty. There is a buffy stripe over each of the yellow eyes. The bill, legs and feet are pale yellow or yellowish-green. Wingspread is from 32 to 50 in (80-106 cm) and the black wing tips are conspicuous in flight. The relatively short tail is rounded and mottled brown.

SIMLAR SPECIES: Immature Night Herons are grayer and more spotted than the American Bittern and frequently perch in trees. The Least Bittern is small with buffy wing patches.

HABITAT IN MASSACHUSETTS: The American Bittern inhabits freshwater marshes, meadows, fens and bogs dominated by emergent vegetation such as cattails, bulrushes, sedges and grasses. It may also occur in brackish wetlands.

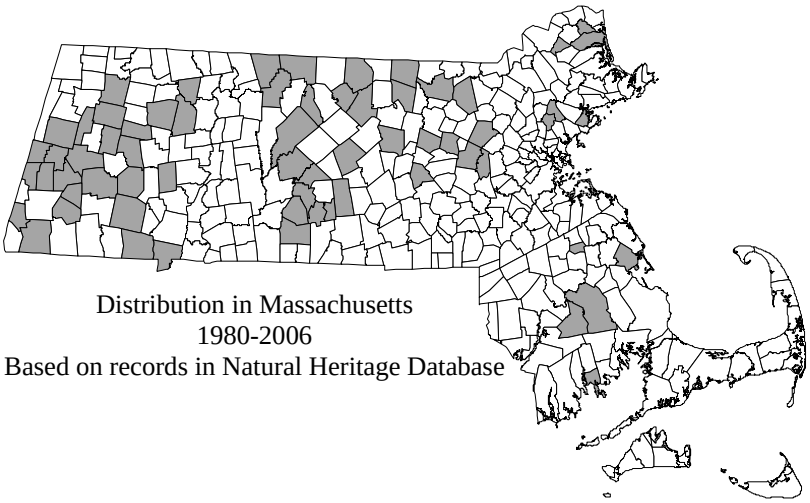
BEHAVIOR: The American Bittern spends most of its time hidden among marshland vegetation. It walks slowly and stealthily. When startled, the bittern assumes what is perhaps it most characteristic stance: standing frozen with the bill pointed skywards, in order to camouflage itself among the reeds, occasionally swaying from side to side with the vegetation as if blown by the wind. When flushed from a marsh, it gives “kok kok kok” call or a nasal “haink”, its wings flap loosely, feet dangle and it flies off slowly, but with rapid wing beats. The distinctive call is loud and guttural; the notes sound like an old-fashioned pump, usually in three syllables, the middle one sharply accented; “oonk-a-lunk” or “oong-ka-chook”. Pumping calls are usually heard at dusk, or dawn in spring or early summer.

MATING/BREEDING HABITS: Courtship behavior is not well understood, but is known to include aerial and ground chases. Males slowly stalk females as they display a pair of white fanlike plumes raised over the back and shoulders. Usually, bitterns nest in marshes, but may also nest in grassy upland fields adjacent to wetlands. Males appear to be territorial throughout the breeding season, and remain in the nest-site vicinity. Males may be polygynous. The female builds the nest and cares for the young. The nest, about a foot (30 cm) in diameter, is located either on the ground in dense vegetation or on a platform about a foot above the water. Nest

material includes dead reeds, cattails, grasses, and sedges. The 3 to 5 buff-brown to olive-brown eggs are laid at 1 day intervals with incubation beginning with the laying of the first egg. An egg hatches about 24 days after it was laid. Young are fed by regurgitation at the nest for about 2 weeks. The female continues to tend the young for an undetermined length of time after they leave the nest. There is one clutch per year.

FEEDING HABITS: Preferred foods include frogs, small snakes and eels, salamanders, crayfish, fish, and occasionally mice and grasshoppers caught on visits to open fields. The American Bittern feeds in marshes, meadows, and along edges of shallow ponds, standing motionless with neck outstretched and level bill, eyes focused down into the water, slowly aiming its bill before suddenly darting downward to seize the prey.

RANGE: The breeding range of the American Bittern extends from Newfoundland west to Manitoba and British Columbia; south to Maryland and west through Oklahoma and Kansas to southern California. This bittern also breeds very rarely in the Gulf States. It winters from the Carolinas south to the Bahamas, Cuba and Panama, and occasionally as far north along the east coast of Massachusetts. American Bitterns return to Massachusetts marshes in April.



Distribution in Massachusetts
1980-2006
Based on records in Natural Heritage Database

POPULATION STATUS: In Massachusetts the American Bittern is classified as an "Endangered" species. Since 1980, NHESP has received reports of American Bitterns at 75 locations during the breeding season. Population trend is not known.

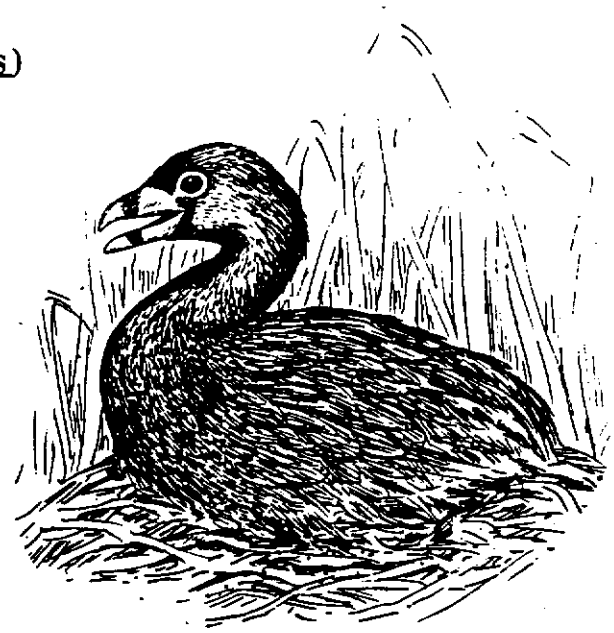
Originated: 1986
Updated: 2006

Natural Heritage & Endangered Species Program

Natural Heritage & Endangered Species Program
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508)792-7270, ext. 200

MASSACHUSETTS RARE AND ENDANGERED WILDLIFE

Pied-billed Grebe
(Podilymbus podiceps)



Charles Joslin, from DeGraaf, R. and Rudis, D. New England Wildlife, 1983

DESCRIPTION: Pied-billed Grebes are stocky waterbirds, 30 to 38 cm (12 to 15 in.) in length, with short legs far back on the body, short wings, a short tail, flat lobes on the toes, and a stout, thick, chicken- like bill. The plumage of the Pied-billed Grebe changes with the seasons. During the summer, the bird is uniformly brown with a dusky underside, a fluffy white posterior, and a large black patch on the throat; its bill is bluish-white, encircled near the middle by a black band. During the winter, the throat loses its black patch, and the bill becomes yellowish, with no black band. The young are liberally banded with black and white stripes, with a smattering of reddish-brown spots. The call of the Pied-billed Grebe is only given during the breeding season, and resembles a series of "*cow cow cow* " sounds. They are poor fliers and must run across the water for several yards before becoming airborne; the head is held low during flight.

SIMILAR SPECIES: Pied-billed Grebes can be distinguished from all other grebes by the lack of white wing patches in flight, the chicken-like bill, and, in summer, the black band around the bill.

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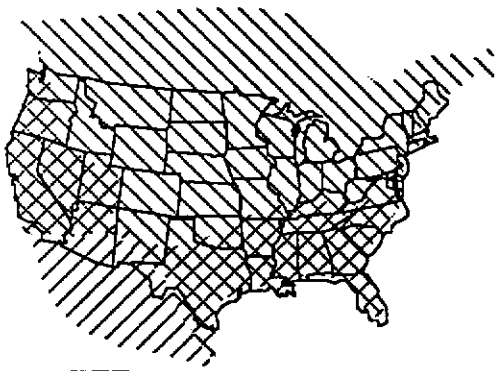
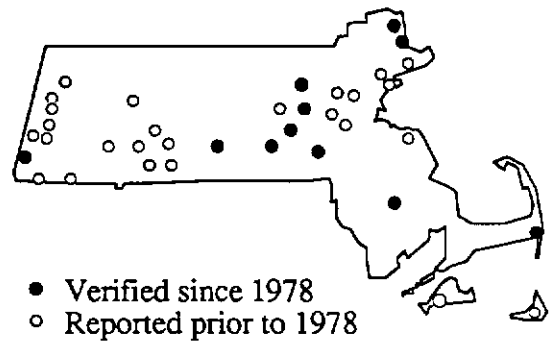


Winter range
Summer (breeding) range
Year-round range



• Verified since 1978
○ Reported prior to 1978

Massachusetts Distribution by Town

1990

HABITAT IN MASSACHUSETTS: Pied-billed Grebes prefer to nest in marshes, lakes, large ponds, and other wetlands which have an abundant supply of cattails, reeds, and other vegetation which can provide cover and nesting materials. They spend the winter in open lakes and rivers, estuaries, and tidal creeks, usually to the south of Massachusetts.

RANGE: The Pied-billed Grebe is the most widespread species of grebe in North America. Pied-billed Grebes can be found from southern Canada southward through the U.S., Central America, and South America to Argentina. The northern populations (including those in Massachusetts) migrate in autumn to the northern limit of unfrozen fresh water south to Panama. Some of the birds may be found in saltwater marshes if there is no unfrozen fresh water available.

BEHAVIOR/LIFE HISTORY: Pied-billed Grebes arrive in Massachusetts in late March and begin courtship displays, which consist of diving and chasing, bill touching, circling, and calling; this may continue until June, but nesting is usually initiated in late April. The nest is constructed over a period of 3 to 7 days by both the male and female out of decayed reeds, sedges, grasses, and other vegetation. It is normally located in thick vegetation near to or surrounded by open water, which allows the birds to travel to and from the nest underwater and undetected. The territory of the breeding pair usually comprises the area within 46 meters (150 ft.) of the nest; the pair's home range is about twice this area. Grebes are very shy during the breeding and nesting periods. When alarmed or disturbed, they sink slowly beneath the water and surface again a considerable distance away, often in an area of dense vegetation.

Egg-laying occurs from late April to June; 2 to 10 whitish-blue eggs are laid over a period of several days. The eggs are covered with debris whenever both parents leave the nest, so the egg color gradually changes to a dirty brown. Both parents (but usually the female) incubate the eggs for 23 to 24 days. The chicks are precocial and can swim and dive only hours after emerging from their shells, but they tire quickly. They often climb onto their parents' backs regardless of whether they are in the water or on the nest. The chicks follow their parents everywhere, constantly begging for food. They grow rapidly and are capable of flight in less than a month.

Pied-billed Grebes eat a variety of foods, including aquatic vegetation, seeds, frogs, tadpoles, fish, aquatic insects, and especially crayfish. Pied-billed Grebes begin to migrate south from Massachusetts in September (sometimes late August), and most of them are gone by the end of December. Considerable numbers of Pied-billed Grebes from farther north can sometimes be seen in Massachusetts as they migrate south. Pied-billed Grebes are infrequently found in Massachusetts in mid-winter.

POPULATION STATUS: The Pied-billed Grebe is classified as a Threatened Species in Massachusetts due to the limited amount of suitable wetland habitats and the small population size of the birds. Nesting occurs erratically at some of the known breeding sites: a pair may breed at a suitable location one year and then never return again. Despite the small amount of available habitat, many of these areas are left vacant by the Pied-billed Grebes.

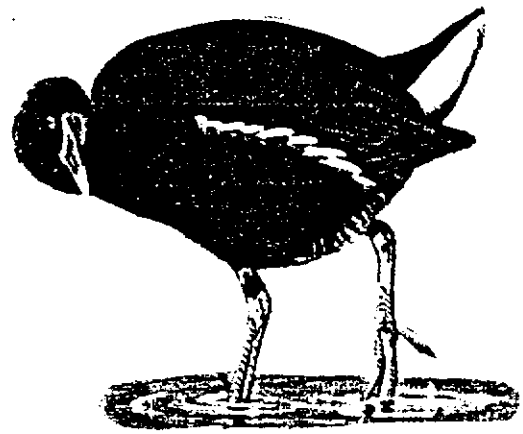
Massachusetts Natural Heritage Program

Natural Heritage & Endangered Species Program
Division of Fisheries & Wildlife
Route 135
Westborough, MA 01581
(508)792-7270, ext. 200

MASSACHUSETTS RARE AND ENDANGERED WILDLIFE

COMMON MOORHEN

(*Gallinula chloropus*)



Forbush, E.H. Birds of Massachusetts. Commonwealth of Massachusetts, 1929.

DESCRIPTION

The Common Moorhen is a duck-like swimming bird about 13" (32cm) long. Its body is slate-grey with a prominent red bill with a yellow tip and a red frontal shield. Its tail cocks up and is white beneath. The voice of the Common Moorhen is a series of clucks or a squawking scream similar to that of the American Coot (*Fulica americana*). Nestlings are black and downy with the red bill with yellow tip, but lack the frontal shield.

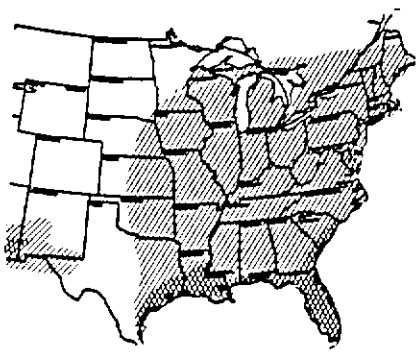
SIMILAR SPECIES IN MASSACHUSETTS

The American Coot is about the same size and is slate-grey, but it has a conspicuous white bill unlike the red bill of the Common Moorhen. Also, the American Coot is often found in open water, while the Common Moorhen keeps to dense vegetation. Rails (Rallus spp.) may be found in the same marsh habitat, but they generally have a brown body and a long bill. They are even more secretive than the Common Moorhen and are very rarely flushed out of dense vegetation.

LIFE HISTORY IN MASSACHUSETTS

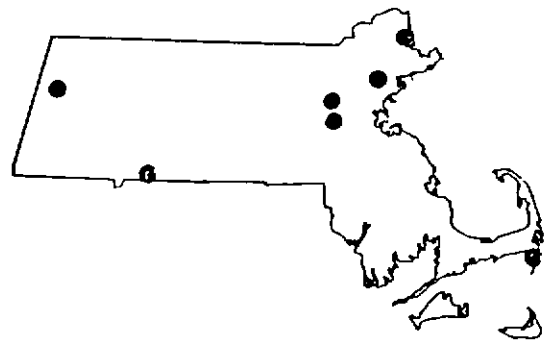
The Common Moorhen inhabits large freshwater marshes and ponds with cattails (*Typha* spp.) and other emergent vegetation. It generally keeps to the cover of dense vegetation and feeds by wading or diving at the edges of open water. Its food is

(continued overleaf)



Range of *Gallinula chloropus*

breeding range
winter range



● Verified since 1978
○ Reported prior to 1978

Breeding Distribution in Massachusetts by Town

mostly made up of grass and sedge seeds and insects.

The Common Moorhen arrives in Massachusetts from the south during late April or May, and returns to its southern wintering range in October. Nesting begins throughout May into early June. It builds its nest of dead marsh plants to form a bulky platform that is usually at the shore edge or floating in dense vegetation.

The female lays 5-12 eggs that are buff or greyish to cinnamon-brown and have reddish-brown or greyish spots. Incubation is carried out by either parent and last for about 21 days. The male cares for the first-hatched chicks while the female incubates the remaining eggs. Young leave the nest very soon after hatching, can feed independently in 3 weeks, and can fly in 6-7 weeks, though they remain with the parents for some time thereafter.

RANGE

The Common Moorhen breeds from Maine to Minnesota, south to Florida and eastern Texas. It also breeds in the west from southern Oregon to Mexico. Its wintering range is from eastern South Carolina through Florida and along the Gulf coast.

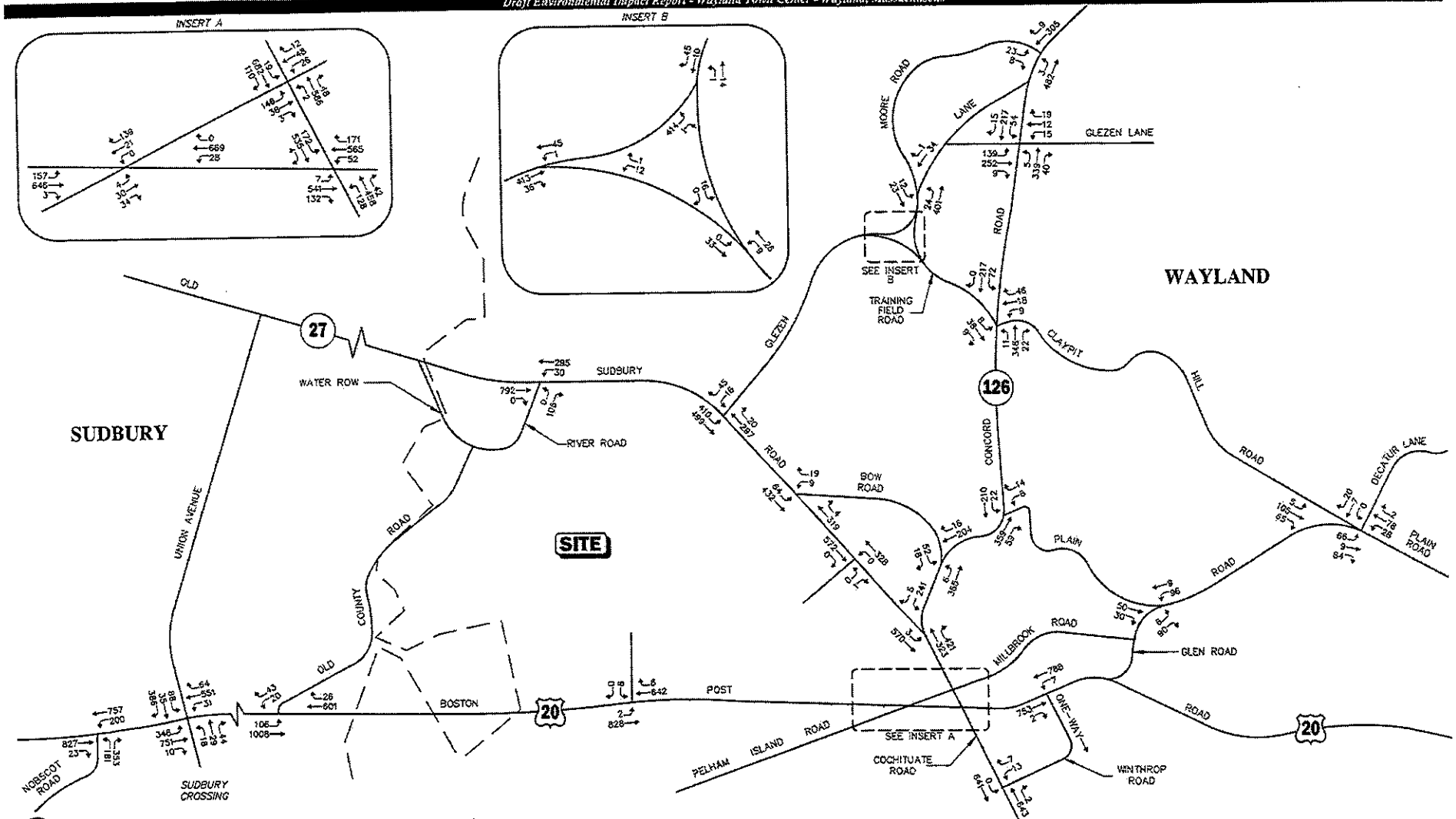
POPULATION STATUS IN MASSACHUSETTS

The Common Moorhen is a species of Special Concern in Massachusetts. Only 8 currently verified sites (since 1978) have been identified in Massachusetts, and 1 additional historical site is recorded. Current breeding population in Massachusetts is estimated at between 11 and 20 pairs.

Since 1985, the hunting season on the Common Moorhen has been closed. Historically, hunting pressure on Common Moorhen has been light in Massachusetts and is unlikely to have affected its population status. The loss of significant amounts of shallow freshwater marsh habitat through drainage and development may be responsible for the decline in population of the Common Moorhen in Massachusetts.

Appendix F Air Quality

Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

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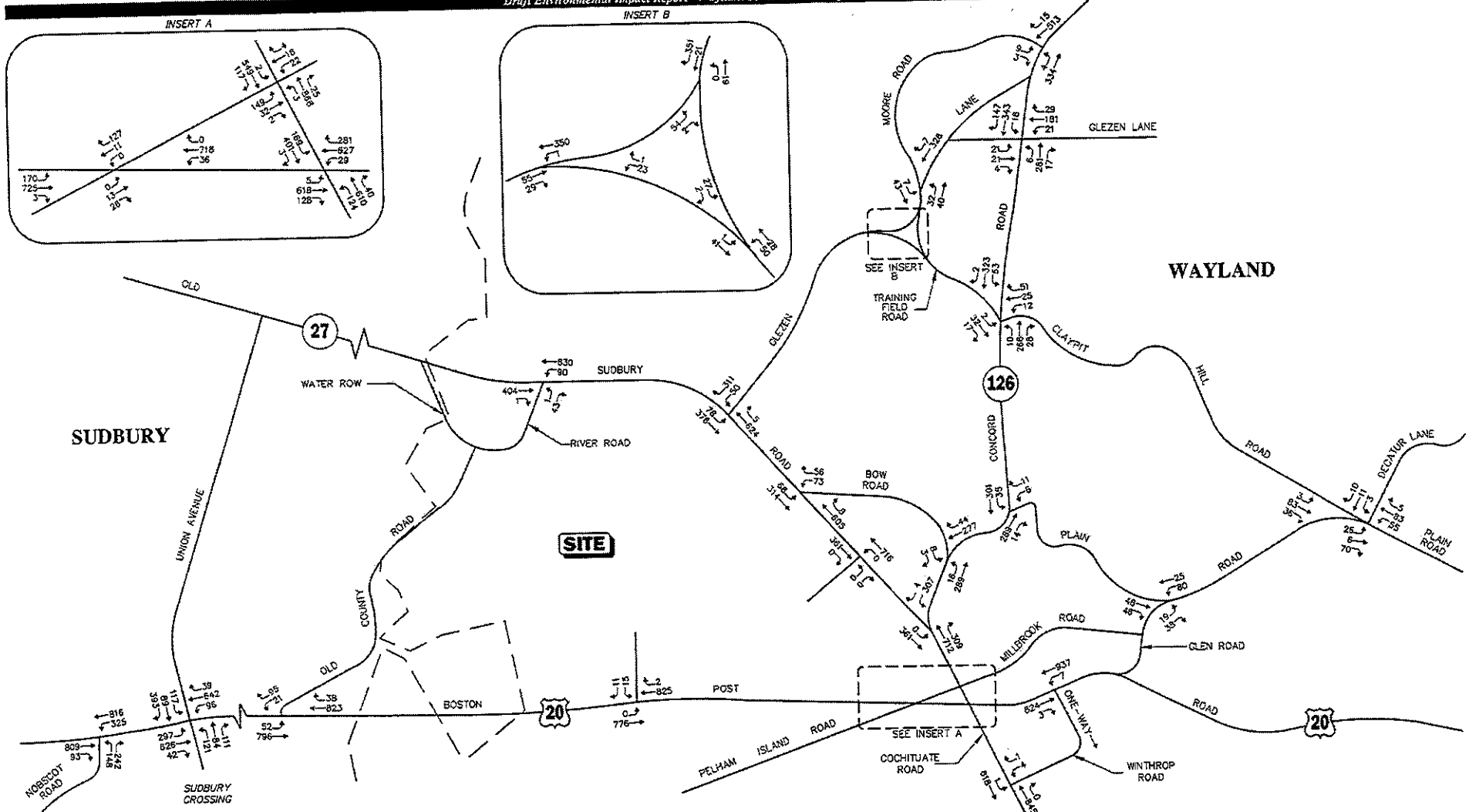
Figure 3-4

2006 Existing Weekday Morning Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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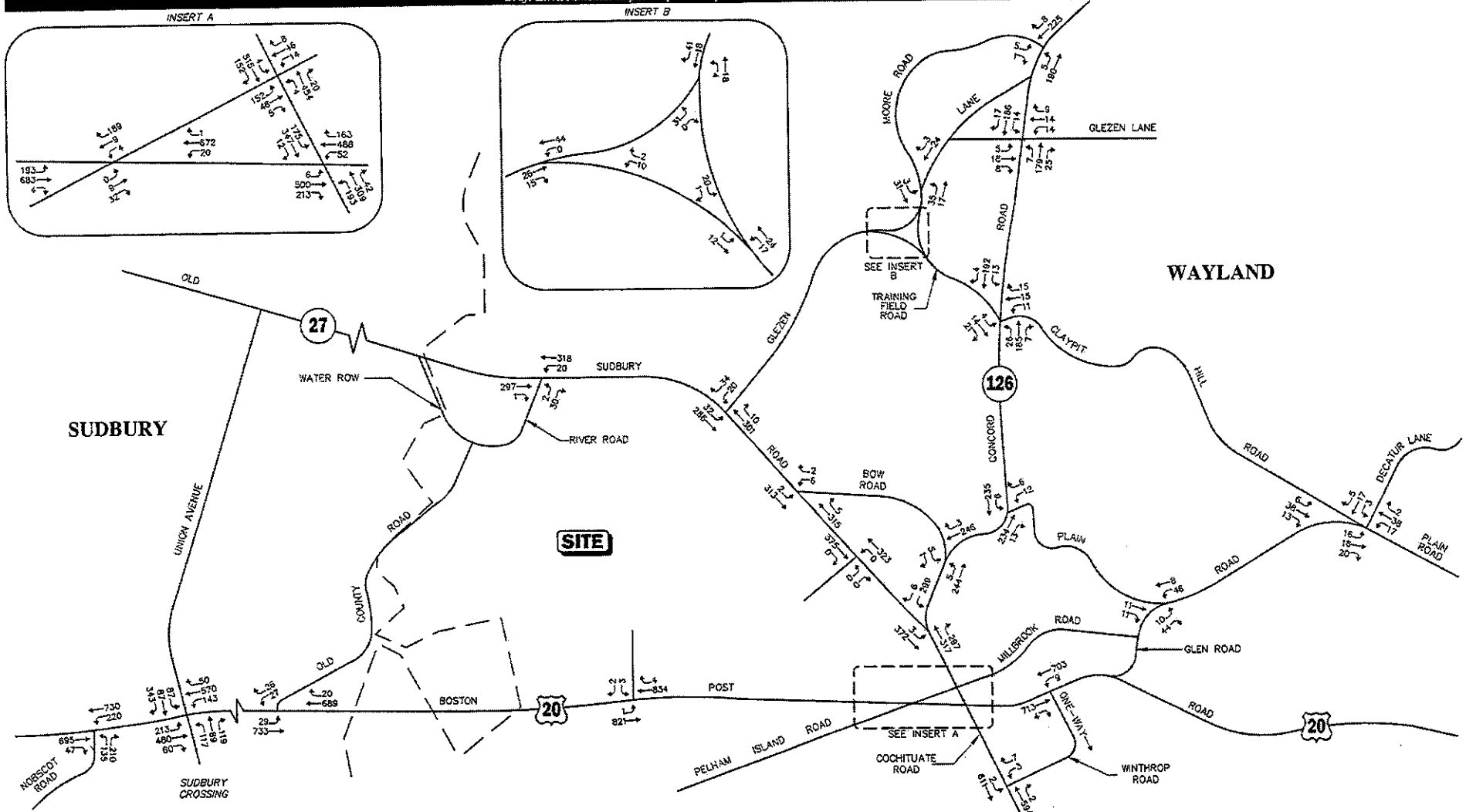
Figure 3-5

2006 Existing Weekday Evening Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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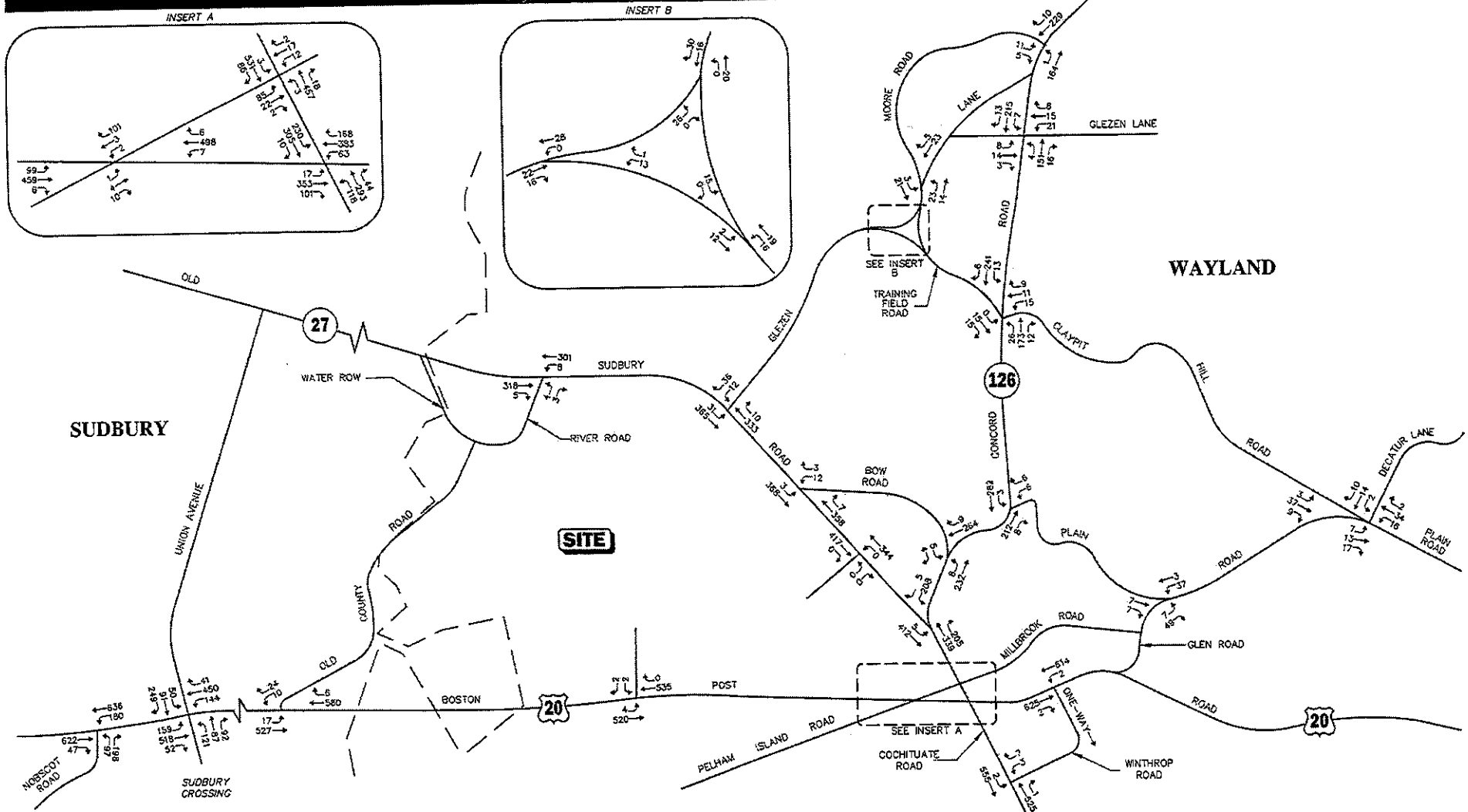
Figure 3-6

2006 Existing Saturday Midday Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-7

2006 Existing Sunday Midday Peak Hour Traffic Volumes

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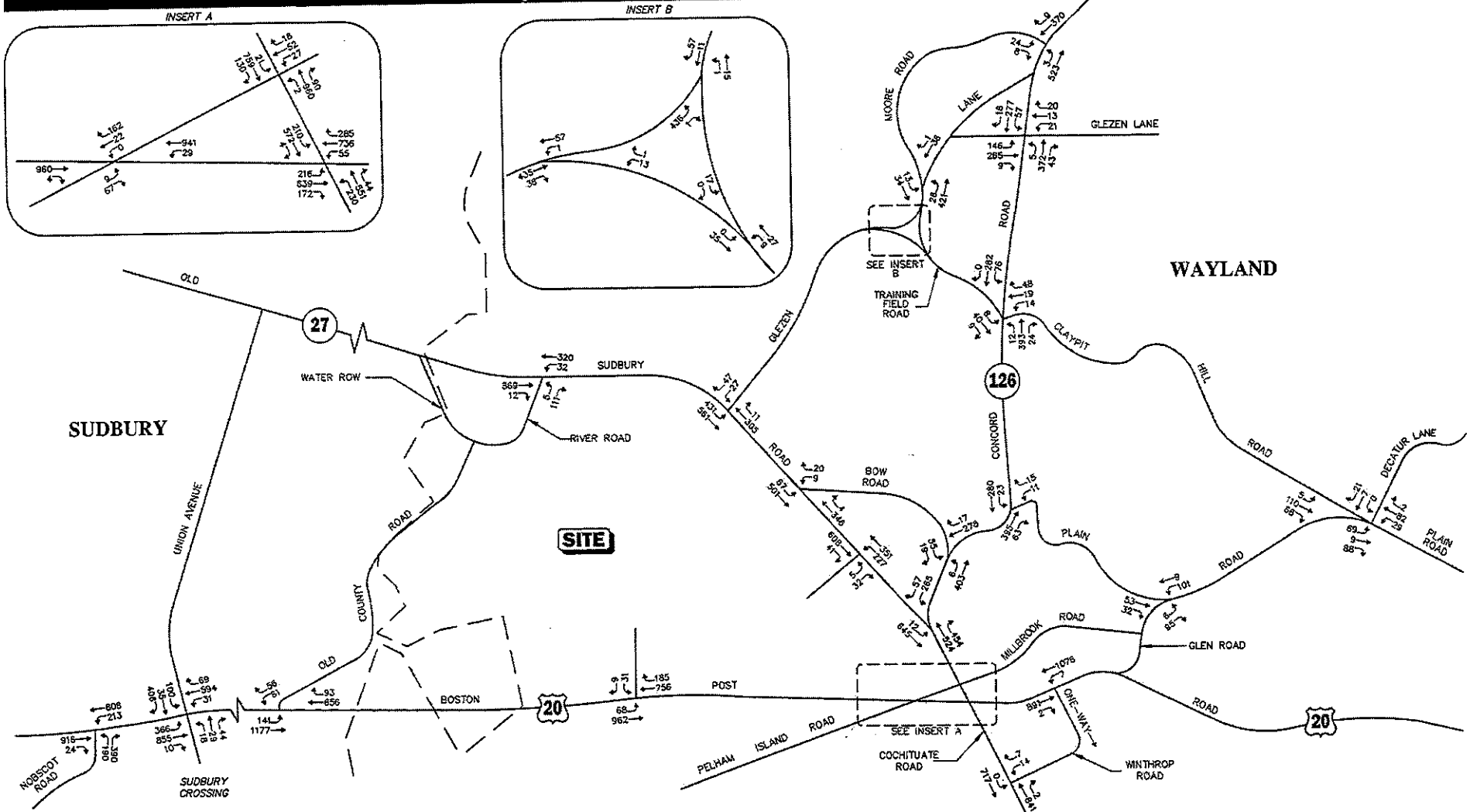

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-8

2011 No-Build Weekday Morning Peak Hour Traffic Volumes

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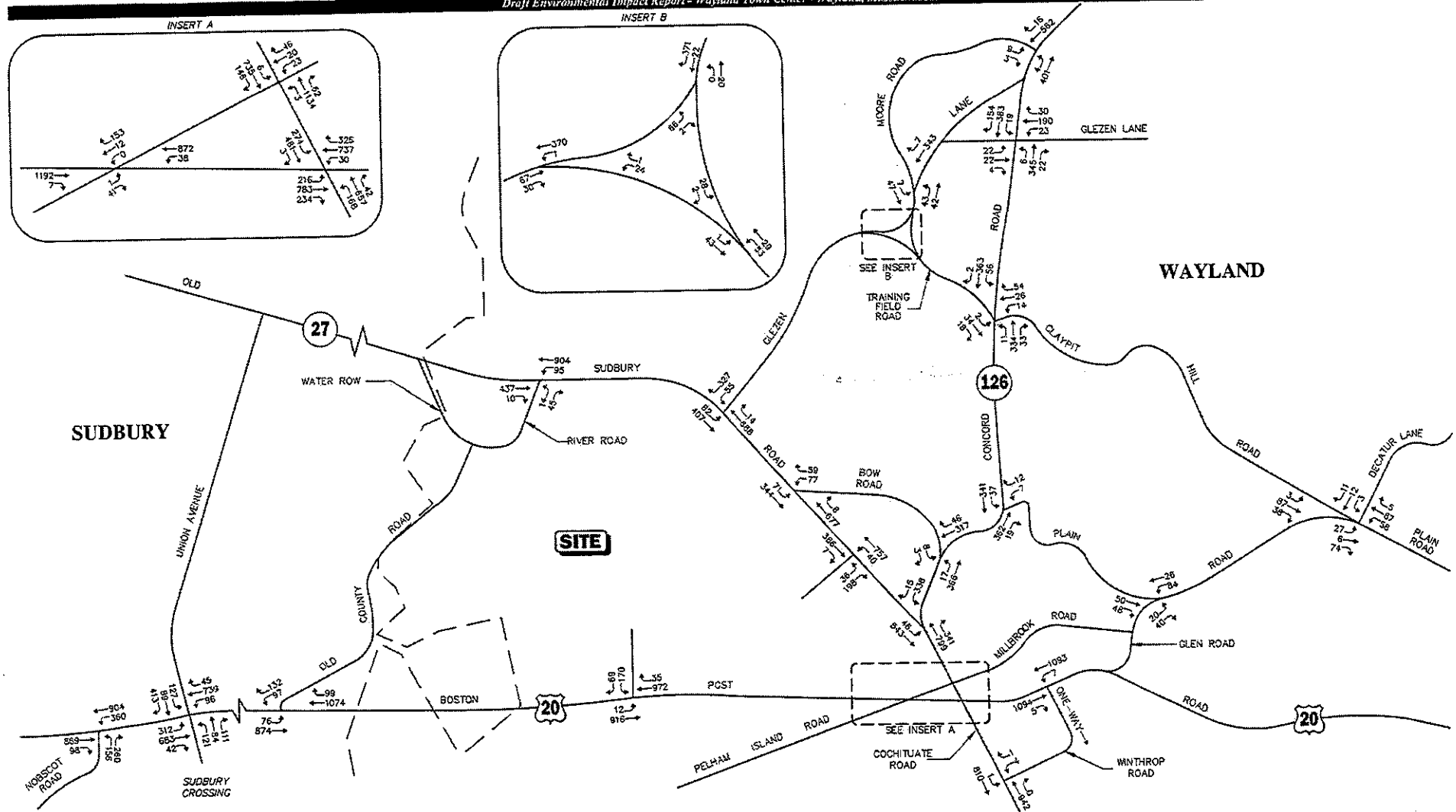

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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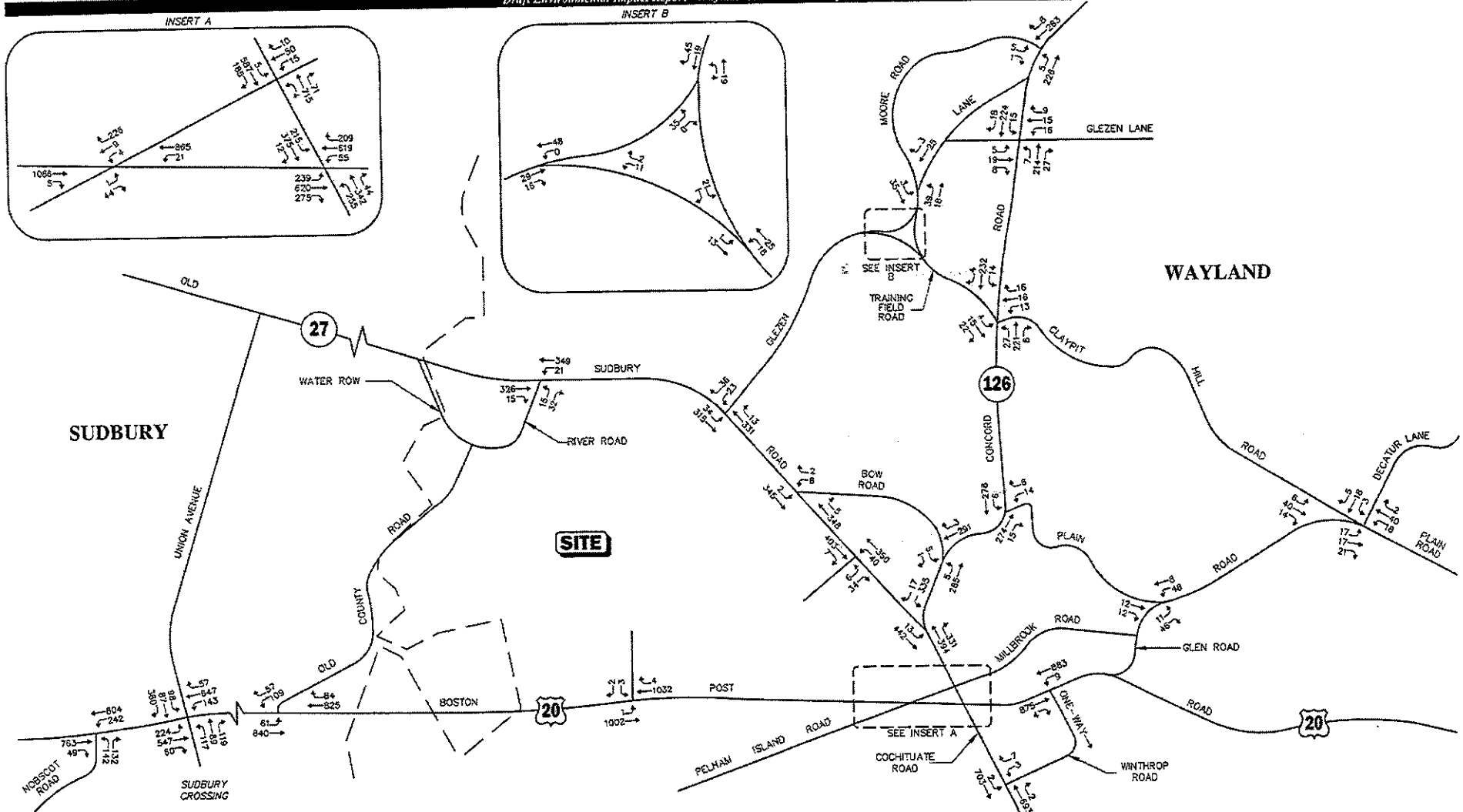
Figure 3-9

2011 No-Build Weekday Evening Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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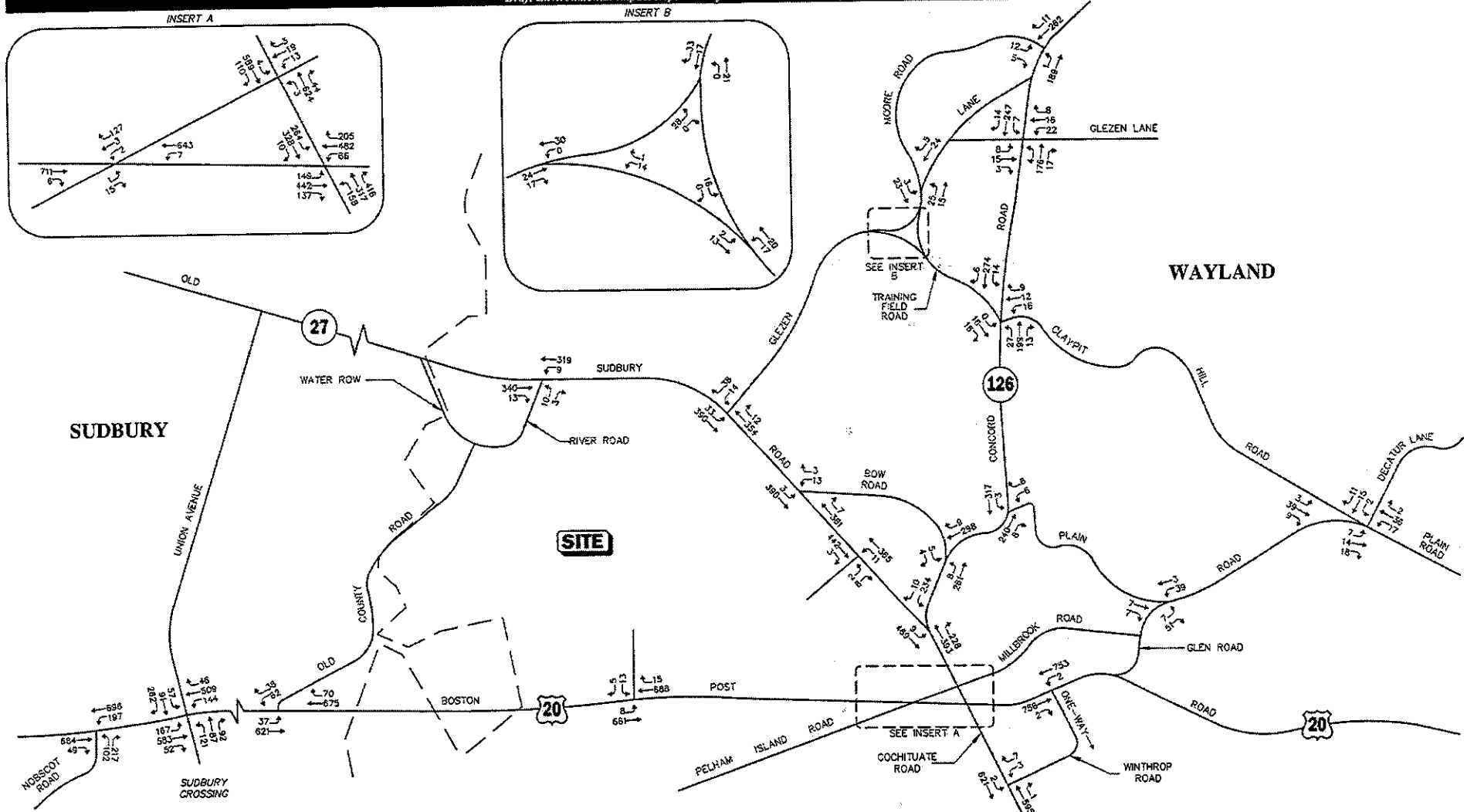
Figure 3-10

2011 No-Build
Saturday Midday
Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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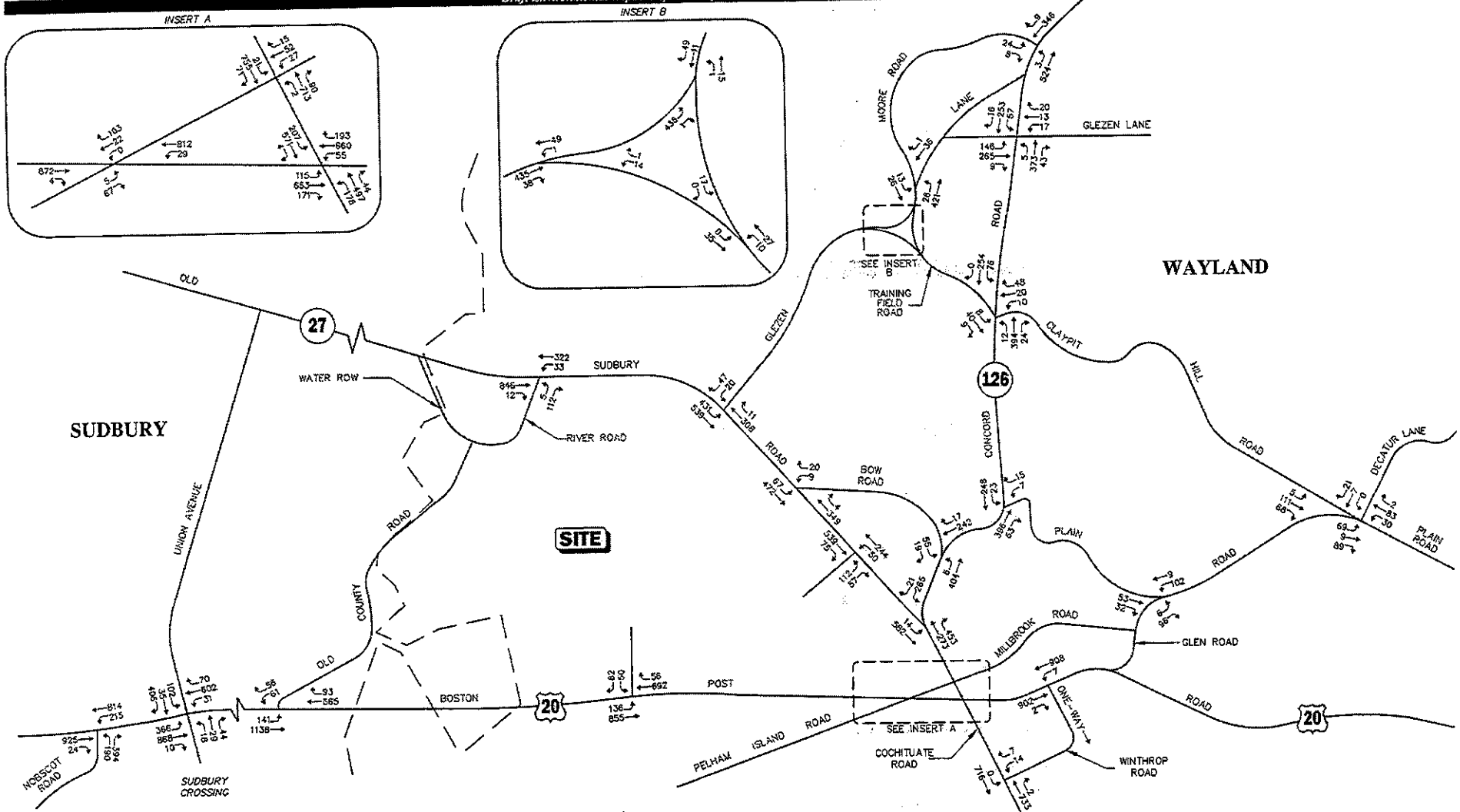
Figure 3-11

2011 No-Build
Sunday Midday
Peak Hour Traffic Volumes



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-23

2011 Build
Weekday Morning
Peak Hour Traffic Volumes
Access Alternative No. 1

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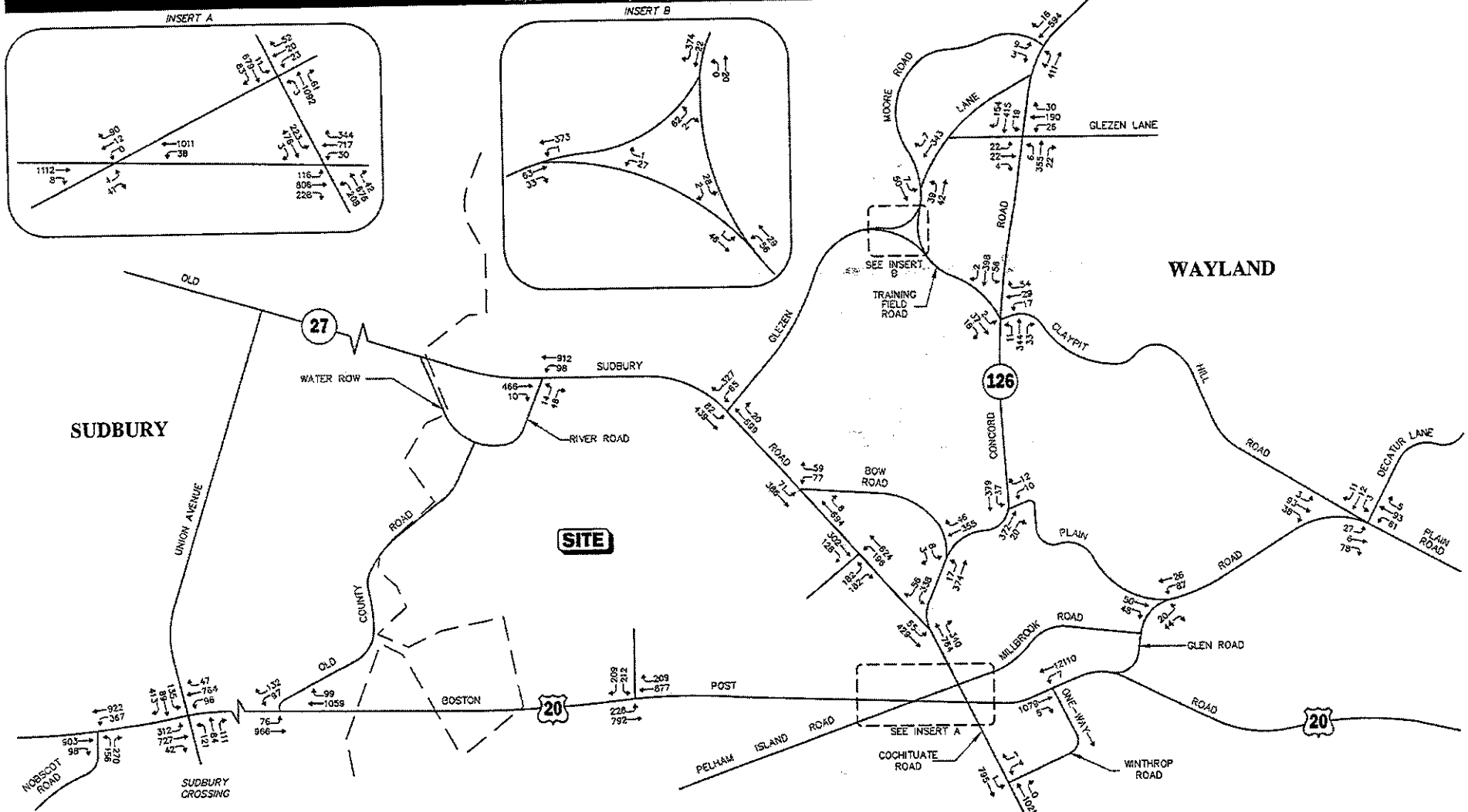

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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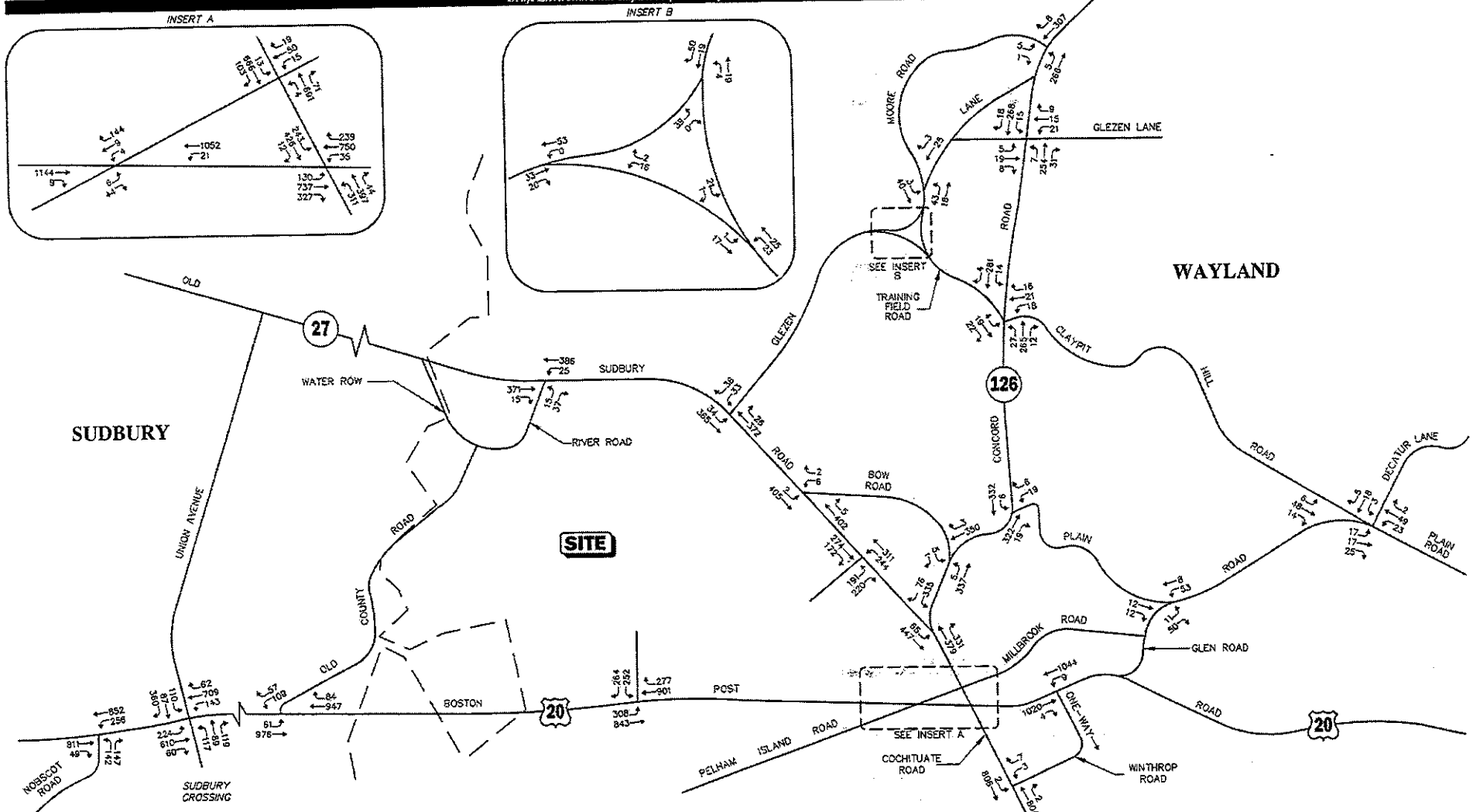
Figure 3-24

2011 Build
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative No. 1



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

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Figure 3-25

2011 Build
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative No. 1

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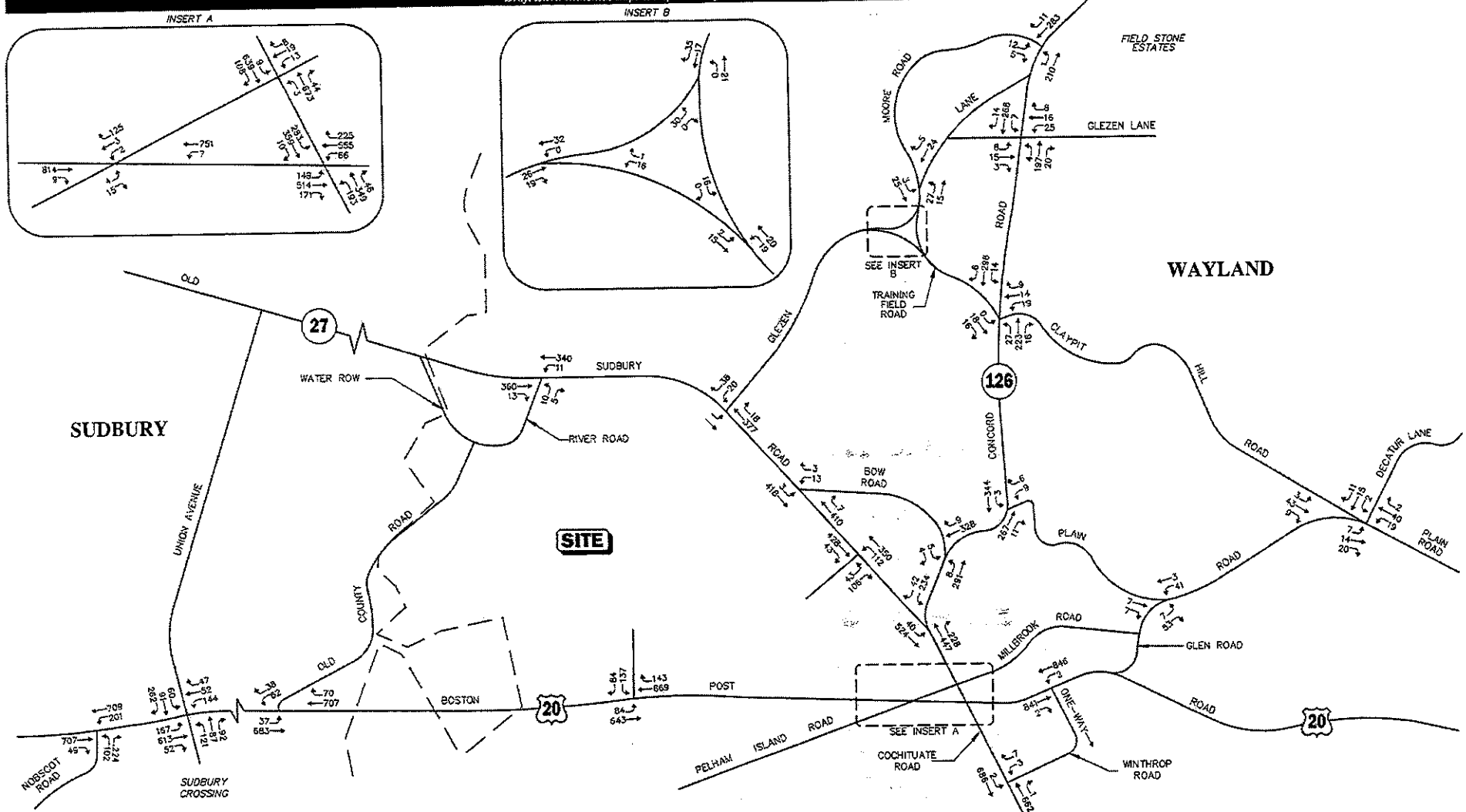

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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Figure 3-26

2011 Build
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative No. 1

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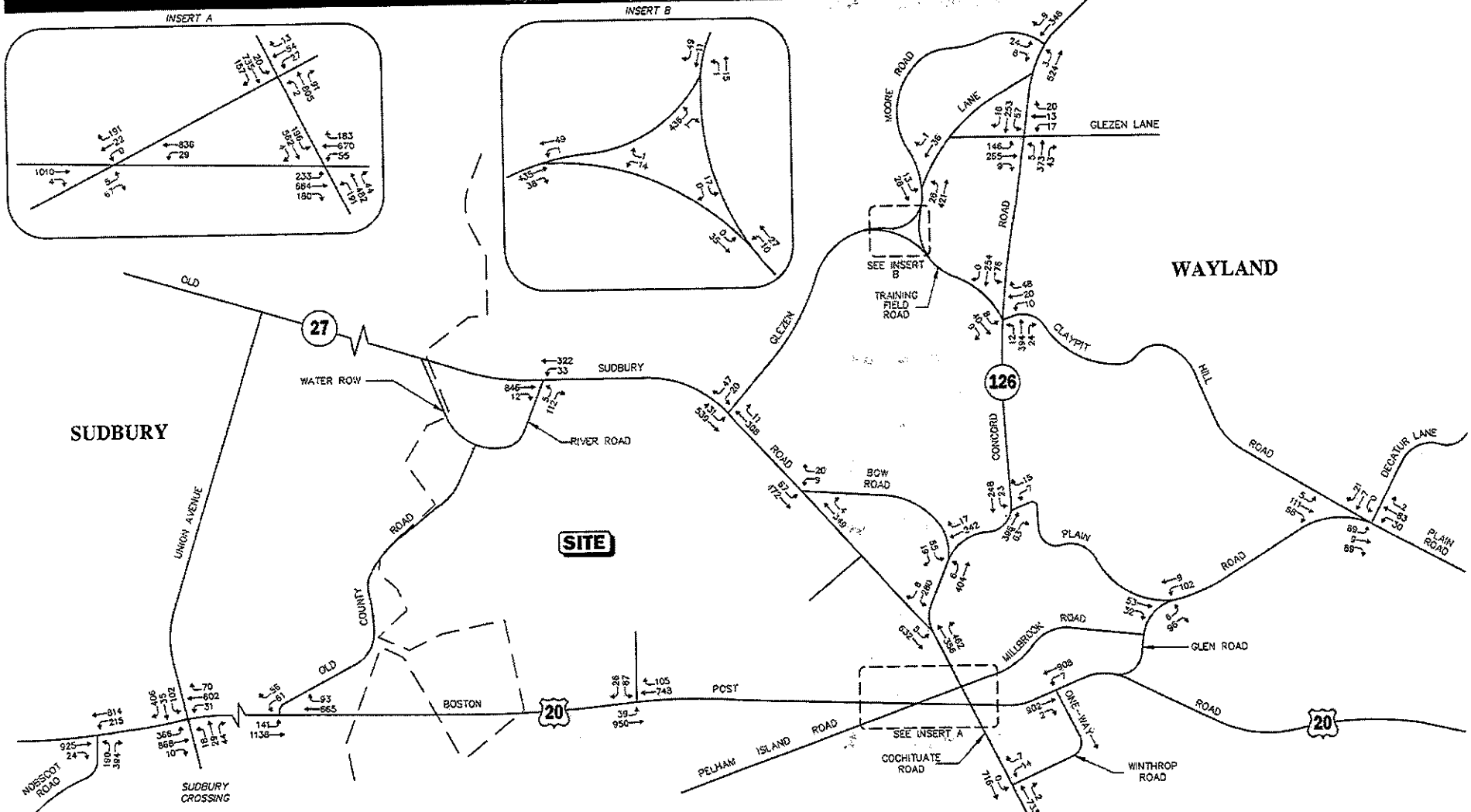

Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

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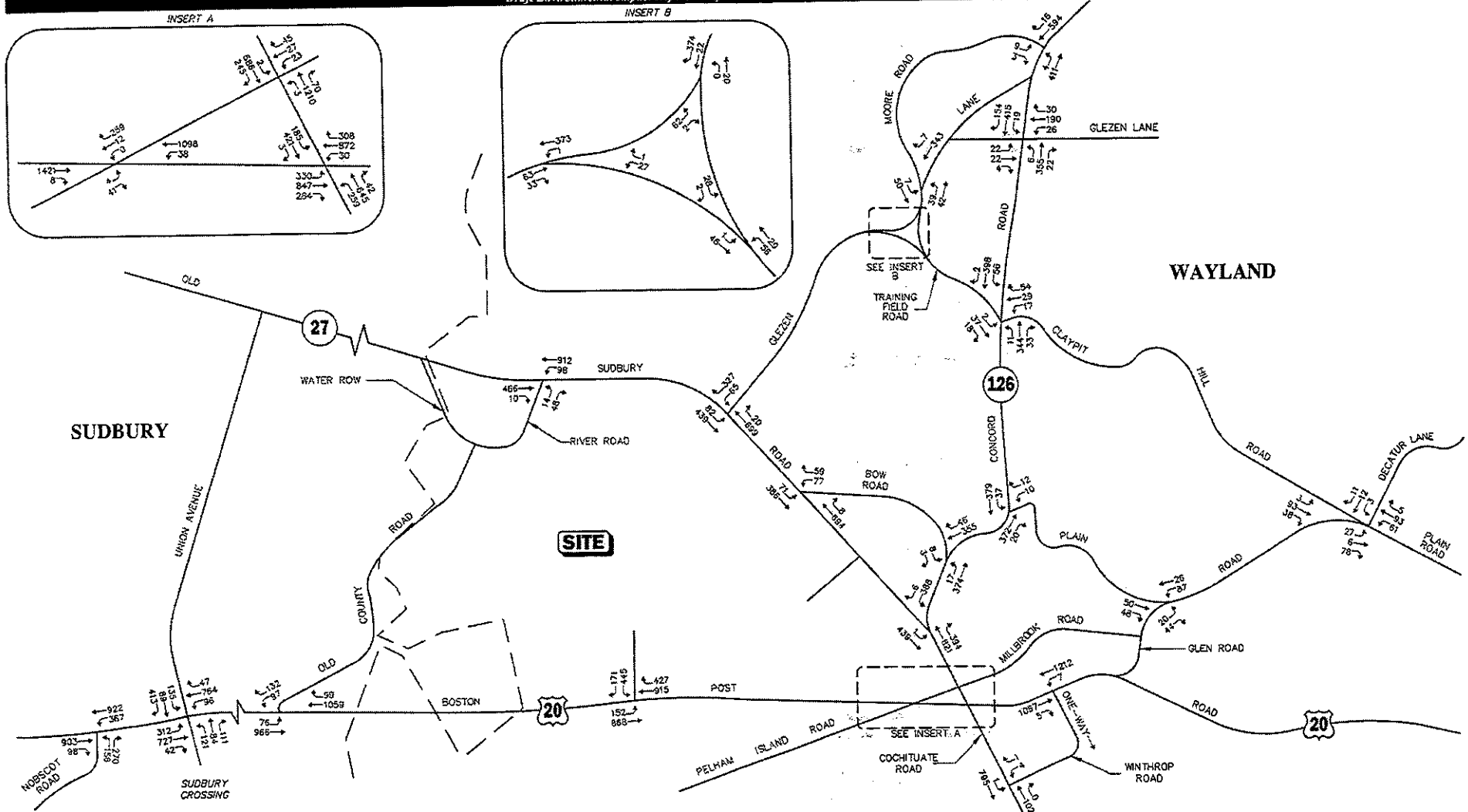
Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-27

2011 Build
Weekday Morning
Peak Hour Traffic Volumes
Access Alternative No. 2



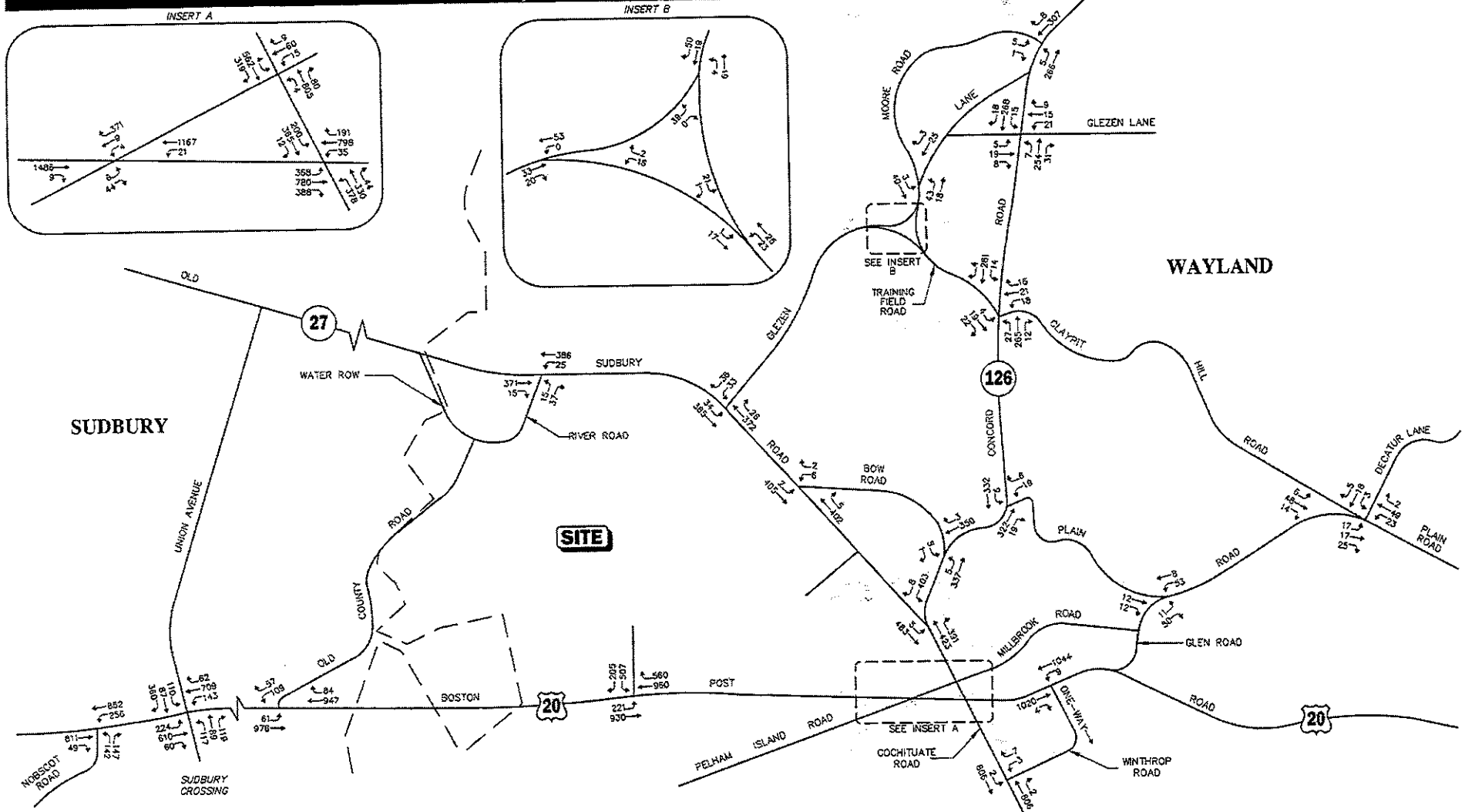
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-28

2011 Build
Weekday Evening
Peak Hour Traffic Volumes
Access Alternative No. 2



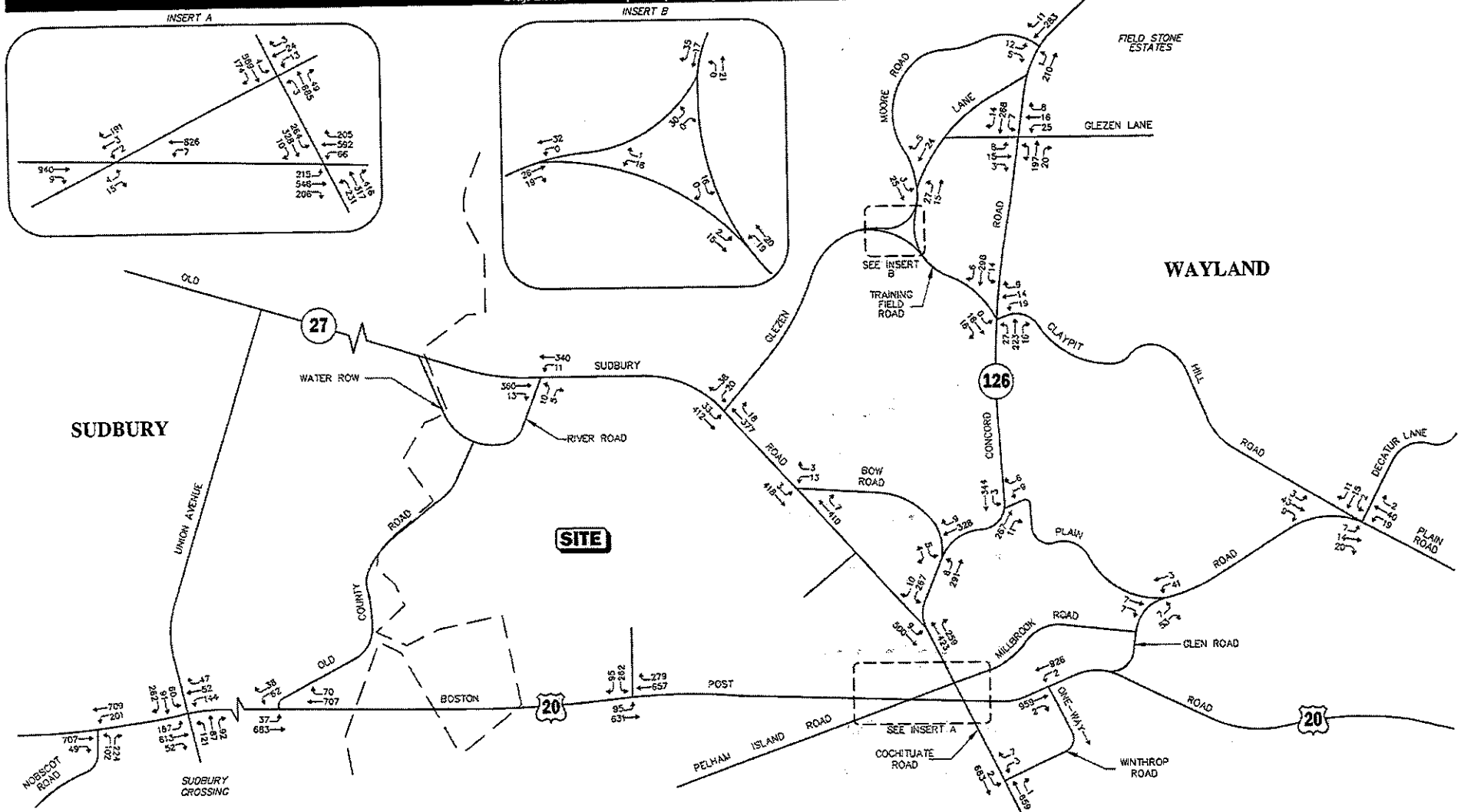
Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-29

2011 Build
Saturday Midday
Peak Hour Traffic Volumes
Access Alternative No. 2



Note: Imbalances exist due to numerous curb cuts and side streets that are not shown.

Not To Scale

Vanasse & Associates, Inc.
Transportation Engineers & Planners

Figure 3-30

2011 Build
Sunday Midday
Peak Hour Traffic Volumes
Access Alternative No. 2

MOBILE6 Output

```
*****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                                *
* Input file: MA06-WT.INP (file 1, run 1).                                  *
*****************************************************************************
* *** Summer 2006 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: MA_IM06.D
* I/M program inputs for 2006 calendar year model run
* MA31 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR

* Reading non-default I/M CUTPOINTS from the following external
* data file: MA06_CUT.D
* Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR
* OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR
* Gas Cap Evap I/M program thru CY 2003 for all Light Duty vehicles <=8,500 lb GVWR
* Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR
* OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR starting 2004
* OBD Evap I/M program for MY 2004+
  M601 Comment:
              User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D
```

```
  Reading User Supplied Tier2 EVAP phase-in fractions

     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D

  M616 Comment:
               User has supplied post-1999 sulfur levels.
  M614 Comment:
               User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer - Idle Scenario - (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
                             Month:  July
                          Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  94.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
                GVWR:                <6000     >6000     (All)
                          ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:     0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
  ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      5.512     3.780     3.857     3.802     5.553     0.842     1.297     1.529     12.79     4.348
     Composite CO  :      19.95     16.65     20.54     17.75     39.10     3.942     2.985    12.084    119.90    19.246
     Composite NOX :      1.348     1.326     1.987     1.512     2.344     1.306     1.649    16.366      1.12     2.763
  ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 15 mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 15.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

        Vehicle Type:     LDGV    LDGT12   LDGT34    LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
                GVWR:             <6000    >6000    (All)
                         ------   ------   ------   ------   ------   ------   ------   ------   ------    ------
   VMT Distribution:    0.3794   0.3530   0.1386            0.0361   0.0008   0.0015   0.0865   0.0041    1.0000
  -----------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     0.873    0.673    0.798    0.708    1.239    0.535    0.797    0.846     4.81     0.819
     Composite CO  :     6.88     6.68     8.01     7.05    14.61     1.951    1.436    4.908    25.21     7.136
     Composite NOX :     0.743    0.793    1.197    0.907    2.648    0.852    1.070   10.717     1.01     1.757
  -----------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 20 mph
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 20.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

        Vehicle Type:     LDGV    LDGT12   LDGT34    LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
                GVWR:             <6000    >6000    (All)
                         ------   ------   ------   ------   ------   ------   ------   ------   ------    ------
   VMT Distribution:    0.3794   0.3530   0.1386            0.0361   0.0008   0.0015   0.0865   0.0041    1.0000
  -----------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :     0.764    0.584    0.693    0.615    0.974    0.467    0.685    0.694     4.34     0.706
     Composite CO  :     6.35     6.26     7.49     6.61    10.85     1.618    1.177    3.707    20.06     6.454
     Composite NOX :     0.665    0.722    1.095    0.827    2.770    0.763    0.957    9.614     1.06     1.597
  -----------------------------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 25 mph
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
          The user supplied arterial average speed of 25.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.704     0.539     0.638     0.567     0.811     0.417     0.603     0.582      4.05     0.643
    Composite CO  :      6.14      6.13      7.32      6.46      8.51      1.402     1.009     2.930     16.90     6.138
    Composite NOX :      0.617     0.679     1.032     0.779     2.892     0.707     0.886     8.921      1.12     1.499
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 30 mph
* File 1, Run 1, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
          The user supplied arterial average speed of 30.0
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
```

```
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:      0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
 ----------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :       0.665     0.511     0.606     0.538     0.703     0.379     0.542     0.499      3.83     0.602
    Composite CO  :       6.11      6.15      7.31      6.48      7.06      1.262     0.900     2.423     14.61     6.027
    Composite NOX :       0.583     0.650     0.990     0.746     3.014     0.678     0.848     8.558      1.18     1.444
  ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 35 mph
* File 1, Run 1, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:       LDGV     LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                 <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:      0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
 ----------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :       0.636     0.490     0.581     0.515     0.629     0.352     0.497     0.437      3.66     0.571
    Composite CO  :       6.24      6.31      7.48      6.64      6.18      1.171     0.830     2.098     12.92     6.091
    Composite NOX :       0.564     0.636     0.973     0.731     3.136     0.672     0.841     8.485      1.22     1.427
  ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 40 mph
* File 1, Run 1, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 40.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
```

```
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:      0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.618     0.478     0.567     0.503     0.577     0.331     0.463     0.392      3.54     0.552
     Composite CO  :      6.63      6.69      7.91      7.03      5.72     1.117     0.787     1.901     11.74     6.396
     Composite NOX :      0.570     0.647     0.984     0.742     3.258     0.689     0.862     8.694      1.25     1.458
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 45 mph
* File 1, Run 1, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2006
                           Month:  July
                        Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  94.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:      0.3794    0.3530    0.1386              0.0361    0.0008    0.0015    0.0865    0.0041    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.603     0.469     0.555     0.493     0.540     0.316     0.439     0.359      3.47     0.537
     Composite CO  :      7.03      7.07      8.34      7.43      5.59     1.089     0.766     1.802     11.00     6.722
     Composite NOX :      0.580     0.661     1.000     0.757     3.380     0.730     0.915     9.208      1.27     1.518
 ---------------------------------------------------------------------------------------------------------------------------
*************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                            *
* Input file: MA06-WT.INP (file 1, run 2).                              *
*************************************************************************
* *** Winter 2006 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
```

```
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: MA_IM06.D
* I/M program inputs for 2006 calendar year model run
* MA31 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR

* Reading non-default I/M CUTPOINTS from the following external
* data file: MA06_CUT.D
* Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR
* OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR
* Gas Cap Evap I/M program thru CY 2003 for all Light Duty vehicles <=8,500 lb GVWR
* Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR
* OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR starting 2004
* OBD Evap I/M program for MY 2004+
  M601 Comment:
               User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions

     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D
```

```
  M616 Comment:
                User has supplied post-1999 sulfur levels.
  M614 Comment:
                User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter - Idle Scenario - (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 2, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
             The user supplied arterial average speed of  2.5
             will be used for all hours of the day.  100% of VMT
             has been assigned to the arterial/collector roadway
             type for all hours of the day and all vehicle types.
  M112 Warning:
                Wintertime Reformulated Gasoline Rules Apply
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2006
                            Month:  Jan.
                         Altitude:  Low
               Minimum Temperature:  35.0 (F)
               Maximum Temperature:  45.0 (F)
                 Absolute Humidity:   75. grains/lb
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                  Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
  ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      5.511     3.874     4.170     3.957     6.326     0.825     1.309     1.577     12.14     4.464
     Composite CO  :     29.42     29.19     34.97     30.82     45.53     3.881     3.033    12.303    100.99    29.424
     Composite NOX :      1.191     1.458     2.217     1.672     2.712     1.294     1.693    17.023      1.48     2.845
  ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 15 mph
* File 1, Run 2, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
             The user supplied arterial average speed of 15.0
             will be used for all hours of the day.  100% of VMT
             has been assigned to the arterial/collector roadway
             type for all hours of the day and all vehicle types.
  M112 Warning:
                Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2006
                            Month:  Jan.
                         Altitude:  Low
```

```
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.891     0.723     0.947     0.786     1.432     0.523     0.802     0.873      4.41     0.872
    Composite CO  :      13.48     14.15     15.58     14.55     17.01     1.914     1.453     4.998     22.56    13.404
    Composite NOX :      0.741     0.904     1.375     1.037     3.064     0.844     1.098    11.158      1.33     1.868
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 20 mph
* File 1, Run 2, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 20.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
                             Month:  Jan.
                          Altitude:  Low
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:              <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.774     0.637     0.836     0.693     1.087     0.456     0.689     0.716      3.95     0.753
    Composite CO  :      12.85     13.51     14.77     13.86     12.64     1.585     1.189     3.774     18.29    12.546
    Composite NOX :      0.680     0.829     1.265     0.952     3.205     0.756     0.982    10.013      1.40     1.709
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 25 mph
* File 1, Run 2, Scenario 4.
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
                             Month:  Jan.
                          Altitude:  Low
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      0.712     0.587     0.772     0.639     0.876     0.407     0.606     0.601      3.67     0.684
     Composite CO  :      12.51     13.16     14.35     13.50      9.92     1.372     1.018     2.983     15.67    12.063
     Composite NOX :      0.643     0.784     1.200     0.901     3.346     0.701     0.909     9.293      1.48     1.613
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 30 mph
* File 1, Run 2, Scenario 5.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
                             Month:  Jan.
                          Altitude:  Low
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
```

```
                GVWR:                <6000     >6000     (All)
                              ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
  VMT Distribution:           0.3868 0.3485 0.1366        0.0355 0.0008 0.0015 0.0862 0.0040 1.0000
 ---------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :           0.673  0.559  0.738  0.609  0.737  0.370  0.544  0.515  3.46   0.642
    Composite CO  :          12.39  13.04  14.18  13.36   8.22  1.233  0.906  2.467 13.78  11.839
    Composite NOX :           0.619  0.754  1.156  0.867  3.488  0.672  0.871  8.917  1.56   1.560
 ---------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 35 mph
* File 1, Run 2, Scenario 6.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 35.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
                             Month:  Jan.
                          Altitude:  Low
               Minimum Temperature:  35.0 (F)
               Maximum Temperature:  45.0 (F)
                 Absolute Humidity:   75. grains/lb
               Fuel Sulfur Content:   30. ppm

               Exhaust I/M Program:  Yes
                  Evap I/M Program:  Yes
                       ATP Program:  Yes
                 Reformulated Gas:  Yes

       Vehicle Type:      LDGV   LDGT12   LDGT34    LDGT    HDGV    LDDV    LDDT    HDDV    MC   All Veh
                GVWR:            <6000     >6000    (All)
                              ------ ------ ------ ------ ------ ------ ------ ------ ------ ------
  VMT Distribution:           0.3868 0.3485 0.1366        0.0355 0.0008 0.0015 0.0862 0.0040 1.0000
 ---------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :           0.645  0.538  0.710  0.586  0.644  0.343  0.498  0.451  3.30   0.610
    Composite CO  :          12.47  13.13  14.30  13.46   7.20  1.144  0.835  2.136 12.37  11.842
    Composite NOX :           0.607  0.740  1.140  0.853  3.629  0.666  0.863  8.841  1.61   1.548
 ---------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 40 mph
* File 1, Run 2, Scenario 7.
* # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 40.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2006
```

```
                    Month:  Jan.
                 Altitude:  Low
Minimum Temperature:  35.0 (F)
Maximum Temperature:  45.0 (F)
  Absolute Humidity:   75. grains/lb
Fuel Sulfur Content:   30. ppm

Exhaust I/M Program:  Yes
   Evap I/M Program:  Yes
        ATP Program:  Yes
   Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.629     0.529     0.697     0.576     0.580     0.323     0.464     0.404      3.18     0.592
    Composite CO  :      12.85     13.54     14.80     13.89      6.66     1.090     0.791     1.935     11.40    12.163
    Composite NOX :      0.621     0.756     1.157     0.869     3.770     0.683     0.885     9.058      1.65     1.585
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 45 mph
* File 1, Run 2, Scenario 8.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 45.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                  Calendar Year:  2006
                    Month:  Jan.
                 Altitude:  Low
Minimum Temperature:  35.0 (F)
Maximum Temperature:  45.0 (F)
  Absolute Humidity:   75. grains/lb
Fuel Sulfur Content:   30. ppm

Exhaust I/M Program:  Yes
   Evap I/M Program:  Yes
        ATP Program:  Yes
   Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3868    0.3485    0.1366              0.0355    0.0008    0.0015    0.0862    0.0040    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.617     0.521     0.686     0.568     0.537     0.308     0.440     0.370      3.11     0.578
    Composite CO  :      13.24     13.95     15.29     14.33      6.51     1.063     0.770     1.835     10.78    12.508
    Composite NOX :      0.638     0.777     1.181     0.891     3.911     0.723     0.939     9.591      1.68     1.653
 ---------------------------------------------------------------------------------------------------------------------------
```

```
*************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                            *
* Input file: MA11-WT.INP (file 1, run 1).                              *
*************************************************************************
* *** Summer 2011 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: MA11_IM.D
* I/M program inputs for 2011 calendar year model run
* MA31 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR

* Reading non-default I/M CUTPOINTS from the following external
* data file: MA11_CUT.D
* Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR
* OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR
* Gas Cap Evap I/M program thru CY 2003 for all Light Duty vehicles <=8,500 lb GVWR
* Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR
* OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR starting 2004
* OBD Evap I/M program for MY 2004+
  M601 Comment:
               User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D
```

```
  Reading User Supplied Tier2 EVAP phase-in fractions

     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D

  M616 Comment:
               User has supplied post-1999 sulfur levels.
  M614 Comment:
               User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2.5 mph - Idle Scenario - Summer (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D

 LEV phase-in data read from file MA_LEV2.D
                     Calendar Year:  2011
                             Month:  July
                          Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  94.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
               GVWR:               <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:      0.3160    0.3987    0.1566              0.0361    0.0006    0.0017    0.0865    0.0038    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite VOC :      2.958     2.108     2.377     2.184     3.554     0.699     0.881     1.086     12.15     2.418
     Composite CO  :      14.23     12.16     13.62     12.57     30.57     3.190     2.166     6.516    119.90    13.609
     Composite NOX :      0.781     0.698     1.032     0.792     1.004     0.894     0.950     8.925      1.12     1.501
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 20 mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 20.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
```

```
 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2011
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  Yes

      Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:             <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
 VMT Distribution:     0.3160    0.3987    0.1566              0.0361    0.0006    0.0017    0.0865    0.0038    1.0000
 -----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     0.444     0.351     0.432     0.374     0.608     0.392     0.475     0.493      4.12     0.429
    Composite CO  :     4.63      4.52      5.04      4.67      8.48      1.333     0.873     1.999     20.06      4.615
    Composite NOX :     0.376     0.382     0.574     0.436     1.187     0.524     0.553     5.186      1.06     0.858
 -----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 25 mph
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
           The user supplied arterial average speed of 25.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2011
                           Month:  July
                        Altitude:  Low
             Minimum Temperature:  68.0 (F)
             Maximum Temperature:  94.0 (F)
               Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                 Reformulated Gas:  Yes

      Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:             <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
 VMT Distribution:     0.3160    0.3987    0.1566              0.0361    0.0006    0.0017    0.0865    0.0038    1.0000
 -----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     0.411     0.325     0.398     0.345     0.523     0.350     0.420     0.414      3.85     0.392
    Composite CO  :     4.45      4.36      4.86      4.50      6.66      1.161     0.753     1.580     16.90      4.350
    Composite NOX :     0.348     0.360     0.542     0.411     1.239     0.486     0.512     4.802      1.12     0.804
 -----------------------------------------------------------------------------------------------------------------------
```

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Summer 30 mph
* File 1, Run 1, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2011
                            Month:  July
                         Altitude:  Low
              Minimum Temperature:  68.0 (F)
              Maximum Temperature:  94.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes
```

Vehicle Type: GVWR:	LDGV	LDGT12 <6000	LDGT34 >6000	LDGT (All)	HDGV	LDDV	LDDT	HDDV	MC	All Veh
VMT Distribution:	0.3160	0.3987	0.1566		0.0361	0.0006	0.0017	0.0865	0.0038	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.389	0.308	0.377	0.327	0.465	0.320	0.380	0.355	3.64	0.367
Composite CO :	4.41	4.33	4.81	4.47	5.52	1.049	0.674	1.307	14.61	4.243
Composite NOX :	0.328	0.344	0.521	0.394	1.291	0.466	0.491	4.601	1.18	0.773

```
*************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                            *
* Input file: MA11-WT.INP (file 1, run 2).                              *
*************************************************************************
* *** Winter 2011 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
```

```
                0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                 1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: MA11_IM.D
* I/M program inputs for 2011 calendar year model run
* MA31 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR

* Reading non-default I/M CUTPOINTS from the following external
* data file: MA11_CUT.D
* Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR
* OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR
* Gas Cap Evap I/M program thru CY 2003 for all Light Duty vehicles <=8,500 lb GVWR
* Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR
* OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR starting 2004
* OBD Evap I/M program for MY 2004+
  M601 Comment:
               User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions

     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D

  M616 Comment:
               User has supplied post-1999 sulfur levels.
  M614 Comment:
               User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2.5 mph - Idle Scenario - Winter (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 2, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of  2.5
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
               Wintertime Reformulated Gasoline Rules Apply
*** I/M credits for Tech1&2 vehicles were read from the following external
```

```
   data file: TECH12.D

LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2011
                            Month:  Jan.
                         Altitude:  Low
             Minimum Temperature:  35.0 (F)
             Maximum Temperature:  45.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3217    0.3954    0.1550              0.0355    0.0007    0.0017    0.0862    0.0038    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      2.977     2.121     2.507     2.230     3.972     0.687     0.896     1.113     11.49     2.468
    Composite CO  :      22.22     20.97     23.13     21.58     37.68     3.144     2.192     6.985    100.99    21.352
    Composite NOX :      0.670     0.764     1.172     0.879     1.175     0.887     0.984     9.658      1.48     1.582
 ---------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 20 mph
* File 1, Run 2, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 20.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply

LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2011
                            Month:  Jan.
                         Altitude:  Low
             Minimum Temperature:  35.0 (F)
             Maximum Temperature:  45.0 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  Yes
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3217    0.3954    0.1550              0.0355    0.0007    0.0017    0.0862    0.0038    1.0000
 ---------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite VOC :      0.438     0.366     0.496     0.403     0.645     0.383     0.481     0.505      3.73     0.444
    Composite CO  :      10.50     10.08     10.42     10.18     10.46     1.307     0.878     2.143     18.29     9.608
```

```
    Composite NOX :      0.379     0.437     0.676     0.504     1.389     0.519     0.572     5.612      1.40     0.939
  ----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 25 mph
* File 1, Run 2, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 25.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2011
                            Month:  Jan.
                         Altitude:  Low
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm

              Exhaust I/M Program:  Yes
                 Evap I/M Program:  Yes
                      ATP Program:  Yes
                Reformulated Gas:  Yes

       Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                         ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:     0.3217    0.3954    0.1550              0.0355    0.0007    0.0017    0.0862    0.0038    1.0000
  ----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.404     0.339     0.458     0.373     0.533     0.343     0.425     0.424      3.46     0.405
    Composite CO  :     10.24      9.83     10.14      9.91      8.20     1.137     0.756     1.694     15.67     9.250
    Composite NOX :      0.357     0.413     0.641     0.478     1.450     0.482     0.530     5.197      1.48     0.884
  ----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # #
* Winter 30 mph
* File 1, Run 2, Scenario 4.
* # # # # # # # # # # # # # # # # # # # # # # # #
  M583 Warning:
            The user supplied arterial average speed of 30.0
            will be used for all hours of the day.  100% of VMT
            has been assigned to the arterial/collector roadway
            type for all hours of the day and all vehicle types.
  M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply

 LEV phase-in data read from file MA_LEV2.D
                    Calendar Year:  2011
                            Month:  Jan.
                         Altitude:  Low
              Minimum Temperature:  35.0 (F)
              Maximum Temperature:  45.0 (F)
                Absolute Humidity:   75. grains/lb
              Fuel Sulfur Content:   30. ppm
```

Exhaust I/M Program: Yes
Evap I/M Program: Yes
ATP Program: Yes
Reformulated Gas: Yes

Vehicle Type: GVWR:	LDGV	LDGT12 <6000	LDGT34 >6000	LDGT (All)	HDGV	LDDV	LDDT	HDDV	MC	All Veh
VMT Distribution:	0.3217	0.3954	0.1550		0.0355	0.0007	0.0017	0.0862	0.0038	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.383	0.323	0.438	0.355	0.460	0.312	0.384	0.363	3.26	0.380
Composite CO :	10.16	9.75	10.04	9.83	6.80	1.026	0.677	1.401	13.78	9.096
Composite NOX :	0.343	0.398	0.619	0.460	1.512	0.462	0.508	4.980	1.56	0.854

Mesoscale Spreadsheets

Mesoscale Analysis Summary

Wayland, MA

Wayland Town Center

Pollutant	Time	Units	Existing	Full Build	No-Build	BD-NB	% Difference (BD-NB)	BD-Existing	% Difference (BD-Exist)
VOC	AM Peak	grams/hr	9,399.5	6,200.3	6,623.0	(422.8)	-6.38%	-3199.25	-51.60%
		tons/hr	0.01036	0.00683	0.00730	-0.00047	-6.38%		
		tons/day*	0.104	0.068	0.073	-0.005	-6.38%		
	PM Peak	grams/hr	9977.001	9269.910	7077.310	2,192.6	30.98%	-707.09	-7.63%
		tons/hr	0.01100	0.01022	0.00780	0.00242	30.98%		
		tons/day*	0.110	0.102	0.078	0.024	30.98%		
	Saturday Peak	grams/hr	7,276.7	5,943.6	5,179.8	763.8	14.75%	-1333.17	-22.43%
		tons/hr	0.00802	0.00655	0.00571	0.00084	14.75%		
		tons/day*	0.080	0.066	0.057	0.008	14.75%		
	Sunday Peak	grams/hr	6,448.6	4,584.1	4,353.7	230.5	5.29%	-1864.44	-40.67%
		tons/hr	0.00711	0.00505	0.00480	0.00025	5.29%		
		tons/day*	0.071	0.051	0.048	0.003	5.29%		
NOx	AM Peak	grams/hr	22,840.0	13,934.3	14,884.4	(950.1)	-6.38%	-8905.67	-63.91%
		tons/hr	0.02518	0.01536	0.01641	-0.00105	-6.38%		
		tons/day*	0.252	0.154	0.164	-0.010	-6.38%		
	PM Peak	grams/hr	24,243.2	20,832.9	15,905.3	4,927.6	30.98%	-3410.28	-16.37%
		tons/hr	0.02672	0.02296	0.01753	0.00543	30.98%		
		tons/day*	0.267	0.230	0.175	0.054	30.98%		
	Saturday Peak	grams/hr	17,681.8	13,357.4	11,640.9	1,716.5	14.75%	-4324.41	-32.37%
		tons/hr	0.01949	0.01472	0.01283	0.00189	14.75%		
		tons/day*	0.195	0.147	0.128	0.019	14.75%		
	Sunday Peak	grams/hr	15,669.4	10,302.2	9,784.3	518.0	5.29%	-5367.19	-52.10%
		tons/hr	0.01727	0.01136	0.01079	0.00057	5.29%		
		tons/day*	0.173	0.114	0.108	0.006	5.29%		

* Tons/day estimated by assuming hourly peak is 10 percent of total volume.

Wayland Town Center

Mesoscale Analysis

Intersection	Peak	Exist	Exist Saturday	Exist Sunday	No-Build	No-Build Saturday	No-Build Sunday	Build	Build Saturday	Build Sunday	Miles Per Intersection	Exist	Exist Saturday	No-Build	No-Build Saturday	Build	Build Saturday
1 Old County/Rt 20	AM	1804	1524	1164	2184	1976	1503	2154	2234	1597	0.5	902	762	1092	988	1077	1117
	PM	1925			2352			2429			0.5	962.5		1176		1214.5	
2 Site S/Rt20	AM	1486	1215	1063	2011	2044	1390	1871	2845	739	0.5	743	607.5	1005.5	1022	935.5	1422.5
	PM	1629			2174			2527			0.5	814.5		1087		1263.5	
3 Old Sudbury/River Road	AM	1223	668	639	1349	758	694	1330	849	739	0.5	611.5	334	674.5	379	665	424.5
	PM	1366			1505			1548			0.5	683		752.5		774	
4 Glezen/Old Sudbury Road	AM	1287	683	787	1382	752	841	1356	866	898	0.2	257.4	136.6	276.4	150.4	271.2	173.2
	PM	1444			1573			1632			0.2	288.8		314.6		326.4	
5 Insert B	AM	1041	284	236	1154	307	203	1140	382	253	0.5	520.5	142	577	153.5	570	191
	PM	1055			1130			744			0.5	527.5		565		372	
6 Glezen/Moore Road	AM	495	113	89	531	123	95	523	132	97	0.5	247.5	56.5	265.5	61.5	261.5	66
	PM	455			489			488			0.5	227.5		244.5		244	
7 Moore/Rt 126	AM	830	434	420	937	508	480	914	592	522	0.5	415	217	468.5	254	457	296
	PM	878			995			1037			0.5	439		497.5		518.5	
8 Glezen/Rt 126	AM	1116	496	475	1244	577	537	1217	670	585	0.5	558	248	622	288.5	608.5	335
	PM	1089			1220			1265			0.5	544.5		610		632.5	
9 Rt 126/Claypit	AM	798	507	536	925	592	602	895	703	660	0.5	399	253.5	462.5	296	447.5	351.5
	PM	821			947			1001			0.5	410.5		473.5		500.5	
10 Claypit/Decatur	AM	469	191	164	490	201	173	494	227	185	0.5	234.5	95.5	245	100.5	247	113.5
	PM	391			411			430			0.5	195.5		205.5		215	
11 Plain/Glen Road	AM	281	130	110	296	137	114	298	146	118	0.5	140.5	65	148	68.5	149	73
	PM	256			268			275			0.5	128		134		137.5	
12 Plan/Rt 126	AM	670	506	517	787	593	580	752	704	640	0.5	335	253	393.5	296.5	376	352
	PM	656			778			830			0.5	328		389		415	
13 Bow/Rt 126	AM	661	504	522	778	590	585	743	701	645	0.5	330.5	252	389	295	371.5	350.5
	PM	637			757			803			0.5	318.5		378.5		401.5	
14 Bow/Sudbury	AM	847	643	751	947	708	797	921	822	854	0.5	423.5	321.5	473.5	354	460.5	411
	PM	1124			1236			1295			0.5	562		618		647.5	
15 Site E/Sudbury	AM	901	698	761	1264	840	831	1077	1412	1082	0.5	450.5	349	632	420	538.5	706
	PM	1077			1424			1614			0.5	538.5		712		807	
16 Concord/Sudbury	AM	1563	1294	1174	1957	1532	1343	1608	1633	1515	0.5	781.5	647	978.5	766	804	816.5
	PM	1693			2082			1982			0.5	846.5		1041		991	
17 Insert A	AM	6258	5736	4511	7967	7163	5248	7006	7716	6166	0.5	3129	2868	3983.5	3581.5	3503	3858
	PM	6655			8442			8209			0.5	3327.5		4221		4104.5	
18 Winthrop/Post	AM	1550	1429	1243	1976	1771	1513	1819	2077	1691	0.5	775	714.5	988	885.5	909.5	1038.5
	PM	1771			2199			13201			0.5	885.5		1099.5		6600.5	
19 Winthrop/Cochituate	AM	1306	1219	1093	1581	1410	1229	1472	1624	1361	0.5	653	609.5	790.5	705	736	812
	PM	1469			1758			1822			0.5	734.5		879		911	
20 Sudbury Crossing	AM	2355	2358	2054	2557	2548	2211	2481	2690	1788	0.5	1177.5	1179	1278.5	1274	1240.5	1345
	PM	2657			2862			2941			0.5	1328.5		1431		1470.5	
21 Nobscot Rd	AM	2341	2037	1780	2541	2132	1945	2562	2257	1992	0.5	1170.5	1018.5	1270.5	1066	1281	1128.5
	PM	2433			2647			2716			0.5	1216.5		1323.5		1358	
Total	AM	29282	22669	20089	34858	27262	22914	32633	31282	24127		14254.9	11129.6	17014.4	13405.4	15909.7	15381.2
	PM	31481			37249			48789				15307.3		18152.6		23904.9	

Notes:

Wayland Town Center
Wayland, Massachusetts

Mesoscale Analysis

Intersection	Peak	Total Vehicles			Miles per Intersection	Miles		
		Existing	No-Build	Build		Existing	No Build	Build
Old County/Rt 20	AM	1804.0	2184.0	2154.0	0.5	902.0	1092.0	1077.0
	PM	1925.0	2352.0	2429.0	0.5	962.5	1176.0	1214.5
	SAT	1524.0	1976.0	2234.0	0.5	762.0	988.0	1117.0
	SUN	1164.0	1503.0	1597.0	0.5	582.0	751.5	798.5
Site S/Rt20	AM	1486.0	2011.0	1871.0	0.5	743.0	1005.5	935.5
	PM	1629.0	2174.0	2527.0	0.5	814.5	1087.0	1263.5
	SAT	1215.0	2044.0	2845.0	0.5	607.5	1022.0	1422.5
	SUN	1063.0	1390.0	739.0	0.5	531.5	695.0	369.5
Old Sudbury/River Road	AM	1223.0	1349.0	1330.0	0.5	611.5	674.5	665.0
	PM	1366.0	1505.0	1548.0	0.5	683.0	752.5	774.0
	SAT	668.0	758.0	849.0	0.5	334.0	379.0	424.5
	SUN	639.0	694.0	739.0	0.5	319.5	347.0	369.5
Glezen/Old Sudbury Road	AM	1287.0	1382.0	1356.0	0.5	643.5	691.0	678.0
	PM	1444.0	1573.0	1632.0	0.5	722.0	786.5	816.0
	SAT	683.0	752.0	866.0	0.5	341.5	376.0	433.0
	SUN	787.0	841.0	898.0	0.5	393.5	420.5	449.0
Insert B	AM	1041.0	1154.0	1140.0	0.5	520.5	577.0	570.0
	PM	1055.0	1130.0	744.0	0.5	527.5	565.0	372.0
	SAT	284.0	307.0	382.0	0.5	142.0	153.5	191.0
	SUN	236.0	203.0	253.0	0.5	118.0	101.5	126.5
Glezen/Moore Road	AM	495.0	531.0	523.0	0.5	247.5	265.5	261.5
	PM	455.0	489.0	488.0	0.5	227.5	244.5	244.0
	SAT	113.0	123.0	132.0	0.5	56.5	61.5	66.0
	SUN	89.0	95.0	97.0	0.5	44.5	47.5	48.5
Moore/Rt 126	AM	830.0	937.0	914.0	0.5	415.0	468.5	457.0
	PM	878.0	995.0	1037.0	0.5	439.0	497.5	518.5
	SAT	434.0	508.0	592.0	0.5	217.0	254.0	296.0
	SUN	420.0	480.0	522.0	0.5	210.0	240.0	261.0
Glezen/Rt 126	AM	1116.0	1244.0	1217.0	0.5	558.0	622.0	608.5
	PM	1089.0	1220.0	1265.0	0.5	544.5	610.0	632.5
	SAT	496.0	577.0	670.0	0.5	248.0	288.5	335.0
	SUN	475.0	537.0	585.0	0.5	237.5	268.5	292.5
Rt 126/Claypit	AM	798.0	925.0	895.0	0.5	399.0	462.5	447.5
	PM	821.0	947.0	1001.0	0.5	410.5	473.5	500.5
	SAT	507.0	592.0	703.0	0.5	253.5	296.0	351.5
	SUN	536.0	602.0	660.0	0.5	268.0	301.0	330.0
Claypit/Decatur	AM	469.0	490.0	494.0	0.5	234.5	245.0	247.0
	PM	391.0	411.0	430.0	0.5	195.5	205.5	215.0
	SAT	191.0	201.0	227.0	0.5	95.5	100.5	113.5
	SUN	164.0	173.0	185.0	0.5	82.0	86.5	92.5
Plain/Glen Road	AM	281.0	296.0	298.0	0.5	140.5	148.0	149.0
	PM	256.0	268.0	275.0	0.5	128.0	134.0	137.5
	SAT	130.0	137.0	146.0	0.5	65.0	68.5	73.0
	SUN	110.0	114.0	118.0	0.5	55.0	57.0	59.0
Plain/Rt 126	AM	670.0	787.0	752.0	0.5	335.0	393.5	376.0
	PM	256.0	778.0	830.0	0.5	128.0	389.0	415.0
	SAT	506.0	593.0	704.0	0.5	253.0	296.5	352.0
	SUN	517.0	580.0	640.0	0.5	258.5	290.0	320.0
Bow/Rt 126	AM	661.0	778.0	743.0	0.5	330.5	389.0	371.5
	PM	637.0	757.0	803.0	0.5	318.5	378.5	401.5
	SAT	504.0	590.0	701.0	0.5	252.0	295.0	350.5
	SUN	522.0	585.0	645.0	0.5	261.0	292.5	322.5
Bow/Sudbury	AM	847.0	947.0	921.0	0.5	423.5	473.5	460.5
	PM	1124.0	1236.0	1295.0	0.5	562.0	618.0	647.5
	SAT	643.0	708.0	822.0	0.5	321.5	354.0	411.0
	SUN	751.0	797.0	854.0	0.5	375.5	398.5	427.0
Site E/Sudbury	AM	901.0	1264.0	1077.0	0.5	450.5	632.0	538.5
	PM	1077.0	1424.0	1614.0	0.5	538.5	712.0	807.0
	SAT	698.0	840.0	1412.0	0.5	349.0	420.0	706.0
	SUN	761.0	831.0	1082.0	0.5	380.5	415.5	541.0
Concord/Sudbury	AM	1563.0	1957.0	1608.0	0.5	781.5	978.5	804.0
	PM	1693.0	2082.0	1982.0	0.5	846.5	1041.0	991.0
	SAT	1294.0	1532.0	1633.0	0.5	647.0	766.0	816.5
	SUN	1174.0	1343.0	1515.0	0.5	587.0	671.5	757.5
Insert A	AM	6258.0	7967.0	7006.0	0.5	3129.0	3983.5	3503.0
	PM	6655.0	8442.0	8209.0	0.5	3327.5	4221.0	4104.5
	SAT	5736.0	7163.0	7716.0	0.5	2868.0	3581.5	3858.0
	SUN	4511.0	5248.0	6166.0	0.5	2255.5	2624.0	3083.0
Winthrop/Post	AM	1550.0	1976.0	1819.0	0.5	775.0	988.0	909.5
	PM	1771.0	2199.0	13201.0	0.5	885.5	1099.5	6600.5
	SAT	1429.0	1771.0	2077.0	0.5	714.5	885.5	1038.5
	SUN	1243.0	1513.0	1691.0	0.5	621.5	756.5	845.5
Winthrop/Cochituate	AM	1306.0	1581.0	1472.0	0.5	653.0	790.5	736.0
	PM	1469.0	1758.0	1822.0	0.5	734.5	879.0	911.0
	SAT	1219.0	1410.0	1624.0	0.5	609.5	705.0	812.0
	SUN	1093.0	1229.0	1361.0	0.5	546.5	614.5	680.5
Sudbury Crossing	AM	2355.0	2557.0	2481.0	0.5	1177.5	1278.5	1240.5
	PM	2657.0	2862.0	2941.0	0.5	1328.5	1431.0	1470.5
	SAT	2358.0	2548.0	2690.0	0.5	1179.0	1274.0	1345.0
	SUN	2054.0	2211.0	1788.0	0.5	1027.0	1105.5	894.0
Nobscot Rd	AM	2341.0	2541.0	2562.0	0.5	1170.5	1270.5	1281.0
	PM	2433.0	2647.0	2716.0	0.5	1216.5	1323.5	1358.0
	SAT	2037.0	2132.0	2257.0	0.5	1018.5	1066.0	1128.5
	SUN	1780.0	1945.0	1992.0	0.5	890.0	972.5	996.0
Total	AM	29282.0	34858.0	32633.0		14641.0	17429.0	16316.5
	PM	31081.0	37249.0	48789.0		15540.5	18624.5	24394.5
	SAT	22669.0	27262.0	31282.0		11334.5	13631.0	15641.0
	SUN	20089.0	22914.0	24127.0		10044.5	11457.0	12063.5