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Memorandum

To/Attention	Molly Casto, City of Portland	**Date**	June 30, 2011 Rev (City of Portland): October 20, 2011
From	Tegin Teich, IBI Group	**Project No**	29754
cc	Martin Hull, IBI Group; Carl Eppich, PACTS	**Steno**	tt
Subject	Land Use and Transportation Concept Plan, Transforming Forest Avenue		

1. Introduction

The goal of the Transforming Forest Avenue study is to "develop an integrated transportation and land use plan that will leverage transportation and other public investments to stimulate private redevelopment and infill of underutilized properties."[1] This memorandum summarizes a Concept Plan that evolved from a process of assessing existing conditions and evaluating alternatives based on feedback in the public process. This Land Use and Transportation Concept Plan is actually a combination of both land use and zoning as well as transportation and streetscape plans, and together they are meant to represent a possible vision for the corridor's future development.

The Land Use and Zoning Concept Plan is described generally for the entire corridor. The Transportation and Streetscape Concept Plan is presented both as a set of improvements for the whole corridor, as well as application of the Plan in each of the three segments (A, B, and C) of the study corridor shown in Figure 1.

The Land Use and Zoning Concept Plan is described at a higher level, in a more goal-oriented perspective. The Transportation and Streetscape Concept Plan is illustrated through a variety of transportation and streetscape improvements that have been proposed and vetted for basic feasibility based on the existing conditions analysis, as well as the future traffic analysis carried out in the Transforming Forest Avenue study. This set of possible improvements has been further narrowed down based on public feedback. Future studies should determine the full extent to which many of these improvements can be carried out.

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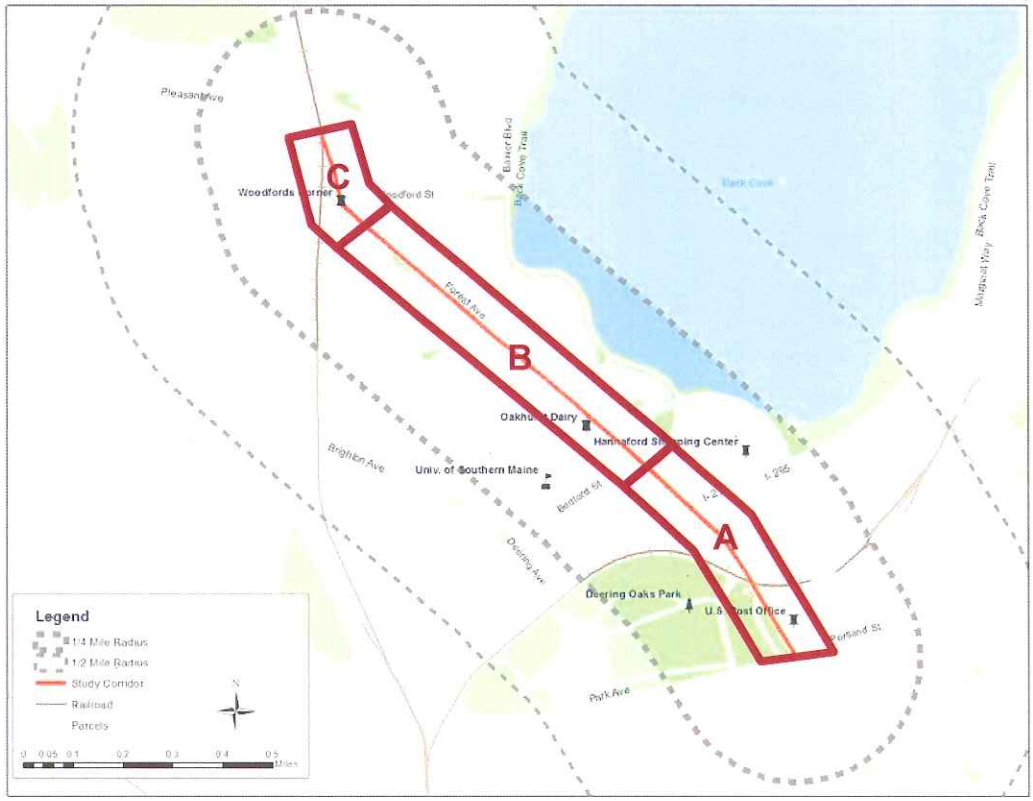
[1] From *The Portland Area Comprehensive Transportation System (PACTS) Request for Proposals for a Portland -Forest Avenue Integrated Transportation and Land Use Plan*, November 2, 2010.

Figure 1: Study Area Segments for Transportation Forest Avenue



Section 2 of this document describes the overall process carried out in the Transforming Forest Avenue study. Section 3 describes the Land Use and Zoning Concept Plan, beginning with a summary of the alternatives that were explored and ending with a description of how to realize Transit-Supportive Development Principles within the existing zoning framework. Section 4 describes the Transportation and Streetscape Concept Plan, including a summary of the alternatives that were evaluated followed by the corridor wide as well as segment specific improvements that would realize this Concept Plan. Section 5 provides a summary of future studies that would be necessarily to further develop approaches to realizing this overall Concept Plan.

2. Process

Transforming Forest Avenue was a five-month study to determine a land use and transportation plan for a portion of Forest Avenue from Park Avenue/Portland Street to the railroad crossing north of Woodfords Corner. The plan was developed in accordance with Complete Streets and Transit-Supportive Development (TSD) principles and was based on a context sensitive approach. The following tasks were carried out in the Transforming Forest Avenue study:

- The development of TSD and Complete Streets principles;
- The assessment of existing conditions for both land use and transportation with separate deliverables;
- The analysis of existing traffic conditions, including Level of Service assessment;

- The analysis of the corridor's streetscape, including the creation of three street sections of existing conditions;
- The development of three land use and zoning alternatives;
- The development of three transportation and streetscape alternatives;
- The analysis of future traffic conditions for the year 2035;
- The development and application of evaluation tables for the land use and zoning alternatives and the transportation and streetscape alternatives;
- The development of draft alternative for the Concept Plan from feedback on alternatives;
- The development of Concept Plan; and
- The Enhanced Project Scoping for two locations on the corridor (I-295 and Woodfords Corner).

This process included the submission of five memoranda summarizing the results of various stages of this process. The submitted memoranda are included as Appendices 13 through 17, after the appendices that are most relevant to this document. Other deliverables throughout this process included the TSD and Complete Streets principles, evaluation tables, and other items that are included within this memorandum. Finally, the Enhanced Project Scoping will be submitted as a separate memorandum at the same time as this document.

The Concept Plan and the vision of Forest Avenue contained within were developed based on input by the City of Portland and Portland Area Comprehensive Transportation System (PACTS), and reflect the input of stakeholders, including residents and business owners on or adjacent to the corridor. Stakeholder and public input was given in two Public Advisory Committee meetings held on May 4, 2011 and June 15, 2011, as well as two Public Meetings held on May 12, 2011 and June 22, 2011. Due to changes in policy at the state level, the project timeline was compressed from 11 months to 5 months. This resulted in a compressed public process; however, feedback was still obtained on major deliverables in the study. The City of Portland has pledged to continue the study beyond the consulting team contract in order to carry out the necessary public process and implement any necessary revisions to the plan prior to consideration by the Portland City Council. The first Public Advisory Committee meeting and Public Meeting included discussion of existing conditions, TSD and Complete Streets principles, as well as key challenges and opportunities on the corridor. The draft alternatives for both land use and zoning as well as transportation and streetscape were presented to the Public Advisory Committee at the second meeting. A draft set of improvements for the Concept Plan was presented to the public at the second Public Meeting for feedback. Comments have also been received through individual meetings, written submission, an online comment interface available through the project website and other forms of feedback such as email.

3. Land Use and Zoning Concept Plan

3.1 Alternatives

Three conceptual alternatives that embodied different land use and zoning strategies were defined and evaluated in order to explore possibilities for the future of land development around Forest Avenue. The alternatives included modification of the current zoning framework, as well as an exploration of alternative zoning paradigms, such as form-based codes, which a handful of cities and towns across the country are beginning to implement. The project's Transit-Supportive Development (TSD) principles (see Appendix 1), developed with input from the City of Portland,

PACTS, the Public Advisory Committee, and public, served as the guidance for selecting improvements to explore and evaluate.

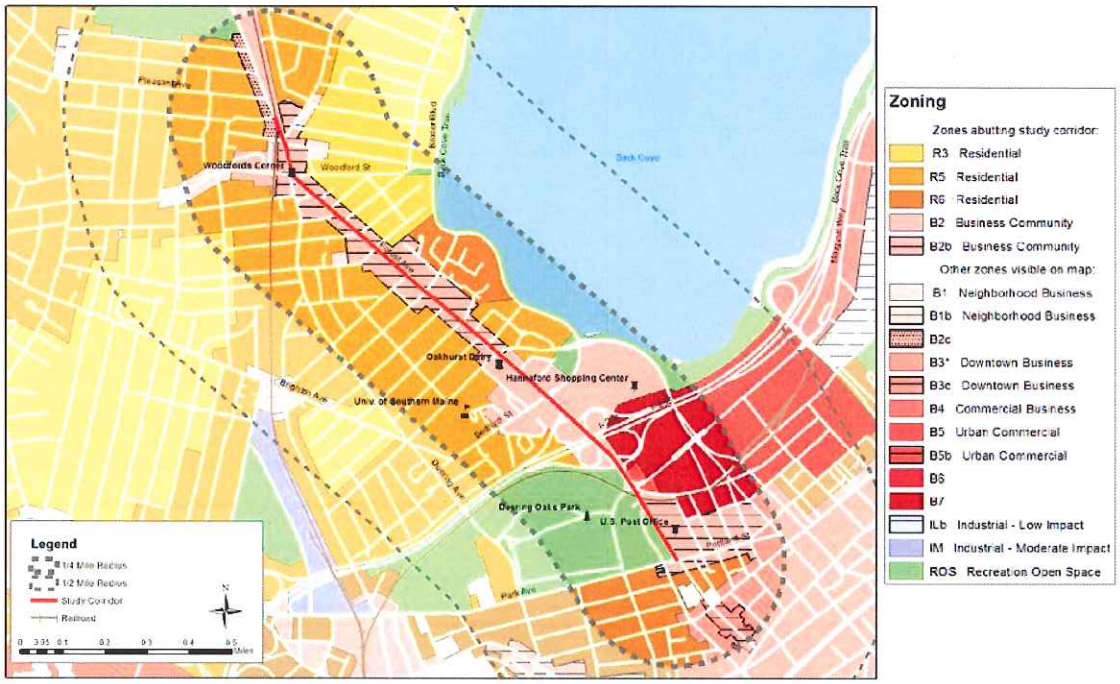
3.1.1 Summary of Alternatives

The following alternatives were developed and presented to the Public Advisory Committee for feedback. Details for each of the alternatives are contained in the document, *Draft Land Use/Zoning Alternatives, Transforming Forest Avenue,* submitted June 15, 2011 (Appendix 16).

Use-Based Zoning

Euclidean zoning, characterized by the segregation of land uses into specified geographic districts and dimensional standards stipulating limitations on development activity within each type of district, is the most well known and widely used form of zoning code. In this approach, land uses, such as commercial, residential, industrial, institutional, and so on, are defined and grouped into zoning districts. Development throughout the City is currently governed by a Euclidean code, which is shown in Figure 2. The zoning for Forest Avenue could be considered typical for a commercial corridor, with mixed us commercial along Forest Avenue, surrounded by residential areas. There is an overlay zone around the University of Southern Maine (USM), making this area subject to different guidelines than the rest of the residential zone around it.

Figure 2: Existing Zoning on Forest Avenue



The first conceptual alternative (Use-Based Zoning) envisioned a strategy based on adapting the current Euclidean zoning to the principles of TSD. Some possible enhancements to the existing code were explored, as well as some improvements and incentives for the existing City of Portland Technical and Design Standards, which are incorporated into the City of Portland Land Use Code by reference.

Form-Based Zoning

The second conceptual alternative (Form-Based Zoning) involved the application of a Form-Based Code (FBC), a contemporary form of zoning which regulates development based on the desired physical urban form rather than separation of uses. FBCs address the scale and type of blocks and streets, relationships between buildings, and relationship between buildings and the public realm by incorporating three primary elements: vertical form, site design, and land use. Land use is still regulated in FBC, though it is generally considered secondarily to form. A regulating plan is used to designate an area by the appropriate form of development (i.e. designate a character), rather than by land use.

FBCs typically aim towards some of the following goals:

- Achieving quality aesthetics in neighborhoods and village centers
- Improving walkability
- Increasing the amount of neighborhood parks and open space
- Providing safer neighborhoods and village centers day and night
- Conserving city resources (infrastructure and others)
- Creating a stronger sense of place and identity for neighborhoods and village centers
- Creating economic growth opportunities
- Providing more housing options for citizens
- Conserving agricultural lands by providing village centers and reducing sprawl

Some examples of developments that resulted from implementing design guidelines and FBCs are shown in Appendix 2. Many of the abovementioned goals are already identified in adopted City of Portland policy documents such as the Comprehensive Plan.

Hybrid Zoning

The third conceptual alternative (Hybrid Zoning) retained the existing Euclidean zoning code with some enhancements to achieve TSD outcomes, while incentivizing the use of FBCs or providing FBC overlays at certain locations. Overlays would be used to achieve certain goals in certain locations, such as providing a housing and activity center for USM students or providing an intensive residential feeder for the commercial activity on the corridor.

3.1.2 Evaluation of Alternatives

The alternatives were evaluated qualitatively according to the TSD principles and a preliminary assessment of institutional feasibility, technical feasibility, and cost.
Figure 3 shows a summary of that evaluation. Each category for which alternatives were evaluated has a weight assigned to it that reflects the priorities and goals of the project. For example, in this visioning exercise, cost is weighted less than the realization of the principles or the feasibility. Weighted averages were taken in several stages. First, all of the principles were evaluated and the weighted average taken for each category. Then, an overall weighted average for the principles was calculated. This weighted average was considered with weighted averages for feasibility and cost to determine an overall rating.

Overall, the alternatives received the same rating. This result stems from the fact that the alternatives achieve different outcomes that average out to the same rating. For example, FBCs may be best able to achieve the TSD principles, however, they would require a comprehensive

revision of the existing zoning code and, thus, may be less politically attractive and more costly to prepare. Use-Based Zoning might not be able to address as many of the TSD principles, but it is a type of zoning that is known, and revisions and enhancements to current zoning regulations would be less costly than developing a new strategy.

Figure 3: Evaluation of Land Use and Zoning Alternatives

Rating Key
0 Very Poor
1 Poor
2 Neutral
3 Good
4 Excellent

	Transit-Supportive Development Principles							TSD Principles			Feasibility			Overall Rating			
	Land Uses			Placemaking/Built Environment				Categories						Weighted Averages			
	Encourage vibrant and diverse uses	Encourage compact land uses	WEIGHTED AVERAGE	Design for architectural quality	Provide quality public space	Provide high quality parking	WEIGHTED AVERAGE	Land Uses	Placemaking/Built Environment	WEIGHTED AVERAGE	Institutional Feasibility	Technical Feasibility	WEIGHTED AVERAGE	TSD Principles	Feasibility	Cost	Overall Rating
Weights	60%	40%		33%	33%	33%		50%	50%		50%	50%		*40%*	*40%*	*20%*	
Alternative 1: Use-Based Zoning	2	2	2	1	1	2	1	2	1	2	2	2	2	2	2	2	2
Alternative 2: Form-Based Zoning	4	4	4	4	4	4	4	4	4	4	0	1	1	4	1	1	2
Alternative 3: Hybrid Zoning	3	3	3	2	2	3	2	3	2	3	1	1	1	3	1	1	2

3.2 Concept Plan

Feedback during the public process for Transforming Forest Avenue indicated that there is a general satisfaction with the current zoning code. The evaluation indicates that, although it may not be the ideal approach to achieving TSD principles, it is more feasible and less costly than other approaches. Therefore, it is likely that for the time being, the approach to zoning will not change, though enhancements or adjustments can be made to the existing zoning and incentives could be added to promote TSD principles. The following subsections describe the way that these goals might be realized within the existing zoning framework.

3.2.1 Vibrant and Diverse Land Uses

The existence of vibrant and diverse land uses should stimulate a variety of activity at all times of day to increase the economic vitality and perceived safety on the corridor, as well as provide a variety of options to residents and visitors for living, working, and engaging in recreational activities. Providing a mixture of uses also provides multiple reasons to visit the same location, making transit a more feasible or reasonable way to travel and reach destinations.

Mixed uses typically are realized by having a variety of uses located near each other, either next to or in the same building. A typical example of this is to have commercial on the bottom floor of a building and residential above. The current zoning code allows for a mixture of uses, particularly in the B-2 and B-2b zoned areas. Some examples can already been seen, such as multi-story buildings with first floor commercial and upper story residential. The purpose of the B-2 and B-2b zones is to provide appropriate locations for the development and operation of community centers offering a mixture of commercial uses, housing and services serving the adjoining neighborhoods and the larger community.[2] The B2-b zone emphasizes more pedestrian-oriented urban form requiring that development be oriented to and built close to the street. Conditional uses that are more auto-oriented are also permitted in the B2 and B2-b zones, subject to Planning Board review. Examples of conditional uses in the B2 and B2-b zone

[2] City of Portland Land Use Code. Article 3. Division 10. B-2 and B-2b Community Business Zones. Sec 14-181 (a).

include auto service stations, car washes and drive-throughs when adjacent to a residential zone.

Changing the mixture of land uses along a corridor can be a slow process that focuses primarily on new development. A shift in the mixture of land uses can be accomplished either by changing what is allowed by the current zoning or by encouraging the mixture of uses currently allowed to be more fully realized. For example, in the first approach, some areas could be rezoned to a type that encourages more pedestrian-oriented, mixed use development, such as rezoning the areas of B-2 in the southerly portion of the study area to B-2b. The zoning text and/or Design Standards could also be revised to further regulate the development of auto-oriented uses such as drive-throughs and service stations. In the second approach, the City could provide incentives for certain uses that are allowed in the existing zoning and are considered desirable but are currently lacking along the corridor.

Successfully mixing uses requires attention to both the transition between uses as well as buffers between certain uses. For example, residents located on the corridor that are near commercial activity may still wish to retain a more residential feel to their neighborhood. Certain improvements make this possible without restricting the mix of uses. For example, residences can be buffered from busier parts of the corridor with landscaping or fencing. Building equipment can be attractively screened from view of residences. Noise buffering can be installed, where necessary. The transition between uses should not be abrupt and should include good connections between uses to encourage pedestrian activity. Many of these types of standards are already required for new development and redevelopment according to the City of Portland Site Plan Ordinance (Article 5 of the Land Use Code) and the corresponding Technical and Design Standards.[3]

The following image shows the existing transition between the Forest Avenue shopping plaza and the housing immediately behind. This is one of the more extreme examples of abrupt contrast between existing commercial and residential along the corridor. If this site is redeveloped in the future, this transition should be improved to provide a more pleasant residential environment as well as better access to the retail opportunities from people accessing from the rear of the site versus the front parking lot. This could include but not be limited to additional landscaping, improved pedestrian pathways, and rear entrances to shops.

Figure 4: Existing Transition between Retail and Residential on Forest Avenue

[3] City of Portland Land Use Code. Article 5. Section 14-526.

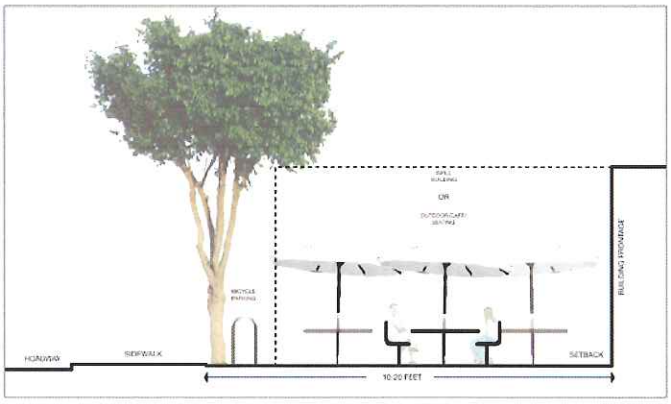
3.2.2 Compact Uses

Compact uses also provide support for transit. By concentrating development and activities around transit on a corridor like Forest Avenue, people will be more inclined to make use of the transit itself and the activities around it because they become more convenient. Compactness should not create an adverse environment for pedestrians by allowing development at a scale that would be intimidating or out of place. Rather, it should provide for vibrant loci of activity at a pedestrian scale.

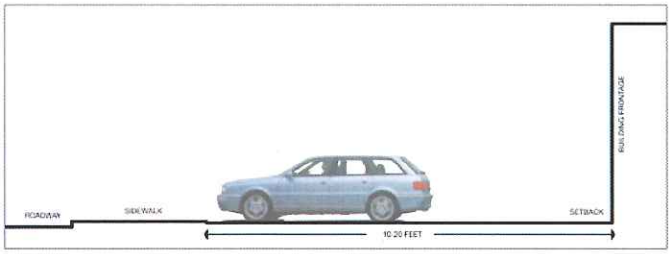
Compact uses can be encouraged in a variety of ways, though two general approaches are described here. First, particularly in the commercial areas, incentives can be used to encourage new development to more fully realize the allowed compactness in the current zoning code. Incentives for infill of existing development can also be used to increase compactness and enhance the pedestrian environment.

Figure 5 shows a representation of infilling a parking lot with buildings and street furniture (in this case, seating and bicycle parking). The ability to encourage compact development through such approaches could be limited by constraints in the zoning code, such as requirement for providing a minimum amount of off-street parking. Incentives may include easing parking requirements as long as this does not result in a serious lack of parking supply. However, the creation of a more pedestrian-scaled environment through TSD principles may mean that fewer people feel obligated to drive, thus decreasing demand for parking. A strategic approach to managing parking is described in Section 3.2.5.

Figure 5: Example of Infill



Possible Infill Strategies



Existing Front Yard Configurations

3.2.3 Architectural Quality

In addition to the specific form of a building, architectural quality includes consideration of building scale, orientation, and access. Good architecture quality in this sense can create an attractive, pedestrian scaled environment that draws people to the corridor and makes them more willing to spend time there.

Architectural quality can be more directly addressed through design guidelines. The City of Portland's *Design Manual*, adopted in May of 2010, sets out more general standards for a particular zone, accompanied by a set of more specific design criteria to help achieve the standards in those zones. Improvements to the design standards could include additional explanatory graphics and additional form-based elements. By incorporating more of these features, the guidelines would be better able to guide developers towards achieving a certain character on the corridor.

Some examples of typical ways to address form through design standards include the following:

- Define building envelope within which a building on a typical lot may be designed.
- Provide a reference library of approved façade treatments and materials.
- Provide a reference library of approved front yard landscape treatments.
- Recommend store window dimensions, awning types, colors, and materials, consistent with the corridor branding.

3.2.4 Public Spaces

The study area has the benefit of two major public open space amenities nearby or on the corridor: Back Cove and Deering Oaks Park. Improved connections and compatible nearby land uses would optimize use of these existing resources. However, on a smaller scale, the public spaces could be improved along the corridor. Well-used and active public spaces, such as sidewalks, pockets of green space and seating areas, can help draw activity to an area as well as increase the perception of safety by providing more 'eyes on the street'.

Some strategies, such as improvements to the streetscape (such as plantings) and installation of attractive street furniture (such as benches) would improve the 'public' environment (even if it is installed on adjacent private property). Figure 6 shows a simple approach to improving building frontages with street furniture. Enhancements to the design guidelines also would improve the immediate public environment while walking up and down the corridor. In addition, public spaces should be located next to other activities, have good pedestrian connections, should 'activated' through programming (i.e. activities in the space), and should have high quality, durable installations (such as street furniture/seating).

Figure 6: Example of Improvement to 'Public' Space in Building Frontages

Existing Conditions

Possible Improvements to Create 'Public' Space

Figure 7 shows a public plaza space that is currently underutilized in front of the University of Southern Maine Glickman Library. The library's entrance, which faces Forest Avenue, was originally designed as an operable door and the primary entrance to the facility. When a building expansion was completed in 2008, the entrance was shut by the University who now direct users to a rear entrance interior to the campus. Thus, there is little reason for pedestrians to use the public plaza. Re-opening this entrance, as well as installing additional street furniture such as benches or picnic tables and other amenities such as bicycle parking, would re-establish usage of the space and re-establish activity along the street frontage.

Figure 7: Example of Underutilized Public Space on Forest Avenue

3.2.5 High Quality Parking

This section covers two main considerations regarding parking. The first is to improve the appearance of parking. The second is to develop a more comprehensive parking strategy to minimize usage of land for parking.

Parking lots in the front yard are generally not harmonious with TSD principles because they hinder the development of active, pedestrian-oriented street frontage. Some approaches to improving parking on the corridor could be to visually screen parking through landscaping, which is already required as part of the City of Portland site plan standards, or to require or incentivize side or rear location of parking. In addition, requiring or incentivizing pervious paving in parking lots, such as the example from Chicago in Figure 8, or other Low Impact Development (LID) strategies could increase the attractiveness of parking lots as well as lessen their environmental impact.

Figure 8: Example of Pervious Parking Lot[4]

In addition to improving the appearance of parking, a parking strategy could help reduce the amount of land area used for parking and optimize the location of parking lots. A one-time survey performed as part of this study to estimate utilization of off-street parking spaces along the corridor revealed less than half (around 40%) occupancy between 1:00 and 3:00pm on a weekday. 85% is typically viewed as an optimal parking occupancy, with enough parking to meet demand as well as allow for turn-over without searching for parking. Although further study is required to examine different times of day and to consider different types of demand, the preliminary survey indicates that the use of space for parking may not be optimal. The majority of the parking lots along the corridor are privately owned and dedicated to a single user. Thus, while certain businesses have surplus parking, adjacent uses often have none. Instead, some space currently dedicated to parking might be appropriate for other uses such as plazas, public space, and infill opportunities. The parking requirements in the zoning code, however, currently restrict the ability to do so. Modifications to the parking requirements may be considered after a full parking study to accomplish more efficient provision of parking. Centralized parking structures could also provide a concentration of parking that allows for better realization of the economic potential of other land. Centralized parking, when combined with other TSD principles, can help create a 'park once and walk' environment. As these various approaches are explored, businesses along the corridor have expressed clearly that the elimination of on-street parking

[4] Source: http://www.lrc.usace.army.mil/co-r/best_management_practices.htm, accessed June 28, 2011.

along the corridor, with the exception of certain spaces at Woodford's Corner, as detailed on p. 28, would not be supported at this time.

Another way to achieve more efficient use of parking is for businesses to cooperate and share parking. This approach may be particularly desirable when businesses experience parking demand at different times of day. For example: with the exception of funerals and other weekday events, a church typically experiences the most demand for parking on the weekend; an office must provide parking for its employees during the day on the weekdays; a bagel or coffee shop might only be open from early morning until early afternoon; and a restaurant and bar may only be open in the evenings. By sharing parking, businesses can meet demand with fewer spaces and less land devoted to parking.

There are various ways in which collaboration could be structured, some of which include the following:

Informal Collaborative: If stakeholders decide to coordinate activities, an informal collaborative can be established involving no clear legal or financial relationships.

Semi-Independent: In some cases, more regular, formalized organization may be necessary to allow for financial participation in joint activities. These can occur within an existing framework such as a Chamber of Commerce.

Independent Organizations: These organizations can be independent (non-profit) organization with dedicated staff. This type of organization would also likely require the election of a board.

Authority: An authority is a formal government body to manage parking.

The following are a few examples of the types of organizations that have been established to foster coordination between business owners to manage parking:

Parking Management Collaborative: This type of organization is typically a voluntary collaboration between public and private participants. The level of formalization can depend on the desired purview of the collaborative. A collaborative can be used to provide a coordinated approach to parking such as through provision, marketing, and wayfinding (including providing information in a consistent format so that people can more effectively utilize existing parking). They can also involve coordination of technology such as common parking validation.

Transportation Management Association (TMA): TMAs typically focus on reducing congestion and increasing air quality by implementing transportation demand management (TDM) strategies. This can include parking, but efforts typically also include marketing, the development of complimentary programs, and advocacy. TMAs are more formal structures.

Parking and Business Improvement Area (PBIA): These types of organizations build on the concept of a business improvement area (BIA) or district (BID) in which member businesses fund improvements in a certain area meant to contribute to the economic vitality of the area (such as beautification of an area and marketing). Member businesses would also participate in the decision of how to use funds, and could include the task of developing a parking management strategy.

Establishing a volunteer parking collaborative with minimal formalization would be an immediate-term approach to begin coordination. Woodfords Corner, with a density of small businesses and limited off-street parking, could be an appropriate location to pilot such a collaborative if there is interest from property owners. A collaborative would require the least upfront investments out of the above options, including some staff time and monetary resources. At first, there would be no financial commitment, though this could be considered in the future to fund studies and implementation of the parking management strategy.

One way to kick off a collaborative is to invite business owners to a series of workshops to raise interest about the possibility of sharing parking and educate participants regarding the benefits that might be realized, including through incentives. In these workshops, business owners could also be engaged in the tasks of examining the existing supply and identifying needs, exploring solutions, and developing their own parking management program.

These efforts would all benefit from a comprehensive parking study, which would explore demand as already mentioned, but also analyze parking access with consideration of curb cut consolidation and funding sources for parking management strategies.

4. Transportation and Streetscape Concept Plan

4.1 Alternatives

As part of the Transforming Forest Avenue study, three transportation alternatives were developed to represent three different visions for the future of Forest Avenue to achieve study goals. They represent different interpretations of how to apply Complete Streets principles (see Appendix 3), developed as a part of this study with feedback from the City, PACTS, Project Advisory Committee, and public. Complete streets accommodate all users, but may prioritize users to different degrees based on the intended primary function of the road. In each alternative, Forest Avenue was envisioned as a different type of street. Although all three alternatives included a common set of improvements, such as streetscape improvements, intersection treatments, narrowing of travel lanes, and additional transit service, they were intended to differ thematically to elicit conversation regarding desirable features and possible trade-offs to achieve certain goals. These alternatives are summarized below.

4.1.1 Summary of Alternatives

The following alternatives were developed and presented to the Public Advisory Committee for feedback. Details for each of the alternatives are contained in the document, *Draft Transportation Alternatives, Transforming Forest Avenue,* submitted June 13, 2011.

Alternative 1: Connecting Destinations

In this alternative, Forest Avenue was envisioned as a vibrant main street. The most vulnerable users of the road (pedestrians and cyclists) were prioritized through a variety of improvements intended to enhance the corridor's role as both a destination and a connector between off-corridor destinations. The main features of this alternative included improvements to pedestrian and bicycle facilities, such as upgraded and increased crossings, shared lane markings for bicycles, and a bicycle lane where there is sufficient road width in Segment A. On-street parking was retained as an important buffer for pedestrians. Automobile and transit travel was not envisioned as significantly changing.

Alternative 2: Greening Forest Avenue

This alternative envisioned Forest Avenue as an enhanced avenue, and a boulevard with a landscaped median where road width allowed. In this alternative, relatively equal consideration was given for all users in creating a greener, more attractive corridor. New plantings and a landscaped median contributed to a consistent green character throughout the corridor. It also included the elimination of on-street parking to allow for a bicycle lane in both directions along the entire corridor. Bus stops were envisioned as pull-out locations wherever possible.

Alternative 3: Creating a Transit Corridor

This alternative envisioned Forest Avenue in its existing role as an arterial but with a focus on improving transit as a way to draw riders from single occupancy vehicle trips. This most significant improvement was achieved through the elimination of on-street parking to allow for a bus only lane in the southbound direction. This lane would allow buses to bypass the worst congestion in the PM peak hours. This alternative also included the provision of additional express transit service from a park-and-ride location at the northern terminus of Route 2.

4.1.2 Evaluation of Alternatives

The alternatives were evaluated qualitatively according to the Complete Streets principles, a preliminary assessment of institutional and technical feasibility, and high-level costs. Figure 9 shows a summary of that evaluation. The top table shows the more detailed evaluation of each Complete Streets principle. The lower table shows the summary of the weighted averages of categories of Complete Streets principles along with the evaluation of feasibility and cost to produce an overall ranking. As in the evaluation for the land use and zoning alternatives, each category is weighted according to the priorities and goals of the study.

Overall, the alternatives received the same rating. Despite the similar overall rating, each alternative achieves different things. For example, Greening Forest Avenue was rated to achieve the most benefit in terms of the Complete Streets principles categories. However, the overall average for Complete Streets principles was the same for all alternatives based on the weighted average. A shift in priorities, and therefore in the weights for each category, could cause the alternatives to rank differently. Alternatives 2 and 3 ranked lower for feasibility and cost because, for example, the removal of parking might be politically undesirable and the costs associated with roadway reconfiguration were higher. This evaluation contributed to the development of a Transportation and Streetscape Concept Plan that focuses largely on the improvements suggested in the first alternative, with significant improvements to the streetscape as described in the second alternative.

Figure 9: Evaluation of Transportation and Streetscape Alternatives

Rating Key
0 Very Poor
1 Poor
2 Neutral
3 Good
4 Excellent

	Complete Streets Principles																
	Health and Safety				Accommodate All Modes						Connectivity/ Accessibility			Environment			
	Promote Physical Activity	Enhance safety of vulnerable users	Manage vehicle speeds	WEIGHTED AVERAGE	Encourage multi-modality	Improve transit operations, facilities, and access	Mitigate traffic diversion	Manage parking	Increase comfort	WEIGHTED AVERAGE	Connect the street network	Provide wayfinding	WEIGHTED AVERAGE	Increase permeability	Reduce greenhouse gas (GHG) emissions	WEIGHTED AVERAGE
Weights	15%	50%	35%		25%	20%	25%	15%	15%		50%	50%		50%	50%	
Alternative 1: Connecting Destinations	3	3	2	**3**	3	2	2	2	3	**2**	2	2	**2**	2	3	**2**
Alternative 2: Greening Forest Avenue	3	3	2	**3**	3	2	2	2	3	**2**	2	2	**2**	3	3	**3**
Alternative 3: Creating a Transit Corridor	2	2	2	**2**	3	3	2	2	2	**2**	2	2	**2**	2	3	**2**

	Complete Streets Principles					Feasibility			Cost			Overall Rating			
	Categories											Weighted Averages			
	Health and Safety	Accommodate all Modes	Connectivity/Accessibility	Environment	WEIGHTED AVERAGE	Institutional Feasibility	Technical Feasibility	WEIGHTED AVERAGE	Capital Cost	Maintenance Cost	WEIGHTED AVERAGE	Complete Streets Principles	Feasibility	Cost	Overall Rating
Weights	25%	30%	25%	20%		50%	50%		50%	50%		40%	40%	20%	
Alternative 1: Connecting Destinations	3	2	2	2	**2**	2	1	**2**	2	1	**2**	2	2	2	**2**
Alternative 2: Greening Forest Avenue	3	2	2	3	**2**	1	1	**1**	1	1	**1**	2	1	1	**2**
Alternative 3: Creating a Transit Corridor	2	2	2	2	**2**	1	1	**1**	1	2	**1**	2	1	1	**2**

The alternatives were evaluated separately for their ability to attract transit riders, using a high-level sketch model that included the major transit improvements such as the addition of a bus only lane. A summary of the assessment in terms of changes relative to the baseline (existing conditions) is shown in Figure 10. None of the proposed changes to transit service were radical enough to induce a significant number of additional transit trips. However, a combination of efforts on the corridor, such as improving the streetscape environment, making the corridor a more attractive destination, and making non-automobile travel more attractive in general, as well as improvements in land use and zoning, should all contribute to creating a more transit-supportive environment for the future. This analysis suggests that there is no 'magic bullet' in the short-term to greatly increase transit ridership; rather, it will be a longer-term process of land use and transportation planning to produce a more transit-supportive community.

Figure 10: Evaluation of Mode Shift to Transit Based on Alternatives

PM Peak Hour Person-Trips	Change from Baseline		
	Alternative 1	**Alternative 2**	**Alternative 3**
Downtown Attraction:			
Transit	13	12	16
Walk/Bike	-2	4	0
Drive Alone/Shared Ride	-11	-16	-16
Downtown Production:			
Transit	19	17	23
Walk/Bike	-1	8	0
Drive Alone/Shared Ride	-18	-25	-23

4.2 Concept Plan

The Transportation and Streetscape Concept Plan includes the components from the three alternatives that were desirable, feasible, and/or compatible, as well as additional improvements that came from feedback from the Public Advisory Committee and the general public.

The improvements in the Concept Plan take into account future traffic operations for the year 2035 as projected by the regional traffic demand forecasting model. On average over the length of the study corridor, these projected traffic levels are 20 percent higher than existing (2011) conditions. The evaluation of the existing conditions is summarized in the *Existing Traffic and Transit Analysis, Transforming Forest Avenue* memorandum submitted on May 11, 2011. A similar analysis was attempted for the year 2035 peak hour volumes, but this did not yield a directly comparable result because all of the projected traffic could not enter the corridor network with only the existing street configuration in place. Forest Avenue is already approaching capacity, and will not be able to accommodate all the traffic that the regional model projects in the future. These results suggest that within not too many years, extensive queuing and stop-and-go operation, and/or diversion to other streets, will prevail throughout the corridor during peak hours. Thereafter the portion of each weekday during which these highly congested conditions pertain will gradually grow, perhaps to take up most of the business day by 2035. In effect, the traffic volume that will be able travel along Forest Avenue in the single peak hour will reach a maximum, but some traffic that would have preferred to move during that hour will 'spill over' into adjacent hours.

The improvements included in the Concept Plan would not eliminate low levels of service on the corridor, but some would achieve modest localized improvement in traffic operations relative to not making the changes. The improvements also aim to make non-motorized forms of transportation more attractive. This Concept Plan includes as many feasible improvements as possible to achieve Complete Streets principles within the constraints indicated in the future traffic analysis, meaning that there is an attempt to avoid a reduction in capacity that would negatively affect traffic operations. The challenge remains that without dedicated facilities, bus operations will experience additional delays related to the congestion on the corridor, and their ability to compete as a travel choice will be limited without regional-scale changes in transportation policy.

Two studies being carried out at the same time as Transforming Forest Avenue are particularly relevant to the potential outcomes of the Concept Plan: the MaineDOT study of the I-295 interchange configuration and a signal timing study on Forest Avenue. The preliminary results from the signal timing study were used in the assessment of future traffic. The impact of the I-295 interchange study is discussed further in Section 4.2.2.

The following subsections describe the Concept Plan both in terms of corridor wide improvements, as well as segment specific improvements. Appendix 4 contains three maps that show the improvements over the entire study corridor. Each subsection begins by describing the improvements that are included in the Concept Plan, supported by the results of the existing conditions and future transportation analysis performed as a part of this study. Each subsection ends, if applicable, with the presentation of possible improvements that would require more study (which are summarized in Section 5 as well) to determine whether they should be included in this Concept Plan.

4.2.1 Corridor Wide Improvements

The following improvements would be applied across the corridor to realize this Concept Plan. The corridor wide improvements are based a refinement of the common transportation and streetscape improvements summarized in the *Draft Transportation Alternatives, Transforming Forest Avenue* memorandum.

The corridor wide improvements for the Concept Plan are organized under categories of modal (pedestrian and bicycle, traffic and transit) improvements, streetscape and design improvements, and environmental improvements. Within the modal improvements, pedestrians and cyclists are grouped because many improvements affect both types of users, and they are presented first because they are considered the most vulnerable users in terms of safety. Traffic and transit improvements are grouped because many traffic improvements affect travel lanes and other factors that relate to transit operations.

Pedestrians and Bicycle Improvements

All of the general bicycle and pedestrian improvements discussed in the *Draft Transportation Alternatives, Transforming Forest Avenue* are included in a refined format in this Concept Plan. They are:

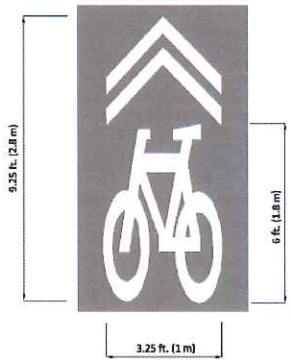
Upgrade sidewalks and intersections to better meet criteria for accessibility for people with disabilities. These upgrades would include upgrades to sidewalk conditions (widening and improving), textured ramps, and countdown pedestrian signal heads. Space for sidewalks within the existing right of way can be gained by narrowing traffic lanes, as discussed further in the traffic and transit improvements.

Redo pavement striping and/or use more attractive materials or techniques such as asphalt stamping. Much of the pavement striping, including pedestrian crosswalks and shared lane markings for bicycles, are faded and almost invisible on Forest Avenue and would be redone. Using asphalt stamping or different materials like brick at certain locations would help to add character to particular areas. Selection of an appropriate treatment should consider life cycle cost under the prevailing climatic and traffic conditions.

Provide shared lane markings (sharrows) for cyclists. Shared lane markings, which would be used throughout the study corridor, guide cyclists to a safe position in the roadway and validate a cyclist's place in a travel lane. AASHTO recommends a lane width of 14' for shared lane markings to allow automobiles to pass cyclists without veering into another lane (see Figure 11). However, this lane width is undesirable in the corridor and shared lane markings are still

often used in narrower lanes to provide the above benefits when there is not enough space for a bicycle lane.

Figure 11: Shared Lane Marking for Bicycles (Sharrow) [5]



Provide additional bicycle parking. Bicycle parking is a relatively inexpensive way to make cycling a more feasible and attractive method of travel. Bicycle parking would be concentrated at major destinations and at transit stops. A variety of parking, such as shorter-term racks and longer-term shelters would provide a range of options. Bicycle parking can also be artistic and add to the character of the corridor.

Traffic and Transit Improvements

It is assumed that the traffic Level of Service will be somewhat improved by the separate signal timing study. Additional improvements contained in the Concept Plan include the following:

Reduce travel lanes widths. Travel lanes throughout the corridor would be narrowed to 12' on the outside and 10' on the inside. AASHTO recommends 10' to 12' lanes on arterials, with narrower widths within that range being acceptable and even advantageous in interrupted (with signals) arterials of this speed (30 miles per hour).[6] The outer lane is widest to facilitate bus travel.

Introduce 2S shuttle service. To stimulate economic development and increase use of Forest Avenue as a commercial destination, an off-peak shuttle service (called "2S" here) would be established to serve more non-work trips. This shuttle service would operate from the terminus of Route 2 in the downtown to a turnaround point just north of Woodfords Corner. Examples of users of this service could include daytime shoppers who wish to park once and then visit other parts of the corridor without walking far, USM students wishing to access other nearby destinations, and people who work downtown but eat lunch or run daytime errands on the corridor.

Improve amenities at bus stops. Overall, amenities would be improved at all bus stop locations to improve the perception of the quality of service. Currently there are only a few locations with a bench, such as at the Trinity Episcopal Church. At a minimum, benches would be added at all bus stop locations unless it conflicts with accessibility for people with disabilities.

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[5] American Association of State Highway and Transportation Officials. (2010). *Draft AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities.* Page 60.
[6] American Association of State Highway and Transportation Officials. (2004). *A Policy on Geometric Design of Highways and Streets (Green Book)*, 5th Edition.

In addition, all stops would include additional information on signage such as the schedule and route map. Bus shelters would be installed at key locations, including near the US Post office, USM, Forest Avenue Plaza, and Woodfords Corner. Discussion during public meetings has emphasized the importance of installing high quality shelters that are enclosed on three sides to provide adequate protection from the elements such as the shelter shown in Figure 12. These efforts would improve a rider's experience without affecting operations. Allowing advertising on shelters is one method to support installation and maintenance costs. Bus shelter advertising was recently legalized in Maine; however a broader conversation would be necessary before moving forward with permitted bus shelter advertising.

Figure 12: Example of a high quality, semi-enclosed bus shelter[7]

Streetscape and Design Improvements

Streetscape and design improvements would primarily be targeted at making the corridor a more pleasant place to be, rather than a place to pass through. These improvements should be made wherever possible, with attention to maintenance requirements.

Install consistent landscaping along the corridor. Consistent plantings, verges, and greenery would be incorporated wherever possible on the corridor, particularly on medians or where sidewalk space would be gained from the narrowing of travel lanes. The goal would be to re-embrace the name of Forest Avenue by increasing vegetation on the corridor.

Install street furniture. Where space is available, street furniture would be installed for both functionality and comfort of the pedestrians using the corridor. There are many types of street furniture, some of which (benches, bicycle parking, and bus shelters) have already been mentioned. However, street furniture could also include trash bins, newsstands, decorative lamp posts (as are installed in designated lighting districts in other parts of the City such as the Old Port), and many other items on the streetscape. Consistently branded street furniture would give Forest Avenue a cohesive identity, and in certain locations, can be used to indicate a special character. Feedback during the public process has prioritized a style of branding that speaks to the history of Forest Ave and its identity as a 1920's auto-row street. Street furniture could also include artistic installations.

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[7] EnseiCom Design and Engineering Service. http://www.ensei.com/docs/street02.html. Cantilever Shelter. Accessed October 20, 2011.

Environmental Improvements

The following are a few more directly streetscape-related environmental improvements along the corridor. Incentives discussed in Section 3 for land use and zoning improvements could be used to encourage more sustainable development generally on the corridor.

Use recycled materials. Recycled materials would be used when possible on the corridor for construction (with consideration of cost and maintenance trade-offs) and/or for more decorative elements such as street furniture.

Use pervious materials and surfaces. Pervious paving has already been addressed in Section 3.2.5 in terms of parking lots. Use of pervious paving would be expanded where possible in alleys and private walkways or sidewalks. In addition, stormwater cub extensions, stormwater street planters, and rain gardens would be used to capture and filter stormwater runoff.

Items for Further Consideration

The following improvements could be included in the Concept Plan, and are considered important enough to warrant further consideration for inclusion. However, additional analysis or study is required to determine whether these would, in fact, be improvements, as well as to determine the most appropriate way to implement them.

Introduce additional pedestrian crossings. Three-way crossings at intersections would be completed to four-way when possible. A few locations are suggested improvements in the segment specific sections, however, other locations or the possibility of midblock crossings should be assessed more carefully in terms of the traffic impacts. Any new crossings at signalized intersections should be considered in the ongoing signal timing study.

Upgrade pavement striping. The Concept Plan includes the renewal of pavement striping at all crossings and for pavement markings like sharrows. Further research should be done to select the best material given available resources to better withstand the adverse weather conditions. For example, thermoplastic is commonly used in more adverse weather conditions, but it is also more expensive to install and maintain than paint. The particular maintenance requirements in Portland should be considered in the selection of the appropriate method.

Consolidate Curb Cuts. This Concept Plan would include the consolidation of curb cuts due to more centralized or shared use parking as discussed in the Land Use and Zoning Concept Plan and as an effort to reduce the potential conflict between pedestrians, cyclists, and traffic. Reducing the number of locations at which local access turns are made could also serve to improve traffic flow if the increased turning movements at consolidated locations do not have a negative impact. However, specific locations should be considered based on further parking management efforts as well as potential impact to traffic flow. Therefore, further analysis should be done if curb cut consolidation is to be pursued.

Determine appropriate location and spacing of bus stops. The location and spacing of bus stops can have a significant impact on average bus speeds. Further analysis would be required to determine the optimal location and spacing. A study should be undertaken with Metro to determine the best location for bus stops within the study corridor considering both bus operations as well as customer access. Such a study could focus on optimizing the entire Route 2, including examining the ridership, schedule, and routing.

Strategic stormwater management. Simply increasing the pervious pavement and plantings on Forest Avenue may not be enough to effectively manage stormwater run-off. In addition, there could be tradeoffs to aggressive stormwater management approaches, such as the loss of usable sidewalk space. Stormwater management should be addressed strategically at a more regional scale to determine the level of improvement that is ideal for this corridor given the constraints on right of way.

Develop a comprehensive wayfinding strategy. Wayfinding allows people to more effectively use the transportation options available to them. Wayfinding systems can be branded to provide a character to the corridor that contributes to a sense of place. The City of Portland already employs some wayfinding strategies, such as signage for designated bicycle routes. A more comprehensive wayfinding strategy could be employed for multiple modes to improve the ability of people on the corridor to determine direction, distance, and time to arrive at other destinations by walking, cycling, and transit. In addition, as already mentioned in the Land Use and Zoning Concept Plan, wayfinding strategies could be employed to assist with locating parking, particularly if a more centralized or coordinated parking approach is pursued.

4.2.2 Segment A: Deering Oaks Park

In the Transportation and Streetscape Concept Plan, Segment A would have some of the most dramatic improvements for cyclists and pedestrians beyond the general streetscape improvements on the corridor. The goal for this segment would be to create a unique identity as a gateway to the downtown, complete with branded signage and iconic installations when possible. The improvements below are intended to create a progression from a more boulevard-style street near the interchange to a calmer, more pedestrian-scaled street towards downtown. Appendix 5 contains a street section drawing just north of Marginal Way illustrating a possible application of this Concept Plan at one point in the segment. The following improvements are included in this Concept Plan.

Widen and landscape center median. This segment would be developed as a boulevard with beautification and landscaping of the center median from Bedford Street/Baxter Boulevard to Marginal Way. The existing right of way is adequate to allow for some widening of the existing median. Landscaping should include attractive plantings that do not negatively impact line of sight.

Reduce travel lanes between High Street and Park Avenue. The Level of Service analysis suggests that there is excess capacity on Forest Avenue between High Street and Park Avenue/Portland Street. In the Concept Plan, the travel lanes in this part of the segment would be reduced to one in each direction. This improvement would provide space for bicycle facilities and would not impact on-street parking.

Install bulb-outs at Park Avenue/Portland Street. The intersection with Park Avenue/Portland Street would be narrowed using bulb-outs to decrease the turning radii for automobiles, slowing them, and to reduce the crossing distance for pedestrians. This would also eliminate the right turn 'slip lane' onto Park Avenue.

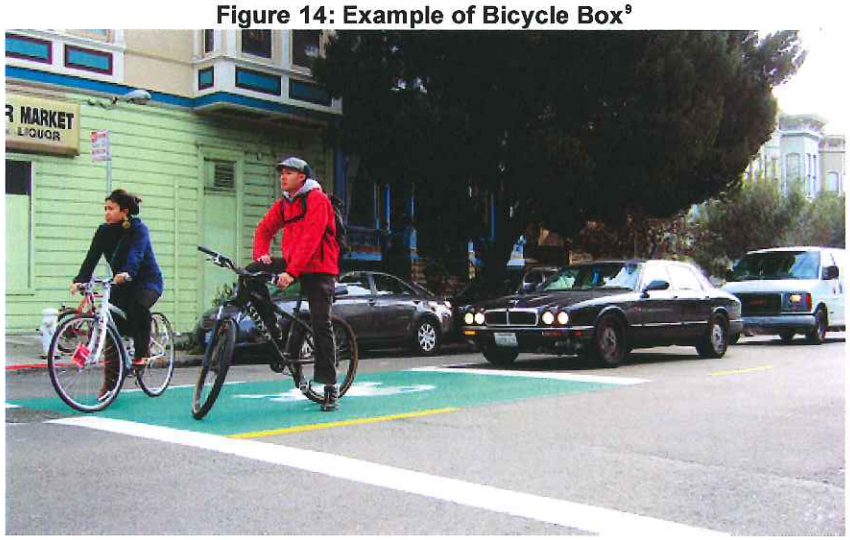
Expand and improve amenities on sidewalks. Sidewalks would be significantly improved and widened, and would have more street furniture and art that is compatible with both the grand institutional structures as well as the lushness of the park. Bus shelters would be installed near USM and the Post Office.

Provide consistent cycle tracks. This is the only segment in the Concept Plan that would have exclusive bicycle facilities. Cycle tracks are bicycle facilities that are distinct from both the roadway and pedestrian facilities. In this case, the distinction would be achieved by a slight grade separation as well as protection, such as bollards, from travel lanes. Care should be taken that bollards are not a hazard for cyclists or motorists, and are used more as delineation rather than preventing access. See Figure 13 for an example in Washington DC. The cycle tracks would continue from Bedford Street/Baxter Boulevard (connecting with the bicycle facilities on those streets), through the interchange, and end at the Park Avenue/Portland Street intersection.

Figure 13: Example of Bollards to Buffer Bicycle Lanes[8]

Provide bicycle boxes where left turns are desirable. Bike boxes are rectangles, painted on the pavement at intersections, which move car traffic back several feet from the crossing and allow space for bicyclists to position themselves visibly in front of waiting traffic (see Figure 14). Bike boxes are intended to reduce bicycle and car collisions, especially those between drivers turning right and bicyclists going straight by providing greater visibility. Bicycle boxes provide the benefit of clearly delineated queuing areas at lights and added space for maneuvering to make a left turn. At the public meetings, there was feedback that bicycle boxes may not be necessary along the entire corridor. Concerns were also raised that they could be confusing to cyclists and drivers who are unfamiliar with their correct use. However, they are typically applied where there are high volumes of vehicles and significant turning movements and may be useful in this small section for less experienced cyclists. Therefore, the cycle tracks should be integrated with bicycle boxes where cyclists would take lefts onto Portland Street, Marginal Way, and Bedford Street.

Figure 14: Example of Bicycle Box[9]



[8] Source: Sebastian, Jim (DDOT). From National Association of City Transportation Officials (NACTO), http://nacto.org/cities-for-cycling/projects/truncated-cycle-track-at-the-intersection-of-o-st-and-15th-st-washington-d-c/, accessed June 30, 2011.

Exit 6 Interchange

The Exit 6 interchange of I-295 is an important and problematic part of this segment that merits being addressed in more detail. MaineDOT has proposed a series of improvements to the existing ramp system in order to reduce rear end vehicle collisions. The proposal did not propose bicycle infrastructure or improvements to existing pedestrian infrastructure, which is limited to pedestrian tip downs at the end of each ramp crossing. MaineDOT has postponed implementation of improvements in order for this study to be completed so as to recommend improvements for pedestrian and bicycle safety at this location. These improvements are the subject of Enhanced Project Scoping (EPS). The improvements could be implemented whether or not the ramps are reconfigured as a result of the MaineDOT study but they are based on the premise that the previous recommended changes to the ramp configuration would be implemented.

Though outside the scope of this study, members of the public have expressed strong interest in the development of a more comprehensive solution at this location; specifically replacement of the existing cloverleaf ramp system with a diamond interchange or other mechanism to slow or stop drivers at ramp terminals. Where entry and exit ramps make a free flowing transition between the highway and secondary road, it can be difficult for pedestrians and bicyclists to cross due to motor vehicle speeds and insufficient breaks in traffic. Merging drivers are focused on observing oncoming motor vehicle traffic, particularly at sharply angled intersections, and therefore are less observant of pedestrian and bicyclists. Diamond interchanges use less space than other types of freeway interchange and do not create interweaving traffic flows, thus reducing potential conflicts between vehicles, bicycles and pedestrians.

The MDOT changes being proposed at this time include tighter turning radii at the off-ramps and building out of delta islands to provide off-ramp traffic with its own merging lane onto Forest Avenue. This study proposes a variety of improvements, listed below, to improve safety for pedestrians and cyclists at this location under the proposed MDOT configuration. The improvements that are implemented should be approved or deemed acceptable by the MaineDOT and the Federal Highway Administration (FHWA).

Improve ramp crossings for cyclists and pedestrians. Rumble strips, zigzag striping (see the example in Virginia shown in Figure 15), signage, warning beacons (see Figure 16 for a pedestrian crossing example), and other warnings would be used to alert drivers on the exit ramps to slow down and yield for both pedestrian and bicycles. Appendix 7 contains a visualization of the bicycle facilities and crossing at an off-ramp ramp on a proposed built-out delta as in the preliminary I-295 plans.

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[9] Source: SFBike. http://www.flickr.com/photos/sfbike/4249106734/in/photostream/. Accessed July 20, 2011.

Figure 15: Example of Zigzag Striping to Alert Motorists to Reduce Speed[10]

Figure 16: Warning Beacon for Pedestrian Crosswalks[11]

Provide colored treatments at possible bicycle/automobile conflict areas. Colored bicycle lane treatments provide warning to both cyclists and motorists when they are approaching an area where cars may wish to cross a bicycle lane. The treatment at ramps for cyclists would look something like Figure 17. Another option within the existing configuration that is not being recommended at this point is installing unprotected bicycle lanes to the left of merge lanes rather than protected cycle tracks at the curb. This alternative would encourage more 'vehicular' cyclist behavior, keeping cyclists with the flow of traffic instead of requiring them to cross at the ramps, almost as pedestrians. In either solution, any conflict areas should be clearly colored and marked, such as the treatment shown in Figure 17.

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[10] Source: LIVINGINLOCO, http://www.livinginloco.com/2010/03/survey-says-zig-zags-on-belmont-ridge/, accessed June 28, 2011
[11] Source: Spot Devices, http://www.spotdevices.com/system-rrfb.html, accessed June 30, 2011.

Figure 17: Example of Colored bicycle lanes and Signage in Conflict Areas[12]

Provide lighting and visual interest under the interchange. The interchange is currently an uninviting place for pedestrians and cyclists to navigate. Improvements such as pedestrian lighting and public art will help improve the aesthetics and perception of safety of this primary City gateway. Any public art would need to be resistant to vandalism. Bollard lighting was also identified during the public process as a good strategy to illuminate the sidewalk while also providing a sense of separation between pedestrians and vehicles. It would need to be sturdy enough to withstand vandalism. Figures 18 and 19 shows examples of artistic lighting and public art installations at underpasses in Chicago and San Antonio.

Figure 18: Examples of Artistic Lighting of Underpasses[13]

[12] Source: National Association of City Transportation Officials (NACTO), http://nacto.org/cities-for-cycling/design-guide/bikeway-signing-marking/colored-bike-lanes/#design, accessed June 28, 2011.
[13] Source: Fitzgibbons, Bill. From San Antonio Current, http://www2.sacurrent.com/printStory.asp?id=69955, accessed June 29, 2011.

Figure 19: Example of Public Art along Underpasses[14]

Items for Further Consideration

The following include additional improvements that could be considered in the Concept Plan after further study, as well as discussions of the relevance of possible long-term realignments of the corridor raised during the Transforming Forest Avenue study.

Complete crosswalks at Marginal Way. An additional pedestrian crosswalk could be introduced at Marginal Way to complete the pedestrian crossings at the intersection. However, the current signal timing would not likely provide a crossing phase long enough to be ideal for typical pedestrian crossing speeds. The signal timing study, which is occurring simultaneously, could correct this problem and provide an adequate pedestrian crossing phase.

Consider implications of relocation of Kennebec Street. There has also been discussion of a possible future reconfiguration of the Marginal Way intersection including the relocation of Kennebec Street to intersect with Forest Avenue at State Street and termination of the Bayside Trail at the Marginal Way intersection in conjunction with the upcoming Somerset Street project. If this reconfiguration were ever to occur, both intersections should include pedestrian crossings at all sides if possible, along with all of the previously discussed pedestrian crossing improvements.

Consider a pedestrian and Cyclist bridge connection to Bayside Trail. A pedestrian and bicycle bridge could be considered over Forest Avenue to create a direct and safe connection between Deering Oaks Park and the future exit of the Bayside Trail. This improvement is not included in the Concept Plan because it would be expensive, may not be desirable compared to improving bicycle and pedestrian facilities at the street level, and would depend on the final configuration of Bayside Trail and the Marginal Way intersection. However, it may prove to be more desirable as these concepts progress.

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[14] Source: Public Art in Chicago Blogspot, Bryn Mawr and Lake Shore Drive Underpass Bricolage. Artists: Tracy Van Duinen and Todd Osborne http://chicago-outdoor-sculptures.blogspot.com/2009/11/living-2007-growing-2008.html. Accessed July 20, 2011.

Consider implications of closure of State Street. There is another major reconfiguration in this segment that has been discussed but its potential impacts are not fully understood. The closure of State Street from Forest Avenue to Park Avenue would provide some benefits in terms of reducing conflicts for pedestrians and cyclists and reconnecting parts of Deering Oaks Park. However, it would also have significant traffic impacts that should be explored in much greater detail.

Coordinate improvements with the final configuration of the I-295 interchange. Determining the configuration of the interchange is not within the scope of this study. The final implementation of improvements to the I-295 interchange area would ideally be coordinated with the final interchange alignment established by the MaineDOT study. All improvements that would affect any of the interchange area under the purview of state and federal authorities should be addressed with those authorities to ensure that they are considered acceptable.

4.2.3 Segment B: Central Forest Avenue

In this Concept Plan, this segment would serve as the heart of commercial, civic, and other activity along the corridor. Access to businesses would be the most important goal, so a priority would be to encourage easy travel between the many destinations in this segment of the corridor by maximizing pedestrian, bicycle, and transit improvements. Improvements to this segment would not involve any major reconfiguration of the roadway, as shown in the street section representing the application of the Concept Plan in this segment (see Appendix 8). The few additional segment specific improvements are listed below.

Complete pedestrian crossing at Preble Street. The pedestrian crossing would be completed at Preble Street to allow pedestrians to cross in all directions.

Traffic calm side streets. The diversion of traffic onto neighborhood roads is an ongoing concern for the study corridor. The existing congestion and low Level of Service already cause diversion, and careful consideration was given to all improvements in this Concept Plan to avoid or reduce the chances of additional diversion. One direct approach to discouraging traffic diversion would be to traffic calm (or slow traffic down on) the more residential side streets. Specifically, this would include the streets between (but not including) Preble Street and Revere Street.

Traffic calming on these streets could be accomplished through a variety of established methods that aim to directly control speeds or create an environment that makes motorists naturally drive slower. For example, a few ways in which speed control can be achieved include speed tables (flat topped speed humps, see Figure 20) and chicaning (forcing repeated back and forth turns in the road often achieved through placement of parking or construction of islands, see Figure 21). There are many more possible approaches. Such interventions can be made attractive through techniques already described like asphalt stamping (as in

Figure 20) and landscaping.

Figure 2019: Speed Table with Stamped Asphalt and Pedestrian Crossing

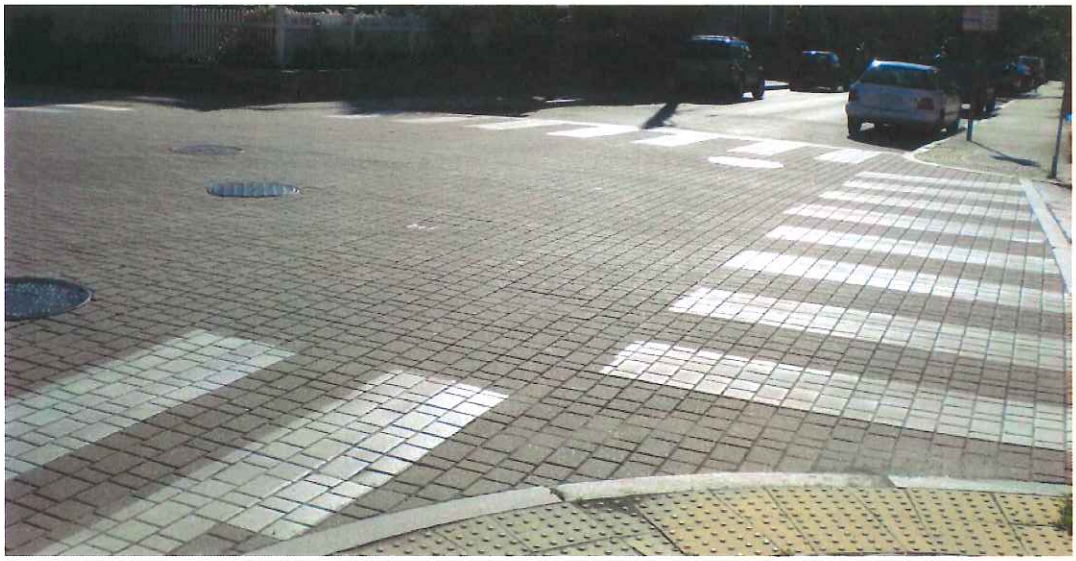


Figure 21: Chicaning Created by Placement of Parking

4.2.4 Segment C: Woodfords Corner

Improvements to Segment C would involve significant changes to the road right of way to address congestion. In addition, significant streetscape improvements would create a more pedestrian friendly environment in Woodfords Corner, which is also a school crossing area. Similar to the I-295 interchange, this segment has been an important focus of the study and an EPS was submitted for this area at the same time as this document. Appendix 9 contains a street section representing this Concept Plan at a point north of Woodfords Corner. Appendix 10 contains a diagram of the more detailed improvements to this area that would be a part of this Concept Plan.

A Synchro traffic analysis was completed for the three northernmost signalized intersections in the corridor for projected year 2035 volumes. The results of the baseline scenario (using the current configuration) indicated that the intersections would be able to accommodate the 2035 demand at a very low Level of Service ('F' at the intersections with Ocean and Woodford Avenues) in the PM peak. A Synchro analysis with the same volumes over the new configuration included in this Concept Plan suggested about a 70 percent reduction in delay from the baseline, resulting in Level of Service 'D' at these intersections. The 2035 Synchro PM peak outputs for both configurations are contained in Appendix 11.

Restrict on-street parking in the PM peak. Public feedback for this area strongly focused on the congestion on Forest Avenue in the northbound direction approaching Woodfords Corner. A variety of approaches were explored to address the congestion throughout Woodfords Corner. Based on the evaluation, the Concept Plan would restrict on-street parking between Woodford Street and Ocean Avenue in the PM peak hours to allow for a second travel lane. Because there is currently no on-street parking directly north of Ocean Avenue, the width is insufficient to accommodate two northbound through lanes. Therefore, if two northbound through lanes would be provided uninterrupted through to the north of the intersection with Ocean Avenue, roadway widening would be necessary. This configuration is included in the EPS.

Prohibit left turns in the PM peak. In addition to the extra travel lane in the PM peak hours, northbound left turns off of Forest Avenue onto Saunders would be prohibited, and the peak hour ban on southbound left turns off of Forest Avenue onto Vannah Avenue would be enforced.

Remove a receiving lane in the southbound direction and add a bulb-out. In the southbound direction, only one lane of traffic is permitted to continue through Woodfords Corner on Forest Avenue. If this rule were enforced, the Level of Service assessment indicated that it would be possible to reduce the receiving lane south of Woodfords corner to one lane for a short distance. This reduction would allow for the installation of a bulb-out to make crossing Woodfords Corner more pedestrian friendly as well as add a plaza area. This concept is visualized in Appendix 12. After 20', the road would expand back to two travel lanes to accommodate the queuing at the signalized intersection with Revere Street, as well as to cause minimal loss of on-street parking. For this improvement to be successful, it will be important to ensure that motorists are in the appropriate southbound lane. If an error is made, motorists still have the option to continue onto Deering Avenue and then access Forest Avenue from Revere Street. The goal, however, would be to minimize these types of diversions onto Deering Avenue. The Public Advisory Committee discussed this recommendation at length. There are ongoing concerns that removal of a receiving lane at this location could increase traffic diversion into residential neighborhoods along Deering Avenue. As an alternative, the PAC recommends that further analysis be conducted to evaluate the possibility and benefits of formalizing two southbound travel lanes at this location. If a single lane is pursued, this improvement should be tested using temporary infrastructure for a period of time before something permanent is installed.

Install Bulb-out on Deering Avenue. Another bulb-out would be installed on Deering Avenue near the existing bus stop by Dunkin' Donuts. Landscaping and other improvements could create another plaza area. This improvement would also create a slower traffic environment for vehicles continuing onto Deering Avenue.

Complete crosswalk at Vannah Avenue. Improved landscaping as well as the bulb-outs would already provide a significant improvement for pedestrians. Another pedestrian improvement would include adding a crosswalk across Forest Avenue at Vannah Avenue to complete crossings at the intersection.

Provide signage to direct motorists to appropriate lanes. Signage would help drivers and cyclists be aware of the changes at different times of day and determine which lanes they should be in. For example, overhead signage for motorists approaching Woodfords Corner in the northbound direction would clearly indicate each lane and whether or not the outside lane is open or being used as parking. There could also be signage in the southbound direction regarding which lane continues onto Forest or Deering Avenues. As already mentioned, signage is already cluttered on Forest Avenue and a consolidation would help achieve clarity of important information.

Use appropriate streetscape improvements. As with the rest of the corridor, streetscape improvements would be made throughout the area. However, planters would be more common that actual planted trees here due to maintenance challenges. Asphalt stamping and branded street furniture in any plaza space created from improvements would be an approach to improve appearance with less plantings.

Items for Further Consideration

Determine appropriate shared lane markings where parking is restricted. The treatment for cyclists north of Woodfords Corner should accommodate the fact that sometimes the right-most lane is a parking lane, and sometimes it is a travel lane. One approach is to simply provide shared lane markings in the outside parking/travel lane that would be covered while cars are

parked. Another is put shared lane markings both to the right and left of the parking/travel lane so that the outside one is visible while cars are parked. However, the parking/travel lane will not be wide enough to allow for safe travel of cyclists when cars are parked (if cars park using 8', only 3' will be left to cyclists, leaving them in the 'dooring zone'). Figure 20 provides an example of this dilemma in Baltimore. Care should be taken to determine a safe design based on the final implementation and striping of the parking/travel lane.

Figure 202: Shared Lane Marking Placement while Off-Peak Parking Allowed[15]

Determine configuration for cyclist-railroad track crossing. Cyclists should be encouraged to cross railroad tracks north of Woodfords Corner at closer to 90 degrees. One way to accomplish this could be to install a brief section of bicycle lane or an angled shared lane marking (see Figure 23) and/or signage that directs cyclists in the safest direction (closer to 90 degrees) across the railroad track within the existing lane. This approach requires a cyclist to take up more of the travel lane to accomplish maneuvers but prevents them from having to leave and then re-enter the travel lane with their back to traffic.

Figure 213: Angled Shared Lane Marking[16]

[15] Source: Elly Blue, Western Bike Works, http://bikeportland.org/2009/01/27/baltimores-bike-improvements-13783, accessed June 29, 2011.
[16] Source: NACTO, http://nacto.org/cities-for-cycling/design-guide/bikeway-signing-marking/shared-lane-marking/#design, accessed June 28, 2011.

5. Further Analysis and Future Studies

Both the Land Use and Zoning Concept Plan and the Transportation and Streetscape Concept Plan contain elements that demand further study to determine feasibility or desirability. These have been discussed throughout the Concept Plans and are summarized in this section as a set of recommended future studies.

Comprehensive Parking Study. A comprehensive parking study should examine parking demand at different times of day and attempt to differentiate between different types of demand. In addition, work should include meeting with stakeholders to discuss needs and explore challenges to coordination. Based on this understanding, a comprehensive parking strategy should be developed. Funding sources should be identified for any key projects identified. The assessment of the existing supply and demand should provide business owners with enough information to begin to consider joint parking lots. Results of the parking study could be combined with further traffic analysis to determine appropriate locations for curb cut consolidation.

Snow Removal Strategy. In its snow removal strategy, the City should aim to achieve better year-round access for pedestrians, transit riders, and cyclists. The current approach to snow removal can leave sidewalks almost impassable in the winter as snow is piled on sidewalks, melts, and refreezes. Access to buses from the curb at bus stops is not maintained. A snow removal strategy should take into account available resources or seek to identify additional resources in order to improve snow removal.

Bus Stop Optimization Study. A bus stop optimization study should aim to minimize overall passenger travel and access times by considering alternative locations for stops along Route 2 in the corridor. Changes might include shifts from one side of an intersection to another to reduce traffic signal or operational delays, or even consolidation of existing stops, reducing the number slightly to improve overall average speed. This analysis should include a detailed assessment of passenger boardings and alightings by stop, and the origins and destinations of these passengers. It should also include an operational simulation that takes both traffic signal operation and actual traffic volumes into account.

Stormwater Management Strategy. The City should consider a more regional stormwater management strategy that takes into account ground water recharge, retention, and drainage. Consideration of drainage strategies would include a hydrology analysis to ascertain where storm water will be emptied and the natural direction of flow. It should also consider filtration mechanism to ensure pollutants are not carried off with stormwater. Within this context, the City could consider stormwater strategies that should be employed on Forest Avenue along with the tradeoff with further development or infill.

Comprehensive Wayfinding Strategy. The City should determine a consistent strategic approach expanding on the wayfinding currently available. The strategy should consider multiple modes, including automobiles (those passing through and those searching for parking), non-motorized transportation, and transit. Currently, there are many signs along Forest Avenue which clutter the streetscape. Simply adding wayfinding signs, therefore, may not necessarily improve navigation along the corridor. This study could include determining how signs can be consolidated.

Continuation of I-295 Interchange Study. It is expected that MaineDOT will complete this study to determine an appropriate alignment for the I-295 interchange. However, the final configuration would ideally consider and incorporate the various pedestrian and bicycle improvements included in this Concept Plan. The PAC proposes further study of alternatives to the bicycle and pedestrian improvements proposed in this concept plan, along with the proposed MDOT ramp alignment to optimize the configuration for the safety and convenience of all user types, including vehicles, bicycles and pedestrians.

Long-term Improvements to I-295 Interchange. The MaineDOT study could consider the narrowing of the roadway through and south of the interchange to allow for better bicycle and pedestrian facilities. MaineDOT could also consider a comprehensive redesign of the interchange, as previously discussed, to incorporate a diamond interchange or other reconfiguration that would reduce conflicts between vehicles, pedestrians and bicycles.

Relocation of State and Kennebec Streets. Relocation or realignment of these streets would require a major traffic study. Any future studies related to these reconfigurations could also include consideration of a pedestrian/bicycle overpass over Forest Avenue to accommodate a Bayside Trail-Deering Oaks connection.

Appendix 1: Transit-Support Development Principles for Transforming Forest Avenue

Transit Supportive Development Principles

Overall Approach: Develop principles for land use characteristics that support current and promote future transit demand. These principles should promote transit use as well as support the pedestrians and cyclists that will be using transit to access the land uses on the corridor, without excluding consideration of current or desired future automobile use.

Principle	Strategy	Description
Land Uses		
Encourage vibrant and diverse uses	Promote a mixture of land uses	Mixed land uses provide more desired destinations in a smaller area and can stimulate activity at various times of day, supporting all-day and nighttime transit service.
	Promote a variety of housing types	Residential development should contain mixed housing types and sizes, such as townhouses and apartments appropriate for singles and families at a variety of price points.
	Provide active streets	Commercial streets should have active streetfronts with a variety of retail, food, office and entertainment opportunities in proximity to the transit stops. Encouraging outdoor seating or other visible activity can further increase the vibrancy of a corridor and the appeal of arriving by transit.
	Provide civic uses and neighborhood amenities	Incorporating civic uses and amenities in development engages the community, provides benefits to residents, and provides additional destinations on the corridor to draw transit riders.
Encourage compact land uses	Promote compact development	Promoting higher density within the land uses on the corridor provides a greater concentration of potential demand for transit.
	Focus the most compact development near transit	Development should be most compact along the corridor closest to transit stops, and gradually less compact away from the corridor.
Placemaking/Built Environment		
Design for architectural quality	Scale buildings to human use	Buildings should be oriented to the street to be pedestrian-friendly, help define the streetscape, and be easily accessible.
	Keep building scales consistent and transition gradually	Avoiding abrupt changes in building scales ensures a reasonable transition to adjacent sites and respects the character of existing neighborhoods.
	Promote public safety and security	Following City of Portland Crime Prevention Through Environmental Design (CPTED) guidelines during development helps to maintain or improve natural surveillance, increasing perception of safety of arriving by transit, foot, or bicycle.
	Promote architectural quality	Employ high quality, durable building materials that are consistent with the overall composition of area.

Principle	Strategy	Description
	Orient buildings to allow easy pedestrian access	Orienting buildings and entrances towards the street and pedestrian walkways decreases the walking distance to transit and provides an environment that is more functional and pleasant.
Provide quality public space	Provide public meeting and gathering spaces	Centrally located or visible parks and plazas provide public meeting places, which can increase vitality on a corridor and support transit demand.
	Provide high quality landscaping	Landscaping and design features such as shade trees, median plantings, appropriate lighting, and street furniture can improve comfort and security for pedestrians, as well as provide an attractive, human-scaled corridor.
Provide high quality parking	Conceal parking areas	Parking areas should be concealed with landscaping or wrapped with development while not creating barriers for pedestrian or bicycle access to land uses. Options for more pedestrian-friendly parking lot design include placing parking in the rear or side of the property rather than in the front, using pedestrian pathways, and clearly marked pedestrian crossings.
	Prioritize on-street over other forms of parking	On-street parking provides convenient short-term parking, reducing area needed for parking lots and allowing other more compact development.

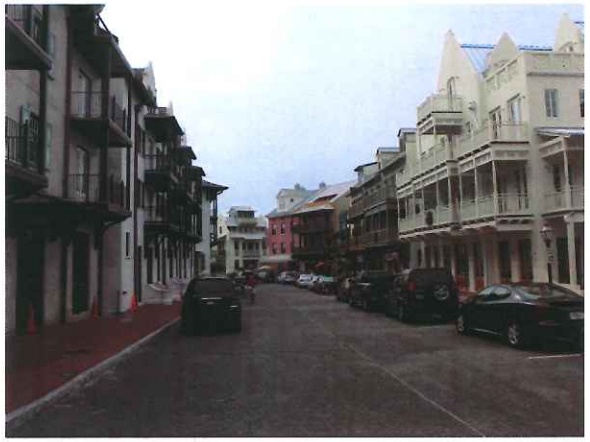
Appendix 2: Examples of Applications of Form-Based Code and Design Guidelines

Design Guidelines Regulated Building Form
Contributing to Street Vitality in Vancouver, BC.

Photo: Steve Ruark for The New York Times
Mixed-Use Development at
Market Commons, a Retail and Entertainment Hub in
Clarendon, VA

Photo: Google Street View
Aesthetically Designed Mixed-Use Parking Structure outside the
University of Pennsylvania Campus, Philadelphia, PA

Residential Development of Uniform Character Enhancing Edge
Conditions at Stapleton, Denver, CO



Form-Based Code Application at Rosemary Beach, FL

Form-Based Code Application at Kentlands, MD

Form-Based Code Application at Kentlands, MD

Appendix 3: Complete Streets Principles for Transforming Forest Avenue

Complete Streets Principles

Overall Approach: "Complete Streets" are designed, operated and maintained to enable safe access for all users. Pedestrians, cyclists, transit riders and motorists of all ages and abilities must be able to safely move along and across a complete street.

These Complete Streets principles are intended to be applied using a Context Sensitive Solutions approach; the design of a complete street and the level of accommodation of each mode varies depending on the context and needs of a community. Forest Avenue is an arterial (which would have some focus on providing longer through travel between major trip generators) but has also been targeted for better serving transit, bicyclists and pedestrians. These principles acknowledge the importance of transit, commercial, and automobile traffic on this corridor while retaining a focus on better serving pedestrians and cyclists.

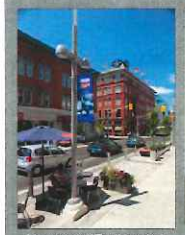
Principle	Strategy	Description
Health and Safety		
Promote physical activity	Promote active forms of transportation as well as other physical activities	The health benefits of active transportation have been widely acknowledged. Designing streets to promote physical activity helps to connect to a wider network of amenities to keep residents fit.
	Design streets to acknowledge their role as public spaces that define a vibrant community	Streets include not just lanes for traffic, but the entire right of way, which can include bicycle lanes, parking, plantings, and sidewalks. Designs should account for streets' potential as public spaces.
Enhance safety of vulnerable users	Manage conflicts and increase safety of vulnerable users	Intersections are important focal areas for safety for all users. Attention should be paid to these potential conflict areas to accommodate the most vulnerable users. This includes the physical design of the intersection as well as signals.
	Promote safe walking and cycling for children	Follow street design principles and promote activities and policies that make streets safer for children. Link to Safe Routes to Schools efforts.
	Ensure access for persons with disabilities	Ensure that all streets are accessible to persons with disabilities so that they can move along and across those streets
Manage vehicle speeds	Implement traffic calming measures when appropriate to make streets safer for all users	Lowering speeds reduces fatalities associated with accidents and makes a street more comfortable for all users.
Accommodate all Modes		
Encourage multi-modality	Design streets to accommodate all modes to the degree feasible given desired functionality	Streets should accommodate all modes, ensuring that no mode is disproportionately disadvantaged by improvements for another mode. The level and type of accommodations varies by context and desired functionality.
	Design streets to be an appropriate size	Road diets, reducing the width or number of travel lanes, can improve conditions for all users. Careful considerations should be made for accommodating larger vehicles (such as buses) and bicycle lanes, however, studies have shown that design standards are often wider than necessary.

Improve transit operations, facilities, and access	Increase transit flow in roadway	Special infrastructure or technology for transit, such as queue jumping lanes or transit signal priority, as well as enforcing policies such as bus right-of-way at pull-outs, can decrease travel times by transit.
	Design streets to allow for efficient transit operations without negatively impacting pedestrians and cyclists	Increased operational efficiency makes transit more desirable. Traditional improvements for transit operational efficiency, such as wider lanes or larger turning radii, may not be ideal for pedestrians and cyclists. Such approaches should be avoided or mitigated as feasible given a street's desired functionality.
	Improve bus stop amenities, including shelters and benches	Improving amenities for waiting passengers makes transit more attractive. Shelters and other amenities can be designed to brand transit service.
	Provide high quality sidewalks around bus shelters	Improving sidewalk quality around and near bus stops improves pedestrian accessibility.
	Improve pedestrian crossings near bus stops	When possible and without disproportionally negatively impacting bus operations, locating stops near crossings or providing mid-block crossings can provide pedestrians with safe and easy access to transit.
	Locate bus stops conveniently relative to desired destinations	Locating bus stops near desirable locations decreases walking times and increases attractiveness of transit.
Mitigate traffic diversion	Design arterial and residential streets to reduce the effects of diversion of arterial traffic into neighborhoods	Arterial traffic can bring with it congestion, noise, pollution, and other qualities that would be undesirable to divert to neighborhood streets. Well designed streets that incorporate pedestrians, cyclists, and transit users should not cause significant amounts of arterial through traffic to seek alternative routes onto residential streets that are not designed for that purpose.
Manage parking	Manage parking demand	Appropriately pricing parking can help manage demand and space required to accommodate automobiles as well as incentivize other modes of transportation.
	Design parking to mitigate potential conflict	On-street parking buffers pedestrians from traffic, but care should be taken to address or mitigate potential conflict with bicycle facilities. Entrances to parking lots can also be sources of conflict with other users.
	Provide bicycle parking	Increasing bicycle access to the corridor includes providing parking at or near transit stops and destinations.
Increase comfort	Design streets to include characteristics that increase comfort for pedestrians and cyclists	Utilize design features such as building and landscaping enclosures, street furniture, buffers between pedestrians/cyclists and traffic to increase pedestrian and cyclist comfort.

Connectivity/Accessibility		
Connect the street network	Enhance interconnectivity of street network	Interconnected streets patterns, such as a grid network that avoids dead ends and cul-de-sacs, improve mobility of pedestrians and cyclists, assists in efficient transit routing, and helps to distribute traffic among streets. Street redesign should retain or enhance existing connectivity. In an established street pattern, additional connections for pedestrians and cyclists may be created on existing blocks.
Provide wayfinding	Provide legible signage and landmarks	Highly visible and legible signage and clear landmarks ensure that all travelers can easily find destinations.
	Provide signs to direct towards major destinations	Additional wayfinding, such as signage indicating direction and distance to other desirable destinations, can improve wayfinding as well perceptions of pedestrian, cycling, and transit accessibility.
Environment		
Increase permeability	Limit impervious footprint of streets	Limiting street footprints includes reducing width and using pervious paving where possible.
	Limit the concentration of water	Using pervious materials and infiltration basins help limit pressure on potable groundwater supplies.
	Capture stormwater	Consider stormwater curb extensions, street planters, and rain gardens to capture and filter stormwater runoff and allow it to infiltrate into the ground.
Reduce greenhouse gas (GHG) emissions	Reduce congestion	Employ strategies that decrease congestion, thereby decreasing GHG emissions. Strategies can both focus on reducing the stop-and-go emissions in congested conditions and reducing SOV travel.
	Increase attractiveness of non-motorized and transit modes	When possible, prioritize transit and active transportation over SOV travel to encourage a mode shift to less polluting per capita forms of transportation.

Appendix 4: Maps of Transportation and Streetscape Concept Plan Improvements

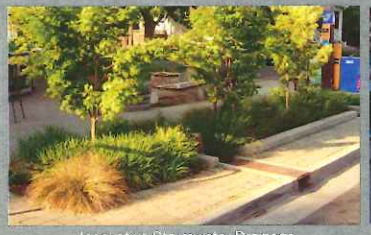
Transforming Forest Avenue
June 30, 2011

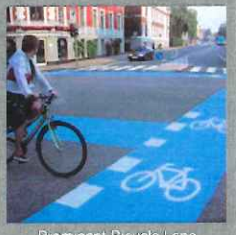

Improved Pedestrian Lighting


Textured Ramps for Improved Accessibility


Bus Shelters with all Amenities


Pervious Paving


Innovative Stormwater Drainage solutions


Prominent Bicycle Lane Markings

CORRIDOR WIDE IMPROVEMENTS

Improved access for people with disabilities	Improved treatment (e.g. asphalt stamping) of pedestrian and cyclist crossings	Improved paving treatment and pedestrian lighting	Distinctly visible shared lane markings for cyclists	Additional bicycle parking	Narrow travel lanes	Route '2S' shuttle service	Improved amenities at bus stops	Consistent landscaping	Branded and consistent street furniture	Use of recycled materials	Use of pervious materials and surfaces

BAXTER BOULEVARD INTERSECTION

'University of Southern Maine' branding

Bus shelters with all amenities

Bicycle boxes on NB Forest Ave and side streets

BAXTER BOULEVARD - I-295

Landscaped medians

Expanded sidewalks

Cycle tracks

Conflict area markings

Rumble strips/zigzag striping on interstate exits

I-295 UNDERPASS

Landscaped medians

Expanded sidewalks with improved paving treatment and pedestrian lighting for pedestrian safety

Cycle tracks

I-295 - MARGINAL WAY

Landscaped medians

Expanded sidewalks

Cycle tracks

Conflict area markings

Rumble strips/zigzag striping on interstate exits

MARGINAL WAY INTERSECTION

Additional pedestrian crossing

Bicycle boxes

HIGH STREET INTERSECTION

Improved ped crossing configuration

Pedestrian bulb-outs

'Gateway to Portland' branding placed past Marginal Way Intersection

HIGH STREET - PARK AVENUE

Removal of one travel lane in each direction

Expanded sidewalks

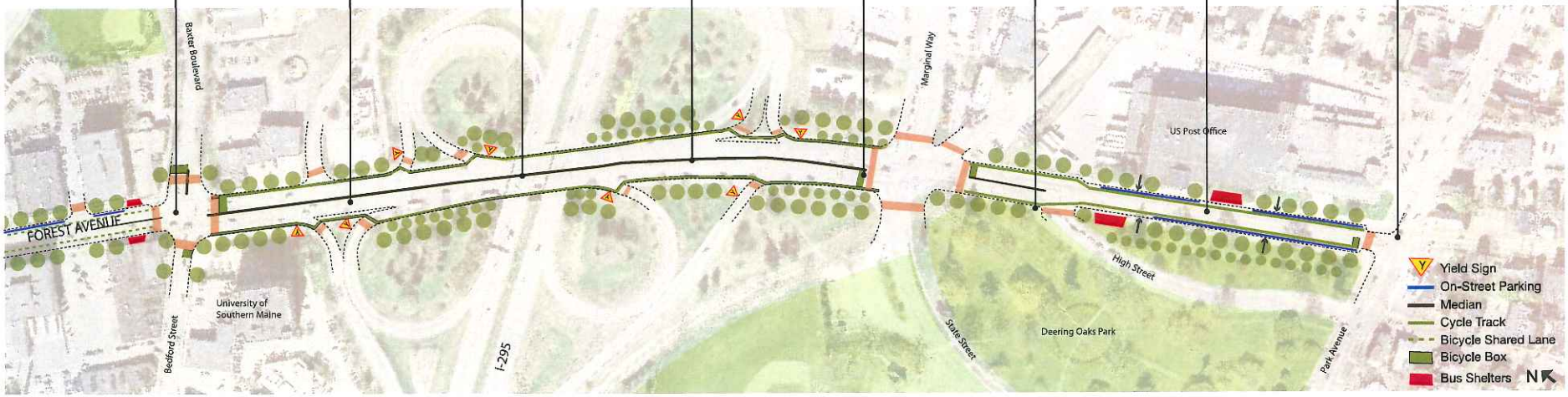
Cycle tracks

Bus shelter with all amenities

PARK AVENUE INTERSECTION

Pedestrian bulb-outs

Bicycle boxes



Transportation and Streetscape Concept Plan

Corridor Segment A - Deering Oaks Park

PACTS

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CORRIDOR WIDE IMPROVEMENTS

Improved access for people with disabilities	Improved treatment (e.g. asphalt stamping) of pedestrian and cyclist crossings	Improved paving treatment and pedestrian lighting	Distinctly visible shared lane markings for cyclists	Additional bicycle parking	Narrow travel lanes	Route '2S' shuttle service	Improved amenities at bus stops	Consistent landscaping	Branded and consistent street furniture	Use of recycled materials	Use of pervious materials and surfaces

COYLE ST INTERSECTION
- Traffic calm side streets

ASHMONT STREET INTERSECTION
- Pedestrian bulb-outs
- Traffic calm side streets

NOYES STREET INTERSECTION
- Traffic calm side streets
- Add crosswalks to northerly and southerly side of intersection and install flashing pedestrian signage

DARTMOUTH ST INTERSECTION
- Pedestrian bulb-outs
- Bus shelter (NB direction) with all amenities
- Traffic calm side streets

WILLIAM STREET INTERSECTION
- Traffic calm side streets
- Bus shelter (SB direction) with all amenities
- Increased use of pervious paving for parking lots
- Remove southerly unsignalized crosswalk and install flashing pedestrian signage

PITT STREET INTERSECTION
- Traffic calm side streets

COYLE STREET - BEDFORD STREET
- Improved amenities at bus stops

PREBLE STREET INTERSECTION
- 4-way pedestrian crossings
- Pedestrian bulb-outs

Transportation and Streetscape Concept Plan

Corridor Segment B - Central Forest Avenue

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Transforming Forest Avenue
June 30, 2011


Improved Paving with Street Furniture and Bicycle Parking


Improved Street Planting and Stormwater Drainage

Landmark/ Directional Signs for Pedestrians


Place Branding


Bicycle Box


Improved Sidewalk Paving and Street Furniture

CORRIDOR WIDE IMPROVEMENTS

Improved access for people with disabilities	Improved treatment (e.g. asphalt stamping) of pedestrian and cyclist crossings	Improved paving treatment and pedestrian lighting	Distinctly visible shared lane markings for cyclists	Additional bicycle parking	Narrow travel lanes	Route '2S' shuttle service	Improved amenities at bus stops	Consistent landscaping	Branded and consistent street furniture	Use of recycled materials	Use of pervious materials and surfaces

OCEAN AVE - PLEASANT AVE

Expand ROW to 2 continuous NB lanes north of Ocean Ave intersection

Signage or lane marking instructing cyclists to cross tracks at 90 degrees

OCEAN AVE/VANNAH AVE INTERSECTION

Complete pedestrian crossings

Prohibit and enforce PM peak left turns onto Saunders & Vannah Ave

REVERE ST INTERSECTION

Pedestrian bulb-outs

WOODFORD STREET - OCEAN AVE

Prohibition of peak hour parking in NB direction to accomodate additional NB travel lane

Add crosswalks on side streets along Ocean Ave at Hersey and Codman Streets

WOODFORDS CORNER

'Woodfords Corner' placemaking and branding

Pedestrian bulb-outs on Deering Ave

Bus shelter on Deering Ave

Redesigned pedestrian friendly traffic island

WOODFORD - REVERE STREETS

One SB travel lane up to 20' south from Woodfords Corner

Prohibition of peak hour parking in NB direction to accomodate additional NB approach lane

Expanded sidewalks

Bus shelter

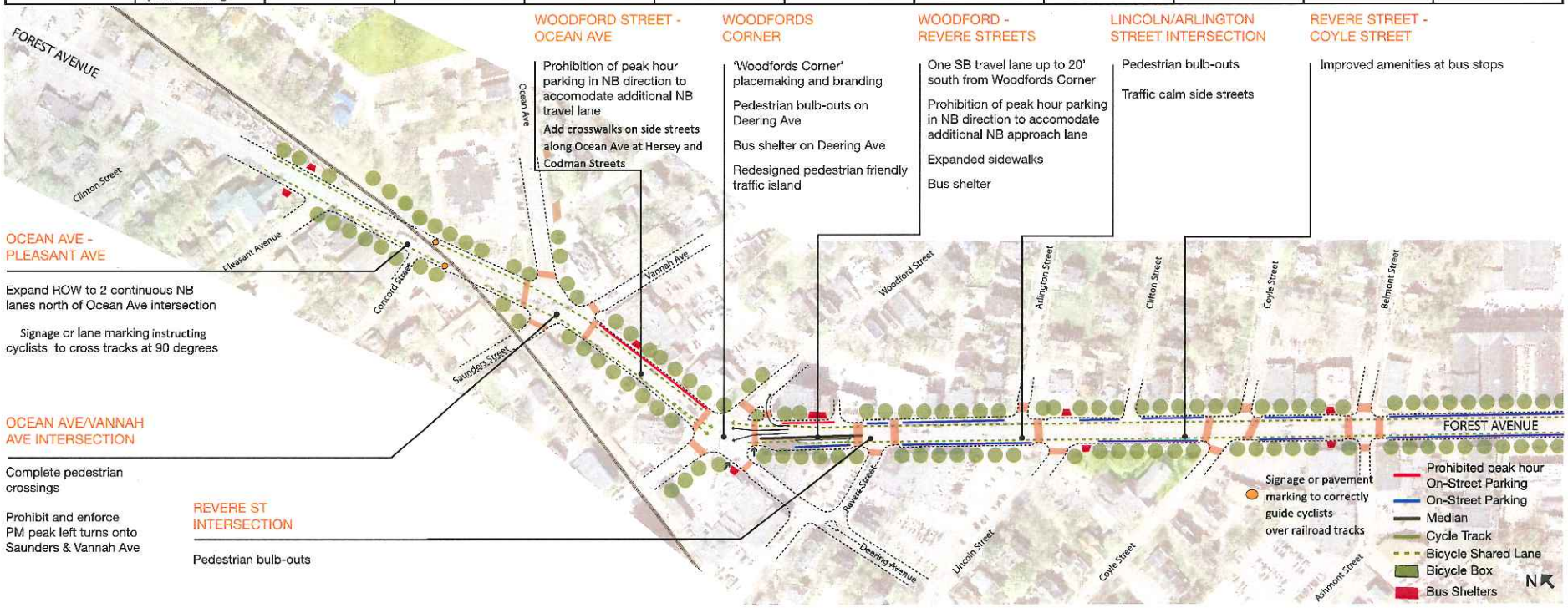
LINCOLN/ARLINGTON STREET INTERSECTION

Pedestrian bulb-outs

Traffic calm side streets

REVERE STREET - COYLE STREET

Improved amenities at bus stops



Transportation and Streetscape Concept Plan

Corridor Segment C - Woodfords Corner

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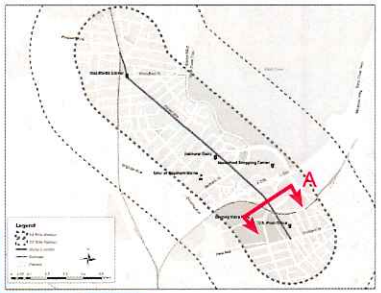
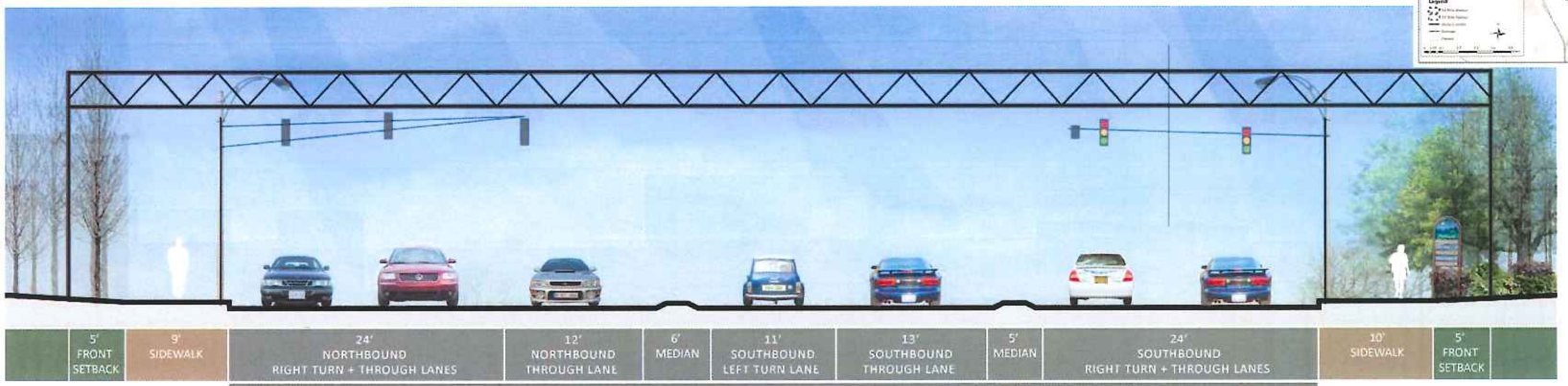
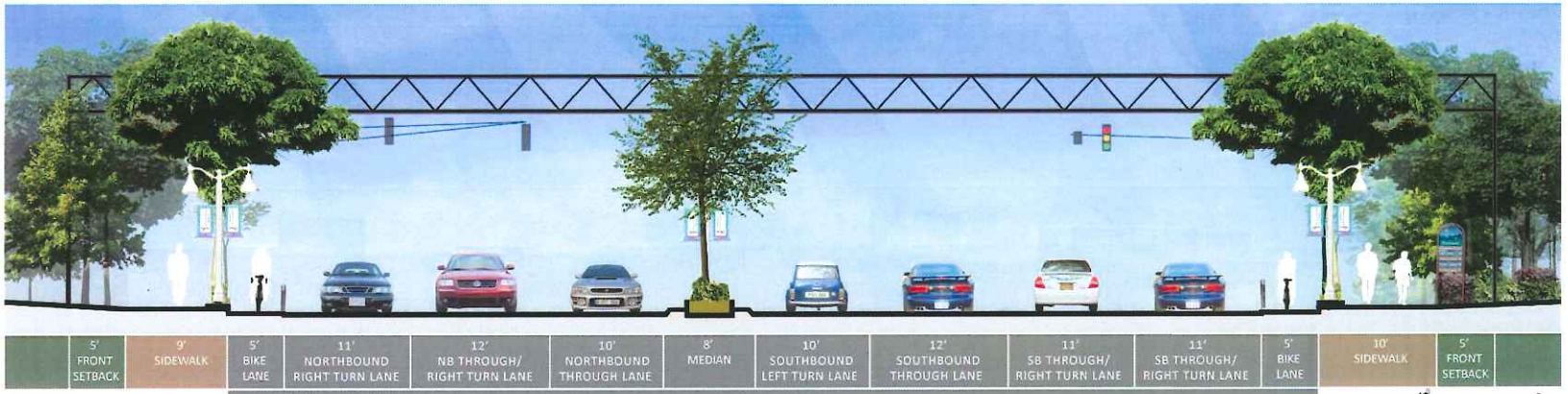
Appendix 5: Street Section of Concept Plan at Segment A



Key Map



Existing Street Section A



Proposed Street Section A

10 0 5 10 20

1 inch = 10 feet

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Transportation and Streetscape Concept Plan

Street Section for Segment A - Deering Oaks Park

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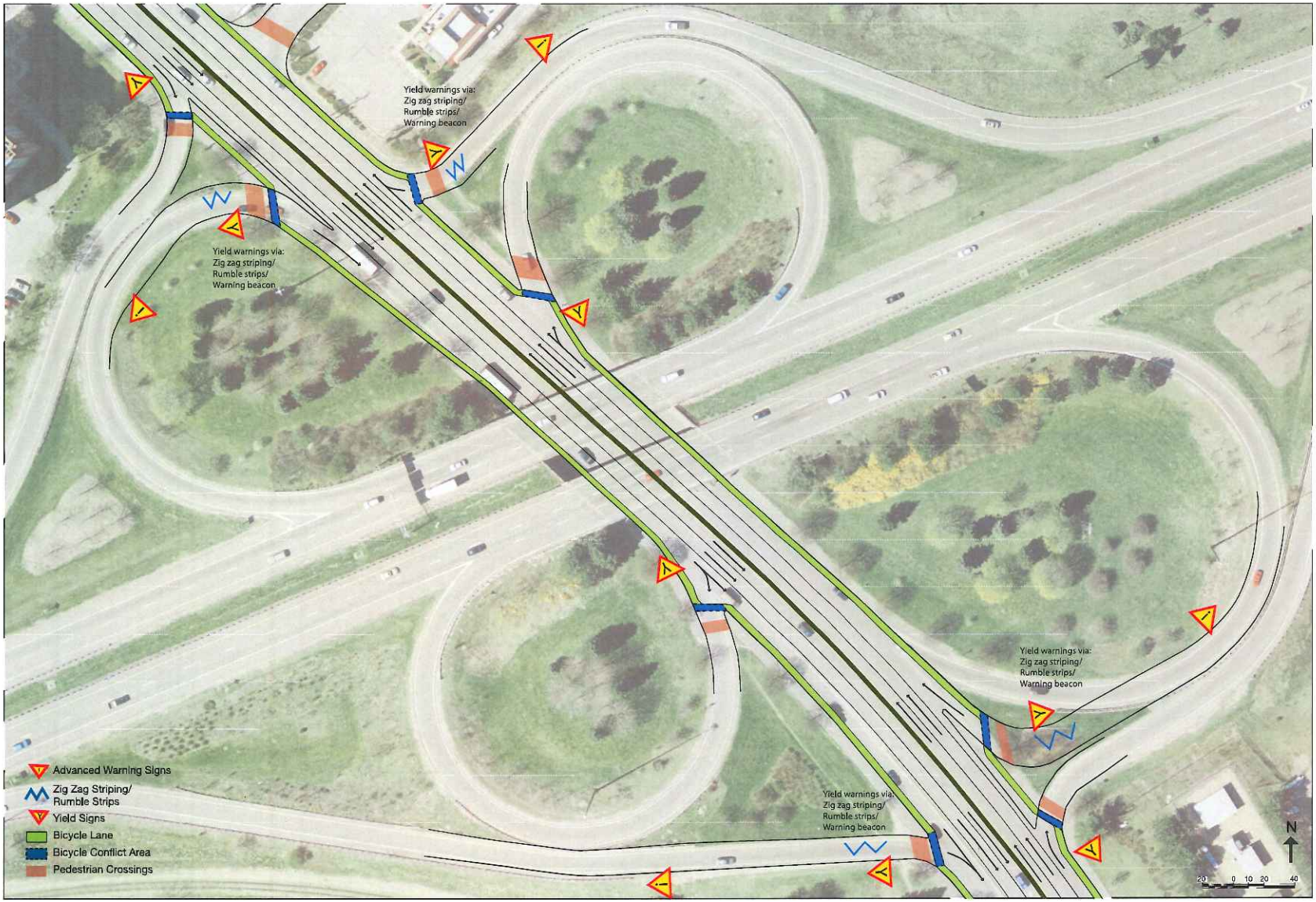
Appendix 6: Diagram of Improvements to Exit 6 of I-295



Lane Configuration Concept

I-295

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Appendix 7: Visualization of Pedestrian and Bicycle Improvements at an I-295 Exit Ramp

Existing View from North of I-295 Intersection facing South

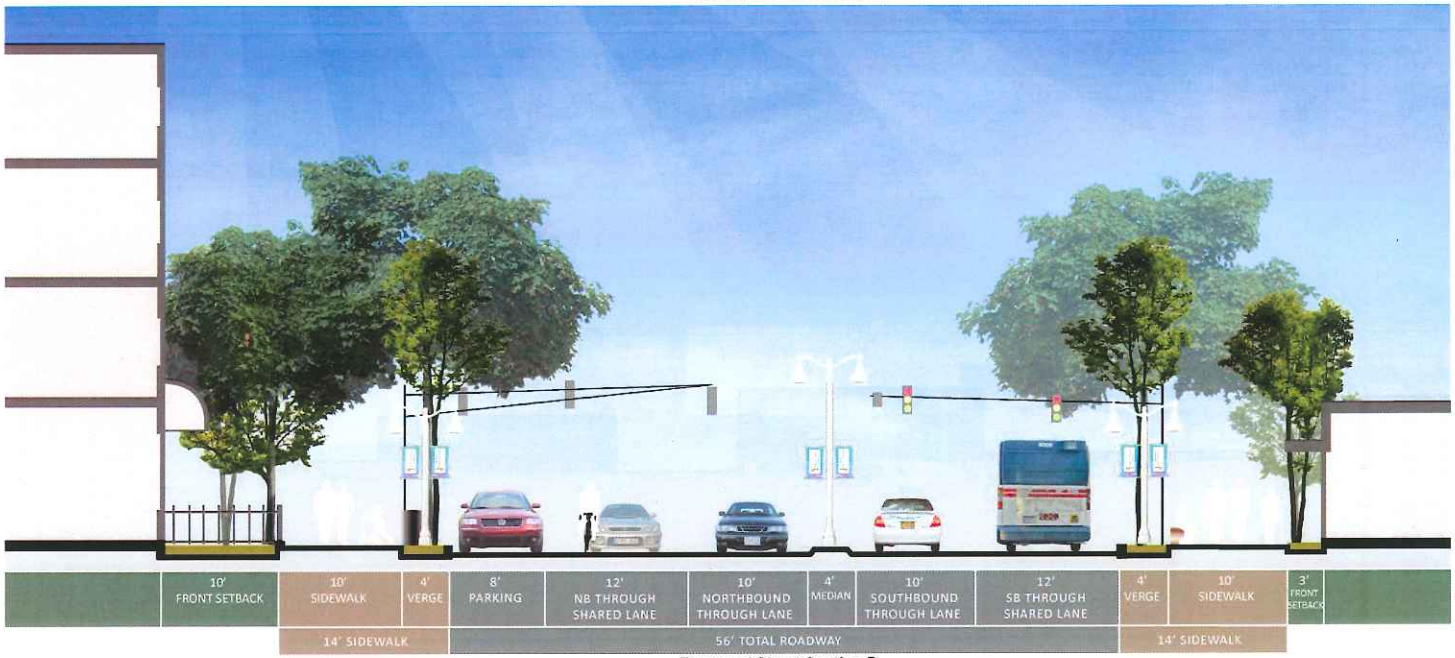
View of I-295 Intersection facing South with Proposed Improvements

Visualization of Improvements at I-295

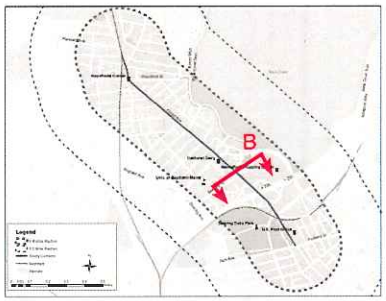
Appendix 8: Street Section of Concept Plan at Segment B

Transforming Forest Avenue
June 30, 2011

Existing Street Section B



Proposed Street Section B



Key Map

10 0 5 10 20

1 inch = 10 feet

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Transportation and Streetscape Concept Plan

Street Section for Segment B - Central Forest Avenue

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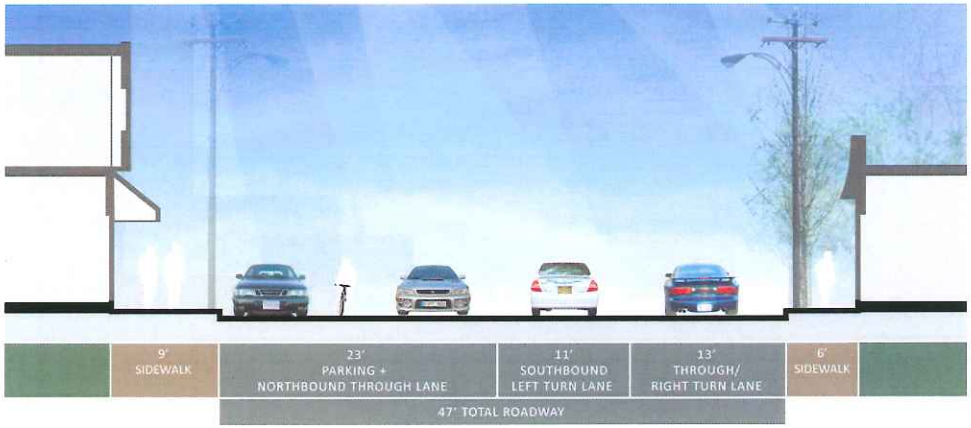
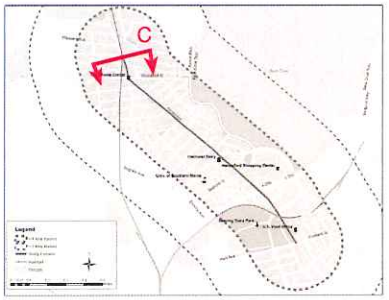
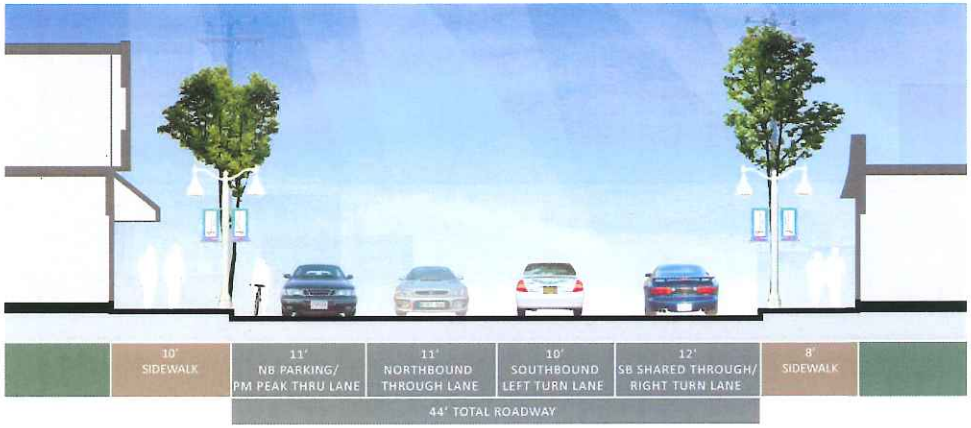
Appendix 9: Street Section of Concept Plan at Segment C



Existing Street Section C



Key Map



Proposed Street Section C

Transportation and Streetscape Concept Plan

Street Section for Segment C - Woodfords Corner

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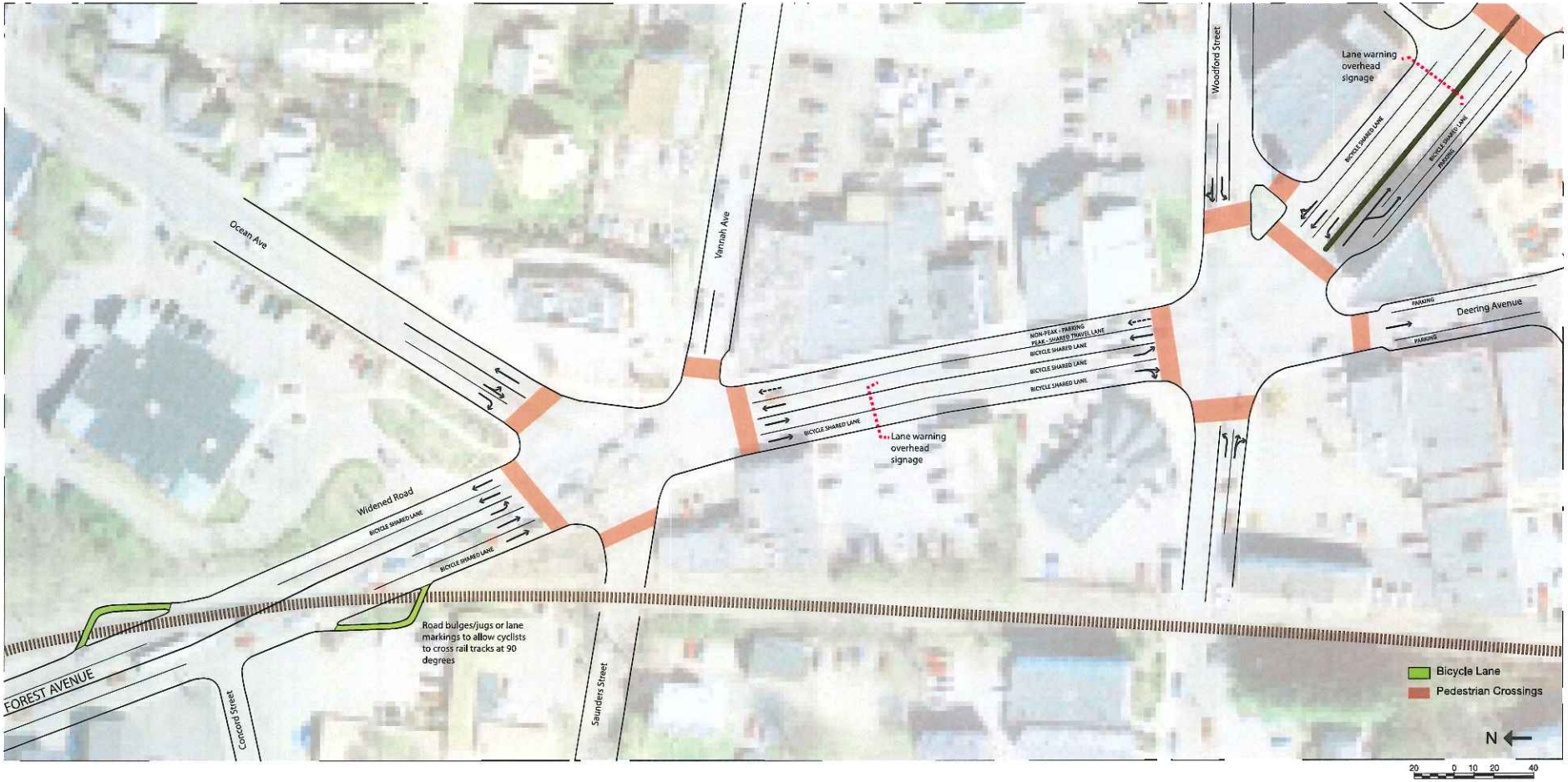
Appendix 10: Diagram of Improvements to Woodfords Corner



PACTS

Lane Configuration Concept

Woodfords Corner

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Appendix 12: Visualization of Improvements at Woodfords Corner

Existing View from North of Woodfords Corner facing South

View of Woodfords Corner facing South with Proposed Improvements

Visualization of Improvements at Woodfords Corner

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IBI GROUP

GP Gorrell-Palmer Consulting Engineers, Inc.

BARTON & GINGOLD

ATT. C

Order 185-10/11
Passed as Amended on 4/4/11 8-0 (Anton absent)

NICHOLAS M. MAVODONES (MAYOR)
KEVIN J. DONOGHUE (1)
DAVID A. MARSHALL (2)
EDWARD J. SUSLOVIC (3)
CHERYL A. LEEMAN (4)

CITY OF PORTLAND
IN THE CITY COUNCIL

JOHN R. COYNE (5)
JOHN M. ANTON (A/L)
DORY RICHARDS WAXMAN (A/L)
JILL C. DUSON (A/L)

ORDER ESTABLISHING THE PUBLIC ADVISORY COMMITTEE FOR TRANSFORMING FOREST AVENUE

ORDERED, that the Public Advisory Committee for a planning study entitled Transforming Forest Avenue is hereby established to participate in the comprehensive study and development of integrated transportation and land use plans and alternatives for the Forest Avenue corridor between Park Street and Woodfords Corner; and

BE IT FURTHER ORDERED, that the issues for consideration by the Public Advisory Committee shall be focused by the work products of the City's consultant team which will result in the following: a roadway plan that incorporates the principles of Transit Supportive Development and Complete Streets; a corridor Land Use and Zoning Assessment; an Existing Transportation and Roadway Characterization Assessment; a Draft Concept Plan; and an Enhanced Project Scoping Memo; and

BE IT FURTHER ORDERED, that the Public Advisory Committee shall review documents provided by the City and consultant study team in advance of each of the Public Advisory Committee meetings and shall provide input to the project team; and

BE IT FURTHER ORDERED, that the following positions on the Public Advisory Committee are hereby created and the indicated individuals appointed to those positions:

- Bill Hall, Planning Board (Co-Chair)
- Lee Lowry, Planning Board (Co-Chair)
- John Bennett, Oakhurst Dairy
- Bob Caswell, University of Southern Maine
- Stuart Collins, Forest Avenue Shopping Plaza
- John Colton, Hershey Avenue
- Keith Cunningham, Codman Street
- Sarah Cushman, Safe Routes to School Program
- Martha Elkus, Big Sky Bread Company
- David Evans, The Great Lost Bear
- Peter Eyerman, District 4 Appointee
- Frank Gallagher, Ashmont Street
- Hallie Gilman, District 2 Appointee
- Alan Kuniholm, PDT Architects
- Alex Landry, Bayside Neighborhood Organization
- David Libby, Town and Country Credit Union
- Naomi Mermin, Deering Center Neighborhood Association
- Pat Muzzy, Woodford-Oakdale Neighborhood Association
- Tom Ridge, METRO
- Drew Sigfridseon, CB Richard Ellis
- John Spritz, Back Cove Neighborhood Association
- John Sundling, Bicycle and Pedestrian Advisory Committee Representative
- Will Watman, District 1 Appointee
- TBD, District 5 Appointee
- Bill Welch, District 3 Appointee