PVTA service on Main Street in downtown Springfield, Massachusetts

Main Street Bus Stops and Parking Study

Downtown Springfield, Massachusetts

February 6, 2009

Prepared under the direction of the Pioneer Valley Metropolitan Planning Organization for the Pioneer Valley Transit Authority by the Pioneer Valley Planning Commission

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TABLE OF CONTENTS

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Executive Summary

The purposes of this study are to assess the effectiveness of the current locations of Pioneer Valley Transit Authority (PVTA) bus stops on Main Street in downtown Springfield between Lyman and Union Streets; evaluate the impact that parking patterns may have on traffic congestion; and offer recommendations to improve the transit service to downtown businesses, workers and residents.

PVTA directed the Pioneer Valley Planning Commission (PVPC) to perform this study in response to concerns expressed in October 2008 by officials of the Greater Springfield Chamber of Commerce and City of Springfield that: 1) PVTA customers appear to be waiting for buses in front of Main Street businesses and obstructing building entrances, and 2) PVTA buses are slowing down vehicular traffic on Main Street. PVTA also agreed to address the issue of relocating bus stops from Main Street to East Columbus Avenue and other streets as part of the effort to address these concerns.

Study findings are summarized below.

Bus Stop Locations

This study found that twice as many passengers use the bus stops between Bridge and State Streets than use the stops in the two other sections (Hampden to Worthington Streets, and Bliss to Union Streets) of the study area. This area also has the longest gaps between bus stops—ranging from 265 to almost 400 yards—even though industry standards recommend that stops be located every 100-200 yards for optimum service in a central business district. The result is an imbalance between bus rider demand and the bus stops to serve that demand.

PVTA customers were observed in general to be distinct from other pedestrians on Main Street. The majority of people congregating near building entrances did not arrive or depart by bus. Instead, bus passengers tended to wait near posted stops (or in shelters, where available). Bus riders were observed seeking shelter under awnings and in doorways during inclement weather.

An evaluation of bus operations identified several opportunities to optimize bus stop locations and better balance rider demand with stop locations:

- Relocate the Fort Street southbound stop to 1550 Main Street (former Federal Building) with a new shelter.
- Eliminate the Taylor Street northbound stop.
- Relocate the 1350 Main Street southbound stop to Court Square and refurbish the existing shelter.
- Relocate the Falcons Way northbound stop to 1277 Main Street (MassMutual Center) with a new shelter that is aesthetically complementary to the location.

These improvements could be accomplished at little cost, as there would actually be a net reduction of one stop (from 12 to 11), with expected gains in operational efficiency to improve traffic flow. New and refurbished shelters would encourage passengers to congregate at bus stops, rather than in doorways or under the awnings, especially during inclement weather.

Notably, PVTA has already reduced by approximately half the number of buses traveling on Main Street south of Harrison Avenue/Boland Way by permanently adopting the alternate routes away from State Street followed by several PVTA lines during the construction of the MassMutual Center. PVTA acknowledges that regular cleaning and maintenance of all downtown shelters is essential and is committed to improving the appearance of these shelters.

Parking

This study found that a lack of parking enforcement on Main Street is creating conditions that contribute to traffic congestion. At least 78% of cars parked in legal spaces on Main Street were observed violating posted time restrictions. This greatly increases the utilization rate of legal spaces, which in turn leads to more illegal parking—much of it in bus stops. In fact, an average of 8 cars per hour were observed blocking bus stops between Union and Lyman Streets. This means that on average, every bus traveling on Main Street in either direction encounters at least one blocked bus stop. Observers noted that the bus stops at 1350 Main Street and Falcon's Way were constantly blocked by illegally parked cars.

Blocked bus stops are forcing buses to discharge and pick up passengers in the middle of Main Street, which delays all traffic. In-street boarding also puts the safety of passengers at risk, especially disabled people, who take the bus more often than the general population. This study recommends the following measures to resolve the parking problems that appear to be causing blocked bus stops:

- Increase turnover at legal parking spaces by creating more 15-minute and/or better time limiting of parking spaces.
- Increase parking enforcement along Main Street.
- Install pavement markings and improved signage to clearly mark bus stop pull-in areas.

Relocation of Main Street Bus Stops

- Main Street is the most pedestrian-friendly of the north-south arteries in downtown and therefore the most well-suited to transit service.
- More than 75% of downtown bus riders surveyed oppose relocating Main Street bus stops to other streets.
- It would cost at least $279,000 more per year to operate current PVTA bus routes using alternate streets, an increase that would be assessed to the City of Springfield on the basis of additional miles traveled (79,000 miles per year), consistent with the funding formula for regional transit administration financing.
- Relocation of bus service to East Columbus Avenue would involve significant new capital costs to design and construct ADA-compliant pedestrian amenities, such as sidewalks, crosswalks and building entrances, as well as roadway reconfigurations for bus stops.
- Relocation of bus routes to other streets would require approximately 5,000 additional bus operating hours annually, resulting in increased air pollution emissions of volatile organic compounds (VOCs), nitrogen oxide (NOx), and carbon monoxide (CO).
- Relocating bus stops would disproportionately diminish access to downtown destinations for transit riders, who would be forced to walk further to reach Main and Dwight Streets, where the majority of employment and commercial buildings are located. A large

percentage of transit users are low-income and/or minority residents; therefore, any reduction in transit access could jeopardize PVTA compliance with federal Title VI civil rights requirements for transit funds, as well as state and federal environmental justice standards. Public hearings would be required prior to such a change in service.

The downtown Main Street corridor remains the transit spine of Springfield's urban core. This study offers findings and recommendations to further improve the functionality and efficiency of this vital transportation service.

Next Steps

A draft version of this report was presented to representatives of the Greater Springfield Chamber of Commerce, Springfield Business Improvement District, Springfield Parking Authority and Springfield Mayor Office on December 22, 2008. At follow-up meetings with these organizations on January 9 and January 21, 2009, representatives of these organizations stated support for the bus stop relocation recommendations and advised PVTA that property owners at the proposed locations also supported the recommendations.

At the January 21 meeting, the Springfield Parking Authority announced several new initiatives, including the installation of parking meters on Main Street, to effectively address many of the parking concerns and recommendations in this report.

The Springfield Parking Authority and PVTA are now cooperating to obtain the approval of the Springfield Traffic Commission and Springfield City Council to implement the bus stop recommendations. PVTA will present plans for the bus stop relocation recommendations at the April 6, 2009 meeting of the Traffic Commission, and City Council approval will be sought shortly thereafter. It is anticipated that work to locate the stops can begin in May 2009.

Further, PVTA will conduct public outreach to raise awareness of the new $100 fine for parking in bus stops that was enacted by the legislature earlier this year. Also, PVTA has committed to a cleaning and maintenance program for all the new and existing bus stops and shelter structures in downtown.

I. Study Purpose and Area

The purposes of this study are to assess the effectiveness of the current locations of Pioneer Valley Transit Authority (PVTA) bus stops in downtown Springfield on Main Street between Lyman and Union Streets; evaluate the impact that current parking patterns may have on traffic congestion; and offer recommendations to improve transit service to downtown businesses, workers and residents.

PVTA directed the Pioneer Valley Planning Commission (PVPC) to conduct this study in response to concerns expressed in October 2008 by representatives of the Greater Springfield Chamber of Commerce and City of Springfield that: 1) PVTA customers appear to be waiting for buses in front of Main Street businesses and blocking building entrances, and 2) PVTA buses are slowing down vehicular traffic on Main Street. PVTA agreed to address the issue of relocating bus stops from Main Street to East Columbus Avenue and other streets as part of the effort to address these concerns.

The study area is the Main Street corridor in downtown Springfield, Massachusetts, from the intersection with Lyman and Gridiron Streets south to Union Street, a distance of approximately three-quarters of a mile (see map: Study Area). This section of Main Street is the heart of downtown, home to many of the city's largest employers, civic buildings, transportation facilities and entertainment venues. Main Street has been the spine of the local street transportation network since the development of the street rail system more than a century ago.

There are 12 bus stops in the study area that are served by multiple PVTA bus routes. These stops and routes serving them are shown below (from north to south):

Bus Stop Location	Routes
Southbound	
Hampden St	G1, G2, G3, G5, G8, B6, B7, B13, B17/15
Fort St	G1, G2, G3, G5, G8, B6, B7, B13, B17/15
1350 Main (Monarch Place)	G1, G2, G5, G8
Bliss St	G1, G2, G5, G8
Howard St	G1, G2, G5, G8
Northbound	
Taylor St	G1, G2, G3, G5, B6, B7, B13, B15/17, P11, R10, R14, G8
Worthington St	G1, G2, G3, G5, B6, B7, G8, R10, P11, B13, R14, B17/15, R27
Bridge St	G1, G2, G3, G5, G8, B6, B7, R10, P11, R14, B13, B17/15
Harrison Ave	G1, G2, G5, G8
Falcon Way (East Court St)	G1, G2, G5, G8
Stockbridge St	G1, G2, G5, G8
Union St	G1, G2, G5, G8

Currently, there is an imbalance in the southbound number of stops (5 southbound stops versus 7 northbound), as well as their spacing (see page 10).

II. Study Methods

The following methods were employed for this study.

Transit

Bus rider boardings and alightings. Surveyors recorded the number of persons boarding and exiting buses during the peak ridership times at each of the 12 bus stops in the study area, as well as the direction (north, south, east or west) that persons walked after exiting buses.

Bus patron intercept surveys. Surveyors recorded the responses of bus patrons at Main Street bus stops to gauge their reaction to the concept of relocating those stops to other streets.

Bus stop site assessment. Surveyors documented conditions at each of the 12 bus stops in the study area and noted major trip generators near each. Visual and site assessments are shown in Appendix 2.

Bus operations analysis. Bus operations personnel reviewed existing bus stop locations, ridership, and operational requirements to evaluate cost impacts for alternatives to Main Street transit service. Calculations are shown in Appendix 6.

Review of previous studies.

Parking

Main Street parking utilization and turnover. An inventory of all legal and illegal parking spaces in the study area was produced. Survey staff then recorded all legal and illegal parking utilization at 30-minute intervals for an 11-hour period on Wednesday, November 19, 2008. Maps of parking spaces on Main Street are provided in Appendix 5.

Review of previous studies.

III. Findings

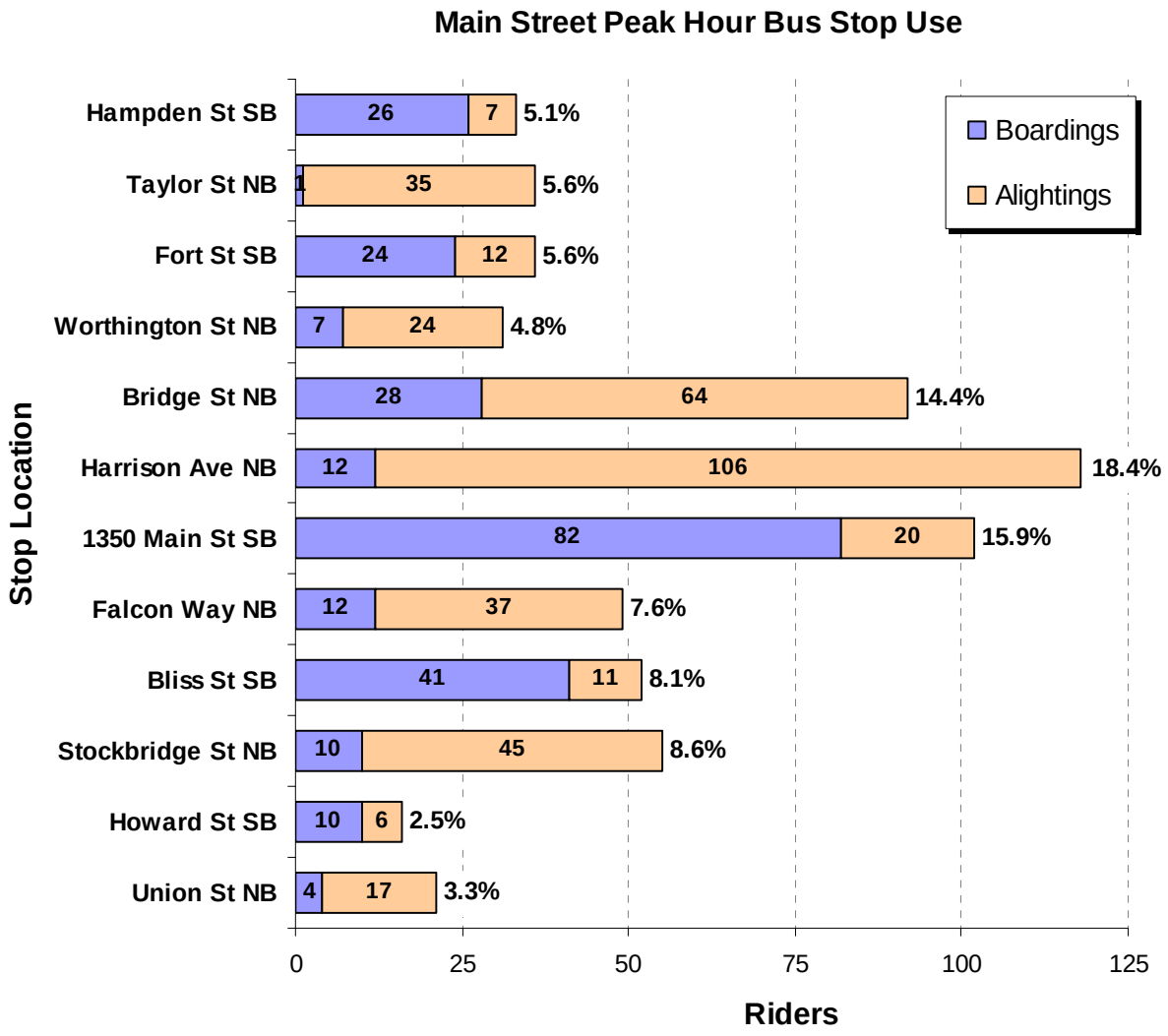
This section presents the findings of the research conducted for this study: transit user surveys, a parking inventory, transit operations evaluation, and a roadway/pedestrian capacity assessment.

A. Transit User Surveys

This section presents the findings of the following four research efforts conducted to determine the preferences and travel patterns of transit users: Bus stop boardings and alightings, bus patron intercept surveys, bus stop site assessments, and previous studies.

1. Bus Stop Boardings and Alightings

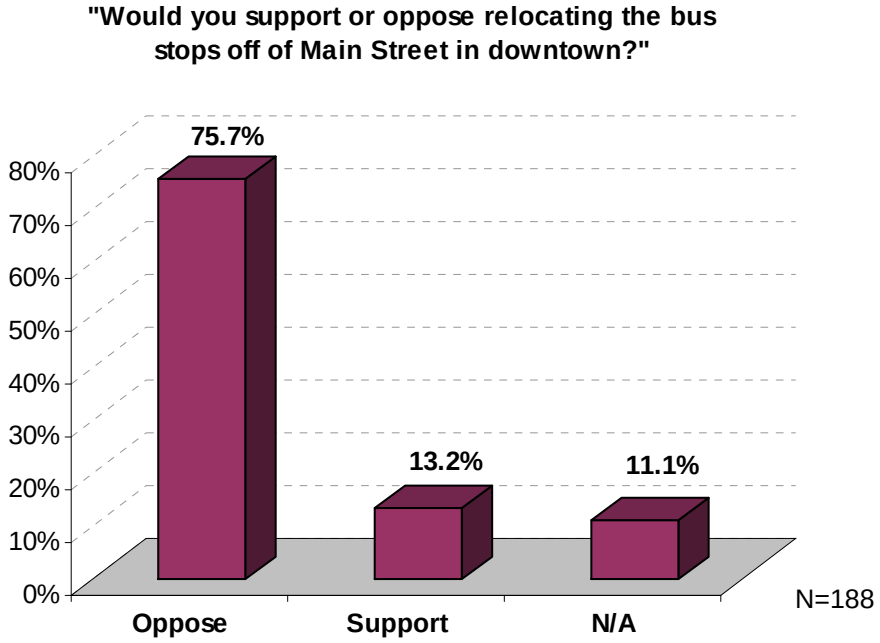
The figure below presents total boardings and alightings observed at each of the 12 bus stops during the two-hour morning peak (7:00 to 9:00 a.m.) and afternoon peak (3:00 to 5:00 p.m.) on typical weekdays, a total of four hours. Counts were recorded on weekdays from November 3 through November 24, 2008 (holidays and Election Day were excluded) for a total of 48 hours of observation. The figure presents all boardings and alightings recorded at each stop during the four hours of observation, as well as the percentage of all bus riders observed who used the stop (N=641).



In addition to the 48 hours of bus stop observation, supplemental daytime off-peak site observations were made at all 12 bus stop locations. These observations found that, similar to the peak period observations, bus customers appear to be a small proportion of all pedestrians during off-peak hours. Detailed assessments of each bus stop, including observations of passenger and non-passenger activity, are provided in Appendix 2.

2. Bus Patron Survey

Transit users in the Main Street corridor were surveyed to assess potential customer interest and/or support for relocating bus stops. A patron intercept survey was conducted at Main Street bus stops and the Springfield Bus Terminal on December 15, 2008 from 7:45 A.M to 4:30 P.M. People waiting for the bus or exiting the bus were asked the following question:



3. Bus Stop Site Assessments

Site assessments of the 12 bus stops in the study area show a variety of conditions. Photographs and complete assessments are provided in Appendix 2. Bus stops are typically marked by a single sign. There are no pavement marks to delineate the actual area of the street where the bus is to pull over. In other cases, newspaper boxes, mailboxes, utility equipment or street furniture may obstruct curbside boarding areas. This can lead to the bus having to overshoot standing passengers to find a safe place to stop. At right is an example of this

is at Harrison Avenue northbound. In such case, bus passengers must walk and re-queue at the bus door, which lengthens dwell times.

The lack of clear bus stop markings may also contribute to the frequently observed instances of illegal parking in bus stops. Few stops have benches and other amenities. Only one stop in downtown has a shelter (Bridge Street). Several stops have narrow sidewalk widths (15-20 feet), which increases conflict between bus customers waiting to board and pedestrians passing by.

In some cases, newspaper boxes, mail boxes, traffic signal control units and traffic signal poles block the convenient access to buses. An example of this problem is seen in the photo of 1350 Main Street at right. This is a mid-block stop, which requires extra space for buses to pull in (as opposed to the preferred near-side or far-side of block stops at other locations). Illegal blocking of bus stops compounds this problem.

Significantly, bus riders were observed to be in general distinct from other groups of congregating pedestrians and passersby on downtown streets. Bus patrons tended to wait for their buses near the posted stop or in shelters where available. Other pedestrians pass by and do not interact with bus patrons. In addition, some pedestrians, many of whom arrived by private auto, congregated around the entrances of convenience stores and service-oriented establishments. These groups were noted during late morning and early afternoon hours, generally outside the morning and afternoon peak travel times. At right, an example of non-passenger congregation is seen at Hampden Street.

4. Previous Studies

Two previous studies of transit use in the Main Street corridor offer findings that are relevant.

1995 Downtown Springfield Transit Study. This report was produced following the implementation of a one-way restriction on Main Street to northbound traffic only between State and Liberty Streets. This restriction involved numerous operational changes to PVTA bus services, key among them was the relocation of the central downtown "pulse" point for transfers from the Springfield Bus Terminal to Harrison Avenue. Most buses were then required to follow a "Downtown Loop" along Dwight Street to East Court Street and back onto Main Street, increasing travel times. Bus patrons also had to walk to Dwight Street to access outbound buses.

An onboard survey of bus patrons on downtown routes, as well as people waiting at downtown bus stops, found overwhelming dissatisfaction with the "Downtown Loop" service. A total 65% of all persons surveyed opposed the new configuration and removal of service from Main Street. Significantly, 3 of every 4 riders on north-south routes opposed the change; opposition among riders traveling on east-west routes was 51%. (Full report included as Appendix 3.)

2006 Report to PVTA and Springfield Department of Public Works. This study examined opportunities to optimize bus stop locations and routes in the Main Street corridor by increasing the use of Harrison Avenue as a "pulse point" for transfers among PVTA downtown lines (thus reducing PVTA's use of the Springfield Bus Terminal). This 2006 study provides several relevant findings:

- Illegal parking of private autos and delivery vehicles was degrading bus operations by requiring buses to stop in the travel lane to allow passengers to board and alight.
- An additional southbound stop in the vicinity of Harrison Avenue was desirable to spread out passenger loadings in this high-volume area.
- Bus operations would be less efficient, as bus layovers between scheduled runs could not take place near the proposed pulse point, resulting in additional operational costs.
- Existing capacity of on-street bus shelters and waiting areas at and near Harrison Avenue is sufficient to accommodate additional riders.

(Full report is included as Appendix 4.)

B. Parking Inventory

An inventory of parking on Main Street performed for this study found that an average of 8 bus stops on Main Street are blocked by illegally parked cars every hour. This means that every bus traveling Main Street can expect to encounter at least one blocked bus stop between Gridiron and Union Streets. Blocked bus stops result in delays to all traffic, as buses must block the travel lane to allow passengers to board and alight in the middle of the street. Such in-street boarding also poses significant safety concerns, especially for disabled passengers who use mobility assistance devices that require curb cuts.

The encroachment of illegal parking in bus stops is likely the result of the high utilization of legal parking, as well as the apparent lack of enforcement of time restrictions at free legal and metered parking street spots. A day-long parking inventory conducted for this study found that 78% of cars parked in legal spots on Main Street are violating the posted time limits, resulting in a lack of turnover at legal spots. As a consequence, a spillover effect is driving up the number of illegally parked vehicles in bus stops and causing traffic congestion.

1. Method

An inventory of all legal and illegal parking spaces on Main Street between Gridiron and Union Streets was performed to: 1) gather information on the existing parking supply; 2) gather observations of the number of parking spaces; and 3) ascertain compliance with posted time restrictions. To conduct the inventory, the study area was divided into two routes each containing an average of 10 blocks. The two areas were: the north side of Main Street in the City of Springfield from Union Street to Lyman Street (Observer Route 1) and the south side of Main Street from Gridiron Street to Union Street (Observer Route 2). Data was collected on November 19, 2008 from 7:30 AM to 6:30 PM.

Accumulation checks (occupancy) and license plate checks (turnover rates) were collected for the 11-hour study period. Parking accumulation is the total number of vehicles parked at a given time. The purpose of accumulation checks is to establish hourly variations and peak parking demand. The information for the occupancy study was gathered by two surveyors who walked Observation Routes 1 and 2 respectively. Surveyors referenced maps and field sheet tables, which contained the location and number of legal and potentially illegal parking spaces of each parking block within the route. The number of parked cars was recorded on field sheet tables at 30-minute intervals.

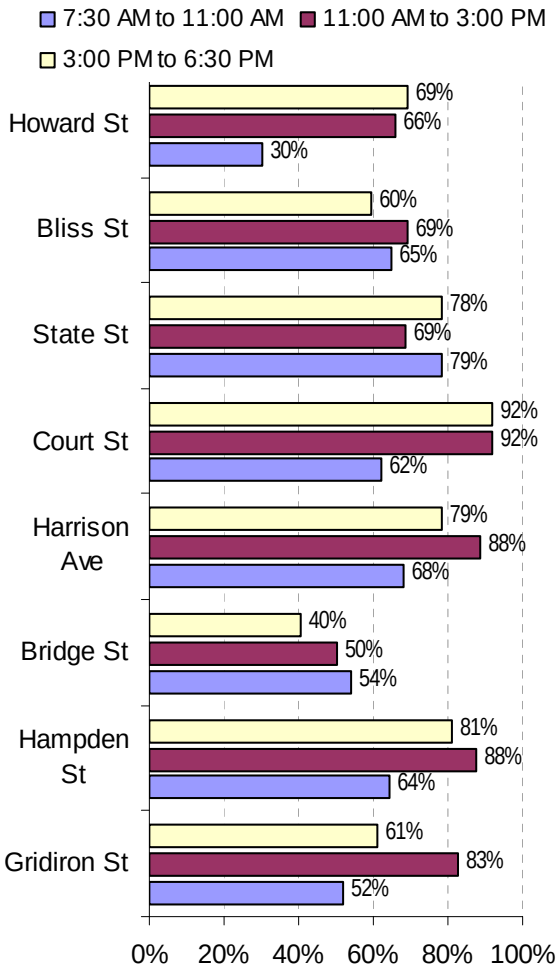
License plate checks were used to observe turnover rates. In this study, turnover rate was defined as the amount of time that one vehicle occupied a unique parking space. Turnover rates were determined by recording the last three digits of the vehicle license plate at each unique parking space. This data was collected every 30 minutes throughout the 11-hour observation period to gauge the length of time that vehicles occupied legal and illegal parking spaces.

2. Parking Space Utilization

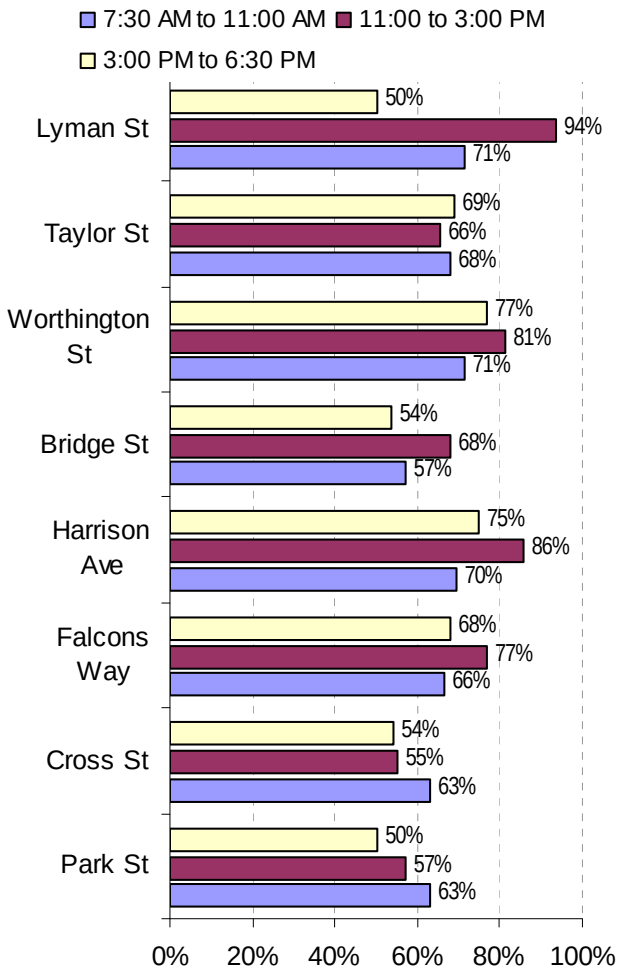
Parking usage varies throughout the day. Therefore, utilization percentages were calculated using the information collected for three periods: 7:30 AM through 11:00 AM; 11:00 AM through 3:00 PM; and 3:00 PM through 6:30 PM. There are a total of 117 legal spaces available on Main Street from Gridiron Street and Union Street. The figures below present the average utilization of

legal spaces during the day on the east and west sides of Main Street; blocks are delineated by the name of the cross street first encountered in the direction of travel. These figures show that the highest utilization of legal parking spaces occurs from 11:00 AM to 3:00 PM. For example, the east side of the block between Falcons Way and Harrison Avenue provides a total of 14 parking spaces reaching an average of 77% utilization during this time period. Similarly, the block between Harrison Avenue and Court Street provides 14 legal parking spaces and reaches a utilization average of 88% within the same time period.

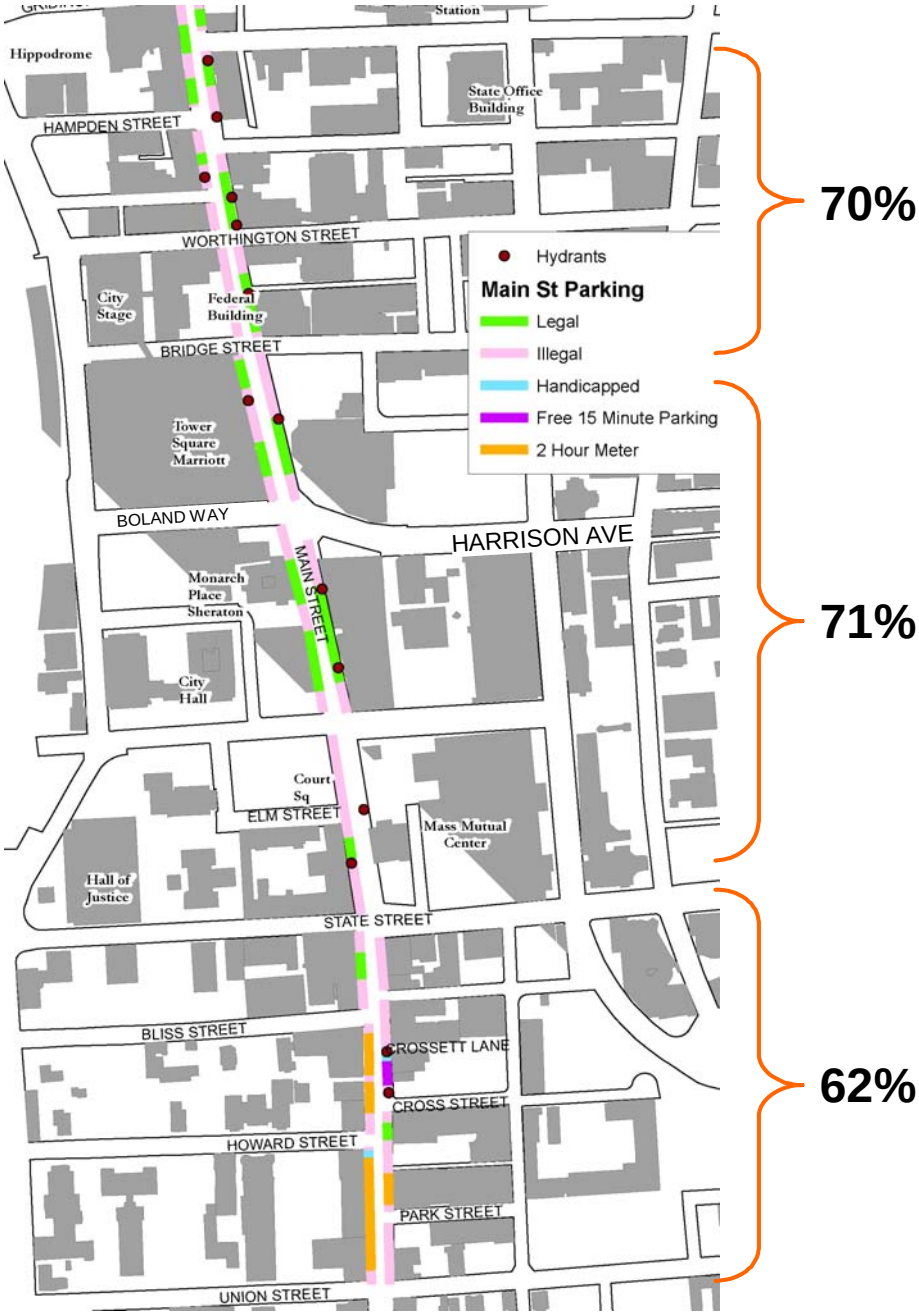
Ave. Legal Parking Space Utilization
West (SB) Side of Main St



Average Legal Parking Space Utilization
East (NB) Side of Main St



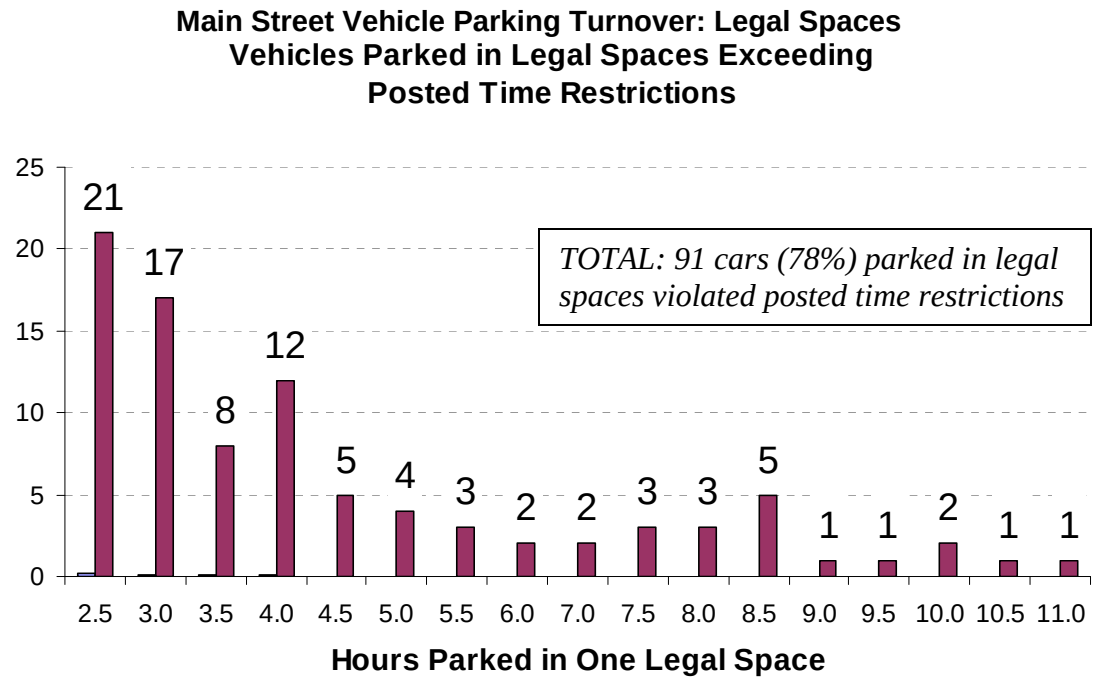
Below is a display of this data as averaged for the full day and plotted on a map of the study area. The average utilization rates are shown at right.



3. Parking Turnover

Turnover rates were recorded for all legal and illegal parking spaces on Main Street. The table below reports the proportion of vehicles parked in legal spaces that violated the two-hour parking restriction. As seen below, a total of 91 vehicles were recorded violating the posted parking time restrictions. In fact, more than a dozen vehicles parked in legal 2-hour spaces did not move for

8 hours or longer. In all, 78% of the vehicles parked in legal spaces on Main Street violated the posted time restrictions.



4. Illegal Parking in Bus Stops

City of Springfield parking laws designate bus stops as no parking zones. A total of 91 vehicles (more than 8 per hour) were observed parking illegally in bus stops during the 11-hour data collection period. However, unlike the 78% of cars in legal spaces that overstayed the 2-hour time limit, none of the illegally parked vehicles stayed more than 30 minutes in a bus stop or other illegal spot. This suggests illegal spaces are being used mainly for short errands.

The impact of illegal parking on traffic congestion is significant. If one assumes that each car illegally parked in a bus stop is there no longer than 15 minutes, this means there would be at least one northbound stop blocked every 10 minutes and one southbound stop blocked every 12 minutes. Therefore, every bus traveling on Main Street (in either direction) can expect to encounter an average of at least one blocked bus stop that they cannot pull into. This forces the bus to pick up and discharge passengers from the travel lane, which stops all traffic behind the bus. Surveyors observed illegally parked cars most frequently in the following bus stops: 1350 Main Street, Falcons Way, and Fort Street.

C. Transit Operations Evaluation

Management and operations personnel of PVTA's bus operating unit for Springfield, the Springfield Area Transit Company (SATCo), analyzed current Main Street bus stop locations, as well as an alternative to relocate Main Street bus stops to other streets. Results are presented below.

1. Optimization of Main Street Bus Stop Locations

Ridership, operations, transfers, parking concerns and driver knowledge of the corridor were weighed to assess the feasibility and desirability of existing Main Street bus stops. The results of this analysis are shown below. "Operational Priority" (last column on right) reflects a balance of operational considerations.

Main Street Bus Stop Operational Evaluation

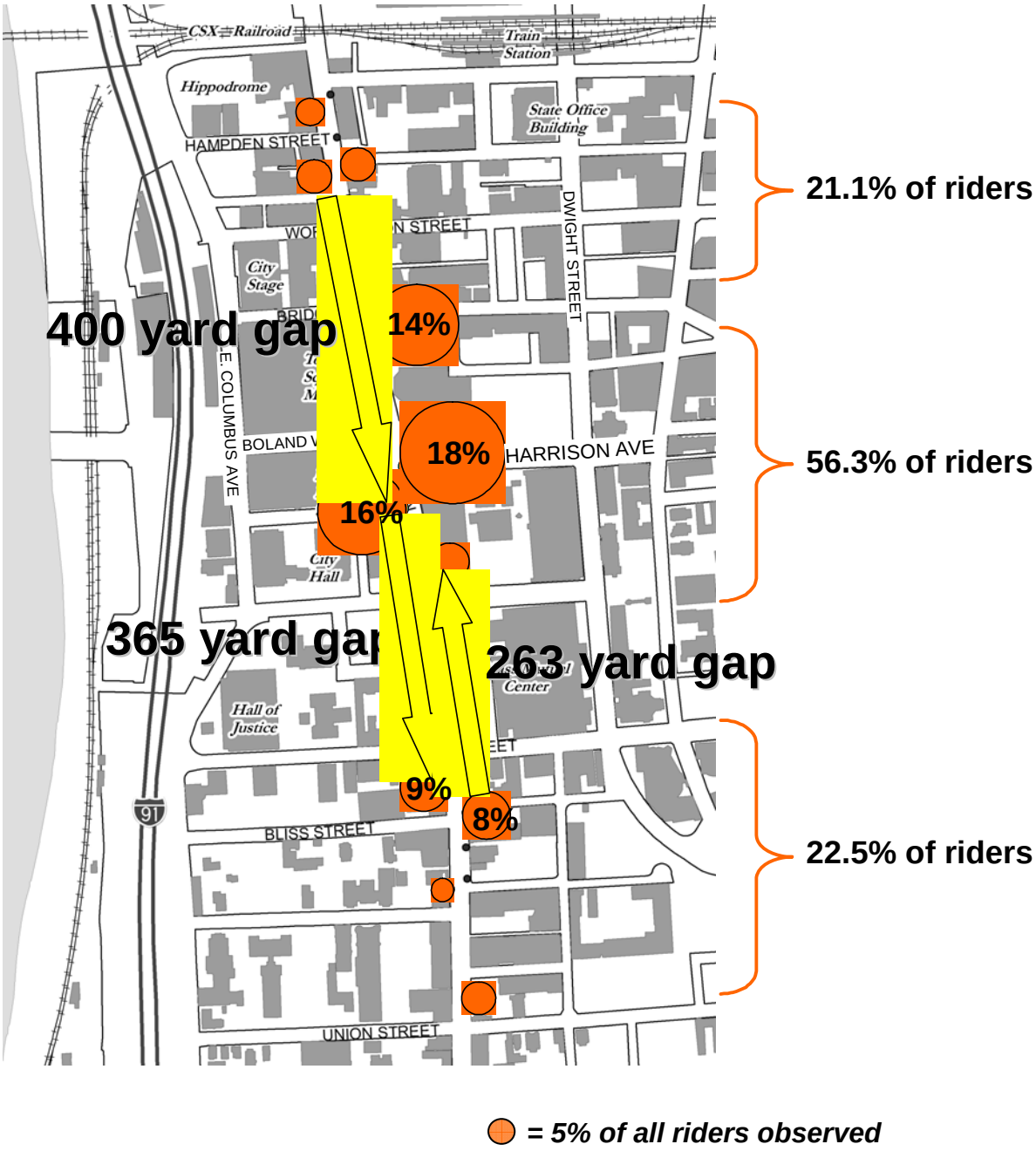
Stop Location	Distance to next stop*	Queuing Area	Transfer Proximity	Considerations	Operational Priority
Southbound					
Hampden St. SB	65 yds	Good	No	First SB stop after SBT. Frequent illegal parking.	Medium
Fort St. SB	395 yds	Limited	No	Turn lane conflicts with SB vehicles turning right.	Low
1350 Main St. SB	365 yds	Limited	No	Mid-block stop is safety concern (no crosswalk). Curbside obstructions; frequently blocked.	High
Bliss St. SB	101 yds	Good	No	Good queuing area and pairing with Stockbridge NB.	Medium
Howard St. SB	300 yds (Williams St)	Limited	No	Minor right turn conflict.	Medium
Northbound					
Taylor St. NB	200 yds (SBT)	Good	No	Last NB stop before SBT. Awkward left turn required onto Hampden for some routes.	Medium
Worthington St. NB	95 yds	Limited	No	Numerous ADA customers at Worthy Apartments.	High
Bridge St. NB	105 yds	Excellent	No	Bus shelter, landscaped park.	High
Harrison Ave. NB	170 yds	Excellent	Yes	Short walk (100 ft) to outbound stop for east-west routes. Key transfer point. Street furniture blocks boarding.	High
Falcon Way NB	155 yds	Limited	Yes	ADA access to PVTA Info Center. Frequently blocked by illegal parking. Short bus pull-in area.	High
Stockbridge St NB	263 yds	Good	No	Low ridership. Paired with Bliss St SB.	Medium
Union St NB	238 yds	Limited	No	Narrow sidewalk. Private awning provides shelter.	High

** in travel direction*

This analysis shows an apparent imbalance in the number of southbound stops in the mid-section of the Main Street corridor—the location where customers are boarding and alighting to make

transfers to and from east-west routes. Significantly, the distances between the Fort Street and 1350 Main Street southbound stops are close to 400 yards (approximately one-quarter mile).

This information is presented below along with the bus stop use results presented in Section A. 1. It is important to note that in prevailing transit industry practice, the preferred bus stop gap distance in a central business district is 200 yards.



2. Relocation of Main Street Bus Stops to Other Streets

A bus operations evaluation was also performed to assess the feasibility and potential operational advantages of relocating bus stops from Main Street to other downtown arterials. This analysis

found that the existing Main Street and Dwight Street/Chestnut Street routes offer the most direct routes for PVTA service in downtown. Use of other nearby streets would result in approximately 79,000 miles per year of additional travel to downtown bus routes. The additional mileage would add about 16 hours per day to bus operations, or 4,896 of additional vehicle operating hours per year. This would also have a negative impact on air quality as the increase in operating hours for PVTA buses would result in increases in volatile organic compounds (VOCs), nitrogen oxide (NOx) and carbon monoxide (CO) emissions.

The additional mileage and operating hours mean that the cost to relocate the existing bus stops on Main Street to East Columbus Avenue and/or Dwight/Chestnut Streets would be approximately $279,000 per year. The basis for this estimate is SATCo's FY2009 operating costs in the Springfield area service ($40 per bus operating hour and $1.05 per mile) and the assumption that existing levels of service will be maintained year round. This estimate includes the cost of the additional buses that would be necessary to maintain the existing G2 schedule, as well as extra helper buses necessary to maintain existing schedules (see Appendix 6).

However, the actual cost of relocating bus stops from Main Street could very well be higher, as the exact routes and additional operating hours needed to serve any new or relocated bus stops from Main Street (or the level of delay that would be caused by some of the additional turning movements) cannot be known without a more detailed operations analysis.

Further, relocation of bus service to East Columbus Avenue would require significant capital costs to design and construct ADA-compliant pedestrian amenities, such as sidewalks, crosswalks and building entrances that do not currently exist on this street.

D. Roadways and Pedestrian Capacity Assessment

Transit usage depends on the ability of pedestrians to access routes and services. A walkable, pedestrian-friendly environment is essential for successful transit operations and reducing demand for private autos. This section offers a brief analysis of the general pedestrian environment surveyed on the three principal north-south arteries in the Main Street area: Main Street, East Columbus Avenue, and Dwight Street.

1. Main Street

Main Street has historically been the transit spine of downtown since the development of street rail in the 1900s. Setbacks range from approximately 20 to 50 feet, offering sufficient sidewalk widths for comfortable pedestrian passage. On wider sidewalks, there is typically some pedestrian congregation, depending on time of day and weather. Main Street is two lanes in each direction. There are seven signalized intersections in the study area. Traffic volumes on Main Street (at Emery Street) are approximately 12,000 vehicles per day (MHD 2006).

Near the middle of the study area, Town Square, Monarch Place and other large buildings are major trip generators.

Street furniture and landscaping provide a welcoming pedestrian environment in several areas of the Main Street corridor.

In the northern part of the study area, short setbacks and traditional storefronts create pedestrian interest (and provide shelter, especially during inclement weather).

Near Union Street, storefronts are also close to the street, with awnings and architectural details.

2. East Columbus Avenue

East Columbus Avenue is the principal north-south artery to the west of Main Street. It is a north-bound, two- to three-lane one-way arterial next to the viaducts of I-91. (West Columbus Avenue is on the west side of the highway.) Pedestrian amenities are limited or absent between Bridge and State Streets; in fact, there are no sidewalks along some portions of the road. There is little scaling or orientation of structures to the street. One of the principal features is the entrance to the Tower Square parking ramp. Traffic volumes range from 9,000 to 12,000 vehicles per day.

As it exists currently, East Columbus Avenue is wholly unsuited for effective transit service. In fact, relocation of bus stops from the more pedestrian accessible locations on Main and Dwight Streets could jeopardize Title VI civil rights eligibility and compliance necessary for federal transit funds, as this reduction in access would disproportionately affect transit riders, a majority of whom are low-income and/or minority residents.

Seen above is the entrance to the Town Square parking ramp, which is the rear of the building. This structure blocks pedestrian egress and passage along the street.

There are no parking lanes along this section of East Columbus Avenue. Bus operations to pick up passengers on this street configuration would cause vehicle backups and degrade traffic safety without significant roadway reconfiguration.

Some sections along East Columbus Avenue have no sidewalk; pedestrians must use this dirt path instead.

One measure to improve pedestrian access along East Columbus Avenue is seen above: a bridge to take the pedestrians off the street.

3. Dwight Street

In the study area, Dwight Street is one-way southbound with two travel lanes and a lane of parking on either side. Curb space is provided for bus stops and there are wide sidewalks on both sides of the street. Traffic volumes are 11,000 to 12,000 vehicles per day. There are sidewalks the entire length of the street; however, there is a grade separation between Dwight and Main Streets that could pose difficulties to transit customers with mobility impairments. Building scale and orientation to the street and pedestrian environment is varied: there are several large structures, such as parking lots, as well as storefront businesses.

There are four signalized intersections between Lyman and State Streets. PVTA east-west routes R10, R14, B6, B7, B15/17, as well as north-south route G3 travel along portions of Dwight to collect downtown passengers for their runs.

Bus stop at Dwight Street and Falcons Way is seen above. The parking garage reduces pedestrian appeal along this block.

Dwight Street at Harrison Avenue, where parking lots and larger buildings reduce the attractiveness of the area to pedestrians.

Dwight Street at Worthington. There is ample street width for on-street parking on both sides, as well as bus stops (currently used by up to five PVTA routes).

Dwight Street at Taylor Street (State Office Building seen at left). Crosswalks with signals offer pedestrians safety along this portion of the corridor, but there is relatively little street furniture.

IV. Analysis

Following is a summary of the key findings of the transit user surveys, parking inventory, transit operations evaluation, and roadways and pedestrian capacity assessment performed for this study:

- Main Street has the most well-developed pedestrian environment of downtown north-south arterial streets, which is essential for effective and efficient transit operations.
- It would cost at least $279,000 more per year to provide current levels of service using streets other than Main Street, plus undetermined capital costs for design and construction of comparable pedestrian facilities on East Columbus Avenue.
- Relocating service to East Columbus Avenue would require an additional 5,000 hours of bus operations, increasing air pollution emissions.
- More than 75% of riders surveyed support keeping bus stops on Main Street.
- The existing spacing of southbound bus stops on Main Street is not well matched to rider demand, especially between Bridge and State Streets where transit user demand is heaviest but the stops are furthest apart.
- The blocking of bus stops by illegally parked cars is contributing to traffic congestion by forcing buses to stop in the travel lane to load and unload passengers in the street.

Discussion follows.

A. Transit

An imbalance exists between passenger demand and the spacing of southbound bus stops in the central section of the study area. Bus stop use is heaviest between Bridge and State Streets, yet the distance between southbound stops is three to four times greater (300 to 400 yards) than the northbound stops. This increases the distance that riders who need to transfer to PVTA east-west routes at Harrison Avenue and Boland Way must walk, which diminishes transfer convenience. This also disrupts the intuitive pairing of northbound and southbound stops, which is desirable to help simplify the overall route system.

The overwhelming preference of riders surveyed at Main Street bus stops (75.7%) was to retain bus stops on Main Street. Significantly, any relocation of bus service from Main Street to Columbus Avenue could disproportionately affect Environmental Justice (minority and low-income) populations. PVTA's December 10, 2008 report on the survey of riders in this service region found that more than half (55%) of bus riders report an annual income of $10,000 per year or less, which indicates they likely belong to a household living at or below the poverty level.

The operational evaluation of the 12 bus stops in the study area found opportunities to relocate and consolidate operations to improve travel times, efficiency and safety.

The site assessment also found that bus passengers are usually distinct from other pedestrians who congregate on downtown streets. Bus passengers tend to wait for their bus near the posted stop location. Pedestrians with other business tend to arrive by private auto or bike and congregate near the entrances to convenience stores and service-oriented businesses.

B. Parking

The high long-term utilization of legal parking spaces resulting from the lack of enforcement of posted time restrictions is driving up demand for short-term parking spaces on Main Street. The result is increased demand and utilization of illegal parking spaces (many of which are in bus stops) for short-term parking. Bus stops are not always well-marked by signage; there are no street markings to clearly show bus stops, whereas some metered parking areas are delineated by street markings. In addition, many illegally parked cars were observed in pedestrian crosswalks, which are very well-marked. Crosswalks are important for the safety of all pedestrians, including bus customers. Both circumstances degrade pedestrian safety, which is important to traffic flow and bus operations.

C. Transit Operations

One significant cause of traffic congestion on Main Street is illegal parking in bus stops. The combination of high demand for legal spots and unmarked bus pull-over areas appears to be causing the blockage of bus stops (an average of 8 per hour), which forces buses to block all traffic to pick up and unload passengers in the travel lane.

The operational evaluation found that the lack of pedestrian facilities, including sidewalks, on alternate routes to Main Street would create concerns related to safety and compliance with the Americans with Disabilities Act (ADA) and Title VI Civil Rights. In addition, moving service to other streets would cost at least $279,000 more per year, which would be assessed to the municipality receiving the service (City of Springfield) under the Commonwealth's formula for regional transit authority funding. Public hearings as part of a federally required local public involvement process to solicit and consider public comment prior to any fare increase or major service reduction described in 49 CFR Section 5307(d)(1)(I) would be necessary before this change of service could be implemented.

PVTA recently optimized bus operations on Main Street by retaining the use of Harrison Avenue by several bus routes that were diverted from their original State Street/Main Street routes during the 2006 construction of the Mass Mutual Center. The retaining of this construction phase detour has actually reduced by approximately half the number of buses traveling on Main Street south of Harrison Avenue/Boland Way today. Also, many bus patrons find this routing convenient.

D. Roadway and Pedestrian Capacity

Main Street is currently handling traffic volumes that are comparable to those of similarly classified parallel arterial roads (East Columbus Avenue and Dwight Street). However, Main Street offers a significantly more pedestrian friendly environment, which is critical for successful transit service. Relocation of transit service to East Columbus Avenue and other streets would require substantial new investment in sidewalks, crosswalks, improved building access and travel lane configurations to achieve the same level of service that is already available on Main Street. The capital costs for design and construction of these facilities would require additional study, but would likely be significant (on the order of $500,000 to $1 million or more). Additional study of these potential costs is necessary.

One additional factor observed contributing to traffic congestion on Main Street are delays caused by vehicles making left turns at some cross streets (i.e., Hampden Street).

V. Recommendations

A. Recommendation 1: Maintain Bus Service on Main and Dwight/Chestnut Streets

Maintain existing bus service on Main Street and Dwight/Chestnut Streets. This recommendation involves no additional cost; does not jeopardize compliance with Title VI Civil Rights requirements of federal agencies for transit funding; and does not increase air pollution emissions.

B. Recommendation 2: Optimize the Locations of Existing Main Street Bus Stops

This recommendation involves three stop relocations and one stop deletion to achieve a spacing of bus stops that better balances passenger demand and stop availability in the central section of the study area. Under this recommendation, the number of stops on Main Street is reduced from 12 to 11, with no changes to routes or operations. Implementation costs would therefore be minimal. Relocated stops would be located positioned consistent with bus stop street-side factor guidelines (see Appendix 8).

Recommendation	Basis	Actions
2A: Relocate Fort St. SB stop to 1550 Main St. (former Federal Bldg)	Fort St SB is one of the most infrequently used stops in the study area. There are frequent illegal parking conflicts, as well as a right turn lane conflict. Fort St is just 65 yards south of the Hampden St SB stop, which has a considerably better passenger queuing area. The 375-yard distance between the Fort St and 1350 Main St SB stops is not balanced to passenger demand. It also reduces transfer convenience to east-west routes at Harrison Ave. This location would also help create a pairing with the Bridge St NB shelter, which is one of the most attractive stops in downtown.	• Relocate the Fort St SB stop to a nearside location on the 1550 Main St. block. • Install a shelter at the new stop location to help create visual pairing with the Bridge St. shelter.
2B: Remove Taylor St. NB stop	This stop is among the most infrequently used northbound. Several routes that currently stop here must then make an immediate left turn onto Hampden Street.	• Eliminate Taylor St. NB stop. • Post signage to direct patrons to Worthington St. NB stop or SBT.
2C: Relocate 1350 Main St. SB stop to Court Square	1350 Main St. SB is a mid-block stop with several street furniture obstructions. It is also frequently blocked by illegal parking. There is no mid-block crosswalk for passengers. The queuing area is between two large buildings that create a wind-tunnel. The relocation of Fort St. SB to 1550 Main St. (Recommendation 2A above) would reduce the gap	• Remove 1350 Main St. stop. • Refurbish Court Square shelter and relocate stop to this location. • Contingent on Recommendation 2A. • Consider Court St. nearside location as an alternative (see Appendix 8 for

	between these stops, allowing the 1350 Main St. stop be moved 140 yards south to Court Square without sacrificing customer convenience. Parking demand on Main St. is typically less than at Court Square, thereby improving bus operations. Significantly, there are at least half as many buses traveling this section of Main St. since 2006, when revised routings for several east-west routes during construction of MassMutual Center were permanently adopted.	recommended pull-in dimensions).
2D: Relocate Falcons Way northbound stop to 1277 Main Street (MassMutual Center)	Bus customers appreciate the convenience of this stop to the PVTA Information Center. However, the combination of a short bus pull-in area and aggressive illegal parking in this stop mean that boardings and alightings in the travel lane are frequent at this stop. Not only does the discharge of passengers in the middle of the street delay cars and other buses, but it also creates accessibility problems (especially in winter months) for the many disabled PVTA customers who travel to this stop to pick up their monthly passes. Furthermore, the sidewalk at the existing stop is relatively narrow (15-20 ft.) and offers little space for passenger queuing. In contrast, there is an ample queuing area just 50 yards to the south on the 1277 Main St. block. In this case, the safety of Info Center customers would outweigh the minor inconvenience of walking an additional 50 yards to the service counter.	• Relocate Falcons Way NB stop to a nearside location on the 1277 Main St. block (MassMutual Center). • Coordinate with City and property owner for appropriate shelter and signage and amenities. • Ensure that signage directing PVTA customers to the Info Center is included at the relocated stop. • As an alternative, consider lengthening the existing farside stop to at least 90 ft. (see Appendix 8).

(See overleaf: Map of Main Street bus stop optimization recommendations.)

C. Recommendation 3: Encourage Improved Parking Conditions

The following recommendations are offered to reduce traffic congestion by increasing the turnover at legal parking spaces and reducing illegal parking in bus stops.

Recommendation	Basis	Actions
3A: Increase turnover rate at legal parking spaces	High demand for legal parking spaces is heightened by lack of enforcement of time restrictions to encourage turnover. A total 78% of cars parked at legal spaces were observed violating the posted time restrictions. This increases demand for illegal parking spaces, including bus stops. The August 2005 Infrastructure Management Report to the Springfield Parking Authority identified increased on-street enforcement as a key strategy for increasing revenue from parking operations.	• Improve enforcement of time restrictions at legal parking spaces. • Consider creating more 15-min and/or metered parking spaces on Main St. • Publicize currently available savings for long-term parking at Springfield Parking Authority facilities. • Conduct public and media outreach to publicize preferred parking areas, including awareness of the safety hazards and ADA compliance issues associated with illegally blocked bus stops.
3B: Increase enforcement at illegal parking spaces	A total of 91 cars, (more than 8 cars per hour) were observed parking illegally in bus stops. This means that, on average, every bus traveling Main Street encounters at least one blocked bus stop. Blocked stops contribute to traffic congestion and diminish the safety of bus passengers, especially those with ADA needs.	• Prioritize bus stops for parking enforcement. • Inventory and improve parking signage (see Appendix 7). • Consider options for giving authority to PVTA supervisors to issue tickets to cars that are illegally blocking bus stops (this is a practice of Connecticut Transit in some locations).
3C: Mark bus stop pull-in areas clearly on pavement; improve signage	One likely contributor to the high rate of illegal parking in bus stops is the lack of pavement markings and signage to clearly delineate bus stops. Clear pavement markings would aid in parking enforcement, especially photo documentation of violations. Also, pavement markings would also aid passengers in queuing for boarding, as well as alighting.	• Use pavement markings consistent with existing pedestrian crosswalk markings to outline rectangles marking bus pull-in areas. • Review and improve bus stop and parking signage (see Appendix 7). • Paint curbs to designate No Parking areas consistent with Manual of Uniform Traffic Control Devices Section 3B.21 (see Appendix 9).

D. Recommendation 4: Study Possible Strategies to Improve Left Turn Maneuvers at Signalized Intersections

Another observed cause of traffic congestion on Main Street are the delays experienced by all vehicles (including buses) making left turns at Hampden Street when forced to wait for oncoming traffic to clear the intersection. This delays all vehicles behind the waiting vehicle. It is recommended that the City of Springfield consider further study of potential signalized traffic improvements on Main Street, such as a brief protected green phase (similar to that implemented on Page Boulevard) for this location, as well as other intersections in the study area that are experiencing similar operational delays.

Appendices

1. List of Preparers
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2. 2008 Downtown Springfield Main Street Bus Stops Site Assessment. Pioneer Valley Planning Commission.

3. 1995 Downtown Springfield Transit Study. Pioneer Valley Planning Commission.

4. 2006 Report to PVTA and Springfield Department of Public Works. Pioneer Valley Planning Commission.

5. Parking Inventory Maps.

6. 2008 Cost Estimate: Relocate Main St PVTA Service to Alternate Streets. Springfield Area Transit Company.

7. Bus Stop Signage Examples

8. Bus Stop Zone Design Types

9. Manual of Uniform Traffic Control Devices Section 3B.21: Curb Markings (2004)

10. Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops. 2002 National Academies, Washington DC.

Appendix 2: Bus Stop Site and Visual Assessment

Location: Main and Hampden Streets

Direction: SB

Routes: G1, G2, G3, G5, G8, B6, B7, B13, B17/15

Sidewalk width: 35’ (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: 1 street light

Shelter: None

Parking: Illegal parking frequently observed (see photo)

Trip generators: Heating assistance office, Graham’s convenience and package store, professional offices

Notes: A wide sidewalk provides sufficient area for bus rider queuing and pedestrian passage. Frequent non-passengers arrive by private auto, bike or foot and tend to congregate near storefronts and building entrances. Non-passengers, many of who are students (depending on time of day), often call to others across the street. Bus passengers tend to wait quietly near the bus stop sign at the curb.

Location: Main and Taylor Streets

Direction: NB

Routes: G1, G2, G3, G5, B6, B7, B13, B15/17, P11, R10, R14, G8

Sidewalk width: 15’ (approx.) at bldg; 35+’ at nearside curb area

Sign condition: Good

Pavement condition: Good

Lighting: 2 street lights

Shelter: None (small park provides queuing area).

Parking: Some illegal parking observed.

Trip generators: Neighborhood Assistance Corp., other multi-story apartment buildings

Notes: Frequent conflicts with non-PVTA ADA vans, delivery vehicles and private autos in bus stop. Few users or non-passengers congregating.

Appendix 2: Bus Stop Site and Visual Assessment

Location: Main and Fort Streets

Direction: SB

Routes: G1, G2, G3, G5, G8, B6, B7, B13, B17/15

Sidewalk width: 15’ (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: no nearby streetlight

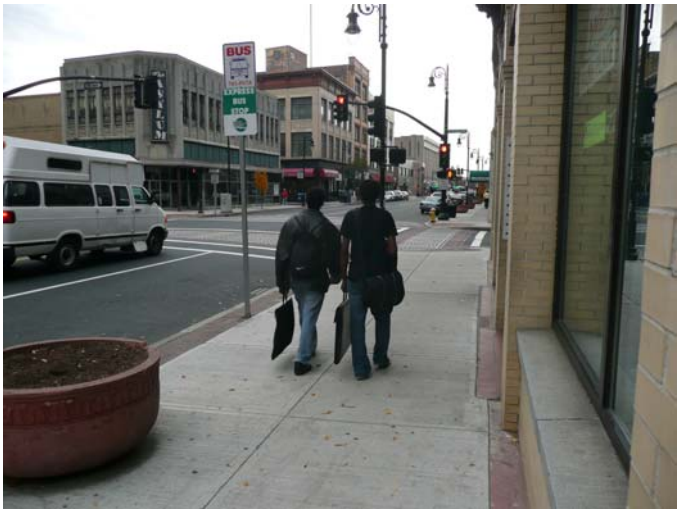
Shelter: None

Parking: Illegal parking in bus stop observed.

Trip generators: Student Prince, Command Security, various service businesses (beauty salon), offices on upper floors.

Notes: Nearside stop is very close to intersection, creating conflicts with other vehicles turning right; safety concern for riders exiting buses and crossing street. Buses frequently pick up and discharge in travel lane. No immediate crosswalk to east side of Main. Passengers tend to congregate under Student Prince awning for shelter, creating conflicts with passersby. Relatively few non-passenger pedestrians congregating at stop, but groups of 6-12 students congregate further up the block, depending on time of day.

Location: Main and Worthington Streets



Direction: SB

Routes: G1, G2, G3, G5, B6, B7, G8, R10, P11, B13, R14, B17/15, R27

Sidewalk width: 15’ (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: 1 street light

Shelter: None

Parking: ADA vans at Worthy Apartments

Trip generators: Jake’s City Café, 7-story Worthy Apartments, offices

Notes: Groups of non-passengers tend to congregate near Worthy Apartments entrance and turnaround loop. Narrow sidewalk width and street furniture creates conflicts between waiting passengers and passersby. Frequent ADA pick ups at Worthy Apartments block bus stop.

Appendix 2: Bus Stop Site and Visual Assessment

Location: Main and Bridge Streets

Direction: SB

Routes: G1, G2, G3, G5, G8, B6, B7, R10, P11, R14, B13, B17/15

Sidewalk width: 35+' (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: 2 street lights

Shelter: Yes (only shelter on Main St)

Parking: No illegal parking observed

Trip generators: Tower Square, 1550 Main St, CVS, service-oriented storefront businesses

Notes: One of Main Street's most attractive stops. No opposite side pairing. Little rider/passerby conflict. Ped-activated walk signal. System map/schedule holder.

Location: Main Street and Harrison Avenue

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 25+' (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: 2 street lights

Shelter: None (shelter at Harrison Ave outbound; see photo at lower right)

Parking: frequent illegal parking observed

Trip generators: Main downtown transfer point to east-west bus routes; major financial employers.

Notes: Mail/courier and newspaper boxes blocks bus boarding/alighting. Often windy.

Appendix 2: Bus Stop Site and Visual Assessment

Location: 1350 Main Street (Monarch Place)

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 35' (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: Street light

Shelter: None (very windy)

Parking: constant illegal parking observed (private autos and delivery vehicles

Trip generators: City Hall, restaurants, major financial employers, MassMutual Center closest SB stop

Notes: Mid-block stop with prominent street furniture obstructions. No nearby crosswalk. Illegal parking in bus stop and on sidewalk forces frequent boarding/alighting in travel lane. Traffic backups observed, especially during afternoon peak. Riders seek shelter near buildings.

Location: Main Street and Falcon Way (1331 Main)

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 15-20' (approx.) – frequent rider/passerby conflicts

Sign condition: Fair (blocked by foliage)

Pavement condition: Fair (uneven surface near plantings)

Lighting: Foliage blocks street light

Shelter: None

Parking: Frequent illegal parking

Trip generators: PVTA Info Center, street-level retail businesses, MassMutual Center, upper level professional offices, City Hall.

Notes: Stop provides convenient access to Info Center; however, continual illegal parking in bus stop during peak hours forces buses to discharge passengers in travel lane. This creates a safety concern for many Info Center customers (typically purchasing monthly passes) who are disabled and/or elderly. Those with mobility assistance devices (i.e., walkers) must go to curb cut at end of block. Short bus pull-in length; stop is farside, but very close to Falcon Way intersection, which creates occasional backups into cross traffic.

Appendix 2: Bus Stop Site and Visual Assessment

Location: Main and Bliss Streets

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 30’ (approx.) – few rider/passerby conflicts

Sign condition: Good

Pavement condition: Good

Lighting: 1 street light

Shelter: None

Parking: No conflicts observed

Trip generators: Sheriff’s Department storefront, professional offices, retail

Notes: Riders congregate near building for shelter. Few non-passengers congregating. Some street furniture blockage causes buses to overshoot posted sign.

Location: Main and Stockbridge Streets

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 25’ (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: No street light

Shelter: None – riders congregate in storefront doorways, depending on weather

Parking: Occasional illegal parking observed

Trip generators: Storefront retail, professional offices on upper floors

Notes: Directly opposite Bliss Street stop, creating intuitive pairing.

Appendix 2: Bus Stop Site and Visual Assessment

Location: Main and Howard Streets

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 35’ (approx.)

Sign condition: Good

Pavement condition: Good

Lighting: 1 street light

Shelter: None; nearby private awning

Parking: No problems observed

Trip generators: County jail, Senior Center and other facilities with transit-dependent users on Howard Street

Notes: Stop is infrequently used during peak hours, but provides important access to elderly/disabled and transit-dependent riders.

Location: Main and Union Streets (Park St)

Direction: SB

Routes: G1, G2, G5, G8

Sidewalk width: 25’ (approx.)

Sign condition: Good

Pavement condition: Fair

Lighting: Street light

Shelter: None (private awning used)

Parking:

Trip generators: Street-level retail, restaurant.

Notes: Stop is mid-block between Union and Park Streets. Nearly all riders observed wait under private awning (away from bus stop sign).

Appendix 3

DOWNTOWN SPRINGFIELD TRANSIT SERVICE STUDY

PREPARED FOR:
THE PIONEER VALLEY TRANSIT AUTHORITY

PREPARED BY:
THE PIONEER VALLEY PLANNING COMMISSION
AUGUST 1995

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This report was prepared with assistance from the Executive Office of Transportation and Construction and the Federal Transit Administration.

Appendix 3

INTRODUCTION

At the request of the Pioneer Valley transit Authority (PVTA), the Pioneer Valley Planning Commission (PVPC) has conducted a formal transit evaluation of the "Downtown Loop" in the city of Springfield, Massachusetts. This "Downtown Loop" is a result of Main Street changing to one way street (northbound) between State Street and Liberty Street. Previous to this change PVTA had their bus transfer point on Harrison Avenue in downtown. Due to the Main Street change, the need for more space and the numerous requests from businesses in that area to have the "wall of buses" moved off Main Street, PVTA has moved the transfer point to the Springfield Bus Terminal at the corner of Main Street and Liberty Street. With the change of Main Street, bus service had to be changed to deal with the one way section of Main Street. The "Downtown Loop" was put in to service the commuters and residents that work and live along Main Street and would find it difficult to get to the Dwight Street bus stops to catch their bus. With that in mind PVTA began service; south on Dwight Street taking a right onto East Court Street, a right onto Main Street, a right onto Harrison Avenue to serve the Harrison South bus stop, and finally a right back onto Dwight Street; called the "Downtown Loop".

METHODOLOGY

On August 10 and 15, 1995, PVPC staff conducted a survey in downtown Springfield, Massachusetts. The survey consisted of three parts, 1) An on-board survey of the buses doing the "Downtown Loop". The survey consisted of one question and was asked to the passengers that were on the bus when the surveyor boarded the bus at the Dwight Street stop just before Harrison Avenue, and any passengers that got on at the Dwight Street stop just before East Court Street. The question asked how the passengers felt about the buses doing this loop between the hours of three and six in the afternoon. There were three possible responses "pro-loop", "anti-loop", or "neutral". The surveyor then asked for comments pertaining to the loop. 2) A surveyor was stationed at the Harrison South bus stop to ask people waiting for a bus between 3:00-6:00PM how they felt about the "Downtown Loop". Then they were asked if they would like to fill out a quick two question survey card. The first question pertained to how many times a week they ride PVTA. The second question asked them if they would be willing to walk to the Dwight Street stop if the buses did not serve this stop as they presently do. Then there was a place for any comments and if they wanted they could write down their name and address in a space provided. These cards were then collected by the surveyor. 3) Also at the Harrison South stop another surveyor was conducting on/off counts of the buses as they served the stop.

The selection of which buses to survey was done so that each route that goes through the "Downtown Loop" was surveyed at least once. Of the XX buses that go through the Harrison South stop between 3:00-6:00PM, twenty-three were used for this survey.

Appendix 3

The on board component of the survey resulted in 23 usable passenger checks. The trips surveyed, are shown in **Table 1**. The time indicated is the scheduled departure time from the Springfield Bus Terminal.

Table 1
LIST OF BUSES SURVEYED

DAY	TIME	BLOCK	DESTINATION
Th	3:00	01-2	Sumner-Allen
Th	3:00	06-3	Ludlow via Bay-Pasco Road
Th	3:30	08-3	Orange-Plumtree
Th	3:40	03-2	King-Westford Circle
Th	4:00	07-1	State-Boston Road-Eastfield Mall
Th	4:15	401-5	North Wilbraham
Th	4:30	05-1	Dickinson Street
Th	4:40	401-7	North Wilbraham
Th	5:00	13-1	Maple Street
Th	5:15	403-4	Wilbraham Road-Parker-Eastfield
Th	5:30	02-2	Belmont Avenue
Th	5:40	04-2	Walnut-College
Th	6:00	02-3	Belmont-Dwight Road
Th	6:00	403-6	Wilbraham Road-Parker-Eastfield
Tu	3:00	02-1	Belmont-Dwight Road
Tu	3:20	07-2	State-Boston Road-Eastfield Mall
Tu	3:40	04-1	Walnut-College
Tu	4:00	01-1	Sumner-Allen
Tu	4:20	06-1	Ludlow via Bay-Pasco-Williams
Tu	5:00	08-1	Orange-Plumtree
Tu	5:30	09-1	St. James Avenue
Tu	5:40	03-3	King-Westford Circle
Tu	6:00	01-2	Sumner-Allen

A total of 340 passengers were surveyed (222 on Thursday, August 10; 118 on Tuesday, August 15). Each passenger was asked how they felt about the Loop. A passenger could vote either “pro-loop”, “anti-loop”, or “neutral”. The results are shown in **Table 2**, and are shown graphically in **Figure 1**.

Appendix 3

Table 2
PASSENGER OPINION: ON-BUS

	Pro-loop	Anti-loop	Neutral
Thursday	11	175	39
Tuesday	6	79	33
TOTAL	17	254	72

This data indicates that the majority of the people on the buses oppose the Loop. A number of comments were received from the passengers surveyed, including the following:

- The Loop is a waste of time, it makes my ride longer.
- The Loop is an inconvenience for the majority of people.
- The Loop is confusing, it makes no sense.
- The old system was better, it was simpler.
- Main Street should be a two-way street.
- There is not enough service this summer, need more trips.
- Buses are overcrowded.
- The walk to Dwight Street isn't all that bad.
- The Loop is good for the elderly.
- Transferring is difficult - both downtown and at the bus terminal.
- Need security at the Springfield Bus Terminal - especially at night.
- The Loop is a waste of fuel, time, and taxpayer money.
- Downtown business has been hurt by the changes.
- It is difficult to get to work on time.

Passengers on Harrison Avenue were also solicited for their input. During the survey, a total of XXX passengers used the Harrison South bus stop (YYY on Thursday; ZZZ on Tuesday). These passengers were also asked how they felt about the loop, and given the same three choices. These results are presented in **Table 3** and are shown graphically in **Figure 2**.

Table 3
PASSENGER OPINION: AT-STOP

	Pro-loop	Anti-loop	Neutral
Thursday	29	84	21
Tuesday	28	29	30
TOTAL	57	113	51

On Harrison Avenue, passengers were invited to fill out a Passenger Comment Card while they waited for their bus to arrive. This comment card asked how many trips per week the passenger makes by bus, and whether or not the passenger would be willing to walk to Dwight Street to catch his/her bus. Ample space was provided for comments. A total of 105 comment cards were completed during the two day survey.

Appendix 3

The data indicates that the average passenger makes approximately WW.W trips per week on PVTA buses. When asked if they would be willing to catch the bus on Dwight Street, instead of Harrison Avenue, passengers said “no” by a two-to-one margin, as shown in **Figure 3**. This conflicts with the data derived from the opinion survey conducted simultaneously at the Harrison South bus stop. According to the data, the average passenger boarding a bus on Harrison Avenue, between the hours of 3:00 and 6:00 on a given weekday, rides the bus WW.W times per week, does not approve of the Downtown Loop, but would refuse to catch their bus on Dwight Street if the Loop were to be eliminated. Passenger comments elude to the reason for this discrepancy. A number of passengers vehemently oppose the new transit center at the Springfield Bus Terminal, and the one-way Main Street trial. These passengers apparently feel that if the Loop were to be eliminated, service would return to normal, and they would continue to board their bus on Harrison Avenue. The full text of all comments received from passengers at the Harrison South bus stop, are shown in **Table 4**.

The third component of the survey, was a count of boardings and alightings at the Harrison Avenue bus stop.

Figure 1

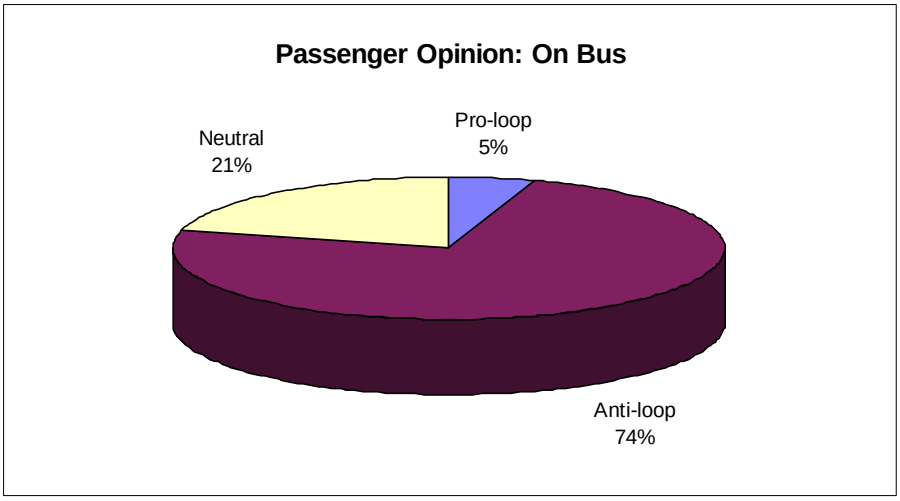
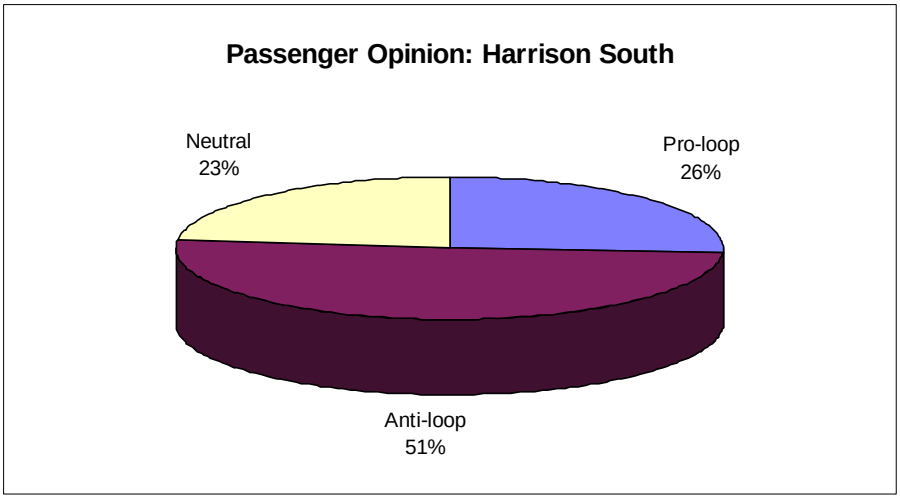
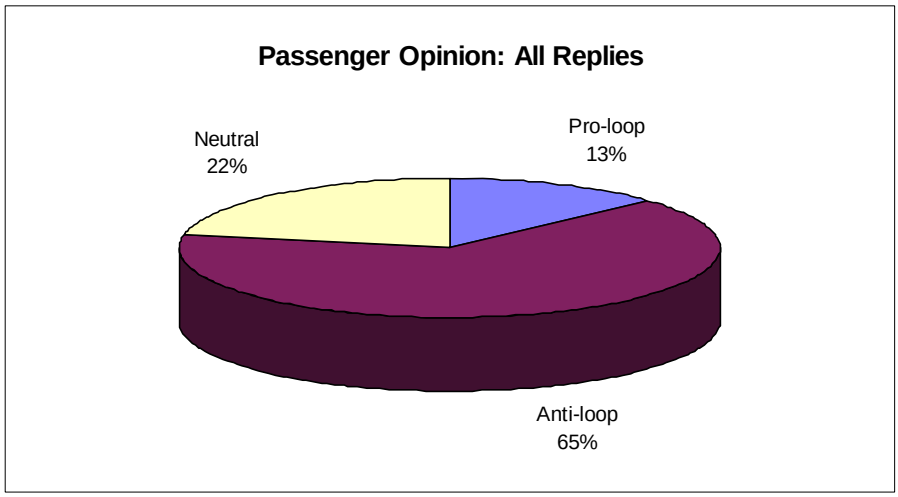


Figure 2



Appendix 3

Figure 3



Appendix 4

PIONEER VALLEY PLANNING COMMISSION

Timothy W. Brennan, Executive Director
26 Central Street-Suite 34, West Springfield
Massachusetts 01089-2787
Tel.: (413) 781-6045
Fax: (413) 732-2593
www.pvpc.org

August 31, 2006

Allen Chwalick, Director
Springfield Department of Public Works
70 Tapley Street
Springfield, MA 01104

Dear Allen Chwalick,

At your request, the Pioneer Valley Planning Commission has reviewed the proposal of the Pioneer Valley Transit Authority to adjust the transit routes and the stops they serve in downtown Springfield. It is our understanding that PVTA seeks to deemphasize its presences at the Springfield Bus Terminal and will instead promote transfers at the existing stops at Main and Harrison (inbound/outbound) and Harrison and Main (inbound/outbound) bus stops.

This initiative presents an opportunity to the city to increase the vitality of the downtown business district while improving the service provided to many city residents who use the service of PVTA each day. On its face value, the change proposed by PVTA is not significant; only a 20% increase in the number of buses through out the day. Currently these bus stops are already served by the 80% of the trips today. However, as is the case with any changes, challenges do exist and the Pioneer Valley Planning Commission suggests a number of measures to be undertaken by PVTA and the City to ensure the success of this effort.

Understanding that the major change presented by this proposal is an increase in the number of passengers using these bus stops, PVPC has sought to assess the capability of the existing stops to handle more riders. This analysis did determine that the stops with some changes could handle the additional passengers. These modifications include moving the bus shelter at the outbound Harrison and Main Stop and improving the pedestrian connections between the outbound Main Street Stops and Harrison and Main Stops. These recommendations as well bus stop locations are discussed in the attached memorandum.

Additional recommendation for PVTA and the City of Springfield include:

Scheduling and Operational Issues

The significance of this change to passengers and drivers should not be underestimated. Public schedules listing the times that the buses will be traveling through the downtown

stops must be created in advance of the change. These times are called 'time points' and are also used by the bus operators in order to maintain their on time performance. It is PVPC's position that for this move to be successful, the new 'time points' need to be published for both passengers and employees.

In order to maintain the existing traffic flows in Downtown, buses will not be able to use Main and Harrison stops as layover points. Buses should only be at the stops for as long as it takes to board and alight passengers. Separate locations downtown should be used as the end of the line layover points for routes terminating downtown.

PVTA should ensure that the long standing policy on limited school 'Trippers' buses in downtown would not be effected by this change. Currently trippers are not scheduled through downtown and school passes are not valid for transfers at Springfield Bus Terminal.

Supervision and Security

PVTA has indicated that it would deploy supervisors to Main and Harrison bus stops to monitor the operations of the buses, ensure that buses move through the stops efficiently, and to answer customer questions. This should be an on going activity with PVTA committing to providing the supervision for a certain number of hours per day. In addition PVTA and the City should consider additional measures, such as increased presence of security or police officers to ensure the security of the stops.

Passenger amenities and maintenance

PVTA and the City should agree on the appropriate passenger amenities required at each stop. New Shelters, schedule holders, benches and trash receptacles should be considered where needed. The designs of these street furniture elements coordinated with other city project such as the improvements to the State Street Corridor. Further a mechanism for trash removal and other maintenance should be established.

Bus Stops and Parking

During a number of site visits to the Main and Harrison stops this summer it was observed that at many times cars and delivery trucks are parking in the bus stops. It is suggested that the City work with PVTA to determine the stops downtown, delineate them, post no parking signs if missing and then enforce the parking regulations. Cars and delivery trucks parking in the bus stops forces the buses to board and alight passengers from the travel lanes often blocking traffic rather than from the side of the street if the stops were clear. The efficient operation of the buses through downtown increases the flow of traffic downtown. This will be critical to minimizing the impacts of this proposed change on existing traffic operations.

Survey

While be believe that this change can be implemented with minimal impacts on the existing traffic flows, PVPC will perform turning movement counts during the morning and afternoon peak hours at the intersections of Main St. with Harrison Ave. prior to and immediately after this change. In addition, PVPC will conduct a survey of the bus stops

to determine the level of their use as well as to assess any pedestrian impacts of the changes. PVPC will document the results of the turning movement counts as well as the survey in reports to the City and PVTA.

In summary the Pioneer Valley Planning Commission believes that the changes proposed by PVTA represent an opportunity for the City and PVTA if implemented in careful and measured way. The longer term success of this effort will require an effective partnership between the City and PVTA to ensure basic issues like trash collection and parking enforcement are addressed. Please feel free to contact me if you have any questions about this analysis.

Sincerely,

Tim Doherty
Senior Transit Planner/Manager

CC: Richard J. Kos, PVTA
David Panagore, City of Springfield
Tim Brennan, PVPC
Dana Roscoe, PVPC
Tom Narrigan, SATCo

Appendix 4

MEMORANDUM

TO: TIM DOHERTY

FROM: JESSICA ALLAN

SUBJECT: MAIN STREET / HARRISON AVENUE INTERSECTION, SPRINGFIELD

DATE: 8/31/2006

Per your request, I have conducted a site visit at Main Street and Harrison Avenue to assess whether this area of Springfield would be able to withstand an additional pedestrian traffic as a result of PVTA service changes in this area.

An increase in pedestrian traffic would be a result of increased ridership of approximately 1,000-2,000 people from the additions of the P11, P20, P21, and B4 bus lines at this intersection. The Main Street / Harrison Avenue intersection currently hosts four PVTA bus stops – the eastbound and westbound stops of the G3, B6, B7, B13, R10, and R14 bus routes on Harrison Avenue and the northbound and southbound stops of the G1, G2, G5, and G8 bus routes on Main Street. According to your sources, this intersection is often a main transfer spot for riders along these bus lines.

This initial assessment reports and provides recommendations on the current design of this intersection to handle the increased ridership and potential transfers. This memo provides information and recommendations in three topic areas for these four bus stops: crosswalks and pedestrian flow; bus shelters and space capacity; and amenities design.

Harrison Avenue: Harrison Avenue hosts the eastbound and westbound stops for the G3, B6, B7, B13, R10, and R14 bus routes. The eastbound stop is located on the northern edge on Boland Square. Boland Square is a well designed urban plaza with plantings and seating, and is currently utilized by riders waiting for the G3, B6, B7, B13 lines and the G1, G2, G5, G8 lines on Main Street. This plaza currently provides sufficient space for current riders waiting for these lines on both Harrison and Main. The assessment predicts that this plaza could sufficiently handle an increase of ridership with the addition of the P11, P20, and B4 lines on the eastbound stop.

However, there is concern that an increase in ridership would impede pedestrian flow along the sidewalk at the eastbound stop. The location of the bus shelter and amenities like a trash can and lightpost could cause pedestrian "traffic jams" at this eastbound stop. I recommend that

PVTA consider moving the bus shelter to the Bollan Square plaza in order to keep the sidewalk free of pedestrian congestion.

Harrison Ave. eastbound bus stop

Boland Square

The westbound G3, B6, B7, B13 stop along Harrison Avenue also appears to have sufficient space to handle an increase in pedestrian traffic with the addition of the P21 bus line. There is additional shading and seating available at this location due to the planting bed next to the bus shelter. The width of the sidewalk also appears to be sufficient. Riders transferring to the G1, G2, G5, G8 lines along Main Street from the westbound line also have the benefit of a mid-block crosswalk which can quickly and efficiently move riders from the Harrison Ave lines to the Main Street lines.

Finally, additional ridership along the G3, B6, B7, B13, R10, and R14 routes on Harrison Ave. could also benefit the businesses located between Harrison Ave and East Court Street.

Main Street: Main Street hosts the northbound and southbound stops of the G1, G2, G5, G8 bus routes. PVTA proposes that an additional three bus routes, the P20, P11, and B4 be added to the northbound stop. The assessment finds that the northbound stop could sufficiently handle an increase of ridership, due in part to its prime location along the southern edge of Boland Square. Sidewalk space appears to be sufficient, and an increase in commuters from the additional lines will most likely not block the flow of pedestrian traffic along Main Street.

A greater concern is for the location of amenities, particularly the mail boxes, at the northbound stop. While the mail boxes may provide a sense of pedestrian safety to passengers waiting for the bus along a busy Main Street, the location of these mail boxes is odd. They are placed directly next to the bus stop sign, and appear to conflict with the loading and unloading zone for bus passengers. A bus on the northbound line needs to pull at least 20' beyond the designated bus stop in order to safely load and unload passengers and avoid the mail boxes. I recommend that PVTA conduct further analysis to see whether these mail boxes should be moved to provide a safer loading and unloading zone to the new passengers that may utilized this bus line.

Appendix 4

Amenities at Main St. northbound stop

Passengers loading the northbound G8 line

The southbound G1, G2, G5, G8 stop along Main Street also appears to have sufficient space to handle an increase in pedestrian traffic and riders to these lines. The major recommendation for this location would be for the City of Springfield to consider a mid-block cross walk adjacent to this bus stop, to allow riders to easily and efficiently transfer from the bus lines on Harrison Street to Main Street. For safety reasons, the City may prefer for pedestrians to use the crosswalks at the lights at Main and Harrison; however, PVTA should coordinate the bus schedules on these two lines to ensure pedestrians have enough time between transfers to safely move from the G3, B6, B7, B13 routes to the G1, G2, G5, G8 routes.

Conclusions: This initial assessment concludes that PVTA proposal to shift four bus lines (P11, P20, P21, B4) to the Main Street / Harrison Avenue is feasible, based on the existing design of the urban landscape. The existence of Boland Square is a huge benefit, and will provide a sufficient space for the additional commuters that will ride and transfer to these bus lines.

Summary of buses scheduled to stop at four locations in Downtown Springfield

Harrison & Main Inbound	
Total number of trips =	189
Times 2 buses scheduled	16
Times 3 buses scheduled	21
Times 4 buses scheduled	12
Times 5 buses scheduled	5
Times 6 buses scheduled	0
Times 7 buses scheduled	0
Number to blocks where more than one bus is scheduled	54
Number of 10 minute blocks	111
% of times when more than one bus is scheduled to stop	49%

Harrison & Main Outbound	
Total number of trips =	251
Times 2 buses scheduled	8
Times 3 buses scheduled	17
Times 4 buses scheduled	16
Times 5 buses scheduled	15
Times 6 buses scheduled	2
Times 7 buses scheduled	7
Number to blocks where more than one bus is scheduled	65
Number of 10 minute blocks	109
% of times when more than one bus is scheduled to stop	60%

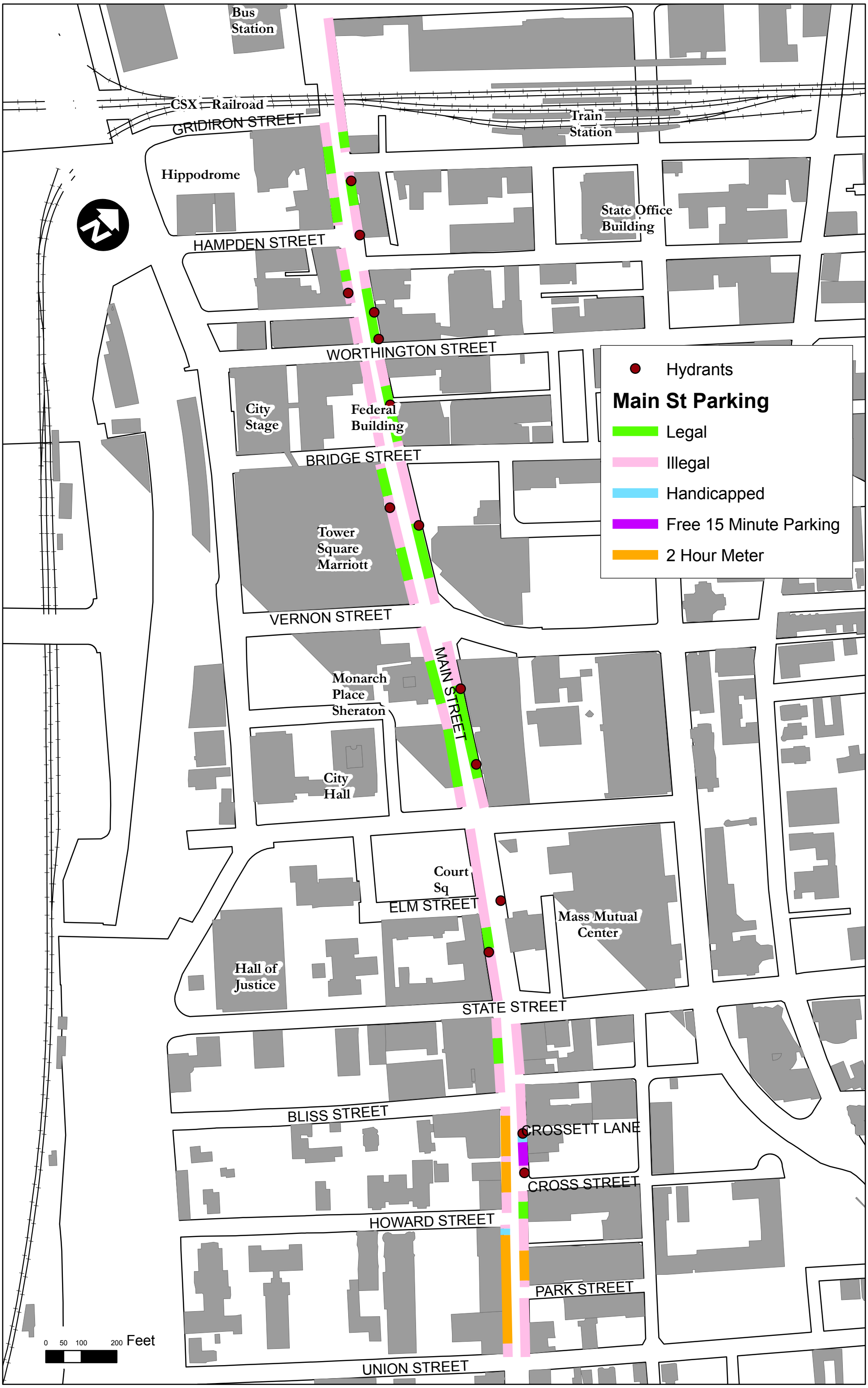
Main & Harrison	
Total number of trips =	179
Times 2 buses scheduled	14
Times 3 buses scheduled	7
Times 4 buses scheduled	1
Times 5 buses scheduled	7
Times 6 buses scheduled	0
Times 7 buses scheduled	0
Number to blocks where more than one bus is scheduled	29
Number of 10 minute blocks	101
% of times when more than one bus is scheduled to stop	29%

Main & Tillie's	
Total number of trips =	124
Times 2 buses scheduled	11
Times 3 buses scheduled	21
Times 4 buses scheduled	17
Times 5 buses scheduled	1
Times 6 buses scheduled	0
Times 7 buses scheduled	0
Number to blocks where more than one bus is scheduled	50
Number of 10 minute blocks	102
% of times when more than one bus is scheduled to stop	49%

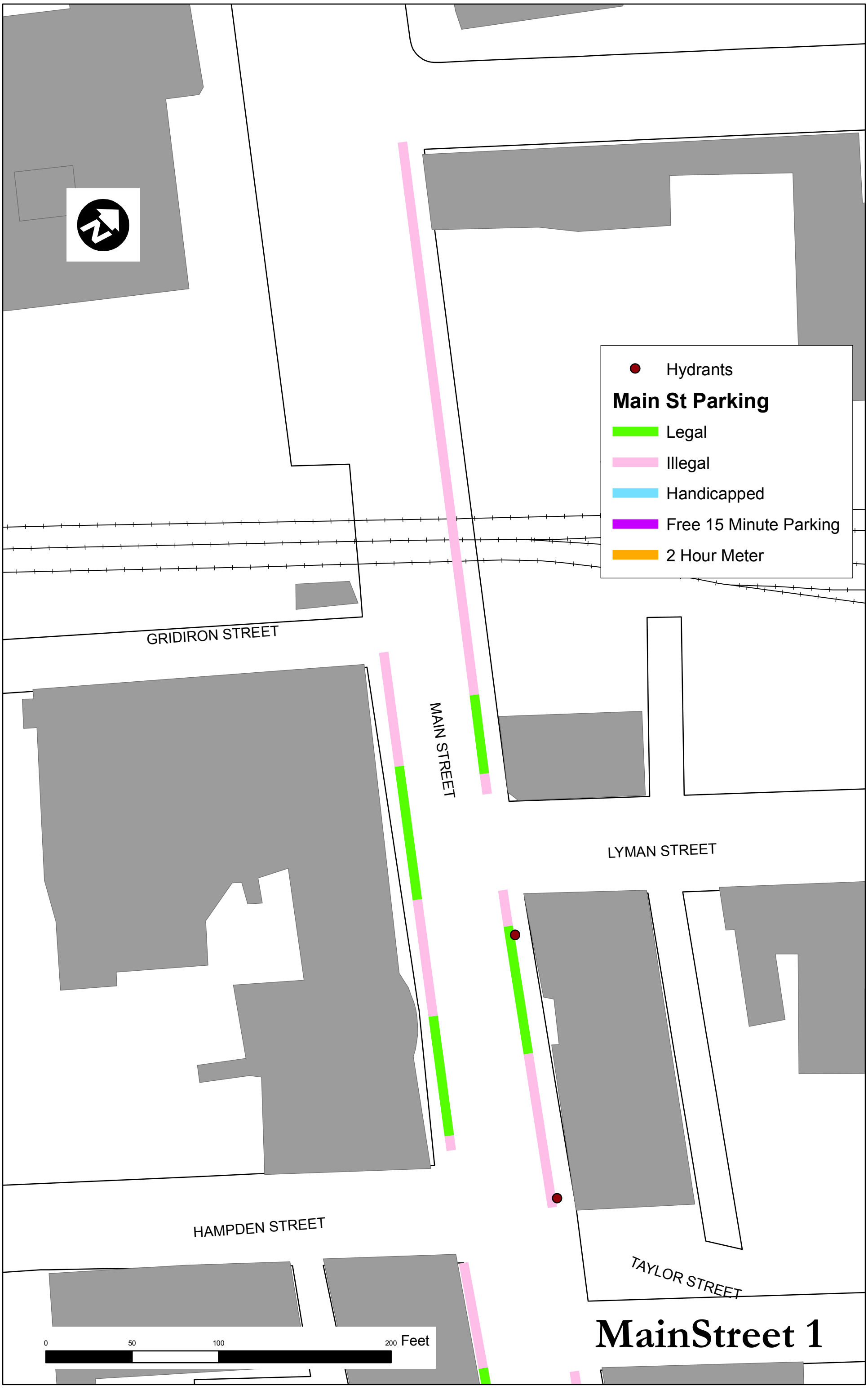
The number of buses scheduled for each stop is over a 10 minute period or block.
The number of blocks for each stop is listed as well as
the percentages of times when more than one bus is scheduled to stop at the same time.

Total number of buses	743
Number of New Buses	142
	0.191117

Appendix 5


Bus Station
CSX Railroad
GRIDIRON STREET
Train Station
Hippodrome
State Office Building
HAMPDEN STREET
WORTHINGTON STREET
City Stage
Federal Building
BRIDGE STREET
Tower Square Marriott
VERNON STREET
MAIN STREET
Monarch Place Sheraton
City Hall
Court Sq
ELM STREET
Mass Mutual Center
Hall of Justice
STATE STREET
BLISS STREET
CROSSETT LANE
CROSS STREET
HOWARD STREET
PARK STREET
UNION STREET
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0 50 100 200 Feet

Appendix 5


Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
GRIDIRON STREET
MAIN STREET
LYMAN STREET
HAMPDEN STREET
TAYLOR STREET
0
50
100
200
Feet
MainStreet 1

Appendix 5


PDEN STREET
TAYLOR STREET
FORT STREET
MAIN STREET
WORTHINGTON STREET
BRIDGE STREET
Federal Building
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0
50
100
200 Feet
MainStreet 2

Appendix 5


Federal Building
BRIDGE STREET
MAIN STREET
VERNON STREET
HARRISON AVENUE
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0
50
100
200 Feet
MainStreet 3

Appendix 5


HARRISON AVENUE
MAIN STREET
COURT STREET
EAST COURT STREET
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0
50
100
200
Feet
MainStreet 4

Appendix 5


Court
Sq
ELM STREET
MAIN STREET
STATE STREET
STOCKBRIDGE STREET
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0
50
100
200 Feet
MainStreet 5

Appendix 5


STOCKBRIDGE STREET
BLISS STREET
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
MAIN STREET
CROSS STREET
HOWARD STREET
PARK STREET
0
50
100
200
Feet
MainStreet 6

Appendix 5


CROSS STREET
HOWARD STREET
MAIN STREET
PARK STREET
UNION STREET
WILCOX STREET
Hydrants
Main St Parking
Legal
Illegal
Handicapped
Free 15 Minute Parking
2 Hour Meter
0
50
100
200 Feet
MainStreet 7

Appendix 6

Cost Estimate: Relocate Main St PVTA Service to Alternate Streets

10/14/2008

DOWNTOWN SPRINGFIELD REROUTING (1300 MAIN ST.)

Route	Description of Change	Total Miles	Cost per Mile	Hours per Route per day	Cost per Hour	Total Days*	Mileage Cost	Hourly Cost		Total Cost
1	Additional mileage	8,139	$1.05		$40.00		$8,546			$8,546
2	Additional mileage	7,624	$1.05		$40.00		$8,005			$8,005
2	Additional scheduled bus	44,064	$1.05	12.00	$40.00	306	$46,267	$146,880		$193,147
5	Additional mileage	2,231	$1.05		$40.00		$2,342			$2,342
8	Additional mileage	2,324	$1.05		$40.00		$2,441			$2,441
Extra	Daily fill for late buses	14,688	$1.05	4.00	$40.00	306	$15,422	$48,960		$64,382
Total		**79,070**					**$83,024**	**$195,840**		**$278,864**

** Excludes Sundays*

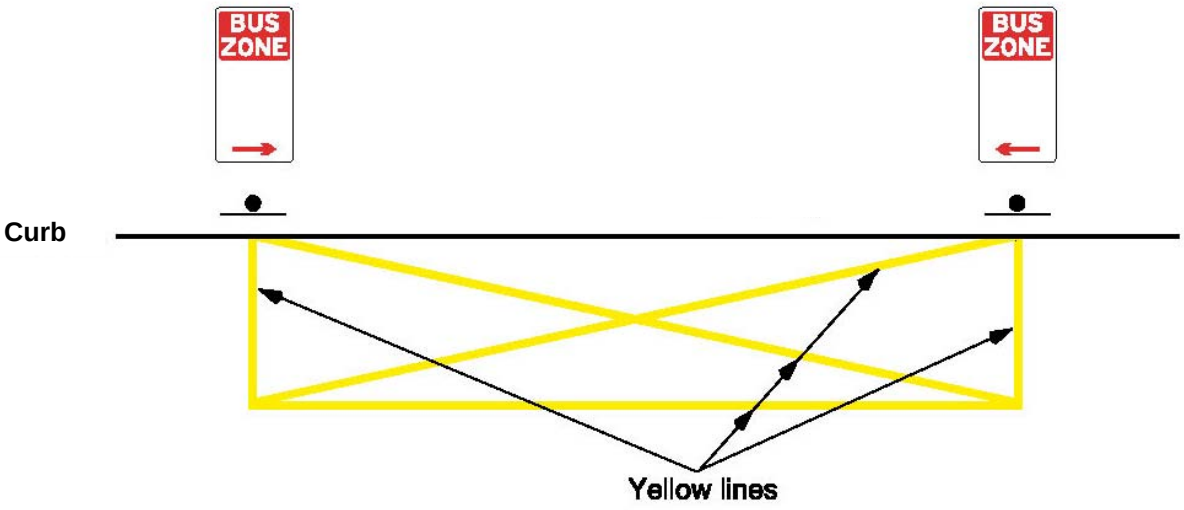
	Trips Per Day			Add'tl Miles per	Number of Days			
Route	Weekday	Saturday	Sunday	Trip	Weekday	Saturday	Sunday	Total Miles
1	94	52	10	0.3	254	52	55	8,139
2	89	54	0	0.3	254	52	55	7,624
2	12	12	0	12	254	52	55	44,064
5	26	16	0	0.3	254	52	55	2,231
8	26	22	0	0.3	254	52	55	2,324
Extra	4	4	0	12	254	52	55	14,688

	DAY COUNT					Holiday Sunday Service?
	Weekday	Saturday	Sunday	Holiday	Total	
Jul-07	21	4	5	1	31	No
Aug-07	23	4	4	0	31	
Sep-07	19	5	5	1	30	No
Oct-07	22	4	4	1	31	Yes
Nov-07	21	4	3	2	30	Yes/No
Dec-07	20	5	5	1	31	No
Jan-08	22	4	4	2	32	No/Yes
Feb-08	21	4	4	0	29	
Mar-08	21	5	5	0	31	
Apr-08	22	4	4	0	30	
May-08	21	5	4	1	31	No
Jun-08	21	4	5	0	30	
	254	**52**	**52**	**9**	**367**	6 = No service
						3 = Sunday service

Appendix 7: Bus Stop Signage

R7-107a

R7-107

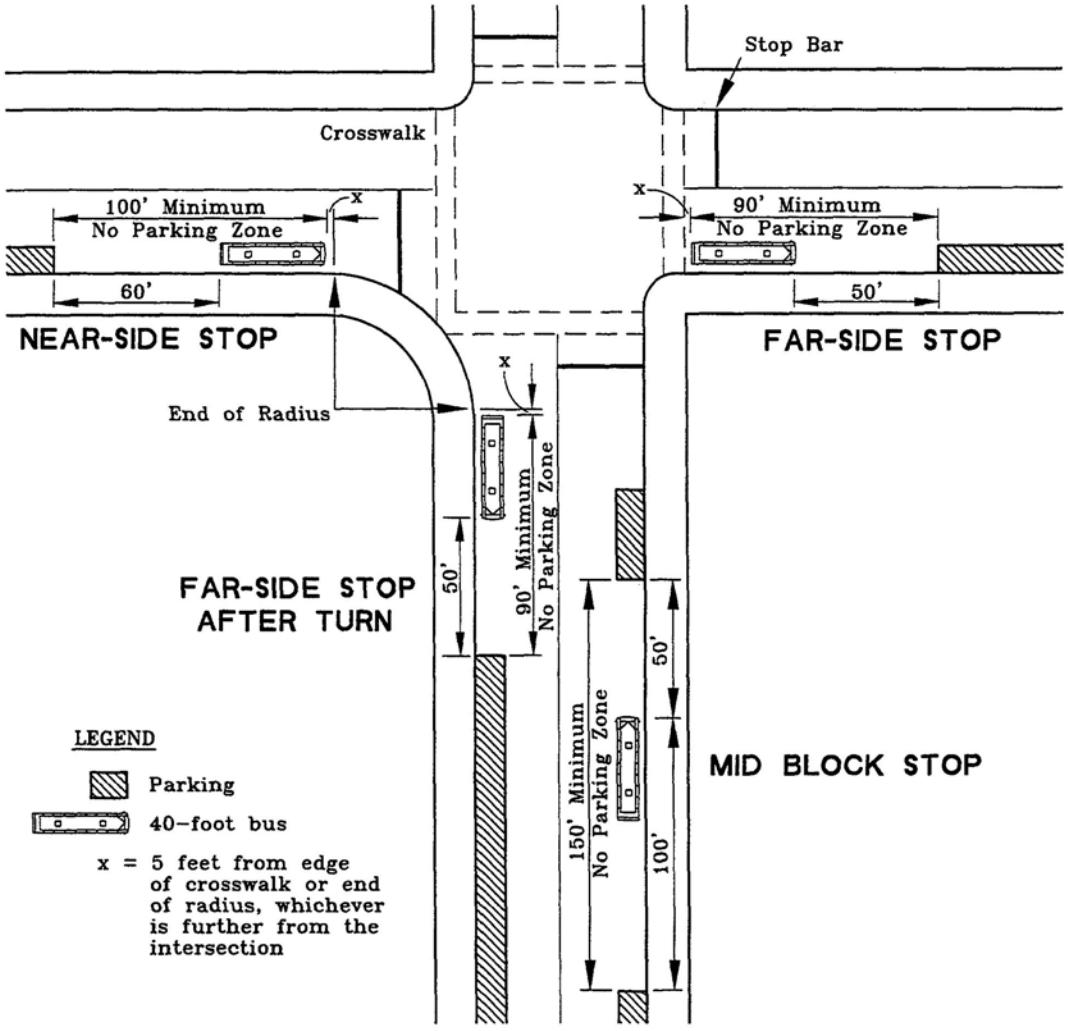


Source: *www.vicroads.vic.gov.au/NR/rdonlyres/FC0338A1-AE4A-4471-8D75-99AE36C6078F/0/vrpin013261.pdf*

Appendix 8

STREET-SIDE FACTORS

BUS STOP ZONE DESIGN TYPES—Curb-Side Bus Stop Zone Dimensions



Notes:

1) Add 20 feet to bus stop zones for an articulated bus.
2) Increase bus stop zone by 50 feet for each additional standard 40-foot bus or 70 feet for each additional 60-foot articulated bus expected to be at the stop simultaneously. See Table 3 for the suggested bus stop capacity requirements based on a range of bus flow rates and passenger service times.

Figure 3. Typical Dimensions for On-Street Bus Stops.

Source: Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops. 1996

Appendix 9: Manual of Uniform Traffic Control Devices (excerpt)
2004

Section 3B.21 Curb Markings

Support:
Curb markings are most often used to indicate parking regulations or to delineate the curb.

Standard:
Signs shall be used with curb markings in those areas where curb markings are frequently obliterated by snow and ice accumulation unless the no parking zone is controlled by statute or local ordinance.

Where curbs are marked, the colors shall conform to the general principles of markings (see Section 3A.04).

Guidance:
Except as noted in the Option, when curb markings are used without signs to convey parking regulations, a legible word marking regarding the regulation (such as "No Parking" or "No Standing") should be placed on the curb.

Option:
Curb markings without word markings or signs may be used to convey a general prohibition by statute of parking within a specific distance of a STOP sign, driveway, fire hydrant, or crosswalk.

Guidance:
Retroreflective solid yellow markings should be placed on the noses of raised medians and curbs of islands that are located in the line of traffic flow where the curb serves to channel traffic to the right of the obstruction.

Retroreflective solid white markings should be used when traffic may pass on either side of the island.

Option:
Local highway agencies may prescribe special colors for curb markings to supplement standard signs for parking regulation.

Support:
Since yellow and white curb markings are frequently used for curb delineation and visibility, it is advisable to establish parking regulations through the installation of standard signs (see Sections 2B.39 through 2B.41).

Where the curbs of the islands become parallel to the direction of traffic flow, it is not necessary to mark the curbs unless an engineering study indicates the need for this type of delineation.

Curbs at openings in a continuous median island need not be marked unless an engineering study indicates the need for this type of marking.

Appendix 10: Guidelines for the Location and Design of Bus Stops

Chapter 3

STREET-SIDE FACTORS

PLACEMENT CONSIDERATIONS—Stop Spacing

Bus stop spacing has a major impact on transit vehicle and system performance. Stop spacing also affects overall travel time, and therefore, demand for transit. In general, the trade-off is between:

Close stops (every block or 1/8 to 1/4 mile), short walk distances, but more frequent stops and a longer bus trip.	Versus	Stops farther apart, longer walk distances, but more infrequent stops, higher speeds, and therefore, shorter bus trips.

The determination of bus stop spacing is primarily based on goals that are frequently subdivided by development type, such as residential area, commercial, and/or a central business district (CBD). Another generally accepted procedure is placing stops at major trip generators. The following are typical bus stop spacings used. The values represent a composite of prevailing practices.

Environment	Spacing Range	Typical Spacing
Central Core Areas of CBDs	300 to 1000 feet	600 feet
Urban Areas	500 to 1200 feet	750 feet
Suburban Areas	600 to 2500 feet	1000 feet
Rural Areas	650 to 2640 feet	1250 feet

Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops 2002 National Academies, Washington DC

STREET-SIDE FACTORS

Chapter 3

PLACEMENT CONSIDERATIONS—General Considerations

After ridership potential has been established, the most critical factors in bus stop placements are safety and avoidance of conflicts that would otherwise impede bus, car, or pedestrian flows.

In selecting a site for placement of a bus stop, the need for future passenger amenities is an important consideration (see Chapter 4). If possible, the bus stop should be located in an area where typical improvements, such as a bench or a passenger shelter, can be accommodated in the public right-of-way. The final decision on bus stop location is dependent on several safety and operating elements that require on-site evaluation. Elements to consider in bus stop placement include the following:

Safety:

- Passenger protection from passing traffic
- Access for people with disabilities
- All-weather surface to step from/to the bus
- Proximity to passenger crosswalks and curb ramps
- Proximity to major trip generators
- Convenient passenger transfers to routes with nearby stops
- Proximity of stop for the same route in the opposite direction
- Street lighting

Operating:

- Adequate curb space for the number of buses expected at the stop at one time
- Impact of the bus stop on adjacent properties
- On-street automobile parking and truck delivery zones
- Bus routing patterns (i.e., individual bus movements at an intersection)
- Directions (i.e., one-way) and widths of intersection streets
- Types of traffic signal controls (signal, stop, or yield)
- Volumes and turning movements of other traffic
- Width of sidewalks
- Pedestrian activity through intersections
- Proximity and traffic volumes of nearby driveways

Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops 2002 National Academies, Washington DC

Chapter 3

STREET-SIDE FACTORS

PLACEMENT OF BUS STOP—Far-Side, Near-Side, and Midblock Stops

Determining the proper location of bus stops involves choosing among far-side, near-side, and midblock stops (see Figure 1). Table 1 presents a comparison of the advantages and disadvantages of each bus stop type. The following factors should be considered when selecting the type of bus stop:

- Adjacent land use and activities
- Bus route (for example, is bus turning at the intersection)
- Bus signal priority (e.g., extended green suggests far side placement
- Impact on intersection operations
- Intersecting transit routes
- Intersection geometry
- Parking restrictions and requirements
- Passenger origins and destinations
- Pedestrian access, including accessibility for handicap/wheelchair patrons
- Physical roadside constraints (trees, poles, driveways, etc.)
- Potential patronage
- Presence of bus bypass lane
- Traffic control devices

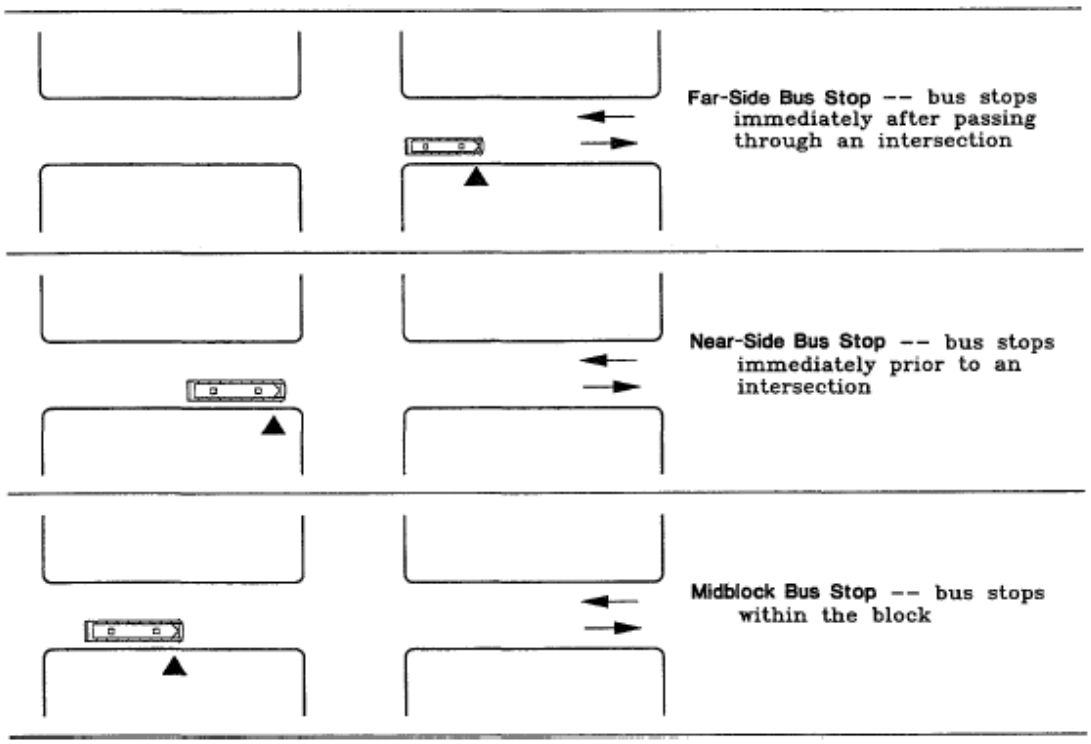
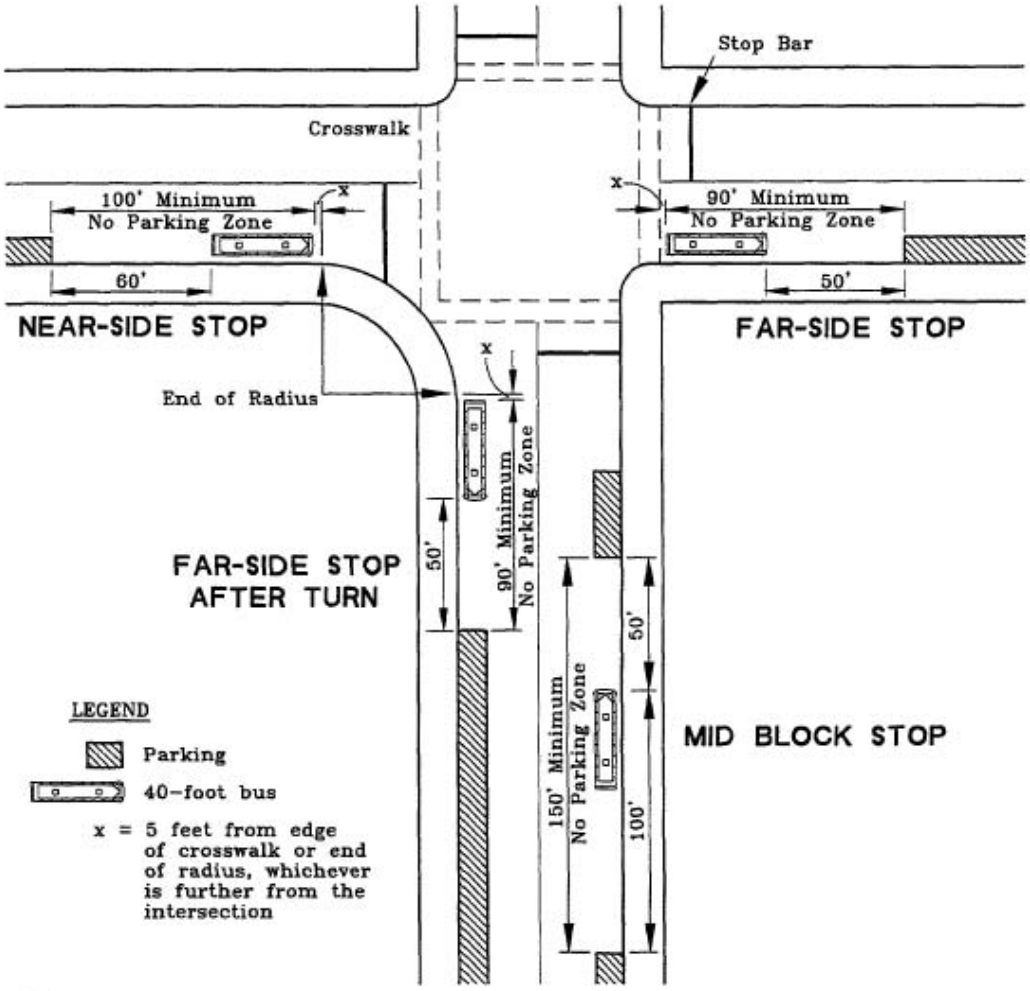


Figure 1. Example of Far-Side, Near-Side, and Midblock Stops.

Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops 2002 National Academies, Washington DC



Notes:
1) Add 20 feet to bus stop zones for an articulated bus.
2) Increase bus stop zone by 50 feet for each additional standard 40-foot bus or 70 feet for each additional 60-foot articulated bus expected to be at the stop simultaneously. See Table 3 for the suggested bus stop capacity requirements based on a range of bus flow rates and passenger service times.

Figure 3. Typical Dimensions for On-Street Bus Stops.

Transportation Cooperative Research Program Report No. 19: Guidelines for the Location and Design of Bus Stops 2002 National Academies, Washington DC