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Downtown Area Shuttle Study

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Prepared for:
The City of Iowa City

Prepared by:
Cole Chase, Becky Robertson
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Field Problems In Planning 102:209
Graduate Program in Urban and Regional Planning
The University of Iowa
May 14, 1997

Property of Urban and Regional Planning
University of Iowa
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Course Instructor: Peter Fisher
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THE DASH CONCEPT

The fundamental concept is to provide a free shuttle which circulates around and through downtown Iowa City during normal weekday business hours, as well as on Saturdays and on holidays.

The purpose of DASH, the Downtown Area SHuttle, is to connect downtown businesses with parking ramps and surface lots on the periphery of the downtown area in order to improve access to shopping and dining, and to facilitate an expanded permit parking system for downtown employees.

The shuttle will pick up passengers at designated stops approximately every ten minutes, and take them to within two blocks of virtually any business in the downtown area in a matter of minutes. The DASH vehicles will be small, friendly, accessible to persons with disabilities, and designed to fit the scale and pedestrian environment of Iowa City’s central business district.

DASH is designed to be operated by Iowa City Transit, but because of the issues and problems it is intended to address and solve, DASH should be considered more a component of Iowa City’s parking system than an extension of the transit system. The objectives of DASH are to:

- improve customer access to businesses--shoppers are able park in ramps outside the CBD and shuttle around at no cost;
- link the downtown core to the north and south side business districts;
- improve the public’s perception regarding accessibility, and parking availability in the downtown area;
• decrease congestion in the downtown area by increasing direct trips to parking ramps thus reducing the congestion caused by people circling around downtown, looking for a suitable metered parking space;

• increase the attractiveness for employee parking in parking facilities beyond the downtown core, making it feasible to reduce permit parking in the CBD and to free additional spaces for shoppers; and

• eliminate the dangers of walking alone in the evening shopping hours during winter months—adequate lighting insures safety at the stops.

For all of these reasons, DASH should help to maintain the convenient access necessary to maintain the economic vitality of the downtown area.
DASH SERVICE PROFILE

Name:  DASH is a name adapted from the City of Phoenix Shuttle System and is an acronym for Downtown Area Shuttle. For now, this is only a working title, and we propose a campaign that would involve the public's input on a name and logo/design scheme for the shuttle system.

Route:  DASH circulates through downtown in a figure eight pattern encompassing the Near North Side business district, the Mercy Hospital complex, and the Near South Side. The route serves all existing and planned peripheral parking structures and surface lots.

Schedule:  Monday-Friday, 7am–6pm, and Saturday, 10am–5pm Arrives at stops every 10 minutes.

Stops:  10 convenient stops indicated by DASH signs.

Fare:  Free

Vehicle Type:  Orion II, Orion Bus Industries, Inc.

Fuel:  DASH is powered by a Cummins B5.9 Diesel Engine

Capacity:  Twenty passengers seated; ten or more standing; two wheelchairs.

Vehicle Cost:  Approximately $180,000 to $220,000 per vehicle, ready for service.

Number of Vehicles:  Three. Two run the route, and one is reserved for backup.

Recommended Funding:  The recommended funding sources are: the City of Iowa City, the federal Intermodal Surface Transportation Efficiency Act (ISTEA), the University of Iowa, and a special tax assessment district.
1.0 Background Issues

1.1 Introduction

**DASH links the downtown core to the north and south side business districts.**

The basic concept is a free shuttle which circulates around and through downtown Iowa City during normal weekday business hours, as well as on Saturdays and on holidays. DASH will connect downtown businesses with parking ramps and surface lots on the periphery of the downtown area. The shuttle will pick up passengers at designated stops approximately every ten minutes, and take them to within two blocks of virtually anywhere in the greater downtown area in a matter of minutes. DASH is designed to be operated by Iowa City Transit, but because of the issues and problems it is intended to address and solve, DASH should be considered more a component of Iowa City’s parking system than an extension of the transit system. Similar shuttle systems have been very successful in other municipalities.

**DASH improves customer access to businesses. Shoppers are able park in ramps outside the CBD and shuttle around at no cost.**

In the sections that follow, we present the data and information necessary to evaluate the DASH concept and determine if it is a viable solution for Iowa City. The remainder of Section 1 discusses some background issues and explores the problems DASH is intended to address. In Section 2 we describe the recommended route structure and stop locations. In Section 3 we present the considerations involved in vehicle selection, as well as our recommendation for specific vehicles. Finally, in Section 4, we address three alternative financing arrangements.
1.2 Transportation Goals of Iowa City
The 1997 Iowa City Comprehensive Plan Draft contains several transportation related goals, which provide justification for implementing DASH.\(^1\) One goal is to maintain an efficient, well-managed, downtown automobile parking system which will strive to cope with downtown parking capacity issues. Another is to maintain a transportation system which enhances the quality of life of all citizens.\(^2\)

In general, the comprehensive plan recognizes the downtown core as well as the University of Iowa together as the activity and employment focal point of Iowa City. DASH would also promote environmental protection goals. For example, the shuttle would encourage linked transit and pedestrian trips around the downtown area as an alternative to automobile trips. Furthermore, DASH is an alternative mode of transportation which will indirectly enhance air quality by lessening vehicle emissions through reduced congestion and fewer automobile trips.

1.3 Public Perception of Parking

\textbf{DASH will improve the public’s perception of access and parking downtown.}

Several important issues are key to this study. One predominant issue is the widely held perception that the City provides insufficient parking downtown. Whether or not this perception is accurate, it persists. A recent study of Iowa City’s parking ramps has, in fact, demonstrated fairly low utilization rates. Despite this fact, the prevailing public perceptions mean that access and convenience are the primary issues at stake. In effect, the parking problem is a lack of easy access to downtown area businesses. Part of the problem is the experience of the walking journey between businesses and parking ramps. The Chauncey Swan parking ramp, for example, is only three blocks from the center of downtown. However, the walk requires crossing Gilbert Street, a primary North-South arterial, which
may act as a physical barrier to pedestrians. The Chauncey Swan parking ramp has the lowest utilization rates of any such facility in Iowa City.

1.4 Downtown Viability

An important and timely issue is the long term viability of the central business district and its ability to compete with other shopping opportunities. Many people, particularly business owners downtown, express concern that the number of shopping trips to the central business district (CBD) may decline due to perceptions that it is not easy to access businesses. Many people are concerned that Iowa City's commercial tax base may also decline as a result. Downtown Iowa City has many attractive features: the pedestrian mall, restaurants, and the University among other attractions. However, there is interest among the business community to increase the level of promotion of the downtown to enhance its attractiveness. We propose that a shuttle system offering a free and convenient ride from any parking facility in the downtown area to within two blocks of any business has the potential to positively affect the public's perception of access to the CBD. Improved access to shopping and dining throughout the downtown area is the primary goal of the DASH system.

1.5 Parking Ramp Utilization

The low utilization rates of parking ramps is of substantial concern. The City has invested roughly $12,000 per parking space; each space remaining empty throughout the day is a cost borne by the public. According to the Downtown Iowa City Parking Study, under-utilization of the
Capitol Street and Dubuque Street ramps alone represents an excess capacity of roughly 300 spaces, amounting to an unused capital asset of approximately $3.6 million. Adding the average of 100 vacant spaces at the Chauncey Swan ramp adds an additional $1.2 million, representing a total unused sunk cost of $4.8 million. Whatever the explanation for ramp under-utilization, given the outcry over parking downtown, it is apparent that steps need to be taken to increase the attractiveness of the parking ramps. The peripheral parking facilities, both ramps and surface lots, are the focus of DASH’s route structure. Persons will be able to park at any facility and wait no more than ten minutes for a ride into the CBD. Revenues to the parking system will increase with better utilization of the ramps; therefore there is a strong economic incentive to influence ramp utilization.

1.6 Metered Parking and Congestion

| By increasing direct trips to parking ramps, DASH will decrease congestion in the CBD caused by people looking for metered parking. |

In addition to increasing the use of and revenues from the parking system, DASH should reduce congestion in the CBD. People visiting the downtown area will know that the shuttle is available, and more will make direct trips to a parking facility. These direct trips will help reduce the additional congestion caused by people circling around downtown looking for a metered parking space. Better ramp utilization also means that more parking spaces will be available in the CBD, allowing for more customer parking.
1.7 Monthly Permit Parking

The City intends to expand the permit parking system by increasing the number of permit spaces in the downtown area. A new parking facility is scheduled for the Near Southside, which will be primarily used for monthly permit parking. An important goal of expanded permit parking is to attract future office development to downtown Iowa City. DASH can complement this goal by increasing access and making the peripheral ramps more attractive for employee parking. In the future it may be possible to shift the permit parking spaces nearer the CBD to the peripheral ramps in order to free up more spaces for short-term metering. Another consideration is the problem of meter-feeding in the downtown core, which is a city parking violation. It may be that employees of downtown businesses engage in meter feeding. If so, DASH may provide enough of an incentive, in terms of convenience, to reduce the number of violations which, in turn, will free even more spaces for short-term parking.

1.8 Summary

In summary, there are a number of parking and access issues which need to be addressed in some fashion. DASH is intended as a possible solution for some of the problems facing the city, as well as an opportunity to carry out some of the city’s current and long-term goals.
2.0 Route Selection

2.1 The Route

Purpose: To link the North and South sides of Iowa City with the CBD, and to provide convenient transportation between the CBD and peripheral

Several factors influenced the design of this route. To generate sufficient demand, we feel it necessary to operate this service without a fee. To this end a self-supported municipal improvement district (SSMID) is an appropriate mechanism to pay part of the operating cost (see Figure 2 in Financing).

Providing access to all businesses within the assessment area is necessary in order to justify the SSMID. The route is designed such that, within the SSMID area, no business is more than two blocks from a stop.

A second consideration is the necessity of keeping short time intervals between vehicles. We assumed that a maximum wait of ten minutes would be required if users were to drawn to the system. Therefore, a bus had to be able to make a half-circuit in about ten minutes. A figure-eight design allows two vehicles to cover the entire route with no more than a ten minute wait at any stop and an average wait time of only five minutes. This design also means that one DASH will travel down Washington Street every five minutes.

2.2 Physical Characteristics

The route is 2.7 miles in length with the North side segment 1.2 miles and the South side 1.5 miles. On the following page, Figure 1 shows the route and stops. Sample runs of the route have generated an average speed of 11 mph and an average cycle time of 21 minutes. Cycle time is the length of one full run of the route with simulated stops. Iowa City Transit averages 12 mph on existing routes served by full-size buses.
2.3 Stop Locations

In developing our route recommendation we also sought to utilize existing Iowa City bus stops whenever possible. The motivation behind utilizing existing stops is that these areas already have established lighting, curb access and, in most cases, protection from the elements. We recommend the construction of a new shelter only for the Prentiss and Dubuque Street stop; all other stops have adequate access to shelter. All existing stops will require the addition of a DASH sign.

Recommended stops:

- Van Buren St. & Market St. See Figure #1
- Market St. & Linn St. Existing stop
- Linn St. & Washington St. Existing stop
- Washington St. & Van Buren St. See Figure #2
- Van Buren St. & Burlington St. See Figure #3
- Gilbert St. & Court St. Existing stop
- Prentiss St. & Dubuque St.* See Figure #4
- Harrison St. & Clinton St. See Figure #5
- Court St. & Dubuque St. Existing stop
- Clinton St. & Washington St. See Figure #6

* shelter construction recommended
Figure 2: Van Buren Street and Market Street

The nearby location of Mercy Hospital transit shelter affords convenient protection from the elements. This stop has sufficient lightning and requires only the addition of DASH signage.

Figure 3: Washington Street and Van Buren Street

Proximity to the Iowa City Civic Center and the Chauncey Swan parking ramp affords convenient protection from the elements. This stop has sufficient lightning and requires only the addition of DASH signage.
Figure 4: Van Buren Street and Burlington Street

The Iowa City Recreation Center is nearby and affords convenient protection from the elements. This stop has sufficient lighting and requires only the addition of DASH signage.

Figure 5: Prentiss Street and Dubuque Street

This site affords no convenient protection from the elements, therefore, the construction of a new transit shelter is recommended. This stop has sufficient lightning but requires the addition of DASH signage.
Figure 6: Harrison Street and Clinton Street

The nearby location of the Federal Building and the Johnson County Courthouse afford convenient protection from the elements. This stop has sufficient lightning and requires only the addition of DASH signage.

Figure 7: Clinton Street and Washington Street

The nearby location of the Old Capitol Mall transit shelters affords convenient protection from the elements. This stop has sufficient lightning and requires only the addition of DASH signage.
2.4 Students

It is important to note that DASH is not intended to compete with University of Iowa Cambus, but to complement it. In order to prevent overlapping service, the western boundary of the route is Clinton Street.

University-generated pedestrian traffic is likely to have a significant impact on the daily operation of DASH. Student pedestrian peaks occur immediately before and after classes. Heavy pedestrian traffic may slow DASH service as a large number of pedestrians cross the DASH route.

Recognizing that the student population is an integral part of the Iowa City community, DASH does not attempt to exclude them as riders. DASH is designed to increase access to the downtown core. As a result, the route focuses on non-University, North and South side activity centers.

2.5 Summary

We feel that several elements we are critical to the operation of this downtown circulating shuttle: easy access for users, safety and convenience, short waits and rides, and service linking Iowa City’s Central Business District with North and South side activity centers. We feel that this route satisfies all of these and has the potential to increase the already attractive nature of shopping in Iowa City.
3.0 Vehicle Attributes

3.1 Primary Goal

Certain considerations led us to determine that a ramp-equipped vehicle would perform better than a lift-equipped vehicle. Lifts require less maintenance and ramps allow disabled persons to enter the vehicle faster. Only low-floor vehicles are capable of utilizing ramps so it was determined that a low-floor vehicle would best serve our needs. At the time of this study the Orion II, produced by Orion Bus Industries Inc., and the Efficient Low Floor (ELF) vehicle, produced by El Dorado International, were the only transit vehicles available in a low floor configuration.

Considerations:

- Environmental Impacts
- Service life
- Buy America requirements
- Americans with Disabilities Act (ADA) compliance
- Clean Air Act Amendment (CAAA) and Alternative fuels
- Ease of operation in the central business district (CBD)
- Flexibility for other use (para-transit and regular routes)

3.2 Environmental Impacts

In respect to environmental issues, one of our goals at the outset of this study was to investigate alternative power sources to the standard diesel powered engine. These included electric propulsion, propane and compressed natural gas (CNG). Unleaded gasoline was considered but eliminated since it is no longer available in the Orion II. The literature that we reviewed and the people...
that we have spoken with have discouraged us from recommending either
electric propulsion or natural gas powered vehicles.

The main arguments against alternative fuels are the high capital costs of fueling
stations, and the shortcomings of alternative technologies. For example, the City
of Phoenix operates a single Orion II electric vehicle and has recognized that it
can only operate three to four hours before recharging and is inoperable during
the summer months because of the need for extensive air-conditioning use. For
these reasons, we recommend diesel fuel to power the vehicles.

In the last five to ten years, concerns have arisen about the environmental
effects of emissions from diesel powered engines, specifically particulate matter.
Particulate matter (particulates) is essentially small pieces of grit that are found
in the road environment ranging from 0.1 to 0.2 micrometers (microns) to ten
times this size. A micron is equal to a thousandth of a millimeter. They can range
in size from smaller than 0.2 μm (micrometer) to 10 μm. All of the particles
released by diesel engines are smaller than 10 μm. Small and Kazimi conclude
that of all measurable air pollutants, particulates very well may be the most
detrimental to human health, particularly to persons with respiratory problems
like asthma.

It should also be noted that fine particulates (those of 2.5 μm or less) can remain
suspended in the air for days or even weeks and can travel deeply into the
lungs. However, though diesel engines emit all particles that are smaller than 10
μm, they account for only 0.43 of 1 percent of all particulates emitted by highway
vehicles. This is made up of particulate matter generated by the vehicle itself
(i.e., tailpipe emissions and dust from brakes and tires). This evidence shows
us that diesel powered engines do have an overall adverse effect on the health
of persons in contact with them. However, other recent evidence has shown that
more than 90% of the particulates found in the air are considered fugitive dust,
which includes road dust raised, but not generated by, vehicular traffic. This leads us to believe that the marginal negative impacts of having two diesel shuttles would be minimal in relation to fugitive dust.

3.3 Service Life
The service life of the vehicle is of critical importance. The Orion II is rated as a heavy duty transit vehicle, with a 12-year life-span. The ELF is rated as a medium duty transit vehicle, with only a 7-year/200,000 mile life. The transmissions available for the Orion II are the Allison AT 545 and the AT 545R. Independent articles have indicated that these Allison transmissions have a service life similar to full size transit coaches. The Ford transmission of the ELF is not as heavily constructed and similar articles have indicated that it has a significantly shorter service life. The difference in construction does not only mean that the ELF has a service life but that it will also require substantially more maintenance. Over the service life of the vehicle this additional maintenance will increase the ELF’s total cost, exceeding that of the Orion II for similar service levels.

3.4 Buy America
In accordance with Section 165 of the Surface Transportation Assistance Act (STAA) of 1982, assurances must be made that all manufactured products purchased with STAA funding meet certain conditions. The manufacturer must comply with the requirements contained in Section 651.13(b) of the Code of Federal Regulation 49 (CFR) and Section 165(b)(3) of the STAA. Both the ELF and the Orion II comply with this requirement.

3.5 Americans with Disabilities Act (ADA)
In accordance with the ADA, transit systems must provide an equal level of service to disabled persons, within one half mile of the service corridor. For those disabled persons able to reach an established stop, all vehicles will be
equipped with ramps and wheelchair restraints, making them accessible to wheelchairs. For those disabled persons unable to reach an established stop, dial-up service has been and will continue to be available from the county paratransit provider, Johnson County Seats.

3.6 Clean Air Act Amendment (CAAA) and Alternative Fuels
The Clean Air Act Amendment of 1991 establishes requirements concerning vehicle gas and vapor emissions. The standard operation of this vehicle will be at low speed with frequent stops and starts. This type of operation leads to increased emission of carbon monoxide. Compressed natural gas (CNG) is a cleaner burning fuel and use of CNG engines would lessen the impact of the vehicle emissions.

The ELF does not currently offer a CNG vehicle. The Orion II includes two engine options: of a Cummins B5.9 Diesel engine, and a Cummins B5.9G compressed natural gas (CNG) engine. Discussions with Ron Logsdon and Joe Fowler of Iowa City Transit have indicated that a CNG fueling facility would be both too costly and too slow for the needs of this project. CNG fueling takes about twice as long per gallon as a liquid fuel pump.

3.7 Ease of Operation
For this program, the vehicles will operate primarily in the central business district of Iowa City. This is a high traffic area; many streets are narrow and have on-street parking, and snow is a concern in the winter. Trips will be shorter than five blocks in most instances, and capacity demand is not expected to exceed twenty persons at any given time. These characteristics mean that a small, agile vehicle is needed.

The Orion II is available in two models, 25-ft and 21-ft lengths. The 21-ft vehicle has about 10% less capacity than the 25-ft vehicle. A variety of seats and layout
configurations are available allowing us to tailor the seating of the bus to our needs. Units of three seats can be folded up to permit access to wheelchair securement positions. A 25-ft vehicle, configured with all peripheral seating, would allow for twenty seats, with additional space for standees in the aisle. The Orion II is available with front wheel drive, for better winter handling.

The ELF has several seat configuration options that will meet the needs of this program. A peripheral seat configuration allows for eighteen seats, with additional space for "standees" in the aisle. The ELF is available with front wheel drive for better winter handling.

3.8 Flexibility
The proposed times of operation for this vehicle are Monday-Friday from 7am-6pm, and Saturdays from 10am-5pm. Since these vehicles will not be in constant use, it is important that they be capable of filling other transit needs. The scheduling is flexible enough to be altered to meet demand and we suggest that, during peak shopping periods, hours be extended to better serve demand.

The secondary function of these vehicles is most likely to be paratransit service. It is, therefore, important that these vehicles comply with the ADA and offer appropriate capacity and ease of use. Both the ELF and the Orion II are being used in other communities as paratransit vehicles. The size and equipment options make these vehicles ideal for paratransit service.

3.9 Recommendation

| The Orion II meets or exceeds all of the requirements for this project. |
| These criteria were applied to each vehicle and a comparison was made. The ELF meets the Buy America requirement, the flexibility and ease of use requirements and is ADA compliant. This vehicle fails our needs in only one |

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category; service life. The ELF is available, with City of Iowa City required equipment, for about $70,000. High maintenance demands will raise the life-cycle cost of the ELF above those of the Orion II.

The Orion II meets or exceeds all of the requirements for this project. Currently these vehicles are available through a negotiated price; the bid process does not apply since there is no equivalent competitor. The City of Waterloo has already negotiated a price of around $180,000 each for six of these vehicles, but is currently unable to raise the city’s portion of this price. To avoid a penalty for canceling their order, the City of Waterloo is seeking agencies willing to purchase these vehicles. Cambus, of the University of Iowa, has committed to purchase two of these vehicles, and the City of Waterloo will keep two. This means that two of these vehicles might be available. The current price range for these vehicles is $200,000 to $220,000. If the City of Iowa City were considering purchasing one or two Orion II coaches, $20,000 to $40,000 per vehicle might be saved by purchasing them from the City of Waterloo.

The quality of construction and unique situation, regarding availability, leads us to recommend that the Orion II be the vehicle selected for the DASH system.
4.0 Financing Recommendations

There are two financing components to DASH: capital and operating costs. Capital costs include the purchase of three Orion II vehicles and a single shelter. Operating costs include labor, vehicle maintenance, extra parts inventory, maintenance of stops, fuel, insurance, and advertising. The addition of DASH to Iowa City Transit will not necessitate any additional fixed costs such as administrative or maintenance overhead, and therefore our figures do not include such costs.

There are two possible arrangements for purchasing the three shuttle vehicles. The first, at a cost of approximately $97,000, involves purchasing two buses which are available through the City of Waterloo, and ordering the third bus directly from Orion. This amount represents the 17 percent local share of the total cost of the three vehicles. Through federal funding, under Section Nine of the 1964 Urban Mass Transportation Act Amendments, the federal government will pay 80 percent of capital costs. An additional three percent of capital costs is covered if the buses are ADA accessible. The City of Waterloo will sell the two Orion II's for approximately $180,000 each. The third will cost roughly $210,000 directly from Orion.

The second scenario involves ordering all three buses from Orion, at a total local share cost of approximately $107,000. The buses ordered directly from Orion would be delivered twelve to fourteen months after they are ordered, thus the cost of the buses could increase due to the annual increase in the price Orion charges for the buses.
The total annual operating cost of two buses will be approximately $244,000. This figure is based on estimated operating costs as calculated by Iowa City transit, and is tailored for the Orion II and the proposed route schedule. The third bus will be used as a back-up, to be used when routine maintenance is needed or if either of the first two buses are temporarily inoperable.

4.1 Self Supported Municipal Improvement District
The Self Supported Municipal Improvement District (SSMID), as defined in the State Code of Iowa, is a financing mechanism intended to distribute the costs of a municipal improvement among the beneficiaries. Under Iowa law, there are a variety of tax assessment mechanisms that can be used to collect taxes in relation to a locationally specific benefit. The SSMID is the only type which can be used for operating expenses as well as capital improvements of a project. In the alternatives proposed below, the SSMID is only intended to finance operating costs. An important feature of a SSMID is that the taxes are deductible when computing individual income taxes because they are property taxes.

In the case of DASH, it is clear that the businesses within the assessment district are intended to be primary beneficiaries. Therefore, two of the three alternatives below propose utilizing a SSMID to pay a portion of the operating costs, while allowing the City to pay for capital costs. The same two alternatives propose that the University of Iowa contribute funds to the shuttle system because students who reside in downtown apartments will directly benefit from the shuttle.

Certain restrictions apply to SSMIDs. Property contained within the SSMID must be contiguous and within city limits. The property tax pertains to any commercial or industrial property, or any property within a historic district. The proposed district does not overlap any historic districts. Residentially zoned property is exempt from the tax. However, apartment buildings containing three or more units are assessed as commercial property, and thus would be subject to the
SSMID tax; they are treated the same as any other commercial property in the downtown area. Although there are government buildings within the SSMID, such as the Post Office and University facilities, none are included in the taxable property valuation for the SSMID because they are exempt from property taxes. Figure 8 shows the proposed SSMID boundary.

Assessed values for properties within the SSMID were obtained from the Johnson County Assessors Office. Property values were assessed for fiscal year 1996. These values are the basis for FY1997-98 tax levies.

The establishment of a SSMID begins when a petition is filed with the city council. The petition must contain signatures representing at least 25 percent of property owners in the proposed district. These property owners must represent at least 25 percent of the taxable property valuation in the district. The city council must approve the petition by a three-quarters majority vote. There are additional procedures to follow and conditions to meet if a petition of equal representation (25 percent of property owners representing 25 percent of value) is submitted in opposition to the SSMID.

The route selection and establishment of the proposed SSMID boundary were completed considering a number of similar factors. The primary goal of DASH is to connect downtown businesses with parking facilities, thereby improving access to downtown in general. The route was chosen based on the location of parking ramps and lots, among some other considerations. The proposed SSMID was then established based on whether or not the property could benefit from the shuttle. It was assumed, for the purposes of this study, that a business located within approximately two blocks of a shuttle stop would benefit from the system. A distance of two blocks is a “reasonable” distance for a pedestrian to walk from a shuttle stop to a business.
4.2 Alternative Financing Arrangements

Three alternate financing arrangements are proposed in this study in order to allow for some flexibility in the implementation of DASH. Each alternative relies on the City to provide the funding for capital costs, which will be incurred only in the first year.

**Alternative 1: City pays 100 percent of operating costs**

The first alternative is for the City to fund the entire project, which includes the portion of bus costs remaining after the federal contribution is received. The City would also pay for the operation of the system once it is established. This financing arrangement is the only one available if a petition from commercial property owners in the downtown area for a SSMID never materializes.

**Alternative 2: City, SSMID, and the University of Iowa each pay a third of operating costs**

The second alternative proposes that each group that benefits pays approximately $81,000 for operating costs, in 1997 dollars. The City would pay all of the capital costs in addition to the share of annual operating costs. One-third of operating costs would be paid by downtown property owners through the implementation of a SSMID, as discussed above. The SSMID would levy a property tax at a rate of $0.50 per $1,000 of assessed value. This tax would cost $75 per year for a property that is valued at $150,000 in 1996 dollars. The remaining one-third of operating costs would be paid by the University of Iowa. The Universities share of the cost approximates the benefits students would receive from the shuttle.
Alternative 3: City pays half of operating costs, SSMID and the University of Iowa each pay a fourth of operating costs. The third alternative is for the City to pay one-half of the operating costs and all of the capital costs. Another one-fourth of operating costs would be paid by downtown property owners through a SSMID. The SSMID would levy a tax of $0.375 per $1,000 of assessed value. This tax would cost $56.25 per year for a property that is valued at $150,000. The University of Iowa would pay the remaining one-fourth of operating costs.

Table 1 contains examples of the SSMID tax per year for sample property values in the downtown. Appendix C contains total property values by street and average property values by street.

**Table 1: SSMID Assessments Based on Sample Property Values**

<table>
<thead>
<tr>
<th>Assessed Value of Property</th>
<th>Share of Operating Cost</th>
<th>SSMID Tax per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>$200,000</td>
<td>1/3</td>
<td>$100.00</td>
</tr>
<tr>
<td>$200,000</td>
<td>1/4</td>
<td>$75.00</td>
</tr>
<tr>
<td>$300,000</td>
<td>1/3</td>
<td>$150.00</td>
</tr>
<tr>
<td>$300,000</td>
<td>1/4</td>
<td>$112.50</td>
</tr>
</tbody>
</table>

Based on a total assessed property value of $158,665,360 within the district.

It is important to mention that a single property may contain more than one business. Thus the cost per business would only be a fraction of the total SSMID tax. Table 2 shows the amount of operating costs each funding source will pay under each alternative.
Table 2: Approximate Total Operating Cost of DASH, by Funding Entity

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to the City</td>
<td>$244,000</td>
<td>$81,000</td>
<td>$122,000</td>
</tr>
<tr>
<td>SSMID</td>
<td>-</td>
<td>$81,000</td>
<td>$61,000</td>
</tr>
<tr>
<td>University of Iowa</td>
<td>-</td>
<td>$81,000</td>
<td>$61,000</td>
</tr>
</tbody>
</table>

Table 3 shows the City’s contribution to the total cost of DASH.

Table 3: Approximate Total Cost of DASH, for the City of Iowa City

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two buses from Waterloo &amp; one from Orion</td>
<td>$341,000</td>
<td>$178,000</td>
<td>$219,000</td>
</tr>
<tr>
<td>Three buses from Orion</td>
<td>351,000</td>
<td>$188,000</td>
<td>$229,000</td>
</tr>
</tbody>
</table>

4.3 Summary

The capital costs of the DASH system, incurred during the first year, will range approximately from $97,000 to $107,000, depending on how the buses are obtained. The costs of operating the system, based on Iowa City Transit estimates, will be roughly $244,000 per year. The City of Iowa City, downtown area businesses, and the University of Iowa will all benefit from the proposed system, and therefore each should be considered as a possible funding source. It is proposed that the City pay all of the capital costs, while operating costs are shared between the three aforementioned beneficiaries of the system.
Appendix A: Particulate Matter

Table A.1: National emission estimates of particulate matter, 1992 (percent)

<table>
<thead>
<tr>
<th>Source Category</th>
<th>Particulate Matter (PM$_{10}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Utilities</td>
<td>0.59</td>
</tr>
<tr>
<td>Industrial fuel combustion</td>
<td>0.48</td>
</tr>
<tr>
<td>Other fuel combustion</td>
<td>1.59</td>
</tr>
<tr>
<td>Industrial production</td>
<td>1.22</td>
</tr>
<tr>
<td>Storage and transport</td>
<td>0.12</td>
</tr>
<tr>
<td>Waste disposal</td>
<td>0.55</td>
</tr>
<tr>
<td>Highway vehicles</td>
<td>0.43$^a$</td>
</tr>
<tr>
<td>Off-highway vehicles</td>
<td>0.87</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>94.15$^b$</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>

$^a$ Relates to only particulate matter generated by the vehicle itself.
$^b$ Includes "fugitive dust" from all sources, some of which is road dust raised (but not generated) by vehicular traffic.

ADAPTED FROM: Forkenbrock and Schweitzer. Environmental Justice and Transportation Investment Policy.

Table A.2: Particle size distribution by type of fuel (cumulative percent)

<table>
<thead>
<tr>
<th>Fuel type</th>
<th>Under 0.2 µm</th>
<th>Under 10 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaded</td>
<td>23</td>
<td>64</td>
</tr>
<tr>
<td>Unleaded with catalytic converter</td>
<td>87</td>
<td>97</td>
</tr>
<tr>
<td>Unleaded without catalytic converter</td>
<td>42</td>
<td>90</td>
</tr>
<tr>
<td>Diesel</td>
<td>73</td>
<td>100</td>
</tr>
</tbody>
</table>

ADAPTED FROM: Forkenbrock and Schweitzer. Environmental Justice and Transportation Investment Policy.
Appendix B: Capital and Operating Costs

Labor Costs:
- $19.00 per hour
- Each employee works 2,080 hours per year
- The shuttle system needs 3.5 full-time equivalents (FTEs) due to DASH's hours of operation

Hours of Operation:
- M-F: 7 a.m. to 6 p.m. = 55 hours per week
- Sat: 10 a.m. to 5 p.m. = 7 hours per week
- Total hours per week = 62 + meal breaks and overlap of bus getting downtown
- Total hours per week = 68
- Weeks per year = 52
- Hours of operation per year per bus = 3,536
- Total yearly hours of operation = 7,072
- Number of employees needed = 7,072/2,080 = 3.4 employees

Labor Cost per Year:
- $19.00 per hour * 2,080 hours = $39,520 per employee
- Total yearly labor cost = $39,520 * 3.5 (FTE) = $138,320

Non-Labor Costs:
- $8.00 per hour for maintenance,
- $7.00 per hour for miscellaneous operating expenses, including fuel costs, advertising, printing, shelter costs, insurance, and inventory of special parts
- Total non-labor costs = $15.00 per hour * 7,072 hours = $106,080

Total Operating Costs per Year:
- Labor costs $138,320 + other operating costs $106,080 = $244,400

Capital Costs:
- The federal government pays for 83% of capital costs.
- The municipality must pay for the remaining 17% of the cost.

Purchase Option One:
- Two buses from Waterloo: 0.17 * $180,000 * 2 = $61,200
- One bus from Orion: 0.17 * $210,000 = $35,700
- Total cost for purchase option one: $97,000

Purchase Option Two:
- Three buses from Orion: 0.17 * $210,000 = 107,000
Appendix C: SSMID Financing

- Total SSMID Assessed Value = $158,665,380
- Total Tax Receipts from SSMID area = $4,901,380

<table>
<thead>
<tr>
<th>Street Name</th>
<th>Street Number</th>
<th>Total Assessed Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloomington (south side only)</td>
<td>0 - 599 East</td>
<td>$3,455,640</td>
</tr>
<tr>
<td>Burlington</td>
<td>99 West - 599 East</td>
<td>$7,735,230</td>
</tr>
<tr>
<td>College</td>
<td>99 West - 599 East</td>
<td>$4,379,840</td>
</tr>
<tr>
<td>Court</td>
<td>99 West - 399 East</td>
<td>$4,019,120</td>
</tr>
<tr>
<td>Harrison</td>
<td>99 West - 399 East</td>
<td>$457,370</td>
</tr>
<tr>
<td>Iowa</td>
<td>0 - 599 East</td>
<td>$6,116,980</td>
</tr>
<tr>
<td>Jefferson</td>
<td>0 - 599 East</td>
<td>$7,900,190</td>
</tr>
<tr>
<td>Market</td>
<td>0 - 599 East</td>
<td>$5,291,620</td>
</tr>
<tr>
<td>Prentiss</td>
<td>99 West - 399 East</td>
<td>$1,942,070</td>
</tr>
<tr>
<td>Washington</td>
<td>99 West - 599 East</td>
<td>$14,946,690</td>
</tr>
<tr>
<td>Capital</td>
<td>101 - 699 South</td>
<td>$3,291,840</td>
</tr>
<tr>
<td>Clinton</td>
<td>299 North - 699 South</td>
<td>$34,350,470</td>
</tr>
<tr>
<td>Dodge (west side only)</td>
<td>299 North - 299 South</td>
<td>$669,920</td>
</tr>
<tr>
<td>Dubuque</td>
<td>299 North - 699 South</td>
<td>$34,012,940</td>
</tr>
<tr>
<td>Gilbert</td>
<td>299 North - 699 South</td>
<td>$11,830,540</td>
</tr>
<tr>
<td>Johnson</td>
<td>299 North - 399 South</td>
<td>$1,329,790</td>
</tr>
<tr>
<td>Linn</td>
<td>299 North - 699 South</td>
<td>$6,113,250</td>
</tr>
<tr>
<td>Van Buren</td>
<td>299 North - 699 South</td>
<td>$10,101,690</td>
</tr>
</tbody>
</table>

Total for all Properties $158,665,380
<table>
<thead>
<tr>
<th>Street Name</th>
<th>Average Property Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloomington (south side only)</td>
<td>$172,782</td>
</tr>
<tr>
<td>Burlington</td>
<td>$407,117</td>
</tr>
<tr>
<td>College</td>
<td>$199,084</td>
</tr>
<tr>
<td>Court</td>
<td>$574,160</td>
</tr>
<tr>
<td>Harrison</td>
<td>$457,370</td>
</tr>
<tr>
<td>Iowa</td>
<td>$278,045</td>
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<tr>
<td>Jefferson</td>
<td>$395,010</td>
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<tr>
<td>Market</td>
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<tr>
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<tr>
<td>Washington</td>
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<tr>
<td>Capital*</td>
<td>$470,263</td>
</tr>
<tr>
<td>Clinton</td>
<td>$321,689</td>
</tr>
<tr>
<td>Dodge (west side only)</td>
<td>$74,436</td>
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<tr>
<td>Dubuque*</td>
<td>$459,905</td>
</tr>
<tr>
<td>Gilbert</td>
<td>$313,768</td>
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<tr>
<td>Johnson</td>
<td>$132,979</td>
</tr>
<tr>
<td>Linn</td>
<td>$265,793</td>
</tr>
<tr>
<td>Van Buren</td>
<td>$325,861</td>
</tr>
</tbody>
</table>

* The values contained in this table do not include the twenty-two million dollar Old Capital Mall property or the eleven million dollar Holiday Inn property at 210 South Dubuque St.
List of References

1 Iowa City, City of, 1997. *Iowa City Comprehensive Plan Draft*.


