

ART Implementation Plan



December 31, 2009

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I. Executive Summary

This report sets out the decisions made in selecting a project delivery mechanism and associated implementation plan decisions for the initial Pace Arterial Rapid Transit (ART) corridors. This document builds upon Pace Arterial Rapid Transit Feasibility Study, Working Draft, Corridor Selection (STV Incorporated, March 2009). These decisions were made in response to the challenge of implementing ART service in the Milwaukee, Dempster, and Oak Brook/Cermak corridors as rapidly as practicable. A senior Pace management team made decisions at three workshop sessions in August, September, and October, 2009 culminating in the project delivery strategy. It was decided to use distinctive ART buses in the forty-foot size category, but the traction technology (drive train) was not selected. Stations were defined in terms of function but not yet in terms of structure or materials. It was decided that Pace would operate and maintain the vehicles, but maintenance of the stations and of portions of the information technology (IT) elements could be provided by a contractor. It was decided to consider contractor design and operation of distributor services in the Oak Brook/Cermak corridor and at the O'Hare terminus of the Dempster corridor. It was decided not to seek Section 5309 (New Starts) funding for the Milwaukee and Dempster corridors, but to pursue such funding for the Oak Brook/Cermak corridor. These decisions are more fully set out in the description of system elements and corridors in the body of this report.

Based on those decisions, Pace selected the contracting strategy of four primary contracts to implement the three corridors:

- A. a Project Management Oversight and Design Services (PMODS) contract to provide preliminary engineering, contracting, and contractor oversight services in all three corridors;
- B. a turnkey contract to provide final design services, station procurement and installation, vehicle procurement, IT system design and installation and options for station maintenance, IT system maintenance, financing, and distributor design and operation in the Milwaukee and Dempster corridors;
- C. a turnkey contract to provide the same services as contractor B excepting vehicle procurement for the Oak Brook/Cermak corridor;
- D. a vehicle supply contract for the Oak Brook/Cermak corridor.

The next steps in implementation are (a) formation and activation of a Cross Functional Team to begin the Pace analysis and decisions necessary to enable the project delivery contracts along with (b) beginning the Project Management Oversight and Design Services procurement.

II. Project Objective

The objective of this overall project is to develop a plan whereby Arterial Rapid Transit (ART) services in the Milwaukee, Dempster, and Oak Brook/Cermak corridors can be implemented as rapidly as practicable.¹

III. System Element Descriptions

This section describes Pace's expectations and requirements for the scope of the ART project. Pace is in an early stage of planning the service and its requirements; if the following characteristics change, the implementation plan will need to be updated.

A. Vehicles

Bus Specifications

Pace requires specialized vehicles for the ART service that provide a distinctive look and differentiate the ART service from regular fixed route bus service. Current assessment of required bus features include:

- Streamlined or aesthetically differentiated 40-foot vehicles
- Large windows
- Wide doors (anticipating heavy passenger volumes)
- Forward-facing seats
- Low floor buses
- Accessible ramps or lifts
- Possibly "Green" propulsion technology: diesel-electric hybrid, or compressed natural gas (CNG)
- Compatibility with Pace Intelligent Bus System (IBS)

Specialized Tools, Equipment and Training

The vehicle supply contracts, including turnkey contracts covering vehicles, must include any specialized tools, equipment or training needed for the ART vehicles.

B. Stations

¹ This document builds upon *Pace Arterial Rapid Transit Feasibility Study, Working Draft,* Corridor Selection; STV Incorporated, March 2009. Many corridor characteristics and unit costs are incorporated without review. The Pace Arterial Rapid Transit Feasibility Study has been completed. This is intended as a cumulative report on the Pace ART plan and next steps

Station Specifications

The ART service stations will be enhanced bus shelters, with heat, lighting and electric power for passenger information displays. Stations will not be established at the outset in the City of Chicago portion of the Milwaukee corridor²; busier stations may have more improvements in the future. The location of stops/stations in the first three corridors will be determined by Pace Service Planning. In general, the stations will be spaced at least one-half mile apart, as this increased spacing is critical to achieving the overall travel speed that is a key objective of ART service.

Sitework and Special Conditions

The station sites will vary considerably but will usually be located in the public right-of-way. Pace intends to work with Illinois Depart of Transportation (IDOT) and the respective municipalities to obtain approval for the station locations. The station design will be modular and will be a recognizable attribute of ART service. The cost estimate categories provide for typical sitework or conditions needed for the stations, including:

- demolition, clearing, earthwork
- <u>site utilities, utility relocation</u> including both relocation of existing utilities to the extent that below-grade work for the stations requires, as well as provision of electrical power to the station for light, information system and heating
- <u>hazardous materials</u> which may be disturbed by the below-grade work and may require special disposition
- <u>environmental mitigation</u> that may arise either in the discovery of hazardous materials or in other environmental investigations
- <u>site structures</u> required for the station in addition to the station structure itself, such as retaining walls, steps, etc.
- <u>pedestrian and bike access</u> including any construction of sidewalks, sidewalk ramps, or other pedestrian/bicycle system improvements essential to the station
- temporary facilities required for construction of the station and related improvements

Right of Way and Land Acquisition

While, in general, it is anticipated that the stations will be located in the public right-of-way, there may be locations where roadway realignment or the passenger convenience of a specific station location warrants an easement or other acquisition. Even use of the public right-of-way may require an easement in some circumstances. Furthermore, there are selected locations where the station may be

² Pace current service within the city limits is drop-off inbound / pick-up outbound and does not duplicate CTA service. Cost estimates do not include stations within Chicago boundaries.

located on private property, such as at Golf Mill shopping center, or on restricted use property such as at O'Hare Airport, and where acquisition agreements are necessary.

C. Guideway

Buses will run on existing streets in mixed traffic. In general, Pace does not make roadway improvements. However, selected improvements may be needed to operate ART service in these corridors. This section will include any guideway improvements that are needed in the three corridors.

Realignment of Roadway

In general the ART services will operate in existing lanes without dedication. However, in some cases, roadway realignment could reduce bus delays at bus stops or intersections. This could require an acceleration lane for buses or more probably a queue-jump lane to permit buses to pass traffic queued at a red signal by receiving an advance green in the bus lane. In the Milwaukee and Dempster corridors, few opportunities for these treatments are anticipated. An allowance for two queue jumpers is included in the cost estimates. Each of these assumes an additional lane within the existing right-of-way.

The Jefferson Park Station offers opportunities for improvements after initial implementation of the ART service. Delays in turning left from Milwaukee inbound into the Jefferson Park Station are noteworthy. In addition, pedestrian and bus traffic flow within the station could be improved. Alternative bus and pedestrian patterns for the Jefferson Park CTA Station were explored in 2008 by a joint Pace and CTA cross-functional team from Planning and Safety but no improvements have been made as yet.

Paint Lane Markings and Signage

Pavement markings and traffic signage will be required for some stations in the corridor and will also accompany any realignments of roadway included in the final design.

Sitework and Special Conditions

Just as in the case of stations, whenever roadway realignments require subsurface work or disturbing existing soil, material costs for environmental and other incidental work should be expected, such as:

- demolition, clearing, earthwork
- <u>utility relocation</u> of existing utilities to the extent that below-grade work for the roadway requires
- <u>hazardous materials</u> which may be disturbed by the below-grade work and may require special deposition
- <u>environmental mitigation</u> that may arise either in the discovery of hazardous materials or in other environmental investigations
- site structures may be required for the roadway such as retaining walls, steps, etc.
- <u>pedestrian access</u> including any construction of sidewalks, sidewalk ramps, or other pedestrian system improvements essential to the roadway realignment

- <u>temporary facilities</u> required for construction of the roadway improvements and related improvements

Right of Way and Land Acquisition

While, in general, it is anticipated that any realignment will be located in the public right-of-way, there may be locations where roadway realignment warrants an easement or other acquisition. Even use of the public right-of-way may require an easement in some circumstances. Furthermore, there are selected locations where the service may be located on private property, such as at Golf Mill shopping center, or on restricted use property such as at O'Hare Airport, and where acquisition agreements are necessary.

D. Support Facilities

This system element includes any facilities needs which are not in or near the public right-of-way, including but not limited to garage modifications and central information processing support such as traffic signal priority displays or controls. ART service will operate out of the existing garages which may require some adjustment to the facility and equipment.

Support Facilities

Support facility Specifications

Building or building improvements, such as garage modifications, may be necessary if the vehicle characteristics require. If a decision is made to acquire compressed natural gas (CNG) propulsion, significant fueling and life-safety modifications to the facilities would be necessary. Station maintenance, TSP maintenance, and passenger information system maintenance may be contracted out or performed in-house. If one or more of these functions is provided in-house, a small base of operations with component inventories may be required.

Sitework and Special Conditions

If the support facilities require, sitework and special conditions needed for the support facilities may include:

- Demolition, Clearing, Earthwork
- Site Utilities, Utility Relocation
- Hazardous Materials
- Environmental Mitigation
- Site Structures
- Temporary Facilities

Central Information Support

If the traffic signal priority system or the passenger information system requires central facilities such as status displays or central control stations, space and facilities will be required for these functions. For

each such function, Pace must decide whether the function should be located at a respective operating division in conjunction with the IBS and Operations Decision Support systems, or centralized with IT or another headquarters group.

E. Transit Signal Priority (TSP)

Beginning in December 2005, Pace began work on the Pace Transit Signal Priority (TSP) Initiative. Pace now has substantial experience with signal optimization, TSP planning and design, installation and testing, and utilization of TSP. TSP is a critical component of the ART project. Pace will not implement ART without it. For the communication of both TSP and the Passenger Information System, Pace is planning a wireless mesh communication system. This network can support TSP, and in addition could support (given sufficient bandwidth) bus arrival information, customized advertising, etc. Permits must be obtained from IDOT for the TSP installation. The time required to obtain the permits may affect the total time required to implement service. Components of the TSP system include:

Signal Heads, Masts and Controllers - existing will be used where feasible

Signal Control Boxes -including installation of the TSP components

Vehicle On-Board Signal – transmitter to activate signal when schedule adherence criteria are satisfied

Communication to Signal Controller – link from vehicle on-board-signal to signal control boxes, Pace is planning a wireless mesh communication system.

Central Information System Interface – links must be provided to and from the IBS and possibly to other components of the overall ITS network

F. Real Time Passenger Information System

The Passenger Information System is another critical component of the ART project. Unlike the TSP element, the design of the Passenger Information System has not been developed or demonstrated at Pace. Passenger information showing the time until the next bus arrives at the station will be included in every station. Departure times may be shown at locations such as terminals. In loops or other cases where two directions are served, times for each direction will be shown. The time information will be updated in real time, so that passengers will be informed of the projected arrival time even when there has been a delay. The passenger information system must be integrated into the overall ITS network.

Software for Logic and Data

The design and development (or configuration, if off-the-shelf software is used) of software to deliver real-time vehicle information to ART shelters is included in this classification. The system must be designed so that no additional data entry is required, but data from pre-existing systems concerning schedules, vehicle progress, and arrival times are used automatically.

Passenger Information Displays (PIDs) at Stations and Communication System

Each shelter will be equipped with a PID. These will be capable of displaying the required arrival time information. In addition the PIDs will be able to display other digital messages such as transit system

messages or digital advertising messages. They may be advanced displays capable of displaying graphics or video. According to the passenger information system software design, this classification will also include the communication system necessary to download the data to the PID.

Transmission of Passenger Information

The capability to transmit the required data according to the Passenger Information System software design is included in this classification. It may be located at central transmission points, may be transmitted through the wireless mesh, or may be on board buses, depending on the design.

Central Information System Interface

The software interface to successfully link the Passenger Information System to the central system for data including schedule data and any required schedule adherence data is included in this classification.

G. Fare System

Fare Policy

Pace must decide the fare policy for the ART service. If Pace requests proposals regarding distributor service as part of an ART service proposal, Pace must provide proposers the basis of their distributor service pricing proposals. The fare policy must be enabled by the fare collection equipment system.

Fare Collection System

The existing fare collection system will be used for the ART service implementation. The initial ART fare policy and structure will be feasible using the existing collection equipment and system. However, Pace will consider the possibility of off-board fare collection at high volume stations. No separate allowance for off-board fare collection systems is included in the cost estimate. ART buses may replace existing buses in the Pace fleet. If the fleet replacement plan calls for the installation of existing fareboxes on ART buses, Pace must address how many new fareboxes are required as part of the contracts which include ART vehicles.

H. Distributor Service

Pace must decide whether to add to or modify distributor services in conjunction with the ART service implementation. A turnkey proposal including such an option may be requested in the Oak Brook / Cermak Corridor, may be requested in the O'Hare vicinity of the Dempster corridor, but is not needed in the Milwaukee corridor. If optional distributor service proposals are received from turnkey proposers, Pace would decide whether to exercise each option and acquire the distributor service according to the terms of the option. Possible terms of distributor service proposals are described in a technical memorandum finalized for Pace on October 5, 2009, "Pace ART Implementation Plan – Oak Brook/Cermak Distributor Service."

I. Branding, Customer Information, and Community Relations

Regarding the communication with passengers, the general public, and the institutions representing the community, the following terms are used in this section and throughout this December 2009 report with these meanings

"branding" – refers to the development and deployment of the ART service name(s), logo, and graphic design schemes that communicate the service's identity³

"customer information" – refers to the systems used to communicate service information to the passengers. In the broadest sense it includes real-time passenger information, but this is discussed as a separate element of the ART project scope, above. Customer information discussed in this section, includes particularly the other service information provided to passengers at ART stations on signs or otherwise, as well as the more routine Pace customer information through media such as printed schedules, maps, the internet, telephone information, and displays on-board vehicles.

"community relations" – refers to communications with the institutions, particularly the municipal governments, representing the community

"auxiliary revenue" – refers to the funds generated in a manner ancillary to the delivery of ART service, particularly the sale of advertising space or time, and is discussed in the funding section, below

Branding and Customer Information

Branding and customer information will be critical to the ART system. Branding will have a major influence on the public's perception and support for ART service. Customer information will have a major effect on the ease of using ART service and will be consistent with and reinforce branding. Potential branding and customer information proposals may include employer or retailer sponsorships, or other innovative concepts to differentiate ART service from regular bus service along these corridors. Such sponsorships or arrangements will implement the concepts set out under "Auxiliary Revenue." It is important for the Project Management Oversight and Design Services contractor to establish branding and customer information guidelines early in the project. The branding and customer information guidelines will have far-reaching effects throughout the project. They will affect station design and may affect vehicle procurement. Branding and customer information guidelines for the ART system must be implemented by turnkey contractors. Pursuant to the guidelines, the turnkey contractors must provide the following design work, and should deliver all facilities and equipment according to approved guidelines and branding designs:

- a. Station design compliant with image guidelines
- b. Vehicle design and color scheme consistent with image guidelines
- c. Signs and displays at stations and on vehicles using guideline names and logos

³ Marketing activities sometimes known as "promotion" consist of a coordinated set of actions or a campaign to make the service known and to motivate an increase in ridership, going beyond branding and customer information. Such a promotional campaign is not included in these elements of the ART service, and may be added to the PMODS or one or more turnkey contracts, separately contracted, or executed as part of Pace's marketing program.

- d. Signs and displays including electronic (digital, video, or audio) information in stations and vehicles as called for in the guidelines; the guidelines may call for route names or numbers, schedule and real-time data, fares, and contact information.

Community Relations

Pace should map its community relations process early in the project according to the contracting schedule. Pace has already initiated communication regarding ART service with many of the affected municipalities. The initial corridor, Milwaukee, involves only one community (Niles) in addition to the City of Chicago. The Dempster Corridor involves six municipalities and O'Hare Airport. The community role in branding and customer information, station design, service planning, guideway improvements, and TSP should be decided upon.

It is critical for the schedule that municipalities accept the station locations, station design, and TSP permits. Any advance work that can remove or reduce delays in the approval processes will pay off in the implementation process.

J. Service Planning

Pace service planners will determine station locations, bus frequency and span of service for each corridor. Detailed service specifications for the affected routes will be prepared, including turn-by-turn routing for each route, any cyclical turnback points, and frequency by route segment for each time of day and day of week. The fleet requirements from this analysis can be used to refine the Pace fleet plan, and specifically to determine the final ART fleet requirements for the Milwaukee-Dempster Turnkey contract and for the Oak Brook / Cermak vehicle contract. For use by ART turnkey contractors, they will specify the size (based on projected passenger activity) and intended location of each ART station, the routes (ART and connecting) serving the station, and any other data necessary for the signage and displays to be provided by the contractor. The turnkey contractor will comply with this information and the branding and customer information guidelines in preparing detailed station designs for approval and final service signage.

K. New Starts Funding

Pace has decided to preserve the option to seek New Starts funding⁴ for the Oak Brook / Cermak corridor, but not to seek New Starts funding for the Milwaukee and Dempster corridors.

Alternatives Analysis (AA)

To pursue a New Starts grant, FTA requires that an AA be conducted for the project. This requires objectively comparing alternative transportation solutions in the corridor. For a Very Small Starts

⁴ "New Starts" funding is used to mean any funding under Section 5309 of Title 49 of the U.S. Code, including Small Starts (less than \$250 million total cost) and Very Small Starts (less than \$50 million total cost and meeting other warrants.)

project the AA requirements are relatively simple, and do not require quantitative analysis of projected investments differing from the planned project. The requirements have been stated as⁵:

- Identification of corridor problems or opportunities
- Definition of the project
- · Analysis of costs, benefits, and impacts of the project compared to existing conditions
- Determination of financial viability
- Explanation of choice of preferred alternative
- Implementation Plan

For the larger AA required for Small Starts, however, alternative investments must be compared to a "transportation systems management" (i.e., low capital) baseline and a narrow range of alternatives must be quantitatively compared. Nevertheless, the analytical methods required for this quantitative comparison are simpler than those required for the larger New Starts projects.

The Oak Brook / Cermak corridor may meet the Very Small Starts requirements, but there is also a clear possibility that it may exceed the maximum cost (\$50m) or fail to meet one of the other Very Small Starts warrants.

National Environmental Protection Act (NEPA)

All Federal grants (both New Starts and formula grants) must comply with NEPA. For the non-New Starts funding, NEPA compliance will be initially determined on a grant-by-grant basis, and has already been determined for the grants already awarded to Pace. NEPA compliance determinations are accommodated in the New Starts development process and a compliance determination is normally determined for each project progressing through the New Starts development. There is generally a possibility that the grant will be excluded categorically from a NEPA process. If not excluded, it is possible that an Environmental Assessment rather than an Environmental Impact Statement will be required. There are provisions for public and interested agency participation in NEPA that make it difficult to project the time required for an Environmental Assessment and even more difficult for an Environmental Impact Statement.

IV. Corridor Descriptions

A. Alignment

The alignment of ART services will generally follow principal arterial roads along some of the highestridership routes in Pace's service area. Pace intends these services to follow straight route alignments

⁵ http://www.fta.dot.gov/documents/Small_Starts_Proposed_Interim_Guidance.ppt

and achieve relatively high speeds due to alignment and station stop spacing. Alignment will also establish regional connectivity and provide for future expansion of the ART network.

Milwaukee

The alignment of the proposed Milwaukee ART corridor will follow the current Pace Bus Route 270. This route will provides north-west/south-west service along Milwaukee Avenue between the Jefferson Park CTA station and UP/Northwest Line Metra Station in Chicago and the Golf Mill Shopping Center in Niles.

Dempster

The alignment of the Dempster ART corridor will follow the current Pace Bus Route 250. This route operates from the Davis Street Purple Line CTA Station and Metra/UP North Line Station in Evanston to the O'Hare Airport Kiss-n-Fly station via the Des Plaines Metra Station.

Oak Brook/Cermak

Several alternatives are under consideration for the Oak Brook / Cermak corridor. The alignment of the Oak Brook/Cermak ART corridor assumed in the report unless otherwise noted is based on the "Corridor Selection Study," and will follow the current Pace Bus Routes 747 and/or 322. A portion of Route 747 operates between the Forest Park CTA Blue Line Station and Oakbrook Shopping Center. Route 322 operates between the 54th Cermak Pink Line Station and Yorktown Shopping Center in Lombard via Cermak Road, 22nd Street (Oakbrook Shopping Center) and Butterfield Road. Other alignments under consideration include extending the western terminus of Route 322 to the Esplanade in Downers Grove.

B. Station Spacing

Station spacing will be determined by Pace Service Planners, but is currently estimated at one station every 0.5 miles on each side of the street for all three corridors. Exact station locations will be determined in the future. Milwaukee is estimated between 14 and 20 shelters

The capital cost assumes the 0.7 – 1.0 mile station density for the other two corridors as well.

C. Characteristics of Key Segments of Current Service Recommended for ART⁶

Characteristic	Milwaukee	Dempster	Oak Brook/Cermak
Existing Route	#270	#250	#322
One Way Route Mileage (miles)	6.83	15	17
One Way Scheduled Running Time	27 minutes	50min (off-peak)- 75min (peak)	45- 50 minutes

⁶ Corridor Descriptions provided by the Service Planning Department at Pace Suburban Bus

Weekday Frequency	Peak	10 minutes	20 minutes	15 -20 min to North Riverside; remainder: 20 - 30 min
	Off-Peak	20 minutes	30 minutes	same
Weekend Frequency	Peak	20 minutes	30 minutes	30 minutes
	Off-Peak	20 minutes	30 minutes	60 minutes
	Weekday	4:56 AM – 12:14 AM	4:58 AM – 12:20 AM	4:12 AM - 12:15 AM
Hours of Operations	Saturday	5:25 AM – 11:43 PM	6:05 AM -12:20 AM	5:20 AM -11:35 PM
	Sunday	6:10 AM – 11:25 PM	5:55 AM – 12:20 AM	6:57 AM – 10:37 PM

D. Considerations to Implementing these Corridors

The ART project involves some inherent risks. These are somewhat different from corridor to corridor. In preparing the terms of the contracts, Pace can allocate some of the risk to the contractor or can retain the risk to reduce the contractor's price. Some of the salient risks and benefits from ART service for each corridor are described below. In each case the programmatic risk (risk that the overall program will change), cost risk (risk that costs are higher than expected), and funding risk (risk that specific funding sources are lower than expected) are among the risks addressed.

Milwaukee

Risks

The risks of implementing the Milwaukee Corridor include:

- Programmatic There is relatively little programmatic risk in this corridor, in that existing
 ridership provides assurance of well- utilized service. There is a remote possibility that there will
 be a strong adverse passenger reaction (e.g., among seniors) to the extended stop spacing (also
 mentioned as a design risk, below). This could rise to the level of a programmatic risk if the
 reaction is so strong that ART service is effectively abandoned and the corridor returns to local
 service.
- Funding The accelerated schedule may require initiation of design and construction before the contract is fully funded. Interrupting the contract progress to await further funding will carry a significant cost, and a contract may allocate this risk to Pace.

- Cost Station and TSP permitting are among the more significant cost risks in this corridor, along with traditional construction cost risks when working in the public right-of-way (traffic disruption and utility relocation costs) – these risks can be shared with the contractor to the extent the contractor can be given some control.
- Design Congestion and pedestrian flow issues at Jefferson Park raise some potential design risk, but these are existing conditions that represent an opportunity cost risk rather than a loss risk; there may also be some service design risk in (a) removing stops and thereby causing some adverse passenger reaction, and (b) requiring transfers at Golf Mill for passengers who currently ride through Golf Mill.
- Schedule -- The station and TSP permitting issues present both a delay risk to Pace (that ART service will not be implemented as soon as intended) and a cost risk (that contractor delay claims, inflation, and overhead costs will increase the cost of the project). The greater of these risks is in the cost, which can be shared with the contractor, not in additional adverse impacts of delay.

Benefits

The benefits of implementing the Milwaukee Corridor include:

- This is a heavy commuter corridor in which the higher speeds of ART service will translate into lower operating costs per mile, lower travel times for passengers, and a long term increase in market share
- Ridership increase
- Social, Environmental, Congestion Mitigation
 - This route is part of the Village of Niles Milwaukee Avenue Corridor Study which has been completed by Camiros Consulting and approved by the Niles Village Board. The study proposes to create and foster an environment that encourages travel within the corridor, use of its resources, utilization of all public transportation as the primary means of travel, and develop a lively productive character benefiting the region's economy and quality of life.

Dempster

Risks

The risks of implementing the Dempster Corridor include:

 Programmatic – the Dempster corridor is anchored in Evanston and traverses a large number of municipalities, raising the programmatic risk that municipal opposition to the project will interrupt its progress; while the cost of this risk would be borne by Pace, there is no sign that such opposition will arise, so the risk and probable cost are small

- Funding – as with Milwaukee, the accelerated schedule may require initiation of design and construction before the contract is fully funded. Interrupting the contract progress to await further funding will carry a significant cost, and a contract may allocate this risk to Pace
- Cost Station and TSP permitting risks are higher in this corridor than Milwaukee because of the higher number of municipalities and the length of the corridor, along with traditional construction cost risks when working in the public right-of-way (traffic disruption and utility relocation costs) – these risks can be shared with the contractor to the extent the contractor can be given some control
- Design the service design risk that there may be an adverse reaction to the increased stop spacing is similar to the Milwaukee corridor risk;
- Schedule -- As with Milwaukee, although the station and TSP permitting issues present both cost and delay risks, the risk to Pace is primarily in the cost which can be shared with the contractor, not in additional adverse impacts of delay
- Distributor service the option of including distributor service at the O'Hare end of this corridor
 presents some additional service design and cost risk, as the productivity of the distributor
 service will be difficult to project; this risk can be shared with a contractor if enough control is
 given over the design of the distributor service.

Benefits

The benefits of implementing the Dempster Corridor include:

- Social, Environmental, Congestion Mitigation
 - Route 250 was part of the North Shore Restructuring Initiative. The extension to the O'Hare Kiss-n-Fly location was recommended by the Evanston Transportation Futures Group, and the connection from Evanston via the rail stations to O'Hare has inherent market image.
- Ridership increase

Oak Brook/Cermak

Risks

The risks of implementing the Oak Brook/Cermak Corridor include:

- Programmatic
 - The record of community reaction to ART service in this corridor indicates a greater risk of community opposition than in the Milwaukee or Dempster corridors; this presents both programmatic risk that the program may be substantially changed and delay risk.

- The CTA has extended Route 21 to North Riverside Mall at all times of day which conflicts with the Route 322 schedule and provides more service than there is ridership demand.
- As with many New Starts projects, there is a material risk that the AA or NEPA processes may result in a decision to substantially abandon the project
- Funding the schedule for this corridor is not as accelerated as Milwaukee and Dempster, and while there is never assurance of New Starts funding, the likelihood of a funding shortfall interrupting construction is lower in this corridor
- Cost As with Milwaukee and Dempster, station permitting and TSP permitting are among the more significant cost risks in this corridor, along with traditional construction cost risks when working in the public right-of-way (traffic disruption and utility relocation costs) – there is also material risk that design changes introduced as a result of the AA, NEPA or broader New Starts processes may increase the cost;
- Legal the New Starts processes and the liability involved in NEPA actions presents higher legal risks than in the Milwaukee and Dempster corridors
- Design the service design risk in this corridor is significant at his point in time, because the alignment has not been established, there is not a good history of productive service along much of the western portion of the corridor. The land use within corridor requires significant investment in pedestrian access and a distributor network to access the lower density of developments (p. 45 in ART study). There is a risk (with or without new distributor service) that ridership in this corridor may not warrant the ART Service costs. Further, if Pace seeks proposals for distributor service in this corridor, there is substantial service design risk that ridership may not warrant the distributor service cost. These risks may be reduced as the project progresses through the AA process;
- Schedule risk in this corridor includes not only the permitting risks discussed for Milwaukee and Dempster corridors, but also the schedule risks of the AA, NEPA and New Starts processes
- Distributor service –, the distributor service option presents significant service design and cost risk, which can be shared with the contractor
- Schedule Risk Additional community involvement (communities are not as transit supportive as on Dempster or on Milwaukee) poses schedule risk.

Benefits

The benefits of implementing the Oak Brook/Cermak Corridor include:

Social, Environmental, Congestion Mitigation

- Route 322 will be part of a future Pace service restructuring initiative slated to begin in West Cook County in late 2010 or 2011.
- Pace implemented its 1st (TSP on a 2.5 mile segment of Route 322 at the east end between 54/Cermak CTA and Harlem in the mid-90s. Since operating efficiencies were experienced when the TSP program was introduced, it is hoped this program can be continued especially at the west end of the service where there is much traffic congestion and traffic signals to contend with.
- o Regional connectivity connecting Du Page County to the city of Chicago.

System Element	Milwaukee	Dempster	Oak Brook/Cermak
Vehicles	10	18	15
Stations	Low: 14 High: 20	Low: 30 High: 43	Low: 24 High: 36
Guideway		2 queue jumpers	
Support Facilities	Existing Division Garage Modifications at 1 bay (for cost estimating purposes)		
Traffic Signal Priority	20 intersections	43 intersections	36 intersections
Real Time Passenger Information System	All stations	All stations	All stations

E. System Elements by Corridor

V. Project Delivery Strategy Alternatives

Project Delivery Strategy alternatives were evaluated by developing a matrix that shows how system elements will be bundled into contracts. The standard budget (Standard Cost Categories or SCC) that FTA uses to provide a complete cost picture was transformed into relevant line items and grouped into categories that were relevant to Pace ART. The project alternative matrix (Figure 1) is made up of these categories. System Elements (vehicles, guideway, stations, etc.) make up the columns of the matrix, and project activities (Program Management, Design, Maintain, etc.) make up the rows of the matrix as shown in Figure 1 below. Shading indicates that the Oak Brook/Cermak Distributor Service is an optional System Element of the contract and that Pace or the Contractor could be responsible for financing and maintaining some of the system elements

For each alternative the pros and cons in comparison to the other alternatives are presented.

Figure 1: Project Delivery Strategy Matrix

	System Elements								
Activity	Guideway	Stations	Support Facilities	TSP	Pax Info	Feeder Service Design, Implementation & Operation	ART Vehicles		
Plan, Oversight, Testing, Acceptance									
Program Management							100		
Design									
Manufacture, Install, Construct							1		
Finance									
Maintain			Pace				Pace		

A. Design Bid Build

This section describes the Design Bid Build contract and discuss Pace's reasons for eliminating this option in the second workshop.

Description

Design Bid Build is the most commonly used mechanism to deliver transportation projects. The processes are transparent. This mechanism is characterized by low bid awards intended to ensure the lowest construction costs, but generally results in higher overall project costs. Projects are executed through a highly structured and sequential process, beginning with environmental assessment and concept development, proceeding to preliminary engineering, then to final design, and finally to construction with each element being a separate procurement. An example of a Design Bid Build contract is shown in the matrix in Figure 2. The shading in the matrix indicates that Pace or the Contractor could be responsible for the financing and maintenance activities of system elements.

Figure 2: Design Bid Build Contract Matrix

	System Elements - All Three Corridors							
Activity	Guideway	Stations	Support Facilities	TSP	Pax Info	Vehicles		
Plan, Oversight, Testing,			Pa	се				
Acceptance		Contracto	r A- Program	Managemen	t Oversight			
Program Management	Pace							
Design	Design Contractor B				Vehicle			
Manufacture, Install, Construct	Contractor C	Contractor D		Conti	actor E	Contractor F		
Financing								
Maintain	IDOT		Pace	Pace IDOT		Pace		

Pros/Cons

Disadvantages vs. Turnkey				
Would extend implementation time				
Requires greater Pace involvement than the				
alternative delivery strategies				
May result in higher costs due to changes. Claims and difficulty in coordinating contractors				
More risk to Pace: in these areas?				
• Design				
Claims				
• Schedule				
• Cost				

Decision

The Pace ART Workshop decided on September 16, 2009 *not* to pursue this alternative further because of the higher costs and longer implementation schedule required.

B. Turnkey

Description

In a turnkey⁷ contract, a single contractor is given responsibility for both design and construction. A turnkey contract includes both construction services and engineering services. Awards are generally based on "Best Value" or "Price and Other Factors," but not on "Low Bid". Turnkey has routinely been used for many other types of large, complex projects, but it has not been widely used in public sector transportation projects in the United States. An example of a turnkey contract is shown below in Figure 3. Shading in the matrix indicates that the shaded responsibilities are optional: Oak Brook/Cermak and O'Hare Distributor Service, financing, and maintenance of selected system elements.

	System Elements - All Three Corridors							
Activity	Guideway	Stations	Support Facilities	TSP	Pax Info	Feeder Service Design, Implementation & Operation	ART Vehicles	
Plan, Oversight, Testing,	1		6	Pace				
Acceptance		Co	ontractor A - Pro	ogram Mana	agement Over	sight		
Program Management Design			Contractor B v	vith Multiple	Sub-Contract	ors		
Manufacture, Install, Construct								
Finance								
Maintain	IDOT		Pace	Pace IDOT			Pace	

Figure 3: Turnkey Contract Matrix

⁷ The term "turnkey" is used here to denote a project delivery method in which a single prime contractor is responsible for multiple phases of development and then for delivering the completed project in a condition where the owner simply "turns the key" and can begin operation. While the term "design-build" is similar, major elements of this project include vehicle procurement and IT delivery where the term "design-build" is not as appropriate as "turnkey;" even the structural portion of the project (guideway and stations) does not consist of design and construction similar to most design-build building or infrastructure projects. The term "turnkey," as used here, does not include maintenance and operation, although optional items of maintenance and operation for selected elements of the project are specifically described.

Pros/Cons

Advantages vs. Conventional	Disadvantages vs. Conventional Relatively new to Pace			
Fast Implementation				
Single contract attracts more interest from major firms	Lack of internal project integration expertise Complex price and risk terms			
Lower overall project costs	Less direct control over design and contractors			
Significant risk shifted to contractor: Claims 	Potential for compromises in quality to meet budget			
ScheduleCost	Limited experience on the part of regulatory/ funding agencies			
"Best Value" or "Price and Other Factors" selection	More complex procurement			
Single point of responsibility	Unanticipated changes may cost more			
Lower internal agency costs				
Greater potential for innovation in development				

Decision

The Pace Workshop on September 16, 2009 decided to pursue this alternative further. At the October 20 workshop it was decided not to pursue this delivery method because Turnkey Contracting as Separate Corridors (project delivery alternative section D) better accommodated the differences between the Milwaukee and Dempster corridors, on the one hand, and the Oak Brook / Cermak corridor on the other.

C. Turnkey with Separate Vehicle Contract

Description

This type of contract has the same features as a turnkey contract, but the ART vehicles are contracted separately from the contract for the other system elements as shown in Figure 4. Shading in the matrix indicates that the shaded responsibilities are optional: Oak Brook/Cermak and O'Hare Distributor Service, financing, and maintenance of selected system elements.

Figure 4: Turnkey Contract with Separate Vehicle Contract Matrix

	System Elements - All Three Corridors with Separate Vehicles							
Activity	Guideway	Stations	Support Facilities	TSP	Pax Info	Feeder Service Design, Implementation & Operation	ART Vehicles	
Plan, Oversight, Testing,				Pace				
Acceptance		Co	ontractor A - Pro	ogram Mana	agement Over	sight		
Program Management	Program Management					Pace		
Design	Contractor B with Multiple Sub-Contractors						Vehicle	
Manufacture, Install, Construct							B	
Finance							Keresee Keresee	
Maintain	IDOT		Pace	Pace IDOT			Pace	

Pros/Cons

Disadvantages vs. Turnkey
Removes competitive innovation in vehicle differentiation, contracting, and financing
Pace assumes risk of vehicle interfaces (e.g. with communication systems)
Scheduling alignment
If vehicles are to be financed, requires separate arrangements for financing

Decision

The Pace Workshop decided on September 16, 2009 to pursue this alternative further, but the alternative was not selected at the October 20 workshop.

D. The Selected Method: Turnkey Contracting as Separate Corridors

Description

This type of contract has the same features as a turnkey contract, but the Oak Brook/Cermak Corridor is contracted separately from the contract for the Milwaukee and Dempster corridors because it is in more preliminary stages of development. This mechanism is shown in Figure 5 and Figure 6. Shading in the

matrix indicates that the Oak Brook/Cermak Distributor Service is an optional System Element of the contract and that Pace or the Contractor could be responsible for the financing and maintenance activities of system elements.

Figure 5: Turnkey Contract for Milwaukee and Dempster Corridors Matrix



Figure 6: Turnkey Contract for Oak Brook/Cermak Corridor Matrix

	System Elements - Oak Brook/Cermak Corridor							
Activity	Guideway	Stations	Support Facilities	TSP	Pax Info	Feeder Service Design, Implementation & Operation	ART Vehicles	
Plan, Oversight, Testing,				Pace				
Acceptance		Cor	ntractor A - Pro	ogram Mar	nagement Ove	ersight		
Program Management		Pace						
Design							Vehicle	
Manufacture, Install, Construct		Contractor C with Multiple Sub-Contractors						
Finance								
Maintain	IDOT		Pace	Pace			Pace	

Pros/Cons

Advantages vs. Turnkey	Disadvantages vs. Turnkey
Provides two delivery methods:	Slower implementation
Rapid, lump sum for Milwaukee & Dempster	More technical coordination required from Pace
Deliberate, design dependent pricing for Oak Brook/Cermak	May slow Oak Brook/Cermak Completion
Allows more involvement in Oak Brook/Cermak	

Decision

The Pace ART Workshop decided on October 20, 2009 to implement this project delivery method.

VI. Project Delivery Strategy Decision

The following paragraphs describe each contract in the project delivery mechanism selected by the third workshop as depicted in Figures 5 and 6, above. For each contract, the scope is outlined, the principal interfaces with Pace staff and activities are identified, and significant funding and procurement issues are addressed. The contract schedules are included in Appendix A.

A. Contracts

Contract A: Program Management Oversight Design Services

This section describes the role of the PMODS and how it will interact with Pace staff. It also describes what role the PMODS will play in procuring the system elements.

Major elements of the PMODS scope may include:

- Advance the planning and design of the ART elements to adequate turnkey specifications
- Revise cost estimate and prepare funding plan
- · Develop branding and customer information guidelines for turnkey
- Option: conduct or support Oak Brook/Cermak alternative analysis
- Coordinate all Pace staff activities
- Provide support for Pace's request for community approvals (including station design, station locations, and TSP and queue jumpers)
- Prepare turnkey RFP and evaluation process
- Work on all three corridors concurrently

- Facilitate turnkey procurement(s)
- · Oversee and coordinate turnkey contractor performance
- Facilitate knowledge transfer in all of the above to Pace staff

Pace Interface

The PMODS contractor would have a primary interface with the Pace ART Project Manager and the ART Cross-functional Team. Secondary interfaces would be with (a) Pace procurement in facilitating the other ART contracts (Milwaukee/Dempster Turnkey, Oak Brook / Cermak Turnkey, and Oak Brook / Cermak Vehicles) and (b) Grants, in coordinating contracting with funding.

Procurement

The PMODS contract will be the first of the ART contracts and will facilitate the remaining contracts. Therefore, the procurement will be accelerated. It will include design (architecture and engineering) services and the procurement method should be commensurate with those services. The contract is planned as an indefinite-delivery-indefinite-quantity (IDIQ) contract administered on a task-order by task order basis, with pricing negotiated for each task order.

Funding

Because the PMODS contract is the first of the ART contracts, the funding may be highly fragmented. Correspondingly, the task order nature of the contract lends itself to multiple funding sources. In general, PMODS funding might be obtained from any funding that could be used for ART planning or that could be used for design services for (a) shelters, (b) TSP, (c) passenger information system, or (d) vehicles.

Contract B - Milwaukee/Dempster Turnkey

The second contract will be the turnkey contract for Milwaukee/Dempster corridors, including vehicles, station design, procurement and installation, TSP design and installation, passenger information system design and installation, support facilities and any guideway improvements. Financing, ongoing maintenance, and any distributor service for the Dempster corridor may be optional elements of the scope.

Pace Interface

The primary interface for the Turnkey contractor will be with the PMODS. However, the contractor will have secondary interfaces across Pace including the ART Project Manager, the ART Cross Functional Team, and Pace Procurement and Accounts Payable. Particularly intense interfaces will involve the station and TSP permitting, which the Turnkey contractor will support but must be formally executed by Pace, and with Operations for the vehicle procurement.

Procurement

The PMODS will lead development and execution of the turnkey procurement process. Significant industry outreach should be undertaken to establish terms, including potential financing terms, and to maximize supplier interest.

Options

Financing and maintenance are two activities that may be options in the turnkey contractor's scope of work.

Financing

Financing is an optional activity for the turnkey scope of work. Most contracts involve contractor financing between the date of expenditure (payment to the contractor's employees or subcontractors) and receipt of payment from the owner at the end of the invoice/payment cycle. The optional financing for the Pace turnkey contractor would consist of the contractor financing the expenditures for a greater length of time, possibly as long as the useful life of the assets. The contractor could subcontract the financing with a financing partner, but in any case would expect a return on the use of the money, or interest. A common form of financing that could probably be arranged for the vehicles is leasing. Other forms of financing could involve similar time-delayed payments or availability payments to the contractor. An example of financing that could be proposed by the turnkey contractor would be lease payments over five to ten years for the vehicles and availability payments over five to twenty years for the stations. The feasibility of each financing possibility is a function of the cost (including interest expense and risk premium) charged to Pace by the contractor, and the benefits to Pace in terms of accelerated implementation and a better capital funding program.

- Financing the project may be included as an option, giving Pace Finance additional tools in implementing the funding program. A decision on including a financing option in the RFP should be informed by the industry outreach results. It should be feasible to finance at least the vehicles (through lease or otherwise), possibly the information technology, and finally, the stations. Pace will rely on the turnkey proposers to formulate the optimal financing programs.

Maintenance

Maintenance of stations, passenger information system, and portion of the TSP can be included as options in the turnkey contract. These options would require the contractor to remain responsible for these functions for some period of time following start-up of ART service. If maintenance of stations or the passenger information system is included in the scope, these activities can be closely linked to auxiliary revenue opportunities in the Turnkey RFP.

Contract C - Oak Brook / Cermak Turnkey

Contract C is the turnkey contract for design, procurement, and installation of stations in the Oak Brook / Cermak corridor, design and installation of TSP and passenger information systems, support facilities and any guideway improvements. Pace anticipates that an alternative analysis will be carried out for this corridor by the Regional Transportation Authority (RTA). The PMODS contractor would coordinate with the alternatives analysis and would use the results to prepare the procurement documents for the Oak Brook/ Cermak turnkey contractor.

With the exception of vehicles (which are planned to be a separate procurement based on the prior procurement for Milwaukee/Dempster), the same Pace interfaces, procurement, options (financing, and maintenance) considerations apply as in the case of Contract B (Milwaukee/Dempster turnkey).

Contract D - Oak Brook / Cermak Vehicles

The final recommended contract is for the additional ART vehicles required for the Oak Brook / Cermak corridor. Because vehicles will have been acquired for the Milwaukee/Dempster corridor, a direct acquisition will be more cost-effective than including the vehicles in the Oak Brook / Cermak turnkey.

Pace Interface

The primary Pace interface will again be with the PMODS contractor, and the ART Project Manager, but the interface with Operations will be more intense and will resemble a traditional Pace vehicle procurement.

Procurement

It is recommended that this procurement be a negotiated procurement. Based on the vehicles acquired for Milwaukee/Dempster, it is possible that this would be a sole source procurement, but an objective should be to seek compatible vehicles from competitive sources. A negotiated procurement will lend itself to offerors maximizing the compatibility of vehicles with the Pace ART fleet at the lowest price.

B. Capital Cost Estimate

Although the total cost to Pace to implement these three ART corridors will become clear only once proposals are received and the contract awarded, it is important to estimate the total capital cost of this project for capital planning purposes. The capital cost estimate can be used to describe the ART project's impact on Pace's existing capital program, and to estimate financing costs, if any, by comparing the project's funding requirements to funding available.

Assumptions

This estimate begins with a prior cost estimate assembled by a Pace contractor for Milwaukee corridor alone (STV Incorporated, March 2009). Each cost for the Milwaukee corridor is then scaled to Dempster and Oak Brook/Cermak based on the relative length of those corridors. The resulting cost for each corridor is then allocated into separate scope packages as shown in the colored contract matrices above. The objective is to translate the cost range previously established for Milwaukee into costs for individual packages of scope in all three corridors to be awarded to a contractor. The PMODS will provide a thorough revised cost estimate. As the development proceeds, the cost estimate will become increasingly reliable and the contingency allowance will be reduced accordingly. The capital cost estimate in Appendix A includes the system elements in the three corridors as described above, excluding the optional scope items (i.e., excluding distributor service, financing, and maintenance).

Soft Costs

Over and above the project's direct costs, soft costs will include the capital expenditures required to complete the ART services, but which are not spent directly on activities related to brick-and-mortar construction or vehicle procurement. Instead, these expenses are incurred on ancillary professional services that are necessary to design (including branding and customer information guidelines), manage, and develop the project. The prior cost estimate calculated soft costs as 25% of other direct costs, some of which will be borne by Pace, and some of which will be borne by Pace's contractors depending on the project delivery strategy. The cost estimate presented here begins with this total, and then allocates the

costs to the respective scope packages through national averages for the FTA's Standard Cost Category (SCC) 80, and some estimates from AECOM. For example, national averages show that approximately 30% of soft costs are spent on Final Design services. Pace should expect its turnkey contractor(s) to bear the majority of these costs roughly in proportion to the capital cost of each scope package for which the contractor is responsible. In this way, the total amount of soft costs from the prior cost estimate is divided into SCC components and distributed between the scope packages for the ART project. In the end, soft costs are added to scope packages, and the total cost of each scope package by corridor is presented.

Contingency

In addition to the cost estimates based on historic unit costs, practice requires that a contingency be added to reflect costs that are not anticipated in the projection of units and application to historic unit costs. This contingency allows for higher volume requirements than projected in the units (e.g., a higher number of stations than estimated), higher cost per unit (e.g., a higher cost per bus than estimated), or categories of cost that were omitted (e.g., a requirement to provide street paving reinforcement at all ART stations). This contingency cost estimate is not included to reflect uncertainty regarding any specific cost item; it is shown separately from the system element cost items, and is called "unallocated contingency." When the full cost of any item or corridor is stated, the contingency is normally allocated proportionately across all system element costs and included in the separate cost for an item or corridor.

When cost estimates are prepared for new starts projects, FTA requires including unallocated contingency according to the following guideline⁸:

⁸ http://www.fta.dot.gov/publications/reports/other_reports/publications_1605.html

Estimate Stage	Probable Accuracy	Design Stage	Purpose	Information Available	Estimate Methods	Contingency Guideline
Order of Magnitude (conceptual)	50% - 30%	Preliminary	Evaluation of projects or alternatives	100-scale alignment, facility descriptions, sketches, study reports	Parametric - Cost of a similar facility is adjusted to represent the new facility. Includes costing by SF, LF, or CF. Model - A typical design is used to develop quantities and costs for elements.	20% or higher
Preliminary (budget)	15% - 30%	Preliminary Design Report (25%)	Establish Control Budget	40-scale alignment, facility descriptions, sketches, study reports, cross sections, profiles, elevations, geotechnical data, staging plans, schedule, definition of temporary work	Quantity development of major commodities, pricing by database, manuals, quotes, bid results, or experience which may be adjusted for the conditions of the specific package. Rough estimates or allowances developed for immeasurable items.	10% - 20%
Definitive	15% - 5%	75% to 100% complete	Detailed Control Budget, Cost Control, and Reporting	Progress Plans and Specifications, working construction schedule	Takeoff of quantities from plans, representative pricing by database, manuals, quotes, bid results, or experience adjusted for the conditions of the specific package. Crewed approach to labor and equipment, percent approach to general conditions, overhead and profit, contingency, and escalation. Some allowances carried for immeasurable items.	5% - 15%
Detailed (engineer's estimate)	±5%	PS&E	Check Estimate for Bids, Commit Funds	Complete Plans and Specifications for Bidding, Detailed Construction Schedule, Contract Terms and Conditions	Detailed takeoff of all measurable items, detailed review of specifications, detailed pricing including price quotes, crewed approach to labor and equipment, detailed estimate of general conditions, overhead & profit, and escalation. Consideration of construction schedule, work restrictions, shift requirements, and risk.	0% - 10%

The FTA advises at least 20% unallocated contingency at a conceptual cost estimating stage of development. Because Pace has not decided upon a vehicle technology, has no station design guidelines, and has no functional requirements for the information systems, the Pace project has not yet been specified at the level of conceptual cost estimates. The cost estimates delivered on October 20, 2009 included in an unallocated contingency of 40%. It is anticipated that the cost estimates should not increase above these cost estimates as long as the alignments are not changed and the project is not substantially delayed. Two applications of the unallocated contingency have been included in the

estimates in Appendix A. First, the decisions to separate the turnkey contract into three contracts (Milwaukee/Dempster Turnkey, Oak Brook/Cermak turnkey, and Oak Brook/Cermak vehicles) resulted in a 10% increase in the costs and corresponding deduction from unallocated contingency. Second, the inclusion of two queue jumper locations also resulted in deductions from the contingency. The result is an unallocated contingency of approximately 26% in the cost estimate in Appendix A. As project specification or cost estimates are improved, the unallocated contingency can be reduced, as indicated in the table above. Depending in part on the design decisions made in improving the specifications and estimates, the total cost may then be less than the higher end of the range estimated here.

Conceptual Estimates

Because of the conceptual nature of the project, a high and low cost estimate is provided to reflect uncertainty about both the *quantities* and *unit costs* of the proposed infrastructure. For example, because the locations of stations are not yet selected, the prior cost estimate includes between 14 and 20 shelters for Milwaukee corridor, and estimates their cost between \$275,000 and \$350,000 each. The low estimate therefore reflects 14 shelters at the lower unit price, and the high estimate reflects 20 shelters at the higher unit price.

Note that financing costs and startup costs are not yet estimated, and that the prior cost estimate combines the capital cost of stations and guideway elements.

rigure 7 summarizes the total capital cost estimate for each of the three cornuor	Figure 1	summarizes	the tota	capital	cost	estimate	for each	of the	three corridors
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	Constant 20 (Uninfl	09 Dollars ated)	Year-of-Ex Dollars (I (Based on Accele Schec	ar-of-Expenditure Dollars (Inflated) I on Accelerated Turnkey Schedule)		
Corridor	Low Estimate (000)	High Estimate (000)	Low Estimate (000)	High Estimate (000)		
Milwaukee	\$18,133	\$28,516	\$19,195	\$30,200		
Dempster	\$34,732	\$54,396	\$37,914	\$59,996		
Oak Brook/Cermak	\$28,788	\$46,026	\$33,523	\$53,632		
Total Costs	\$81,653	\$128,938	\$90,632	\$143,828		

Figure 7. High and Low Capital Cost Estimates (2009 and inflated dollars)

Figure 8 breaks down the combined high cost estimate by contract and by corridor. Two implementation schedules are shown: the "accelerated" schedule is the most rapid implementation that was deemed feasible, resulting in opening the Milwaukee service in late 2011 and the Dempster service in 2012. The "Delayed Implementation" is a slightly moderated but still aggressive rate of implementation, resulting in Milwaukee service only slightly later and Dempster service in mid-2013. This scenario could be required, for example to respond to limited funding availability. The single biggest expenditure is for the stations and guideway construction scope package, and will therefore depend highly on the estimated unit cost per station. The second largest expenditure is for the 43 new vehicles required for these services.

Figure 8. Estimated Capital Cost of Three ART Corridors by Contract

CAPITAL COST ESTIMATE OF CONTRACT PACKAGES

Contract Packages	Accelerated Implementation		Delayed Implementation due to Funding				
		Low	High		Low		High
Project Mgmt. Oversight and Design Services (PMODS) Contractor			-				
Milwaukee	\$	411	\$ 646	\$	411	\$	646
Dempster	\$	803	\$ 1,270	\$	826	\$	1,294
Oak Brook/Cermak	\$	697	\$ 1,114	\$	716	\$	1,145
Subtotal	\$	1,911	\$ 3,030	\$	1,953	\$	3,085
Milwaukee and Dempster Turnkey Contractor							
Milwaukee	\$	17,795	\$ 27,998	\$	17,795	\$	27,998
Dempster	\$	35,166	\$ 55,650	\$	36,207	\$	56,732
Subtotal	\$	52,961	\$ 83,648	\$	54,002	\$	84,730
Oak Brook/Cermak Turnkey Contractor	\$	21,257	\$ 36,701	\$	21,824	\$	37,680
Oak Brook/Cermak Vehicles	\$	9,871	\$ 13,101	\$	10,131	\$	13,447
Pace Costs							
Milwaukee	\$	989	\$ 1,556	\$	989	\$	1,556
Dempster	\$	1,945	\$ 3,076	\$	2,003	\$	3,136
Oak Brook/Cermak	\$	1,699	\$ 2,716	\$	1,746	\$	2,792
Subtotal	\$	4,634	\$ 7,348	\$	4,738	\$	7,484
TOTAL COSTS (Year-of-Expenditure \$)	\$	90,632	\$ 143,828	\$	92,648	\$	146,425

All costs in thousands of inflated (year-of-expenditure) dollars Branding/marketing/outreach assumed to be part of turnkey contractor scope

Incremental Fleet Cost

The assumptions provided were that ART vehicles will cost between \$ 350,000 and \$ 450,000 each. It should be noted that Pace is considering Compressed Natural Gas (CNG) or hybrid vehicles, and that these vehicles would cost substantially more even in the most economical body styles. The possibility of a higher cost vehicle is accounted for in unallocated contingency. The vehicle costs have been expressed in year-of-expenditure dollars in Appendix A below.

However, it should be noted that buses are currently in service on each of the corridors. In the final service configuration, the total additional vehicles required for service will be less than the number of vehicles included in the ART program, because the ART vehicles will replace vehicles already in service. The additional cost of the ART vehicles may be viewed as:

Figure 9. Estimated Incremental Cost of Diesel ART Vehicle

	Cost of Vehicle (2009 \$)				
Estimated cost of ART Vehicle	\$350,000 - \$450,000				
Replacement cost of standard fixed-route bus	\$300,000				
Incremental cost of ART Vehicle	\$50,000 - \$150,000				

Thus the incremental cost of an ART vehicle is only 17% - 50% of the estimated price of the vehicle.

The same cost logic applies to much of the capital cost estimate and to operating subsidies. The cost to maintain and replace existing shelters and planned bus stop signs would be small compared to the cost of ART stations, but the operating costs of the current service is substantial relative to ART costs. While the cost estimate in Appendix A represents total cost for funding and procurement purposes, Pace would incur a substantial portion of these costs with or without the implementation of ART in these three corridors. Therefore, in evaluating the feasibility of ART and in assessing the net impact on the funding program, only the incremental cost of ART should be taken into account.

C. Funding Decision

Pace must prepare a funding program that may include the following sources.

Potential Funding Sources

Federal Money/New Starts CIP/Federal Formula Funds State Funding

Municipality Coordination

Auxiliary Revenue

Pace is interested in innovative revenue generating programs beyond what is considered traditional advertising. Obtaining these auxiliary revenues requires Pace forgo some traditional advertising revenues and requires money spent upfront to attract partners for new advertising concepts. Pace currently collects advertising revenues from exterior bus ads, car-cards, individual route map ads, billboards on Pace property, and station shelter ads in certain communities to offset the ongoing costs of operating and maintaining Pace assets. Pace's recent advertising experience with communities in the ART corridors is shown in on page 38. Pace also utilizes co-promotions with local attractions such as newspapers and local sports teams' radio stations. Co-promotions are usually a trade of advertising space, with no money changing hands. Maintaining the ART brand may result in not having ads on the vehicles on the outside.

Potential Revenue on ART Corridors with Traditional Advertising

Pace budgeted system-wide advertising revenues at \$5,015,000 for 2009. Advertising revenues on existing regular bus routes in the three ART corridors generate approximately \$230,000 annually⁹ or about 5% of total advertising revenues. Current advertising revenues on the Milwaukee corridor total approximately \$83,000 annually, or about 1% of expected operating costs¹⁰. Pace could expect higher advertising revenues (approximately \$340,000 annually) from traditional advertising programs on the ART routes because of their additional buses and shelters. Revenues beyond this could be expected because of ART's perceived higher level of service, but not easily estimated. However, Pace is interested in innovative revenue generating programs beyond what is considered traditional advertising.

Innovative Revenue Sources

An innovative advertising concept could generate more revenue than traditional advertising along the three corridors. If Pace chooses to outsource the advertising concept, the turnkey contractor should create this concept as part of their proposal. Two examples of innovative advertising concepts were explored and described below.

The Greater Cleveland Regional Transit Authority (GCRTA) sought corporate sponsorship for their entire bus rapid transit system and chose to forgo traditional advertising revenue streams for a naming rights contract, station underwriting contracts, and other innovative revenue generators¹¹:

GCRTA Revenue Generator	Details	Revenue
System Naming Rights – "HealthLine"	BRT vehicles, system maps, and all other major branding opportunities display co-sponsors names with no additional advertising permitted.	\$250,000/year for 24 years split between co-sponsors: Cleveland Clinic & University Hospitals
Station Underwriting Agreement	Automated announcements at each stop identifying station underwriter, underwriter logo designed into station features	\$30,000/station/year for 10 years
Opening Weekend Funding	Ribbon cutting ceremony, scavenger hunt along corridor, free outdoor concert	\$250,000 from local contributions

⁹ Advertising revenues on existing regular bus routes in the three ART corridors estimated by Pace Marketing Department, AECOM and STV.

¹⁰ Operating Costs of approximately \$5.87 million annually for the Milwaukee Corridor estimated by STV

¹¹ Bitto/GCRTA, Stephen. "Cleveland HealthLine Auxiliary Revenues." Telephone interview. 29 Sept. 2009.

Fare cards	GCRTA printed fare cards with local attraction logos and coupons (Disney on Ice, Cleveland Cavaliers, Rock and Roll Hall of Fame) to provide their customers additional benefits and the opportunity to print local land mark logos next to the GCRTA logo	In-kind services
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Another example of innovative marketing on a BRT system is the Boston Silver Line. The Massachusetts Bay Transportation Authority (MBTA) packaged three Silver Line stations (Airport, Courthouse, and World Trade Center) in a separate advertising contract with Clear Channel focusing on new, high-end advertisements at high traffic BRT stations. Advertisements are displayed every six seconds on illuminated digital billboards that wrap around columns using cold heat technology. This contract included a \$5.6 million minimum guarantee over 10 years for all three stations and a similar split of revenue above the minimum.¹²

In the current economy, Pace should not expect to receive revenue at the same level as the GCRTA or MBTA, who both negotiated their contracts in a stronger economic climate. Also, the HealthLine and the Silver Line have distinct features (dedicated right of way and BRT stations) that are not included in the Pace ART plan. However, an innovative advertising concept could still generate more revenue than traditional advertising along the three corridors. If Pace chooses to outsource the advertising concept, the turnkey contractor should create this concept as part of their proposal.

Proposals should include creative sources of auxiliary revenue to offset the ongoing costs of operating and maintaining Pace ART system elements. Auxiliary revenue can also be used for corridor improvements including, but not limited to landscaping and signage. Examples of auxiliary revenue generators that contractors should explore (subject to the branding and customer information guidelines, which may limit the amount or visual tone of advertising) include, but are not limited to:

Bus

- Exterior king, queen, tail ads, etc.
- Bus wraps

¹² Daniel, Mac. "This smells like a mystery at N. Station." *Boston Globe*. Boston.com, 25 Mar. 2007. Web. 2 Oct. 2009. http://www.boston.com/news/local/articles/2007/03/25/this_smells_like_a_mystery_at_n_station/.

- Exterior digital display panels
- Interior car-cards
- Interior video screens
- Audio advertising connected to Passenger Information System

Station

- Panel advertising
- Station domination
- Digital display panel advertising
- LED screen advertising
- Individual station naming rights
- Station underwriting
- Exclusive taxi rights at stations
- Parking fees at stations

Other

- ART corridor naming rights
 - Potential sponsors include, but are not limited to, local universities, O'Hare airport, local malls, local sports complexes, corporate centers, hospitals, or sports/concert arenas
- System map advertising
- Fare card advertising
- Billboards on transit property
- Co-Promotions with local attractions
- Tax Increment Financing Districts
- Benefit Assessment Districts
- Use of mesh network [communication method that supports electronic advertising]
- ATM, telecommunication, vending machine licenses
- Sale of Passenger Information System Data
- Sale of Traffic Information
- Ads on vehicles

As an item in the maintenance option scope, the turnkey contractor will review the physical assets of the ART system elements to identify potential revenue opportunities and estimate their value. The ART system assets include, but are not limited to:

- ART buses
- ART stations
- Transit Signal Priority System
- Passenger Information System

Additionally the preferred contractor will develop and implement a strategic plan to identify and solicit potential sources of auxiliary revenue.

The contractor will conduct all necessary market research and analysis, including, but not limited to, analyzing auxiliary revenue initiatives that other transit properties and government entities have implemented. Additionally the successful contractor will contact and evaluate potential partners that may be interested in providing revenue generating opportunities for the ART system.

The contractor will develop a detailed database of ART system element assets. The database will provide an estimated value (including cash, in-kind services and other benefits) for each asset, identify potential partners and avenues for attracting them, and identify limitations, legal or otherwise, impacting the marketability of those assets.

The contractor will prepare, deliver and implement a revenue generating strategy for all marketable assets. The strategy must include:

- Recommendation for the best approach to maximizing revenues, in-kind and other benefits to Pace
- Prioritize properties/assets for solicitation; and
- Suggest innovative ways to package assets to attract potential partners.

Local Policy on Advertising for Communities within ART Corridors, based on Recent Pace Experience¹³

Advertising policy decision delayed, tentatively does not allow advertising
Does not allow advertising
Does allow advertising in shelters but with a 3 rd party advertiser, not Pace/Titan
Does allow advertising but Pace/Titan does not advertise currently
Does allow advertising but Pace/Titan does not advertise currently
Does allow advertising but Pace/Titan does not advertise currently
Contract with City of Chicago (JCDecaux), probably will allow advertising in Pace owned shelters

(a) Dempster Corridor

¹³ Source: Douglas Sullivan, Department Manager for Marketing. In some of the communities that permit advertising, shelter or bench advertisements are operated by entities not related to Pace.

(b) Milwaukee Corridor

City of Chicago	Does allow advertising but Pace/Titan does not advertise currently
Niles	Does allow advertising but Pace/Titan does not advertise currently
Golf Mill Shopping Center	Currently has ad shelter, not sure if on public or private land, probably allows advertising

Cicero	Does allow advertising but Pace/Titan does not advertise currently
Berwyn	Does allow advertising but Pace/Titan does not advertise currently
North Riverside	Does allow advertising
Westchester	Does not allow advertising
Oak Brook	Does not allow advertising
Oak Brook Shopping Center	Pace does not have shelters on mall property, but mall allows outdoor advertising
Yorktown Shopping Center	Does not allow advertising on bus shelters
DuPage (unincorporated county)	No information
Forest Park	Does allow advertising
Broadview	There are currently no shelters in Broadview, no information
Hillside	Does not allow advertising

(c) Oak Brook/Cermak Corridor

Based on the above experience, the auxiliary revenues are likely to be dedicated to offset operating subsidy requirements, particularly maintenance of facilities. Until specific, substantial auxiliary revenue plans are identified, e.g. as part of a turnkey proposal, auxiliary revenue will not be relied upon as a source of capital funding.

D. Implementation Schedule

Create Cross Functional Team

The creation of the ART Cross-Functional Team on the project is the most critical and urgent task. The creating and operation of this team would permit Pace to begin to make progress on station site permits and TSP permits even before signing a contract with a turnkey contractor. These items are on the critical path to completion,. It will be impossible to meet the goal of rapid implementation if the cross-functional team does not aggressively resolve as many issues as possible in advance of contractor involvement. This Cross Functional Team will interact heavily with the PMODS contractor (the first contracting priority) to accomplish the knowledge transfer discussed above as a PMODS objective.

Funding Plan

Of equal urgency but probably requiring more elapsed time is the revision of the Pace funding program. Pace has a well maintained fleet and must continue to maintain its assets in a state of good repair. It has access to an annual formula funding program and substantial additional one-time or discretionary funds. Pace should formulate the best steps to arrive at a revised funding strategy to fund the initiation of the ART program while achieving as many other capital objectives as possible. This may require funding analysis and support from the PMODS contractor, particularly in that the more advanced cost estimate will be on the PMODS contractor's critical path. One conceptual approach would be the following sequence:

- Review existing capital program details. Review all on ongoing and programmed capital projects, including project status, funding sources, restrictions from funding sources, forecast cash flow of expenditures, and contractually-committed expenditures.
- Assess relative priority of projects. Review all projects with an eye to qualitatively understanding their relative importance and impacts, including cost-effectiveness, links to strategic goals, deficiencies corrected, operations impacts, and legal requirements, among others.
- 3. Develop alternative funding scenarios and fleet plans. Develop a "worst case plan," assuming that the state bond funding does not become available. When the bond funding does become available, the capital program including ART could be accelerated. Several alternative new Capital Plans and resulting ART funding scenarios should be developed. Because Pace spends most of its capital funds on buses, a fleet plan would underlie each alternative. The alternatives would be distinguished in four ways:
 - a. Speed of ART implementation (cash flow schedule)
 - b. Peak fleet requirement of existing Pace bus services based on speed of implementing the 10-year Plan
 - c. Selection of currently-programmed capital projects to be delayed
 - d. Availability of ART financing
- 4. Interdepartmental review. The alternative scenarios should be widely reviewed by Pace staff, and then the key decision makers should select one. Recommend a funding strategy. The result will be a reprogrammed Capital Plan (with projects and funding sources by year) and a new Fleet Plan which includes ART.

Impact of Federal Funding on Schedule

In the schedule time and cost estimates (Appendix A), we have assumed 18 months as a probabilityweighted estimate to complete both the NEPA and AA requirements for the Oak Brook / Cermak corridor.

Key Contracting Milestones

Based on the most aggressive implementation schedule, the following are the key dates:

- Write PMODS RFP November, 2009
- Advertise PMODS contract December, 2009
- Select and award PMODS contractor March, 2010

- Write turnkey RFP March May, 2010
- Advertise turnkey RFP June, 2010
- Select and award turnkey contractor January, 2011
- Completion of Milwaukee station construction December, 2011
- Completion of Dempster station construction August, 2012

Two alternative schedules including these dates are set out in Appendix A.

VII. Appendix A: Detailed Cost Estimate and Expenditure Schedules

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CAPITAL COST ESTIMATE OF CONTRACT PACKAGES

Contract Packages		Accel Implem	era ent	ted ation	Im	Dela plementa Fun	ayed ation due to iding		
		Low		High		Low		High	
Project Mgmt. Oversight and Design Services (PMODS) Contractor									
Milwaukee	\$	411	\$	646	\$	411	\$	646	
Dempster	\$	803	\$	1,270	\$	826	\$	1,294	
Oak Brook/Cermak	\$	697	\$	1,114	\$	716	\$	1,145	
Subtotal	\$	1,911	\$	3,030	\$	1,953	\$	3,085	
Milwaukee and Dempster Turnkey Contractor				-					
Milwaukee	\$	17,795	\$	27,998	\$	17,795	\$	27,998	
Dempster	\$	35,166	\$	55,650	\$	36,207	\$	56,732	
Subtotal	\$	52,961	\$	83,648	\$	54,002	\$	84,730	
Oak Brook/Cermak Turnkey Contractor	\$	21,257	\$	36,701	\$	21,824	\$	37,680	
Oak Brook/Cermak Vehicles	\$	9,871	\$	13,101	\$	10,131	\$	13,447	
Pace Costs	-				h	-	-		
Milwaukee	\$	989	\$	1,556	\$	989	\$	1,556	
Dempster	\$	1,945	\$	3,076	\$	2,003	\$	3,136	
Oak Brook/Cermak	\$	1,699	\$	2,716	\$	1,746	\$	2,792	
Subtotal	\$	4,634	\$	7,348	\$	4,738	\$	7,484	
TOTAL COSTS (Year-of-Expenditure \$)	\$	90,632	\$	143,828	\$	92,648	\$	146,425	

All costs in thousands of inflated (year-of-expenditure) dollars

Branding/marketing/outreach assumed to be part of turnkey contractor scope

DETAIL OF BASE CAPITAL COST ESTIMATE (2009 DOLLARS)

		Quantity ¹ Unit Cos									ost ¹	Base Total Cost of Infrastructure Low High		Allocat	ted Soft osts	Revisi Contrac Sepa Corri	on for cting as arate dors ²	Fina Esti (Conti Alloo	l Cost mate ngency cated)
			, L	wo			Hi	gh		Low	High	Low	High	Low	High	Low	High	Low	High
Scope Packages	Unit	Milwaukee	Dempster	OakBrook	Total	Milwaukee	Dempster	OakBrook	Total										
	Miles	7	15	12	34	7	15	12	34					1. a	1.1	· · · · · ·		1	1.1
A. Construct Guideway (Alignment and Utility Relocation)	Q-Jumpers	1	1	0	2	1	1	0	2	200	500	400	1,000	487	1,137	49	114	672	1,558
B. Construct Stations	Stations	14	30	24	68	20	43	36	99	275	350	18,700	34,650	21,276	38,736	2,128	3,874	29,543	53,573
C. Make Support Facility Modifications	Bays	1	1	0	2	1	1	0	2	1,000	2,000	3,000	6,000	3,657	7,042	366	704	5,073	9,722
D. Install TSP and Passenger Information System	Intersection	20	43	36	99	20	43	36	99	100	138	9,900	13,613	11,214	15,696	1,121	1,570	15,573	21,708
E. Deliver ART Bus Vehicles, with Spare Components	Buses	10	18	15	43	10	18	15	43	350	450	15,050	19,350	17,350	22,997	1,735	2,300	24,085	31,787
Subtotal Construction + Vehicles												47,050	74,613	53,983	85,608	5,398	8,561	74,946	118,347
All Soft Costs		25%	6 of	Base	e Co	sts a	as of	Oct	ober	20, 2009 ¹		11,764	18,656						
F. Financing		Nor	ne es	stima	ated	here	e.					0	0	0	0	0	0	0	0
G. Project Management and Overs Design Services	ight &	Allocated from "Soft Costs"												1,252	1,985	125	198	1,738	2,744
H. Branding, Marketing, Outreach		Allocated from "Soft Costs"												510	809	51	81	709	1,119
 Identify and Establish New Opera Procedures, Train Staff 	ting	None estimated here.										0	0	0	0	0	0	0	0
J. Pace staff costs & Design Servic	es	Allocated from "Soft Costs" 3,069 4,8											4,867	307	487	4,260	6,728		
K. Unallocated Contingency		40%	6 of	Base	e Co	sts a	is of	Octo	ober :	20, 2009 ³		22,838	35,669	22,838	35,669	(5,881)	(9,327)	0	0
Total Capital Costs						1					81,653	128,938	81,653	128,938	0	0	81,653	128,938	

All costs are in thousands of base year (2009) dollars. No inflation is applied to this table. ¹ Based on prior STV estimate. Dempster and Oak Brook scaled from Milwaukee based on corridor length. ² 10% higher contract costs due to contractor interfaces, deducted from contingency

³ AECOM estimate based on FTA guidance on project development

Revisions to Unallocated Contingency since October 20, 2009

Action	Date	Contingency Before (Low) (000)	Contingency After (Low) (000)
Initial Estimate – 40% of base costs due to project's preliminary stage of development, following FTA guidance	10/20/09		\$23,325
Addition of two queue-jumper lanes at \$200,000 each (low estimate), plus allocated soft costs	11/18/09	\$23,325	\$22,838
Assigned a 10% increase in base costs due to decision to split up the three corridors. Increased contractor interfacing will be required. Reduced contingency by \$5.8m and allocated this to all other line items.	11/19/09	\$22,838	\$16,957



ACCELERATED IMPLEMENTATION SCHEDULE - LOW CAPITAL COSTS SCENARIO

	4	-	N	3	4	5	N	3	4	Ξ	N	3	4	Σ	N	3	4	Σ	N	3	4	5	2	3	4
	0 600	010 0	010 0	010 0	010 0	011 0	011 0	011 0	011 0	012 Q	012 Q	012 0	012 0	013 0	013 0	013 0	013 0	014 0	014 0	014 0	014 0	015 0	015 0	015 0	015 0
Contract Package	2	2	3	2	2	2	2	2	N	2	2	3	2	2	2	2	2	2	N	2	N	2	2	2	2
PMODS Contractor					1														1						
Milwaukee	0	5	22	22	28	56	56	57	57	58	29	12	10	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	21	26	53	54	54	55	55	56	56	57	58	58	59	59	60	22	0	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	26	26	26	32	54	54	55	55	56	56	57	57	62	81	0	0	0	0	0
Subtotal	0	26	48	75	81	110	137	138	139	146	140	123	122	114	115	116	78	57	62	81	0	0	0	0	0
Milwaukee + Dempster Turnkey		-			i har a set		-					-	-						1			-	-		
Milwaukee	0	0	507	793	1,933	2,123	3,744	4,026	3,938	731	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	152	336	997	1,541	2,006	3,249	7,567	8,906	8,937	1.475	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	507	945	2,269	3,120	5,285	6,032	7,187	8,298	8,906	8,937	1,475	0	0	0	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak Turnkey	0	0	0	0	0	0	0	0	0	0	167	194	876	969	1,325	1,389	2,528	6,171	6,717	920	0	0	0	0	0
Oak Brook/Cermak Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	176	366	539	664	4,388	3,116	496	125	0	0	0	0	0
Pace Costs + Design Svcs.		-			-	1	1	-	-	-	-	1				-	-	12000	-	-	-	Contra la		-	-
Milwaukee	0	0	91	138	185	243	142	95	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	90	91	115	139	140	142	191	241	195	197	99	100	101	103	0	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	94	94	95	120	146	147	149	200	253	204	103	78	16	0	0	0	0	0
Subtotal	0	90	182	252	324	383	283	380	432	290	317	245	248	250	303	253	204	103	78	16	0	0	0	0	0
TOTAL COSTS (Year-of-Expend. \$)	0	117	737	1,272	2,674	3,613	5,705	6,550	7,758	8,735	9,530	9,499	2,898	1,700	2,282	2,422	7,199	9,447	7,353	1,143	0	0	0	0	0

ACCELERATED IMPLEMENTATION SCHEDULE - LOW CAPITAL COSTS SCENARIO

All costs in thousands of inflated (year-of-expenditure) dollars



ACCELERATED IMPLEMENTATION SCHEDULE - HIGH CAPITAL COSTS SCENARIO

ACCELERATED IMPLEMENTATION SCHEDULE - HIGH CAPITAL COSTS SCENARIO

Contract Package	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4	2014 Q1	2014 Q2	2014 Q3	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4
PMODS Contractor												·	1												C C
Milwaukee	0	8	34	34	43	87	88	89	90	91	46	19	15	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	33	42	84	85	86	87	88	88	89	90	91	92	93	94	94	34	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	41	42	42	51	86	86	87	88	89	90	91	91	100	130	0	0	0	0	0
Subtotal	0	8	67	76	127	172	215	217	220	230	221	195	193	180	182	183	185	126	100	130	0	0	0	0	0
Milwaukee + Dempster Turnkey	-				-	1-1-1			-		1	-		1						-		1000	-	-	
Milwaukee	0	0	761	1,151	3,172	3,328	5,391	6,178	6,814	1,203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	214	503	1,485	2,384	3,105	5,074	11,592	14,127	14,676	2,490	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	761	1,151	3,386	3,831	6,876	8,562	9,919	6,277	11,592	14,127	14,676	2,490	0	0	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak Turnkey	0	0	0	0	0	0	0	0	0	0	261	310	1,370	1,542	2,153	2,269	4.177	10,809	12,139	1,671	0	0	0	0	0
Oak Brook/Cermak Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	234	486	715	882	5,824	4,135	658	166	0	0	0	0	0
Pace Costs + Design Svcs.		-	0.13	-			-		1	-				-		1	-	-	-	-	-				
Milwaukee	0	0	143	216	291	382	223	150	151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	143	144	181	220	222	224	302	381	308	311	157	159	160	163	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	149	151	152	193	233	236	238	320	404	326	164	124	25	0	0	0	0	0
Subtotal	0	0	286	360	472	602	445	524	604	534	501	545	393	396	480	567	326	164	124	25	0	0	0	0	0
TOTAL COSTS (Year-of-Expend. \$)	0	8	1,114	1,587	3,986	4,606	7,536	9,303	10,743	7,041	12,575	15,177	16,866	5,094	3,530	3,901	10,513	15,234	13,022	1,992	0	0	0	0	0

All costs in thousands of inflated (year-of-expenditure) dollars



DELAYED IMPLEMENTATION SCHEDULE - LOW CAPITAL COSTS SCENARIO

		-	01	-	**	-	01	m	**	-	0	0	**	-	OI.	m	st	-	N	m	47	-	N	m	18
	ð	a	ö	ö	ð	à	ö	ö	ò	à	ö	ö	õ	à	ö	ö	ð	à	ð	ö	ò	a	a	Ø	ð
	60	2	10	10	10	11	11	11	11	12	12	13	12	13	13	13	013	14	14	14	14	15	15	15	15
Contract Package	20	30	20	20	20	20	20	50	20	20	50	50	50	50	50	30	20	20	50	50	50	50	20	20	50
PMODS Contractor						-	1		-				1	-											
Milwaukee	0	5	22	22	28	56	56	57	57	58	29	12	10	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	21	27	55	55	56	56	57	58	58	59	59	60	60	61	61	22	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	0	0	27	27	27	33	55	56	56	57	57	58	58	59	64	84	0	0
Subtotal	0	5	22	22	49	83	111	112	113	141	113	96	100	114	115	116	117	118	119	80	59	64	84	0	0
Milwaukee + Dempster Turnkey		-	-		-721			-			-			1	-				-				-	-	
Milwaukee	0	0	507	793	1,933	2,123	3,744	4,026	3,938	731	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	0	0	157	346	1.027	1,588	2,067	3,348	7,796	9,168	9,194	1,516	0	0	0	0	0	0	0	0	0
Subtotal	0	0	507	793	1,933	2,123	3,901	4,371	4,965	2,319	2,067	3,348	7,796	9,168	9,194	1,516	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak Turnkey	0	0	0	0	0	0	0	0	0	0	0	0	0	172	199	901	996	1,361	1,426	2,595	6,332	6,897	946	0	0
Oak Brook/Cermak Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181	377	553	682	4,503	3,197	509	129	0	0
Pace Costs + Design Svcs.	-	1	-	-	0 - 8		-			1000	200	-	-	-	1000	-		-	-	1			-	-	1
Milwaukee	0	0	91	138	185	243	142	95	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	93	94	118	143	145	146	197	248	201	203	102	103	104	106	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	0	0	0	96	97	98	124	150	152	153	206	259	209	106	80	16	0	0
Subtotal	0	0	91	138	278	337	260	239	241	146	293	346	299	327	252	255	257	312	259	209	106	80	16	0	0
TOTAL COSTS (Year-of-Expend. \$)	ō	5	619	952	2,260	2,542	4,271	4,722	5,319	2,606	2,473	3,790	8,195	9,780	9,760	2,969	1,747	2,344	2,486	7,387	9,693	7,550	1,174	0	0

DELAYED IMPLEMENTATION SCHEDULE - LOW CAPITAL COSTS SCENARIO

All costs in thousands of inflated (year-of-expenditure) dollars



DELAYED IMPLEMENTATION SCHEDULE - HIGH CAPITAL COSTS SCENARIO

DELAYED IMPLEMENTATION SCHEDULE - HIGH CAPITAL COSTS SCENARIO

	0 04	001	0 Q2	0 03	0.04	o,	02	03	1 Q4	2 Q1	2 02	2 Q3	2 Q4	3 Q1	3 02	3 Q3	3 Q4	101	t 02	t Q3	1 Q4	0 Q1	5 Q2	5 Q3	5 Q4
Contract Package	2005	2010	2010	2010	2010	2011	201	201	201	2012	2013	2012	2012	2013	2013	2013	2013	2014	2014	2014	2014	2015	2015	2016	2015
PMODS Contractor									1000	1		1	1		-										
Milwaukee	0	8	34	34	43	87	88	89	90	91	46	19	15	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	34	42	86	87	88	88	89	90	91	92	93	94	94	95	96	35	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	0	0	42	43	43	52	88	89	90	91	91	92	93	94	102	134	0	0
Subtotal	0	8	34	34	77	130	174	176	178	222	178	152	158	180	182	183	185	187	188	128	94	102	134	0	0
Milwaukee + Dempster Tumkey	-	1	-	1	-	and the	-	-	12-2			1					1			Sec. and		-		-	-
Milwaukee	0	0	761	1,151	3,172	3,328	5,391	6,178	6,814	1,203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	0	0	218	513	1,514	2,432	3,169	5,176	11,823	14,400	14,951	2,536	0	0	0	0	0	0	0	0	0
Subtotal	0	0	761	1,151	3,172	3,328	5,609	6,691	8,328	3,635	3,169	5,176	11,823	14,400	14,951	2,536	0	0	0	0	0	0	0	0	0
Oak Brook/Cermak Turnkey	0	0	0	0	0	0	0	0	0	0	0	0	0	269	319	1,409	1,585	2,212	2,330	4,287	11,090	12,464	1,716	0	0
Oak Brook/Cermak Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	240	500	734	905	5,977	4,243	676	171	0	0
Pace Costs + Design Svcs.		-	-	-	-	-	-	-	1000	1		1	-			1							and the later		-
Milwaukee	0	0	143	216	291	382	223	150	151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dempster	0	0	0	0	145	147	185	224	227	229	308	389	314	317	160	162	163	166	0	0	0	0	0	0	0
Oak Brook/Cermak	0	0	0	0	0	0	0	0	0	0	154	156	157	198	240	242	244	329	415	335	169	128	26	0	0
Subtotal	0	0	143	216	436	529	408	374	378	229	462	545	471	515	400	404	408	495	415	335	169	128	26	0	0
TOTAL COSTS (Year-of-Expend. \$)	0	8	938	1,401	3,685	3,987	6,191	7,241	8,883	4,086	3,809	5,873	12,453	15,364	15,852	4,772	2,677	3,628	3,838	10,726	15,595	13,370	2,046	0	0

All costs in thousands of inflated (year-of-expenditure) dollars

Memorandum Pace ART Implementation Plan – Oak Brook/Cermak Distributor Service

Date:	October 5, 2009
То:	Tunde Balvanyos
From:	Scott Baker, Laura Riegel, Justin Antos
Subject:	Pace ART Implementation Plan – Oak Brook/Cermak Distributor Service

ART Project in Oak Brook/Cermak Corridor

AECOM is developing a project delivery mechanism for ART service in three corridors including Oak Brook/Cermak. Although this has not included distributor or other services supporting the ART services, the Oak Brook/Cermak corridor presents a service design challenge, in that ART service alone, with minimal other changes in the corridor may not be as productive as possible, and the percentage of the travel market share captured in the corridor may be disappointing. Pace's 10-Year Plan calls for the exploration and deployment of innovative, flexible services, possibly including private franchises.

Oak Brook Market

An effective distributor service in the Oak Brook/Cermak corridor could greatly enhance the Pace ART service by providing access to rapid transit stations in areas that are currently unserved by Pace. Communities in the Oak Brook/Cermak corridor have meandering streets and poor pedestrian access coupled with low-to-medium demand; resulting in a market that has not supported productive fixed route service. There are also many office complexes in the corridor that have no pedestrian access but offer parking without charge, effectively discouraging passengers from riding fixed route buses for the "final mile" of their trip.

Potential for Including Distributor in Oak Brook/Cermak Turnkey

Base Oak Brook/Cermak Scope

The Oak Brook/Cermak ART service will be the high-speed backbone for transit service. It will connect the Forest Lake CTA station and/or the 54th and Cermak CTA Station to the communities surrounding Oakbrook and Yorktown mails. The ART contractor for the corridor ("the Contractor") will design, purchase, and install a specified number of stations, street improvements, and the traffic signal priority system. Pace will maintain and operate the vehicles.

Oak Brook/Cermak Distributor Proposals

Request for Proposals for Distributor Service

The request for proposals from prospective Contractors could provide that contractors would also propose an option to design, implement, and operate distributor service in the Oak Brook/Cermak corridor for five years. The request would provide that the proposers offer innovative, entrepreneurial services to provide an integrated productive system of ART and distributor service in the corridor. The objective is to serve as many passengers as possible with a fully allocated operating subsidy by Pace of less than \$10 (or an appropriate warrant) per linked passenger trip. While the proposers will provide their own

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estimates of distributor service levels and ridership, Pace will evaluate the proposals based on its independent assessment of the costs, revenues, and ridership that each proposal would generate. Each proposal must assure Pace of adherence to Pace service quality standards, including operator conduct, appearance, reliability, and safety. Pace would consider purchasing insurance for the service, provided compensation agreements and subsidy computations accurately accounted for the costs and risk.

Pace believes that an entrepreneurial system that provides incentives for the operator to serve each facet of the market most cost-effectively will yield the best results. The features of the proposed service that proposers may wish to consider include but are not limited to:

Vehicles – Medium duty transit vehicles, specialized vans, subcontracted taxis or automobiles including distinctive styles may be effective depending on the routing strategies and resulting occupancies. Pace would fund and would consider owning the vehicles. The operating efficiency of the vehicles would be critical because operating subsidy is a primary objective. Pace would consider maintaining the vehicles at one of its operating bases, provided coordinating procedures avoid any degradation of other Pace services and compensation agreements and subsidy computations accurately account for the costs.

Routing – Conventional demand responsive paratransit routings such as many-to-one, route deviation, fixed route or entirely demand responsive service are all possibilities for portions of the market or periods of the day.

Marketing and Dispatching – Marketing will be critical to the proposal's merit and may include employer or retailer sponsorships, targeting subscription service, and independent vehicle operator marketing based on incentives. Dispatching may involve an unconstrained proportion of subscription service, call-and-ride self dispatching, or other techniques that yield the most productive service. Passenger control and operation of vehicles (e.g. car pooling, van pooling, station cars) will be considered provided the proposal resolves parking, storage, and other implementation considerations.

Pricing – Pace intends to operate the Oak Brook/Cermak ART service under the system-wide fare policy including free transfers among Pace routes. However, Pace will consider innovative pricing and fare systems proposed for the distributor service, including free service, premium fare levels warranted by the service, fares negotiated with sponsors, or fares based on demand (e.g. peak period surcharges) or service parameters (e.g. discounts for subscription service). Proposers should consider independent vehicle operator retention of fares as a method of increasing productivity.

Proposals for Compensation and Allocation of Risk

To ensure that ridership is maximized, the Contractor should assume a significant share of the market risk and incentive (i.e. the risk that ridership levels may be lower or higher than projected). The Contractor should assume most of the operating cost risk (i.e., the risk that operating expenses may be higher than projected). A fixed payment by Pace per passenger is one method Pace would consider to allocate these risks. Pace would also consider limiting the Contractor's risk including a termination of the operating obligation based on proven economic infeasibility. Proposers must propose accurate methods for collecting auditable data that will support their proposed terms for compensation and risk limitation.

Proposals should be supported by market research and analysis, any additional evidence supporting cost, revenue, and ridership projections, and comprehensive management and operating plans for the service.

Alternatives to Distributor Option Proposal

In addition to proposing an option for Oak Brook/Cermak distributor service as described above, the proposer may provide an alternative for transit service in the Oak Brook/Cermak corridor which deviates from the base and distributor service option if the proposer believes it will serve Pace's mission. For example, an integrated corridor service utilizing vehicles smaller than base ART vehicles to provide one-seat rides from the rapid transit station to residential or employment sites could be proposed. Any alternative of this nature should be proposed for design, implementation, and five years operation. Proposals must contain detail comparable to the distributor option proposal and comparable projections and economic analysis.

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