CROSS-COUNTY MetroLink Extension

Segment 1
Conceptual Design

Cross-County
MetroLink
Extension

Final Capital Cost Estimates

Prepared for the
East-West Gateway Coordinating Council
in association with the
Bi-State Development Agency
Missouri Department of Transportation

By Parsons Transportation Group
and Associated Consultants

August 1999

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1
Introduction

This report describes the draft capital cost estimates for the candidate alternatives developed for the Cross-County MetroLink Extension, Segment I.

These estimates translate the conceptual design, as described in the Definition of Alternatives Report prepared for this project (dated March 1999) plus some subsequent design modifications, into construction quantities and equivalent cost. In addition, costs for certain non-facility items have been estimated. These pertain to the required fleet of new MetroLink cars to provide service in the Cross-County corridor, new buses for the Bi-State Development Agency to operate for improved local transit service linked to MetroLink in this corridor, and new vehicles and supporting improvements for an improved Forest Park Circulator transit system.

The sources of information for these estimates have been the actual construction cost for prior and current MetroLink projects, experience from other recent transit construction projects, and other local construction experience. These sources have been used to define unit costs and/or lump sum costs for the various construction items or vehicles associated with the candidate alternatives.

Since the design work has been carried only to a conceptual level of detail, the cost estimates are similarly limited in level of detail. The approach has been to be conservative so that the cost implications of the candidate alternatives are both realistic and reasonable.

All costs contained in this report represent current (1999) dollars.

2
Cost Estimation Methodology

The overall approach and methodology used for capital cost estimation was described in the methodology report prepared earlier in this project (January 1999). The application of this methodology is represented in the following sections in terms of construction cost items, non-facility costs, contingencies and soft costs, and mitigation costs.

Construction Costs

There are three key steps to the preparation of construction cost estimates:

1. Assembly of unit construction cost data applicable to the MetroLink project.

2. Translation of the proposed project into the set of construction items, i.e., describing candidate alternatives in terms of specific items of work.

3. Estimation of the amount of construction for each item of work.

Unit Costs

As noted in the introduction, the first has been accomplished via the assembly of unit cost data from St. Louis regional experience and other transit projects in the U.S. Specifically, these sources include:

1. Previous and current MetroLink project experience from the initial line and from the St. Clair County line now under construction.

2. St. Louis regional experience of the project design team associated with construction projects

for state, county, and local agencies and private sector clients. These reflect structural, roadway, utility, landscape, and streetscape improvements.

3. Other urban area experience in the Midwest (Illinois, Wisconsin, Ohio, Iowa) with roadway and rail transit projects and from the broader U.S. in terms of architecture and light rail construction.

4. Information gathered from vendors relative to vehicle costs, specifically for vehicle costs associated with the Forest Park Circulator.

Construction Items

The candidate alternatives were described in terms of the primary construction items. As noted previously, this is constrained in terms of level of detail because only conceptual design has been prepared. The construction items used for the estimates are as follows:

1. Site Preparation

    a. Costs to prepare right-of-way or easement or site for project improvements.

    b. Two items included:

        - Demolition: removal of any existing structures or facilities.
        - Grading: earthwork activity to bring the improvement area to approximate level, grade, or slope required.

2. Trackwork

    a. Costs to construct MetroLink tracks

    b. Five items included:

        - Construct track: rails, ties, ballast, other fastening systems.
        - No. 8 and No. 10 turnouts: switches and other rail junctions.
        - Grade crossings: pavement material associated with at-grade crossings of tracks.
        - Yard facilities: tracks, buildings, and facilities required for a storage and limited maintenance facility for MetroLink trains.

3. Signal Systems

    a. Costs associated with train and traffic signal systems and communications.

b. Three items included:

- Signals/centralized train control (CTC): signals for train operations.
- Signals/power switch: communication for train signals and controls.
- Signals/grade crossings: traffic signal installation for at-grade crossings, including hardware, controllers, and communications.

4. Catenary System

a. Costs associated with providing electric power to MetroLink trains.

b. Two items included:

- Substation: electric power facilities providing needed energy to the MetroLink corridor.
- Overhead contact wire: facilities including contact wire, support structures, and related hardware.

5. Structures

a. Costs associated with various structures to be constructed along the corridor; e.g., bridges for MetroLink tracks, elevated trackway structure, bridges for roads and pedestrians, retaining walls along embankments or other grade transitions, and specific utility facilities.

b. Items vary by section alternative, but could include:

- Roadway bridges/underpasses.
- Pedestrian bridges/underpasses.
- Cut-and-cover concrete tunnel for MetroLink.
- Bored concrete tunnel for MetroLink.
- Concrete transition retaining wall.
- Concrete embankment retaining wall.
- Special structures, such as parking structures.

6. Stations

a. Costs associated with MetroLink stations, including passenger access (elevators, ramps, stairs), canopies, platforms, platform lighting, patron amenities, and signing.

b. Items included are specific to the station locations.

7. Property Acquisition

a. Costs associated with acquisition of property for right-of-way or sites (stations and facilities).

b. Items vary according to the specific parcels required, identified by site area.

8. Streetscaping and Landscaping

a. Costs associated with landscaping, pedestrian-scale lighting, special paving, and similar enhancements at MetroLink stations and along the line.

b. Items included are site-specific:
- At stations.
- Along streets carrying MetroLink tracks.
- Along the MetroLink right-of-way.

9. Street Reconstruction

a. Costs associated with street and parking lot improvements; the former would include access facilities to stations, roadway modifications along streets to include MetroLink tracks, or rehabilitation of streets subsequent to MetroLink construction. Costs would be all-inclusive of construction requirements, pavement removal and replacement, curb and gutter removal and replacement, streetlighting, roadway drainage, etc.

b. Items are site-specific for each section and include:
- Roadway improvements.
- Roadway reconstruction.
- Parking and station road access improvements.

10. Utilities

a. Costs associated with utility modifications required to accommodate MetroLink facilities, including removal and replacement, relocation, or other modifications.

b. Three items are included:[1]

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[1] Costs associated with other utilities, i.e., telephone, electric, and communications, are expected to be relatively small compared to sewer, water, and gas costs. Costs for these other utilities (telephone, electric, communications) are included in unit costs for other construction items.

- Sewers: costs associated with the sanitary sewer system.
- Water: costs associated with the water main system.
- Gas: costs associated with the natural gas supply and distribution system.

11. Traffic Control

    a. Costs associated with maintenance of traffic during the construction period, including temporary paving, traffic controls, barrier/barricade systems, signing, etc.

    b. Items identify the general maintenance-of-traffic situation expected:

    - Closure (full or partial) of roads parallel to MetroLink.
    - Closure of cross streets.

12. Mitigation

    a. Costs reflect potential for mitigation actions to address environmental impacts or related conditions in the corridor. At this point, preliminary cost allowances are being set aside for these items. However, these allowances will need to be confirmed during the preliminary and final design phase of this MetroLink expansion project.

    b. The following lists anticipated items that reflect the potential for mitigation. The anticipated items, which are yet to be confirmed, would be identified by type of action as follows:

    - Noise: installation of noise barriers to protect sensitive land uses, mostly residential areas.
    - Vibration: building protection, mostly during the construction period, to shield activities sensitive to vibration.
    - EMI/EMF: building protection to counteract any impact of electromagnetic fields on scientific research activities.
    - Hazardous materials: site remediation because of the presence of hazardous materials.
    - Traffic and parking management: costs associated with the installation of management facilities, signs, markings, etc., to assist local communities in minimizing parking encroachment by MetroLink riders driving to and parking in areas near proposed stations.
    - Relocation assistance: costs associated with assisting existing residents and businesses to relocate if displaced by facilities built as part of this project.

Quantities of Work

For each construction item, quantities of work have been estimated. The method reflects three techniques for estimating quantities:

1. *Linear and Spatial Quantities.* For the majority of the construction items, quantities are measured in terms of length (linear feet) or area (square feet, yards, or acres). Facilities have been measured from the conceptual design plans in these terms. Unit costs for specific work items included in a construction element (e.g., for roads—pavement, curb and gutter, streetlights) were aggregated into a composite unit cost per linear foot or square foot for estimating purposes.

2. *Prototype Design.* For various facilities (e.g., bridges, retaining walls, streetscape, MetroLink stations), prototype designs were analyzed in terms of cost. This entailed identifying standardized cross sections for such facilities and estimating corresponding quantities of work. These resulted in overall unit costs applied throughout the Cross-County corridor.

3. *Lump Sum.* This method represents an allowance for a construction item. Lump sum is used because the level of detail is not sufficient to permit more specific cost analysis.

Non-Facility Costs

In addition to the specific construction items associated with the candidate alternatives, there are other non-facility capital costs that are included in the overall project costs. These additional capital costs would be the same no matter which candidate alternative is chosen. Three non-facility items have been included:

1. *MetroLink Cars.* Based on the draft operating plan, a fleet of 34 new MetroLink cars will be required to provide service. The cost for this equipment has been included.

2. *New BSDA Buses.* Based on the draft operating plan, new and modified Bi-State bus service will be provided for this project. This will require expansion of the bus fleet. The cost for these vehicles has been included.

3. *Forest Park Circulator.* An improved circulator transit service system has been identified for the Forest Park area. The plan entails a multiple element transit program with the acquisition of new vehicles. Costs also include new passenger facilities: new waiting/stop facilities and a new pedestrian bridge over I-64. These costs have been included.

Contingencies and Soft Costs

Beyond the construction costs, this MetroLink project will incur other important costs. The uncertainties of the design and construction requirements would be addressed through a 20 percent contingency add-on. This is consistent with previous MetroLink and other construction experience. In addition, there are

non-construction costs—labeled "soft costs"—that need to be included in the project budget. These include:

1. Legal fees for property acquisition, as well as general legal services, have been estimated at $2.5 million.

2. Engineering design at 12 percent of construction cost.

3. Construction management at 6 percent of construction cost.

4. Project administration at 6 percent of construction cost.

5. Testing and start-up activities for MetroLink operations at 1 percent of construction cost.

6. Insurance costs for the project at 2 percent of construction costs.

3
Description of Alternatives

As described in previous documents developed for this MetroLink project, a series of candidate alternatives has been developed at a conceptual design level. The following section highlights these alternatives, which have been organized in a manner that permits comparison as well as facilitating the formulation of various combinations that could be attractive as the preferred design for the corridor.

Candidate Alternatives

Following consideration of a full range of conceptual design alternatives, two basic design configurations were retained for detailed analysis: a Fully Grade-Separated Alternative and an alternative light rail transit operating at-grade in public rights-of-way with grade-separated sections to avoid conflict with other major highway and railroad crossings, known as the At-Grade/Grade-Separated Combination Alternative. These alternatives describe concepts that would extend throughout the Segment I corridor. In addition, certain limited options were identified that would affect only certain sections of the corridor.

Corridor Alternatives

Fully Grade-Separated Alternative

- This alternative is a below-ground alignment using a cut-and-cover design from the Forest Park Station (at DeBaliviere) to the east edge of downtown Clayton (near Forsyth Boulevard) at Forest Park Parkway; the MetroLink facility to be located within the existing right-of-way of Forest Park Parkway and Millbrook Boulevard.

- Within downtown Clayton, the alternative is a below-ground alignment, using cut-and-cover design, extending under Forsyth Boulevard and following an alignment to the west under Carondelet Plaza and Carondelet Avenue to Brentwood Boulevard, then south to Galleria Park-way, then east under Galleria Parkway to the CMT right-of-way; the MetroLink facility would be located within existing

street right-of-way except in the east edge of downtown Clayton where the alignment would cross through existing private (vacant) property. For the section along Carondelet Avenue, an option was devised for using a bored tunnel construction technique rather than cut-and-cover. This would affect the profile of the line, which would become somewhat deeper.

- Along the CMT right-of-way, the MetroLink extension would be built at ground level from the Galleria Parkway to Flora Avenue. At Flora Avenue, the MetroLink alignment would ascend on an elevated structure through the Sunnen Business Park, over Big Bend Boulevard, Deer Creek, and I-44 to the Lansdowne Avenue Station and terminus.

At-Grade/Grade-Separated Combination Alternative

- This alternative is a below-grade alignment at the Forest Park Station extending west below Forest Park Parkway (cut-and-cover), and transitioning upward to existing ground level at a point approximately 1,000 feet west of DeBaliviere Avenue. The MetroLink extension then would continue in the median at-grade to a point 600 feet west of Big Bend Boulevard, where it would transition back down to below ground and extend below ground (cut-and-cover) to the east edge of downtown Clayton.

- Within downtown Clayton, the MetroLink extension would transition up to ground level at Forsyth Boulevard and continue west along the north edge of Carondelet Plaza to Hanley Road, and along Carondelet Avenue through the downtown core, turning south along the west side of Meramec Avenue. South of Bonhomme Avenue, the tracks would be elevated over Forest Park Parkway and continue west along the south side of the parkway to the CMT right-of-way.

- The MetroLink extension would cross existing private property in the section east of Hanley Road. It would follow the centerline of Carondelet Avenue, staying within the right-of-way; it would be located in public right-of-way (or a portion on private property at Carondelet and Meramec) for the remainder of this section, with some use of land along the edges of Shaw Park.

- Along the CMT right-of-way, the MetroLink extension would be at ground level from Forest Park Parkway south to Flora Avenue. At Flora Avenue, it would descend to a below-ground (cut-and-cover) alignment through the Sunnen Business Park, passing under the Union Pacific (UP) railroad. South of the railroad, the MetroLink alignment would be at-grade, crossing Big Bend Boulevard and Oxford Avenue. From this point south, it would be on an elevated structure over Deer Creek and I-44 to the Lansdowne Avenue Station.

Section Alternatives/Options

For certain limited sections along the two corridor alternatives described above, there are additional alternatives or design options.

Substitute sections for the At-Grade/Grade Separated Combination Alternative include:

- ***South Edge At-Grade.*** Along Forest Park Parkway and Millbrook Boulevard, the track would be at-grade but along the south edge (not in the median) of the roadway. The at-grade alignment would transition to a below-grade location at a point east of Throop Avenue and continue underground to the east edge of downtown Clayton, where it would rise to the ground surface.

- ***Skinker Boulevard and Big Bend Boulevard Underpasses.***

  a. At Skinker Boulevard and Forest Park Parkway for the at-grade alternative, median alignment (not south edge alignment), special underpasses could be included as follows:

     - *Transit underpass*. The MetroLink tracks would transition from at grade to pass underneath Skinker Boulevard, with the station located under Skinker Boulevard. The transitions would occur west of Des Peres Avenue and east of Hoyt Drive.

     - *Roadway underpass*. Two lanes (one in each direction) on Skinker Boulevard would be placed in an underpass beneath Forest Park Parkway to enhance traffic capacity at this intersection.

  b. At Big Bend Boulevard and Millbrook, also for the at-grade alternative, median alignment, a special transit underpass could be included. The MetroLink tracks would transition from at grade at Throop Drive to pass underneath Big Bend Boulevard, with the station located under Big Bend Boulevard. The tracks would stay underground, connecting with the underground section about 400 feet west of Big Bend Boulevard, which is included in the at-grade combination alternative.

- ***Downtown Clayton Elevated.*** Within downtown Clayton from Forsyth Boulevard (east downtown edge) to the CMT right-of-way, this option entails an elevated transit structure following the north edge of Forest Park Parkway. From Hanley Road to Meramec Avenue, the structure would be kept as low as possible. This would result in at-grade crossings of Bemiston Avenue and Central Avenue at locations over the westbound Forest Park Parkway lanes. The MetroLink extension would cross over Forest Park Parkway and run parallel to the south side of the parkway on an elevated structure until curving southward into the CMT right-of-way. There would be two options for vertical and horizontal alignment in the section between Hanley Road and Meramec. One option would be a high-profile alignment, which would be fully grade-separated and largely over Shaw Park Drive. The second option would have a lower profile and be constructed over the westbound lanes of Forest Park Parkway. This option would intersect Bemiston Avenue and the Central Avenue ramp at grade.

- ***Carondelet/Brentwood At-Grade.*** This would be an optional at-grade alignment in downtown Clayton. Rather than turning from Carondelet Avenue at Meramec, the route would continue west to Brentwood, then turn south along the west side of the street. Near Shaw Park Drive, this option would transition to an elevated alignment, turning west over Shaw Park Drive and then over Forest Park Parkway to the CMT right-of-way.

- ***Forest Park Parkway At-Grade.*** Within downtown Clayton, following a horizontal alignment

similar to the Forest Park Parkway elevated, this option features a profile that would be lower, crossing Forsyth Boulevard at grade, then rising to an elevation equivalent to Forest Park Parkway near the Ritz Carlton Hotel. The alignment would pass over Hanley Road, under Bemiston Avenue, under Central Avenue Ramp, and would be located over Forest Park Parkway from Meramec Avenue west to the CMT right-of-way.

- ***Galleria Elevated.*** In the Galleria area from approximately Clayton Road to Galleria Parkway, the MetroLink extension would ascend from the CMT right-of-way over I-170 to follow an alignment east of and parallel with Brentwood Boulevard; at Galleria Parkway, it would curve east back over I-170 to the CMT right-of-way.

- ***Laclede Station Road At-Grade/Elevated.*** In the section from Flora Avenue to Big Bend Boulevard, the MetroLink extension would leave the CMT, following Laclede Station Road at grade from Flora Avenue south past Sunnen Drive. At this point, the alignment would become elevated, curving eastward and parallel to the north edge of the railroad tracks, and back toward the CMT right-of-way. At the CMT, it would ascend over the railroad tracks and follow the CMT over Big Bend Boulevard.

A substitute for either the Fully Grade-Separated or the At-Grade/Grade-Separated Combination Alternative is:

- ***Deer Creek Terminal Station.*** As an option to extending the MetroLink alignment to Lansdowne Avenue, the MetroLink extension could end north of Deer Creek (north of I-44) in a location just east of Big Bend Boulevard.

Organization of Cost Estimates

To permit comparisons of the various alternatives and the development of combinations that could become the preferred design, the cost estimates have divided the corridor into several sections, which are illustrated in Figure 1.

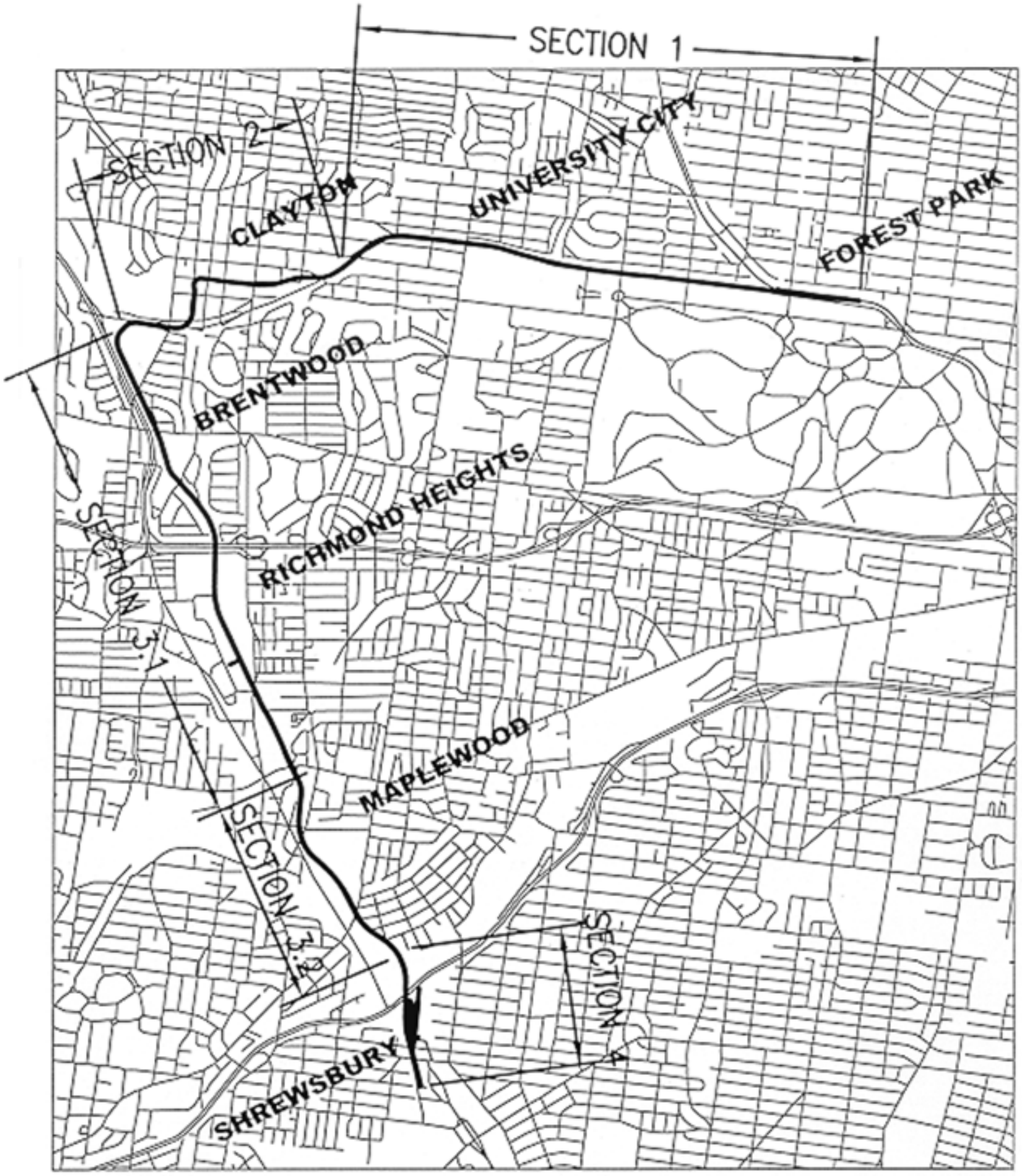
Section 1: From the Forest Park MetroLink station along Forest Park Parkway and Millbrook Boulevard to the east edge of downtown Clayton.

Section 2: Downtown Clayton.

Section 3.1: From just north of I-170 (along the CMT or Brentwood Boulevard) through the Galleria area to Manchester Road along the CMT.

Section 3.2: From Manchester Road along the CMT through the Sunnen Business Park area to Deer Creek (near Big Bend Boulevard and Oxford Avenue).

Section 4: From Deer Creek over I-44 to Lansdowne Avenue.



SECTION LIMITS WITHIN SEGMENT I

FIGURE 1

4
Summary of Cost Estimates

The results of the application of the methodology described in Section 2 of this report are summarized in the following tables. Tables 1 through 5 provide the capital cost estimates for each of the five sections in the Cross-County corridor according to the various alternatives and design options.

These section cost estimates indicate the following:

- Table 1, Section 1: Forest Park through University City
  - Median at-grade would be the least expensive at $79.3 million.
  - Below-grade would be the most expensive at $141.4 million.
  - MetroLink underpass at Skinker would add about $15 million to the cost of the median at-grade.
  - Skinker Boulevard roadway underpass would cost $10 million.
- Table 2, Section 2: Downtown Clayton
  - Carondelet-Brentwood at-grade would be the least expensive at $43.7 million.
  - Carondelet-Meramec at-grade would cost $12 million more than the Brentwood alignment because of the longer length of elevated structure.
  - Carondelet-Brentwood bored tunnel would be the most expensive at $93.9 million. (This option must be linked to the Galleria below-grade option.)
  - Forest Park Parkway alternatives would cost $56.2 to $58.8 million.
- Table 3, Section 3.1: CMT-Galleria to Manchester
  - CMT at-grade would be the least expensive at $55.5 million.

- — Galleria below-grade would be the most expensive at $85.5 million. (This option must be linked to the downtown Clayton below-grade options.)
- — The Galleria elevated option would add $20.7 million to the cost of the CMT at-grade alternative.

- Table 4, Section 3.2: CMT-Manchester to I-44
  - — CMT at-grade with below-grade through the Sunnen Business Park would be the least expensive at $33.1 million.
  - — The Laclede Station Road option would add $2.6 million to the cost of the CMT at-grade/Sunnen below-grade alternative.
  - — CMT at-grade with elevated through the Sunnen Business Park would be the most expensive at $45.2 million, assuming the line extends to Lansdowne Avenue.
  - — Using the Deer Creek station as the terminal adds between $8.9 and $11.7 million to the cost for this section because of the inclusion of the yard and park-n-ride facility.

- Table 5, Section 4: Deer Creek to Lansdowne
  - — Cost for the extension, including the maintenance yard and park-n-ride facility, would be $55.2 million.

These section alternatives need to be combined into corridor-long alternatives. Figure 2 illustrates the first step in defining how such combinations could be created. That is, Figure 2 shows the linkages for the various alternatives between adjacent sections. From a physical or facility compatibility perspective, these possible linkages (or limitations) are as follows:

- Choices between Sections 1 and 2 alternatives are independent of each other.

- Choices between Sections 2 and 3.1 alternatives are dependent on each other:
  - — Downtown Clayton below-grade would connect only to the Galleria below-grade.
  - — Downtown Clayton at-grade or elevated alternatives would connect with CMT at-grade or CMT elevated alternatives.

- Choices between Sections 3.2 and 4 alternatives are independent of each other, except that there is a relationship between the alternatives passing through the Sunnen Business Park area and the Deer Creek station, which is summarized in Table 6.

Using these relationships, there are a number of possible combinations. Some of these are identified in Table 7 and illustrate a range from various at-grade/grade-separated combinations to a fully grade-separated alternative. The range of cost would be:

- At-grade/grade-separated combinations ending at Deer Creek would be the least expensive at $320 million.
- The fully grade-separated alternative ending at Lansdowne Avenue would be the most expensive at $518 million.

Table 1
CAPITAL COST BY ALTERNATIVE FOR SECTION 1: FOREST PARK THROUGH UNIVERSITY CITY

	Capital Cost by Candidate Alternative ($1,000,000s)				
Cost Item	Median At-Grade (No. 1A)	South Side At-Grade (No. 1B)	Skinker/Big Bend Transit Underpass	Skinker Roadway Underpass[1]	Below-Grade (No. 1C)
1. Site Preparation	0.5	0.4	0.3		0.1
2. Trackwork	4.1	4.1	4.0		3.6
3. Signal Systems	4.9	4.7	4.6		4.4
4. Catenary System	4.1	4.1	4.1		4.1
5. Structures	23.8	38.3	39.5		68.2
6. Stations	3.2	2.9	5.9		5.9
7. Property Acquisition	0.0	0.0	0.0		0.0
8. Street- and Landscape	0.8	0.8	0.6		0.4
9. Street Reconstruction	7.3	6.3	7.3	6.7	5.4
10. Utilities	2.3	1.2	2.3		2.7
11. Traffic Control	0.3	0.3	0.3		0.4
12. Mitigation	2.1	2.1	1.9		0.5
13. Subtotal	53.4	65.2	70.8	6.7	95.7
14. 20% Contingency	10.7	13.0	14.2	1.3	19.1
15. Subtotal	64.1	78.2	85.0	8.0	114.8
16. Soft Costs					
a. Legal	0.8	0.8	0.8	0.1	0.8
b. Engineering	6.4	7.8	8.5	0.8	11.5
c. Construct. Mgmt.	3.2	3.9	4.2	0.4	5.7
d. Project Mgmt.	3.2	3.9	4.2	0.4	5.7
e. Testing/Start-up	0.5	0.7	0.7	0.1	1.0
f. Insurance	1.1	1.3	1.4	0.1	1.9
g. Subtotal	15.2	18.4	19.8	1.9	26.6
17. Total Cost	79.3	96.6	104.8	9.9	141.4

[1] These costs would be in addition to Alternatives 1A and 1B only.

Table 2
CAPITAL COST BY ALTERNATIVE FOR SECTION 2: DOWNTOWN CLAYTON

	Candidate Cost by Candidate Alternative ($1,000,000s)						
Cost Item	Caron-delet-Meramec At-Grade (No. 2A)	Caron-delet-Brent-wood At-Grade	Caron-delet-Brent-wood Below-Grade (No. 2B)	Caron delet-Brent-wood Bored Tunnel	Forest Park Pkway Elevated Option 1, Bally's (No. 2C)	Forest Park Pkway Ele-vated Option 2, Maryland Avenue (No. 2D)	Forest Park Pkway At-Grade (No. 2J)
1. Site Preparation	0.5	0.3	0.0	0.0	0.1	0.1	0.1
2. Trackwork	3.2	4.0	2.1	2.1	1.6	1.6	1.7
3. Signal Systems	2.2	2.5	2.2	2.2	1.3	1.3	1.4
4. Catenary System	2.2	2.5	2.2	2.2	2.0	2.0	2.0
5. Structures	18.3	10.2	43.8	47.9	27.7	29.2	21.9
6. Stations	2.0	2.0	2.8	2.8	2.2	2.2	3.2
7. Property Acquisition	3.6	1.7	1.7	1.7	1.4	1.6	3.0
8. Street- and Landscape	1.9	2.3	0.7	0.7	0.2	0.2	0.7
9. Street Reconstruction	3.0	3.0	4.7	2.9	0.9	0.9	1.2
10. Utilities	0.8	1.0	1.9	1.0	0.0	0.0	0.5
11. Traffic Control	0.1	0.1	0.2	0.1	0.0	0.1	0.2
12. Mitigation	0.0	0.0	0.0	0.0	0.4	0.4	1.2
13. Subtotal	37.8	29.6	62.3	63.6	37.8	39.6	37.1
14. 20% Contingency	7.6	5.9	12.5	12.7	7.6	7.9	7.4
15. Subtotal	45.4	35.5	74.8	76.3	45.4	47.5	44.5
16. Soft Costs							
a. Legal	0.5	0.5	0.5	0.5	0.5	0.5	0.5
b. Engineering	4.3	3.5	7.5	7.6	4.5	4.8	4.1
c. Construct. Mgmt.	2.2	1.8	3.7	3.8	2.3	2.4	2.0
d. Project Mgmt.	2.2	1.8	3.7	3.8	2.3	2.4	2.0
e. Testing/Start-up	0.4	0.3	0.6	0.6	0.4	0.4	0.3
f. Insurance	0.7	0.6	1.2	1.3	0.8	0.8	0.7
g. Subtotal	10.3	8.5	17.2	17.6	10.8	11.3	9.6
17. Total Cost	55.7	44.0	92.0	93.9	56.2	58.8	54.1

Table 3

CAPITAL COST BY ALTERNATIVE FOR SECTION 3.1:

CMT (GALLERIA-MANCHESTER)

	Capital Cost by Candidate Alternative ($1,000,000s)		
Cost Item	CMT At-Grade (No. 3.1A)	Galleria Below-Grade (No. 3.1B)[1]	Galleria Elevated (No. 3.1C)
1. Site Preparation	0.9	0.5	0.7
2. Trackwork	3.4	3.0	3.5
3. Signal Systems	4.0	3.1	4.1
4. Catenary System	2.8	2.7	2.9
5. Structures	18.3	42.4	32.0
6. Stations	3.1	3.0	3.1
7. Property Acquisition	0.2	0.2	0.3
8. Street- and Landscape	0.8	0.6	0.7
9. Street Reconstruction	0.0	0.8	0.0
10. Utilities	0.1	0.7	2.0
11. Traffic Control	0.1	0.1	0.1
12. Mitigation	2.6	0.5	1.9
13. Subtotal	37.3	57.6	51.3
14. 20% Contingency	7.5	11.5	10.3
15. Subtotal	44.8	69.1	61.6
16. Soft Costs			
a. Legal	0.7	0.7	0.7
b. Engineering	4.5	6.9	6.2
c. Construct. Mgmt.	2.2	3.5	3.1
d. Project Mgmt.	2.2	3.5	3.1
e. Testing/Start-up	0.4	0.6	0.5
f. Insurance	0.7	1.2	1.0
g. Subtotal	10.7	16.4	14.6
17. Total Cost	55.5	85.5	76.2

[1] This option must be linked to the downtown Clayton below-grade options. See Table 2, No. 2B.

Table 4

CAPITAL COST BY ALTERNATIVE FOR SECTION 3.2: CMT (MANCHESTER—I-44)

	Capital Cost by Candidate Alternative ($1,000,000s)					
Cost Item	CMT/ Sunnen Below-Grade (No. 3.2A)	CMT/Sunnen Laclede Station Road (No. 3.2D)	CMT/ Sunnen Elevated (No. 3.2E)	Deer Creek At-Grade (with No. 3.2A)	Deer Creek Elevated (with No. 3.2D)	Deer Creek Elevated (with No. 3.2E)
1. Site Preparation	0.2	0.2	0.2	1.0	1.2	1.1
2. Trackwork	1.2	1.5	1.3	2.7	4.9	2.6
3. Signal Systems	1.3	1.6	1.1	4.3	3.9	2.8
4. Catenary System	0.7	0.9	0.8	1.3	1.4	1.3
5. Structures	17.0	16.9	20.0	14.2	18.3	20.8
6. Stations	0.9	0.7	1.0	1.7	1.7	1.0
7. Property Acquisition	0.2	0.2	0.2	3.4	3.4	3.4
8. Street- and Landscape	0.2	0.4	0.5	0.4	0.6	0.5
9. Street Reconstruction	0.1	0.6	0.0	0.0	0.6	0.0
10. Utilities	0.1	0.1	5.0	0.1	0.1	4.0
11. Traffic Control	0.1	0.1	0.1	0.1	0.1	0.1
12. Mitigation	0.4	0.4	0.4	0.5	0.9	0.9
13. Subtotal	22.4	23.6	30.6	29.7	37.0	38.5
14. 20% Contingency	4.5	4.7	6.1	5.9	7.4	7.7
15. Subtotal	26.9	28.3	36.7	35.6	44.4	46.2
16. Soft Costs						
a. Legal	0.3	0.3	0.3	0.3	0.3	0.3
b. Engineering	2.7	2.7	3.7	3.6	4.4	4.6
c. Construct. Mgmt.	1.3	1.4	1.8	1.8	2.2	2.3
d. Project Mgmt.	1.3	1.4	1.8	1.8	2.2	2.3
e. Testing/Start-up	0.2	0.2	0.3	0.3	0.4	0.4
f. Insurance	0.4	0.5	0.6	0.6	0.7	0.8
g. Subtotal	6.2	6.4	8.5	8.4	10.2	10.7
17. Total Cost	33.1	35.7	45.2	44.0	54.6	56.9

Table 5
CAPITAL COST BY ALTERNATIVE FOR SECTION 4.1: DEER CREEK—LANSDOWNE

	Capital Cost by Candidate Alternative ($1,000,000s)
Cost Item	Lansdowne Elevated (No. 4A)
1. Site Preparation	3.1
2. Trackwork	4.9
3. Signal Systems	4.1
4. Catenary System	2.3
5. Structures	17.4
6. Stations	1.2
7. Property Acquisition	1.8
8. Street- and Landscape	0.3
9. Street Reconstruction	0.0
10. Utilities	2.5
11. Traffic Control	0.1
12. Mitigation	0.0
13. Subtotal	37.7
14. 20% Contingency	7.5
15. Subtotal	45.2
16. Soft Costs	
a. Legal	0.2
b. Engineering	4.3
c. Construct. Mgmt.	2.2
d. Project Mgmt.	2.2
e. Testing/Start-up	0.4
f. Insurance	0.7
g. Subtotal	10.0
17. Total Cost	55.2

7/14/99

East-West Gateway ---Cross County --- Segment I
Organization of Alternatives by Section

FIGURE 2

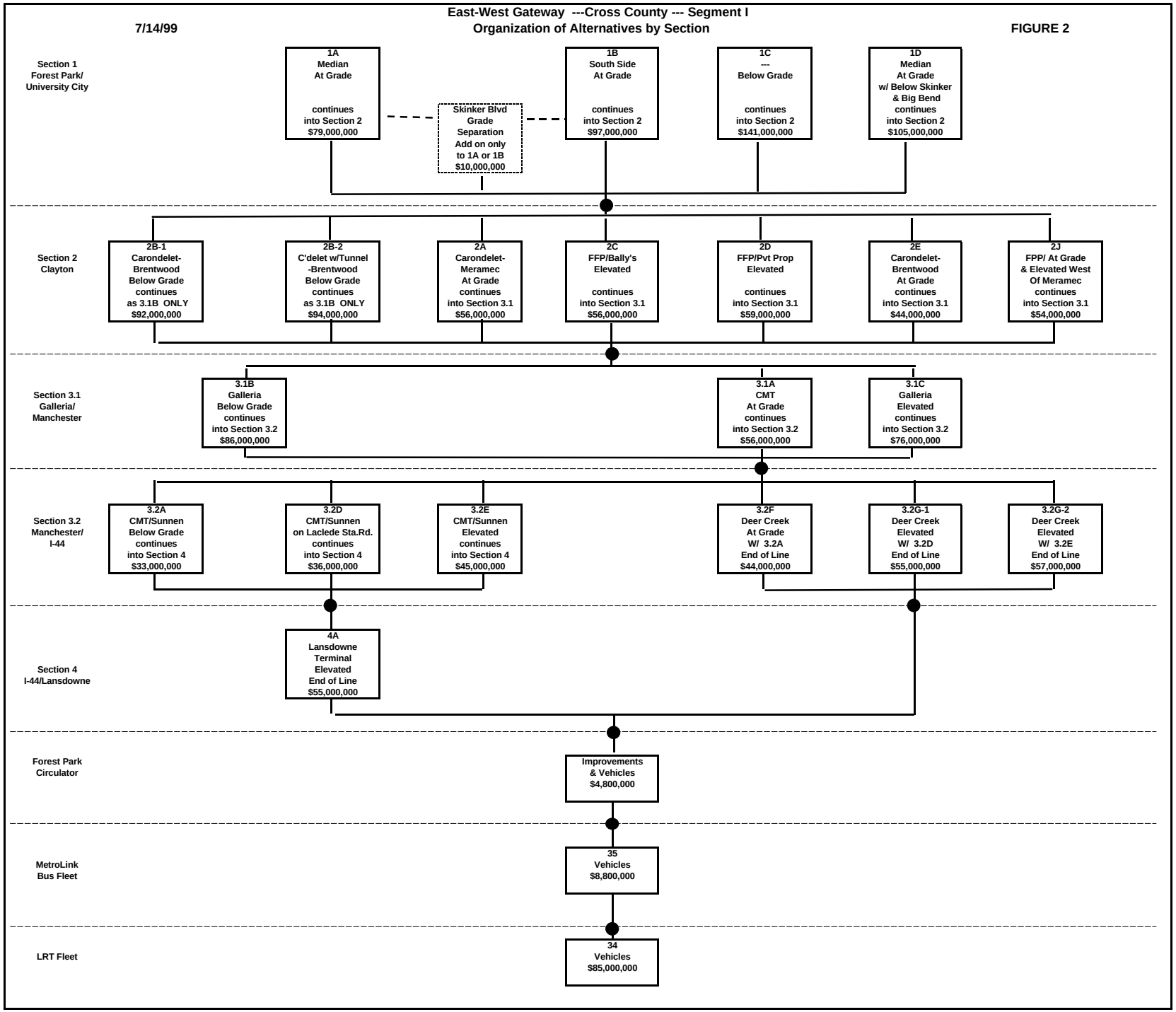


Table 6
COMBINATION OF ALTERNATIVES, SOUTH END, CROSS-COUNTY CORRIDOR

	Terminal Option					
	Lansdowne Avenue Alt. Alignment at Sunnen			Deer Creek Alt. Alignment at Sunnen		
Station Alternative	Under-ground[1]	Elevated[1]	Laclede Station Road[2]	Under-ground[1]	Elevated[1]	Laclede Station Road[2]
Laclede Station Road (at grade)	No	No	Yes	No	No	Yes
Big Bend Boulevard (at grade)	Yes	No	No	No	No	No
Deer Creek (at grade)	No	No	No	Yes	No	No
Deer Creek (elevated)	No	Yes	No[3]	No	Yes	Yes
Lansdowne Avenue (elevated)	Yes	Yes	Yes	—	—	—
Number of Stations Each Alternative	2	2	2	1	1	2

[1] These alignments (underground/cut-and-cover or elevated) would be through the Sunnen Business Park, generally following the path of the previous Terminal Railway right-of-way.
[2] Alignment at-grade following Laclede Station Road with transition to elevated alignment north of and parallel to the Union Pacific Railroad to the CMT right-of-way and then elevated over the Union Pacific tracks.
[3] This could be planned as an added station if new development (and transit ridership potential) occurred in the Deer Creek/Big Bend Boulevard vicinity.

Table 7 w/Revised Header
CAPITAL COST FOR CORRIDOR ALTERNATIVES ($1,000,000s)

		Combination Alternative								
Cost Category	Item	Terminal at Deer Creek	Terminal at Lansdowne (Sunnen Below Grade)	Terminal at Lansdowne (Laclede Station Road)	Terminal at Lansdowne (Downtown Clayton Elevated, with Laclede Station Road)	Terminal at Lansdowne (Galleria Elevated with Laclede Station Road)	Terminal at Lansdowne (Carondelet-Brentwood At-Grade)	Terminal at Lansdowne (South Side At-Grade)	Terminal at Lansdowne (Downtown Clayton FPP At-Grade/with Laclede Station Road)	Fully Grade-Separated Alternative, Terminal at Lansdowne
A. Capital Cost by Section	Section 1: Forest Park through University City	Median At-Grade $79.3	Median At-Grade $79.3	Median At-Grade $79.3	Median At-Grade $79.3	Median At-Grade $79.3	Median At-Grade $79.3	South Side At-Grade $96.6	Median At-Grade Skinker & Big Bend Underpasses $104.8	Below Grade $141.4
	Section 2: Down-town Clayton	Carondelet-Meramec At-Grade 55.7	Carondelet-Meramec At-Grade 55.7	Carondelet-Meramec At-Grade 55.7	FPP/Bally's Elevated 56.2	Carondelet Meramec At-Grade 55.7	Carondelet-Brentwood At-Grade 43.7	Carondelet-Meramec At-Grade 55.7	FPP At-Grade 54.1	Carondelet-Brentwood Below-Grade 92.0
	Section 3.1: CMT-Galleria to Manchester	CMT At-Grade 55.5	CMT At-Grade 55.5	CMT At-Grade 55.5	CMT At-Grade 55.5	Galleria Elevated 76.2	CMT At-Grade 55.5	CMT At-Grade 55.5	CMT At-Grade 55.5	Galleria Below-Grade 85.5
	Section 3.2: CMT-Manchester to I-44	Deer Creek Term. At-Grade 44.0	CMT/Sunnen Below-Grade 33.1	CMT/Sunnen on Laclede Sta. Road 35.7	CMT/Sunnen on Laclede Sta. Road 35.7	CMT/Sunnen on Laclede Sta. Road 35.7	CMT/Sunnen Below-Grade 33.1	CMT/Sunnen Below-Grade 33.1	CMT/Sunnen on Laclede Sta. Road 35.7	CMT/Sunnen Elevated 45.2
	Section 4.01: I-44 to Lansdowne	Not Applicable	Lansdowne Term. Elevated 55.2	Lansdowne Term. Elevated 55.2	Lansdowne Term. Elevated 55.2	Lansdowne Terminal Elevated 55.2	Lansdowne Term. Elevated 55.2	Lansdowne Term. Elevated 55.2	Lansdowne Term. Elevated 55.2	Lansdowne Term. Elevated 55.2
	Subtotal	**$234.5**	**$278.8**	**$281.4**	**$281.9**	**$302.1**	**$266.8**	**$296.1**	**$305.3**	**$419.3**
B. Non-Facility Costs	Forest Park Circulator	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8	Improvement and Vehicles 4.8
	MetroLink Bus Fleet	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8	35 Vehicles 8.8
	MetroLink Cars	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0	34 Vehicles 85.0
	Subtotal	**$98.6**	**$98.6**	**$98.6**	**$98.6**	**$98.6**	**$98.6**	**$98.6**	**$98.6**	**$98.6**