

I-20 East Transit Initiative

PRELIMINARY ORDER OF MAGNITUDE CAPITAL COST ESTIMATING METHODOLOGY

Technical Memorandum

December 2011

**Prepared for:
Metropolitan Atlanta Rapid Transit Authority
Atlanta, GA**

Prepared by:

AECOM

Table of Contents

1.0	INTRODUCTION	1-1
1.1	Purpose.....	1-1
2.0	FEDERAL TRANSIT ADMINISTRATION STANDARD COST CATEGORIES	2-1
2.1	SCC's.....	2-1
2.2	Professional Services.....	2-3
2.3	Contingencies	2-3
3.0	METHODOLOGY AND ASSUMPTIONS.....	3-1
3.1	Overview of Approach.....	3-1
3.2	References.....	3-1
3.3	Cost Prices Adjustment to Atlanta.....	3-2
3.4	Escalation	3-2
3.5	Other Assumptions.....	3-2
4.0	ESTIMATE LIMITATIONS.....	4-1
5.0	CAPITAL COST ESTIMATING TABLES	5-1

1.0 INTRODUCTION

The Metropolitan Atlanta Transit Authority is preparing an Environmental Impact Statement (EIS) for the proposed I-20 East Corridor. In accordance with the National Environmental Policy Act (NEPA), an EIS addresses the proposed development of new transit service. The I-20 East AA/DEIS will identify and summarize the transportation and environmental impacts, both positive and negative, associated with the implementation of new east-west transit service from downtown Atlanta to the Mall at Stonecrest in eastern DeKalb County. The study will seek to identify transit investments that would improve east-west mobility and accessibility to jobs and housing within the corridor, provide convenient and efficient transit service to accommodate the increasing transit demands within the corridor, and support corridor economic development and revitalization.

1.1 Purpose

The objective of this memo is to provide an overview of the methodology used to prepare the capital costs estimates for each of the “Tier 2” alternatives. It outlines the basis for preparing the capital cost estimates for the project. Additionally, it presents the current Federal Transit Administration (FTA) formats (Standard Cost Categories [SCC]).

The alternatives are described below.

Name	Alignment Description	Proposed Stations
HRT1	A new heavy rail transit (HRT) line would spur from the existing MARTA rail network just south of the Garnett station. From there, the alignment would extend south parallel to Windsor Street, then east along Glenwood Avenue/Fulton Street, before it would enter the I-20 right-of-way at Hill Street. From there, the alignment would extend east, on structure, in the center of the I-20 median. At Glenwood Avenue, the alignment would transition to the side of the interstate and run parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.	Turner Field, Glenwood Park/BeltLine, Glenwood Avenue, Gresham Road, Candler Road, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest
LRT1	A new light rail transit (LRT) line would operate in-street along Broad Street from Five Points Station to Garnett Station. It would then operate in an exclusive guideway south of Garnett Station and extend south parallel to Windsor Street, then east along Glenwood Avenue/Fulton Street, before it would enter the I-20 right-of-way at Hill Street. From there, the alignment would extend east, on structure, in the center of the I-20 median. At Glenwood Avenue, the alignment would transition to the side of the interstate and run parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.	Turner Field, Glenwood Park/BeltLine, Glenwood Avenue, Gresham Road, Candler Road, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest
BRT1	A new bus rail transit (BRT) line would operate in-street along Broad Street from Five Points Station to Garnett Station. It would then operate in an exclusive guideway south of Garnett Station and extend south parallel to Windsor Street, then east along Glenwood Avenue/Fulton Street, before it would enter the I-20 right-of-way at Hill Street. From there, the alignment would extend east, on structure, in the center of the I-20 median. At Glenwood Avenue, the alignment would transition to the side of the interstate and run parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.	Turner Field, Glenwood Park/BeltLine, Glenwood Avenue, Gresham Road, Candler Road, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest

Capital Costs

LRT2	<p>A new light rail transit (LRT) line would originate at the North Avenue Station and operate in-street along North Avenue east to the proposed BeltLine alignment. It would follow the Beltline alignment south to I-20. It would then extend east in an exclusive guideway, on structure, in the center of the I-20 median. At Glenwood Avenue, the alignment would transition to the side of the interstate and run parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.</p>	<p>Glenwood Park/BeltLine, Glenwood Avenue, Gresham Road, Candler Road, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest</p>
HRT2	<p>A new heavy rail transit (HRT) line would spur from the existing MARTA rail network just west of the East Lake Station. The alignment would enter a tunnel within existing MARTA right-of-way and extend south to I-20. The alignment would then surface and run parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.</p>	<p>Glenwood Avenue, Gresham Road, Candler Road, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest</p>
HRT3	<p>The existing heavy rail transit (HRT) Blue Line would be extended from the Indian Creek Station, south parallel to I-285, then east parallel to I-20 to the Mall at Stonecrest in eastern DeKalb County.</p> <p>This alternative would also include bus rapid transit (BRT) service inside the Perimeter, originating at the Five Points Station, traveling south along surface streets to I-20, then operating in I-20 serving stations eastward to Candler Road.</p>	<p>HRT: Covington Highway, Wesley Chapel Road, Panola Road, Lithonia Industrial Boulevard, Mall at Stonecrest</p> <p>BRT: Moreland Avenue, Glenwood Avenue, Gresham Road, Candler Road</p>

2.0 FEDERAL TRANSIT ADMINISTRATION STANDARD COST CATEGORIES

In 2005, FTA implemented the SCCs to establish a consistent format for the reporting, estimating, and managing of capital costs for New Starts projects. The cost information gathered from projects across the country are developed into a database and become a cost estimating resource useful to FTA and the transit industry alike. The SCC Workbook is a project management tool, which is project-based as opposed to grant-based. Over the life of a project, the consistent format makes it easier to track, evaluate, and control cost change annually until the eventual submission of the Before and After Study or at project close-out and resolution of claims. Cost categories and units of measures utilize the FTA SCC format as defined by FTA.

2.1 SCC's

The following table, as provided by FTA, lists the SCC's. Further detail is provided in appendix.

Standard Cost Categories for Capital Projects	
DEFINITIONS	
<small>(Rev.13, June 1, 2010)</small>	
10 GUIDEWAY & TRACK ELEMENTS (route miles)	
10.01	Guideway: At-grade exclusive right-of-way
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)
10.03	Guideway: At-grade in mixed traffic
10.04	Guideway: Aerial structure
10.05	Guideway: Built-up fill
10.06	Guideway: Underground cut & cover
10.07	Guideway: Underground tunnel
10.08	Guideway: Retained cut or fill
10.09	Track: Direct fixation
10.10	Track: Embedded
10.11	Track: Ballasted
10.12	Track: Special (switches, turnouts)
10.13	Track: Vibration and noise dampening
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	
20.01	At-grade station, stop, shelter, mall, terminal, platform
20.02	Aerial station, stop, shelter, mall, terminal, platform
20.03	Underground station, stop, shelter, mall, terminal, platform
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.
20.05	Joint development
20.06	Automobile parking multi-story structure
20.07	Elevators, escalators
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	

30.01	Administration Building: Office, sales, storage, revenue counting
30.02	Light Maintenance Facility
30.03	Heavy Maintenance Facility
30.04	Storage or Maintenance of Way Building
30.05	Yard and Yard Track
40 SITEWORK & SPECIAL CONDITIONS	
40.01	Demolition, Clearing, Earthwork
40.02	Site Utilities, Utility Relocation
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments
40.04	Environmental mitigation, e.g. wetlands, historic/archeologic, parks
40.05	Site structures including retaining walls, sound walls
40.06	Pedestrian / bike access and accommodation, landscaping
40.07	Automobile, bus, van accessways including roads, parking lots
40.08	Temporary Facilities and other indirect costs during construction
50 SYSTEMS	
50.01	Train control and signals
50.02	Traffic signals and crossing protection
50.03	Traction power supply: substations
50.04	Traction power distribution: catenary and third rail
50.05	Communications
50.06	Fare collection system and equipment
50.07	Central Control
Construction Subtotal (10 - 50)	
60 ROW, LAND, EXISTING IMPROVEMENTS	
60.01	Purchase or lease of real estate
60.02	Relocation of existing households and businesses
70 VEHICLES (number)	
70.01	Light Rail
70.02	Heavy Rail
70.03	Commuter Rail
70.04	Bus
70.05	Other
70.06	Non-revenue vehicles
70.07	Spare parts
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	
80.01	Preliminary Engineering
80.02	Final Design
80.03	Project Management for Design and Construction
80.04	Construction Administration & Management
80.05	Professional Liability and other Non-Construction Insurance
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.
80.07	Surveys, Testing, Investigation, Inspection
80.08	Start up
Subtotal (10 - 80)	

90 UNALLOCATED CONTINGENCY
Subtotal (10 - 90)
100 FINANCE CHARGES
Total Project Cost (10 - 100)

2.2 Professional Services

Professional Services for HRT and LRT alternatives were assumed to be the same as the design, construction and installation of the systems are similar. The Professional Services for the BRT alternatives are different than those of the HRT and LRT due to the difference between train systems and bus systems.

2.3 Contingencies

Two types of contingencies are included in the SCC 90 Category. Allocated contingency is based on the type of construction and the risk potential for each category. For example, the construction allocated contingency is 10%; design services is 5% and right-of-way acquisition is 25%. These allocated contingency applications are consistent for HRT, LRT, and BRT alternatives.

Unallocated contingency is applied to the project subtotal. Unallocated contingency is 5% for all of the alternatives and is called the Project Reserve.

3.0 METHODOLOGY AND ASSUMPTIONS

3.1 Overview of Approach

The general steps taken to calculate and present costs for each alternative included:

- Develop unit costs for each SCC item listed above, as applicable to this project. Unit costs are portrayed as linear feet, route feet, each, or a percentage of another SCC or group of SCC's. These costs and units are presented in tabs entitled "HRT Unit Costs", "LRT Unit Costs", and "BRT Unit Costs".
- Develop the quantity of each SCC required for each alternative. Quantities are based upon a conceptual level of engineering identifying at-grade, aerial, cut and cover, tunnel, and retained cut and cover sections. Also identified were support facilities, and vehicles required. The quantities are identified in the attached workbook and appendix as tabs titled:
 - HRT1
 - LRT1
 - BRT1
 - LRT2
 - HRT2
 - HRT3
- Multiply the unit costs with quantities required to arrive at the cost for each SCC for each alternative (Top-Down or Parametric estimate approach)
- Sum the costs for each SCC for each alternative to arrive at the cost for each alternative, as presented within the "Build Alts Summary" tab of the workbook

3.2 References

Calculation of cost estimates relied on recent AECOM experience in providing cost estimating and construction management services for various transit and other capital projects across the United States.

Cost estimating for this project was informed by recent experience with the following projects or clients

- Dulles Metro Rail project
- Ansalado (Train Control costs only)
- CCLRT (Minneapolis area contractor cost data)

- Columbia Pike (Arlington, VA Independent Estimate 2011)
- Atlanta Streetcar Independent Estimate - 2011

3.3 Cost Prices Adjustment to Atlanta

Regardless of source, all costs were adjusted to Atlanta cost indexes as R.S. Means. For example, the conversion factor for Atlanta using Washington Metro area City Cost Indexes as published by R.S. Means is 0.9631. Atlanta's City Cost Index is 88.8 while Fairfax County in Virginia is 92.2.

3.4 Escalation

All cost estimates are reported in constant year 2011 dollars. The escalation factor took into account the construction market and estimated increases in the cost of labor, materials, and fuel over the duration of the project. The FTA recommends an escalation of three percent per year, compounded. This method applied for the duration of the project, and for both the design and construction phases.

Unit prices derived from past bids for similar projects or "Means Building Construction Cost Data" were adjusted to match current cost of materials and services. Some unit prices such as direct fixation and ballasted track items from past project estimates were escalated. Other costs were adjusted using "Cost Indexes" provided by Engineering News Record (ENR). Additional adjustments were made to suit labor costs appropriate for the Atlanta region. Three percent escalation was utilized in this estimate.

3.5 Other Assumptions

In preparing the capital cost estimates, other assumptions and methodologies include:

- Right of Way and station costs are not included
- Vehicle costs are not included for HRT alternatives
- Support facilities are deemed necessary only for LRT alternatives
- All track costs are for double track, unless noted
- Connection costs to the existing HRT included in contingency
- All stations are of "Spartan" design and do not include parking
- No premium time on labor costs included (unless noted; see 40.08)
- Adequate experienced craft labor is available
- Normal productivity rates as historically experienced utilized
- Compatible trade agreements exist in the region
- No strike impacts will be experienced by the project

- There are sufficient experienced contractors available to perform said work
- Normal Metro Atlanta area weather impacts to constructions schedule
- Existing state of the art construction technology will be utilized
- Assumes cooperation between stakeholders

DRAFT

4.0 ESTIMATE LIMITATIONS

A reoccurring issue in the estimation of capital cost during the conceptual design phase of a project is the evaluation and treatment of uncertainty. Uncertainty can result in a “difference” between the estimated cost of a project as defined during the concept phase and the actual cost of the project that is ultimately implemented. Four potential sources of uncertainty are generally recognized. These are:

- Changes in project scope
- Changes in design or operating standards
- Incorrect unit cost/quantity assumptions
- Unforeseen issues in implementation

DRAFT

5.0 CAPITAL COST ESTIMATING TABLES

The following tables include the findings of the capital cost estimates for each of the alternatives and additional detail regarding the calculations. An Excel file is also provided in electronic format further revealing the formulas and calculations for cells within the spreadsheets.

DRAFT

Preliminary Order of Magnitude Capital Cost Estimates

Tier 2 Alternative	Total Length	At-grade exclusive ROW	At-grade Mixed Traffic	Length (Feet)				Costs by FTA Standard Cost Category (SCC)											Total Cost	Per Mile Cost
				Aerial Structure	Cut & Cover	Tunnel	Retained Cut or Fill	10 Guideway and Track	20 Stations	30 Support Facilities	40 Sitework	50 Systems	60 ROW	70 Vehicles	80 Professional Services	90 Contingencies	100 Finance Charges			
HRT1 - spur from just south of Garnett, parallel to I-20 to Mall at Stonecrest	102,300	-	-	34,000	-	-	68,300	\$ 1,111,000,000	\$ -	NA	\$ 222,000,000	\$ 357,000,000	TBD	NA	\$ 499,000,000	\$ 472,000,000	\$ 20,000,000	\$ 2,681,000,000	\$ 138,000,000	
LRT1 - from 5-Points and Garnett, parallel to I-20 to Mall at Stonecrest	105,700	-	2,100	35,300	-	-	68,300	\$ 1,038,000,000	\$ -	\$ 27,000,000	\$ 157,000,000	\$ 121,000,000	TBD	\$ 193,000,000	\$ 396,000,000	\$ 394,000,000	\$ 17,400,000	\$ 2,343,000,000	\$ 117,000,000	
BRT1 - from 5-Points and Garnett, parallel to I-20 to Mall at Stonecrest	105,700	-	2,100	35,300	-	-	68,300	\$ 872,000,000	\$ -	NA	\$ 120,000,000	\$ 16,000,000	TBD	\$ 22,000,000	\$ 287,000,000	\$ 283,000,000	\$ 12,000,000	\$ 1,612,000,000	\$ 81,000,000	
LRT2 - BeltLine alignment from North Ave to I-20, then parallel to I-20 to Mall at Stonecrest	112,700	11,800	10,700	21,300	-	500	68,300	\$ 826,000,000	\$ -	\$ 27,000,000	\$ 134,000,000	\$ 128,000,000	TBD	\$ 193,000,000	\$ 329,000,000	\$ 331,000,000	\$ 14,800,000	\$ 1,984,000,000	\$ 93,000,000	
HRT2 - Spur east of Edgewood-Candler Park Station, subsurface to I-20, then parallel to I-20 to Mall at Stonecrest	82,100	800	-	2,500	2,700	11,500	64,700	\$ 995,000,000	\$ -	NA	\$ 195,000,000	\$ 287,000,000	TBD	NA	\$ 436,000,000	\$ 413,000,000	\$ 17,400,000	\$ 2,344,000,000	\$ 151,000,000	
HRT3/BRT Hybrid - from Indian Creek MARTA to Stonecrest & I-20 BRT	67,100	-	-	6,600	-	-	60,500	\$ 542,000,000	\$ -	NA	\$ 122,000,000	\$ 235,000,000	TBD	NA	\$ 265,000,000	\$ 251,000,000	\$ 10,600,000	\$ 1,426,000,000	\$ 112,000,000	

Notes

Station costs to be provided by others.

ROW requirements are yet to be determined, therefore ROW costs are not included.

Year 2011 dollars, adjusted to Atlanta cost indexes as per RS Means.

HRT1

Alternative: HRT spur from just south of Garnett, parallel to I-20 to Mall at Stonecrest

Length (LF)	Length (Miles)
102,287	19.37

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	102,287	RF	10,858	1,110,612,878
10.01	Guideway: At-grade exclusive right-of-way		RF	837	-
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic		0	-	-
10.04	Guideway: Aerial structure	33,987	RF	18,164	617,342,261
10.05	Guideway: Built-up fill		0	-	-
10.06	Guideway: Underground cut & cover		RF	19,338	-
10.07	Guideway: Underground tunnel		RF	38,252	-
10.08	Guideway: Retained cut or fill	68,300	RF	6,276	428,651,273
10.09	Track: Direct fixation	33,987	RF	433	14,714,196
10.10	Track: Embedded		RF	-	-
10.11	Track: Ballasted	68,300	RF	414	28,255,328
10.12	Track: Special (switches, turnouts)	102,287	RF	212	21,649,821
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		-
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	-	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform		EA	28,698,671	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	38,560,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		EA	105,828,800	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development			-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		\$0		-
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility		SF	481	-
30.03	Heavy Maintenance Facility		0	-	-
30.04	Storage or Maintenance of Way Building		0	-	-
30.05	Yard and Yard Track		0	-	-
40	SITework AND SPECIAL CONDITIONS	102,287	\$0	2,175	222,439,709
40.01	Demolition, Clearing, Earthwork	68,300	RF	144	9,856,510
40.02	Site Utilities, Utility Relocation	\$ 1,478,200,598	%	6.0%	88,692,036
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 1,478,200,598	%	0.1%	1,478,201
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 1,478,200,598	%	0.3%	3,695,501
40.05	Site structures including retaining walls, sound walls	102,287	RF	5	461,414
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 1,478,200,598	%	8%	118,256,048
50	SYSTEMS	102,287	\$0	3,493	357,269,797
50.01	Train control and signals	102,287	RF	423	43,299,642
50.02	Traffic signals and crossing protection				
50.03	Traction power supply: substations	102,287	RF	2,222	227,323,120
50.04	Traction power distribution: catenary and third rail	102,287	RF	443	45,267,807
50.05	Communications	102,287	RF	375	38,379,228
50.06	Fare collection system and equipment		EA	1,006,336	-
50.07	Central Control	1	LS	3,000,000	3,000,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		1,690,322,384
60	ROW, LAND, EXISTING IMPROVEMENTS	102,287	\$0		-
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES		\$0		-
70.01	LIGHT RAIL		EA	-	-
70.02	HEAVY RAIL		EA	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS		0	-	-
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		LS	-	-
70.07	SPARE PARTS		0	-	-
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	498,645,103
80.01	Environmental	1,690,322,384	0.00%	0.25%	4,225,806
80.01	Preliminary Engineering	1,690,322,384	3%-6%	3.00%	50,709,672
80.02	Final Design & Design Services for Construction	1,690,322,384	7%-12%	7.00%	118,322,567
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	-	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	1,690,322,384	4%-8%	8.00%	135,225,791
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	-	0.00%	0.00%	-
80.04	Construction Administration & Management	1,690,322,384	2%-5%	3.00%	50,709,672
80.05	Insurance	1,690,322,384	4%-6%	2.50%	42,258,060
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	1,690,322,384	<1%	0.25%	4,225,806
80.07	Surveys, Testing, Investigation, Inspection	1,690,322,384	2%-3%	2.50%	42,258,060
80.08	Start up and Artwork	1,690,322,384	0.00%	3.00%	50,709,672
SUBTOTAL CATEGORY 60 - 80			RF		498,645,103
90	UNALLOCATED CONTINGENCY - Construction	1,690,322,384	10.0%		169,032,238
90	UNALLOCATED CONTINGENCY - Construction AFI	1,690,322,384	10.0%		169,032,238
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	-	5.0%		-
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	4,225,806	5.0%		211,290
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	50,709,672	5.0%		2,535,484
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	118,322,567	5.0%		5,916,128
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	135,225,791	5.0%		6,761,290
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	50,709,672	5.0%		2,535,484
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	42,258,060	5.0%		2,112,903
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	4,225,806	5.0%		211,290
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	42,258,060	5.0%		2,112,903
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	50,709,672	5.0%		2,535,484
90.09	UNALLOCATED CONTINGENCY Project Reserve	2,188,967,487	5.0%		109,448,374
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	472,445,106
TOTAL CATEGORIES 10 - 90			RF		2,661,412,593
100	FINANCE CHARGES (Assume 3/4% of Total)	2,661,412,593	0.75%		19,960,594
GRAND TOTAL ALL CATEGORIES 10-100					2,681,373,188

\$/RF	26,214
Million \$/Mile	138.4

LRT1

Alternative: LRT1 from 5-Points and Garnett, parallel to I-20 to Mall at Stonecrest

Length (LF)	Length (Miles)
105,748	20.03

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	105,748	RF	9,815	1,037,886,451
10.01	Guideway: At-grade exclusive right-of-way		RF	557	-
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic	2,100	RF	130	273,000
10.04	Guideway: Aerial structure	35,348	RF	15,894	561,805,615
10.05	Guideway: Built-up fill		RF	1,518	-
10.06	Guideway: Underground cut & cover		RF	16,921	-
10.07	Guideway: Underground tunnel		RF	-	-
10.08	Guideway: Retained cut or fill	68,300	RF	6,091	416,003,125
10.09	Track: Direct fixation	35,348	RF	378.819	13,390,494
10.10	Track: Embedded	4,200	TF	409	1,717,313
10.11	Track: Ballasted	68,300	RF	362	24,723,412
10.12	Track: Special (switches, turnouts)	107,848	RF	185	19,973,493
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	2,100,000	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform (LRT/Platform)		EA	3,000,000	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	6,300,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		0	-	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development		\$0	-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		RF		27,090,800
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility	20,000	SF	481	9,620,800
30.03	Heavy Maintenance Facility	15,000	SF	650	9,750,000
30.04	Storage or Maintenance of Way Building	6,000	SF	220	1,320,000
30.05	Yard and Yard Track	8,000	TF	800	6,400,000
40	SITWORK AND SPECIAL CONDITIONS	105,748	RF	1,482	156,741,969
40.01	Demolition, Clearing, Earthwork	70,400	RF	126	8,889,619
40.02	Site Utilities, Utility Relocation	\$ 1,194,690,290	%	4.0%	47,787,612
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 1,194,690,290	%	0.1%	1,194,690
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 1,194,690,290	%	0.3%	2,986,726
40.05	Site structures including retaining walls, sound walls	68,300	RF	5	308,099
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 1,194,690,290	%	8%	95,575,223
50	SYSTEMS	105,748	RF	1,140	120,515,320
50.01	Train control and signals	105,748	RF	300	31,724,400
50.02	Traffic signals and crossing protection	9	EA	250,000	2,250,000
50.03	Traction power supply: substations	105,748	RF	300	31,724,400
50.04	Traction power distribution: catenary and third rail	105,748	RF	320	33,839,360
50.05	Communications	105,748	RF	170	17,977,160
50.06	Fare collection system and equipment		EA	284,000	-
50.07	Central Control	1	LS	3,000,000	3,000,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		1,342,234,540
60	ROW, LAND, EXISTING IMPROVEMENTS	105,748	RF	-	-
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES				193,200,000
70.01	LIGHT RAIL	46	EA	4,000,000	184,000,000
70.02	HEAVY RAIL		0	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS		0	-	-
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		LS	5,000,000	-
70.07	SPARE PARTS	184,000,000		5%	9,200,000
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	395,959,189
80.01	Environmental	1,342,234,540	0.00%	0.25%	3,355,586
80.01	Preliminary Engineering	1,342,234,540	3%-6%	3.00%	40,267,036
80.02	Final Design & Design Services for Construction	1,342,234,540	7%-12%	7.00%	93,956,418
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	193,200,000	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	1,342,234,540	4%-8%	8.00%	107,378,763
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	193,200,000	0.00%	0.00%	-
80.04	Construction Administration & Management	1,342,234,540	2%-5%	3.00%	40,267,036
80.05	Insurance	1,342,234,540	4%-6%	2.50%	33,555,864
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	1,342,234,540	<1%	0.25%	3,355,586
80.07	Surveys, Testing, Investigation, Inspection	1,342,234,540	2%-3%	2.50%	33,555,864
80.08	Start up and Artwork	1,342,234,540	0.00%	3.00%	40,267,036
SUBTOTAL CATEGORY 60 - 80			RF		589,159,189
90	UNALLOCATED CONTINGENCY - Construction	1,342,234,540	10.0%		134,223,454
90	UNALLOCATED CONTINGENCY - Construction AFI	1,342,234,540	10.0%		134,223,454
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	193,200,000	5.0%		9,660,000
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	3,355,586	5.0%		167,779
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	40,267,036	5.0%		2,013,352
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	93,956,418	5.0%		4,697,821
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	107,378,763	5.0%		5,368,938
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	40,267,036	5.0%		2,013,352
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	33,555,864	5.0%		1,677,793
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	3,355,586	5.0%		167,779
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	33,555,864	5.0%		1,677,793
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	40,267,036	5.0%		2,013,352
90.09	UNALLOCATED CONTINGENCY Project Reserve	1,931,393,730	5.0%		96,569,686
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	394,474,554
TOTAL CATEGORIES 10 - 90			RF		2,325,868,284
100	FINANCE CHARGES (Assume 3/4% of Total)	2,325,868,284	0.75%		17,444,012
GRAND TOTAL ALL CATEGORIES 10-100					2,343,312,296

\$/RF	22,159
Million \$/Mile	117.0

BRT1

Alternative: BRT from 5-Points and Garnett, parallel to I-20 to Mall at Stonecrest

Length (LF)	Length (Miles)
105,748	20.03

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	105,748	RF	8,244	871,820,187
10.01	Guideway: At-grade exclusive right-of-way		RF	280	-
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic	2,100	0	-	-
10.04	Guideway: Aerial structure	35,348	RF	13,860	489,923,280
10.05	Guideway: Built-up fill		RF	1,152	-
10.06	Guideway: Underground cut & cover		0	-	-
10.07	Guideway: Underground tunnel		RF	-	-
10.08	Guideway: Retained cut or fill	68,300	RF	5,591	381,896,907
10.09	Track: Direct fixation		0	0	-
10.10	Track: Embedded		0	-	-
10.11	Track: Ballasted		0	-	-
10.12	Track: Special (switches, turnouts)		0	-	-
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	2,100,000	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform (LRT/Platform)		EA	3,000,000	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	7,200,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		0	-	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development		\$0	-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		RF		
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility		SF	450	-
30.03	Heavy Maintenance Facility		0	-	-
30.04	Storage or Maintenance of Way Building		0	-	-
30.05	Yard and Yard Track		0	-	-
40	SITWORK AND SPECIAL CONDITIONS	105,748	RF	1,133	119,829,914
40.01	Demolition, Clearing, Earthwork	70,400	RF	124	8,708,198
40.02	Site Utilities, Utility Relocation	\$ 897,276,245	%	4.0%	35,891,050
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 897,276,245	%	0.1%	897,276
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 897,276,245	%	0.3%	2,243,191
40.05	Site structures including retaining walls, sound walls	68,300	RF	5	308,099
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 897,276,245	%	8%	71,782,100
50	SYSTEMS	105,748	RF	155	16,439,760
50.01	Train control and signals		RF	-	-
50.02	Traffic signals and crossing protection	9	EA	250,000	2,250,000
50.03	Traction power supply: substations		RF	-	-
50.04	Traction power distribution: catenary and third rail		RF	-	-
50.05	Communications	105,748	RF	120	12,689,760
50.06	Fare collection system and equipment		EA	284,000	-
50.07	Central Control	1	LS	1,500,000	1,500,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		1,008,089,861
60	ROW, LAND, EXISTING IMPROVEMENTS	105,748	RF		
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES				21,735,000
70.01	LIGHT RAIL		0	-	-
70.02	HEAVY RAIL		0	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS	28	0	750,000	20,700,000
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		0	-	-
70.07	SPARE PARTS	20,700,000	0	5%	1,035,000
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	287,305,610
80.01	Environmental	1,008,089,861	0.00%	0.25%	2,520,225
80.01	Preliminary Engineering	1,008,089,861	3%-6%	3.00%	30,242,696
80.02	Final Design & Design Services for Construction	1,008,089,861	7%-12%	7.00%	70,566,290
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	21,735,000	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	1,008,089,861	4%-8%	8.00%	80,647,189
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	21,735,000	0.00%	0.00%	-
80.04	Construction Administration & Management	1,008,089,861	2%-5%	3.00%	30,242,696
80.05	Insurance	1,008,089,861	4%-6%	2.50%	25,202,247
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	1,008,089,861	<1%	0.25%	2,520,225
80.07	Surveys, Testing, Investigation, Inspection	1,008,089,861	2%-3%	2.50%	25,202,247
80.08	Start up and Artwork	1,008,089,861	0.00%	2.00%	20,161,797
SUBTOTAL CATEGORY 60 - 80			RF		309,040,610
90	UNALLOCATED CONTINGENCY - Construction	1,008,089,861	10.0%		100,808,986
90	UNALLOCATED CONTINGENCY - Construction AFI	1,008,089,861	10.0%		100,808,986
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	21,735,000	5.0%		1,086,750
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	2,520,225	5.0%		126,011
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	30,242,696	5.0%		1,512,135
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	70,566,290	5.0%		3,528,315
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	80,647,189	5.0%		4,032,359
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	30,242,696	5.0%		1,512,135
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	25,202,247	5.0%		1,260,112
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	2,520,225	5.0%		126,011
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	25,202,247	5.0%		1,260,112
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	20,161,797	5.0%		1,008,090
90.09	UNALLOCATED CONTINGENCY Project Reserve	1,317,130,472	5.0%		65,856,524
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	282,926,526
TOTAL CATEGORIES 10 - 90			RF		1,600,056,998
100	FINANCE CHARGES (Assume 3/4% of Total)	1,600,056,998	0.75%		12,000,427
GRAND TOTAL ALL CATEGORIES 10-100					1,612,057,426

\$/RF	15,244
Million \$/Mile	80.5

LRT2

Alternative: LRT on BeltLine alignment from North Ave to I-20, then parallel to I-20 to Stonecrest

Length (LF)	Length (Miles)
112,683	21.34

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	112,683	RF	7,330	826,008,089
10.01	Guideway: At-grade exclusive right-of-way	11,800	RF	557	6,577,124
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic	10,700	RF	130	1,391,000
10.04	Guideway: Aerial structure	21,348	RF	15,894	339,295,753
10.05	Guideway: Built-up fill		RF	1,518	-
10.06	Guideway: Underground cut & cover		RF	16,921	-
10.07	Guideway: Underground tunnel	500	RF	-	-
10.08	Guideway: Retained cut or fill	68,335	RF	6,091	416,216,303
10.09	Track: Direct fixation	21,848	RF	378.819	8,276,438
10.10	Track: Embedded	10,700	TF	409	4,375,059
10.11	Track: Ballasted	80,135	RF	362	29,007,476
10.12	Track: Special (switches, turnouts)	112,683	RF	185	20,868,937
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	2,100,000	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform (LRT/Platform)		EA	3,000,000	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	6,300,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		0	-	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development		\$0	-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		RF		27,090,800
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility	20,000	SF	481	9,620,800
30.03	Heavy Maintenance Facility	15,000	SF	650	9,750,000
30.04	Storage or Maintenance of Way Building	6,000	SF	220	1,320,000
30.05	Yard and Yard Track	8,000	TF	800	6,400,000
40	SITWORK AND SPECIAL CONDITIONS	112,683	RF	1,193	134,438,666
40.01	Demolition, Clearing, Earthwork	90,835	RF	126	11,470,008
40.02	Site Utilities, Utility Relocation	\$ 993,201,624	%	4.0%	39,728,065
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 993,201,624	%	0.1%	993,202
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 993,201,624	%	0.3%	2,483,004
40.05	Site structures including retaining walls, sound walls	68,335	RF	5	308,257
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 993,201,624	%	8%	79,456,130
50	SYSTEMS	112,683	RF	1,139	128,324,470
50.01	Train control and signals	112,683	RF	300	33,804,900
50.02	Traffic signals and crossing protection	10	EA	250,000	2,500,000
50.03	Traction power supply: substations	112,683	RF	300	33,804,900
50.04	Traction power distribution: catenary and third rail	112,683	RF	320	36,058,560
50.05	Communications	112,683	RF	170	19,156,110
50.06	Fare collection system and equipment		EA	284,000	-
50.07	Central Control	1	LS	3,000,000	3,000,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		1,115,862,025
60	ROW, LAND, EXISTING IMPROVEMENTS	112,683	RF	-	-
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES				193,200,000
70.01	LIGHT RAIL	46	EA	4,000,000	184,000,000
70.02	HEAVY RAIL		0	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS		0	-	-
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		LS	5,000,000	-
70.07	SPARE PARTS	184,000,000	0	5%	9,200,000
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	329,179,297
80.01	Environmental	1,115,862,025	0.00%	0.25%	2,789,655
80.01	Preliminary Engineering	1,115,862,025	3%-6%	3.00%	33,475,861
80.02	Final Design & Design Services for Construction	1,115,862,025	7%-12%	7.00%	78,110,342
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	193,200,000	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	1,115,862,025	4%-8%	8.00%	89,268,962
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	193,200,000	0.00%	0.00%	-
80.04	Construction Administration & Management	1,115,862,025	2%-5%	3.00%	33,475,861
80.05	Insurance	1,115,862,025	4%-6%	2.50%	27,896,551
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	1,115,862,025	<1%	0.25%	2,789,655
80.07	Surveys, Testing, Investigation, Inspection	1,115,862,025	2%-3%	2.50%	27,896,551
80.08	Start up and Artwork	1,115,862,025	0.00%	3.00%	33,475,861
SUBTOTAL CATEGORY 60 - 80			RF		522,379,297
90	UNALLOCATED CONTINGENCY - Construction	1,115,862,025	10.0%		111,586,202
90	UNALLOCATED CONTINGENCY - Construction AFI	1,115,862,025	10.0%		111,586,202
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	193,200,000	5.0%		9,660,000
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	2,789,655	5.0%		139,483
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	33,475,861	5.0%		1,673,793
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	78,110,342	5.0%		3,905,517
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	89,268,962	5.0%		4,463,448
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	33,475,861	5.0%		1,673,793
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	27,896,551	5.0%		1,394,828
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	2,789,655	5.0%		139,483
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	27,896,551	5.0%		1,394,828
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	33,475,861	5.0%		1,673,793
90.09	UNALLOCATED CONTINGENCY Project Reserve	1,638,241,322	5.0%		81,912,066
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	331,203,436
TOTAL CATEGORIES 10 - 90			RF		1,969,444,758
100	FINANCE CHARGES (Assume 3/4% of Total)	1,969,444,758	0.75%		14,770,836
GRAND TOTAL ALL CATEGORIES 10-100					1,984,215,594

\$/RF	17,609
Million \$/Mile	93.0

HRT2

Alternative: HRT spur east of Edgewood-Candler Park tunnel to I-20, parallel to I-20 to Stonecrest

Length (LF)	Length (Miles)
82,100	15.55

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	82,100	RF	12,118	994,910,738
10.01	Guideway: At-grade exclusive right-of-way	750	RF	837	627,757
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic		0	-	-
10.04	Guideway: Aerial structure	2,450	RF	18,164	44,501,972
10.05	Guideway: Built-up fill		0	-	-
10.06	Guideway: Underground cut & cover	2,700	RF	19,338	52,212,082
10.07	Guideway: Underground tunnel	11,500	RF	38,252	439,901,459
10.08	Guideway: Retained cut or fill	64,700	RF	6,276	406,057,648
10.09	Track: Direct fixation	13,950	RF	433	6,039,457
10.10	Track: Embedded		RF	-	-
10.11	Track: Ballasted	68,150	RF	414	28,193,273
10.12	Track: Special (switches, turnouts)	82,100	RF	212	17,377,089
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	-	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform		EA	28,698,671	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	38,560,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		EA	105,828,800	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development			-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		\$0		
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility		SF	481	-
30.03	Heavy Maintenance Facility		0	-	-
30.04	Storage or Maintenance of Way Building		0	-	-
30.05	Yard and Yard Track		0	-	-
40	SITWORK AND SPECIAL CONDITIONS	82,100	\$0	2,378	195,228,861
40.01	Demolition, Clearing, Earthwork	65,450	RF	144	9,445,220
40.02	Site Utilities, Utility Relocation	\$ 1,292,078,674	%	6.0%	77,524,720
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 1,292,078,674	%	0.1%	1,292,079
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 1,292,078,674	%	0.3%	3,230,197
40.05	Site structures including retaining walls, sound walls	82,100	RF	5	370,351
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 1,292,078,674	%	8%	103,366,294
50	SYSTEMS	82,100	\$0	3,500	287,352,365
50.01	Train control and signals	82,100	RF	423	34,754,178
50.02	Traffic signals and crossing protection				
50.03	Traction power supply: substations	82,100	RF	2,222	182,459,434
50.04	Traction power distribution: catenary and third rail	82,100	RF	443	36,333,913
50.05	Communications	82,100	RF	375	30,804,840
50.06	Fare collection system and equipment		EA	1,006,336	-
50.07	Central Control	1	LS	3,000,000	3,000,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		1,477,491,963
60	ROW, LAND, EXISTING IMPROVEMENTS	82,100	\$0		
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES		\$0		
70.01	LIGHT RAIL		EA	-	-
70.02	HEAVY RAIL		EA	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS		0	-	-
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		LS	-	-
70.07	SPARE PARTS		0	-	-
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	435,860,129
80.01	Environmental	1,477,491,963	0.00%	0.25%	3,693,730
80.01	Preliminary Engineering	1,477,491,963	3%-6%	3.00%	44,324,759
80.02	Final Design & Design Services for Construction	1,477,491,963	7%-12%	7.00%	103,424,437
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	-	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	1,477,491,963	4%-8%	8.00%	118,199,357
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	-	0.00%	0.00%	-
80.04	Construction Administration & Management	1,477,491,963	2%-5%	3.00%	44,324,759
80.05	Insurance	1,477,491,963	4%-6%	2.50%	36,937,299
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	1,477,491,963	<1%	0.25%	3,693,730
80.07	Surveys, Testing, Investigation, Inspection	1,477,491,963	2%-3%	2.50%	36,937,299
80.08	Start up and Artwork	1,477,491,963	0.00%	3.00%	44,324,759
SUBTOTAL CATEGORY 60 - 80			RF		435,860,129
90	UNALLOCATED CONTINGENCY - Construction	1,477,491,963	10.0%		147,749,196
90	UNALLOCATED CONTINGENCY - Construction AFI	1,477,491,963	10.0%		147,749,196
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	-	5.0%		-
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	3,693,730	5.0%		184,686
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	44,324,759	5.0%		2,216,238
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	103,424,437	5.0%		5,171,222
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	118,199,357	5.0%		5,909,968
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	44,324,759	5.0%		2,216,238
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	36,937,299	5.0%		1,846,865
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	3,693,730	5.0%		184,686
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	36,937,299	5.0%		1,846,865
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	44,324,759	5.0%		2,216,238
90.09	UNALLOCATED CONTINGENCY Project Reserve	1,913,352,093	5.0%		95,667,605
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	412,959,004
TOTAL CATEGORIES 10 - 90			RF		2,326,311,096
100	FINANCE CHARGES (Assume 3/4% of Total)	2,326,311,096	0.75%		17,447,333
GRAND TOTAL ALL CATEGORIES 10-100					2,343,758,430

\$/RF	28,548
Million \$/Mile	150.7

HRT3

Alternative: HRT Extension from Indian Creek, south parallel I-285, east parallel I-20 to Stonecrest. BRT service for I-20 inside perimeter.

Length (LF)	Length (Miles)
67,074	12.70

FTA SCC	DESCRIPTION	QTY	UNIT	BASE UNIT COST (\$2011)	BASE TOTAL COST (\$2011)
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)	67,074	RF	8,074	541,525,684
10.01	Guideway: At-grade exclusive right-of-way		RF	837	-
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)		0	-	-
10.03	Guideway: At-grade in mixed traffic		0	-	-
10.04	Guideway: Aerial structure	6,603	RF	18,164	119,937,357
10.05	Guideway: Built-up fill		0	-	-
10.06	Guideway: Underground cut & cover		RF	19,338	-
10.07	Guideway: Underground tunnel		RF	38,252	-
10.08	Guideway: Retained cut or fill	60,471	RF	6,276	379,516,415
10.09	Track: Direct fixation	6,603	RF	433	2,858,676
10.10	Track: Embedded		RF	-	-
10.11	Track: Ballasted	60,471	RF	414	25,016,514
10.12	Track: Special (switches, turnouts)	67,074	RF	212	14,196,722
10.13	Track: Vibration and noise dampening		0	-	-
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)		RF		-
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)		EA	-	-
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform		EA	28,698,671	-
20.02	Aerial station, stop, shelter, mall, terminal, platform		EA	38,560,000	-
20.03	Underground station, stop, shelter, mall, terminal, platform		EA	105,828,800	-
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.		EA	-	-
20.05	Joint development		-	-	-
20.06	Automobile parking multi-story structure		Space	16,355	-
20.07	Elevators, escalators		STA	3,367,280	-
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS		\$0		-
30.01	Administration Building: Office, sales, storage, revenue counting		0	-	-
30.02	Light Maintenance Facility		SF	481	-
30.03	Heavy Maintenance Facility		0	-	-
30.04	Storage or Maintenance of Way Building		0	-	-
30.05	Yard and Yard Track		0	-	-
40	SITWORK AND SPECIAL CONDITIONS	67,074	\$0	1,816	121,800,878
40.01	Demolition, Clearing, Earthwork	60,471	RF	144	8,726,691
40.02	Site Utilities, Utility Relocation	\$ 785,864,938	%	6.0%	47,151,896
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	\$ 785,864,938	%	0.1%	785,865
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	\$ 785,864,938	%	0.3%	1,964,662
40.05	Site structures including retaining walls, sound walls	67,074	RF	5	302,569
40.06	Pedestrian / bike access and accommodation, landscaping		RF	75	-
40.07	Automobile, bus, van access ways including roads, parking lots		Space	2,020	-
40.08	Temporary Facilities and other indirect costs during construction	\$ 785,864,938	%	8%	62,869,195
50	SYSTEMS	67,074	\$0	3,508	235,309,994
50.01	Train control and signals	67,074	RF	423	28,393,444
50.02	Traction power supply: substations	67,074	RF	2,222	149,065,580
50.03	Traction power distribution: catenary and third rail	67,074	RF	443	29,684,055
50.04	Communications	67,074	RF	375	25,166,916
50.05	Fare collection system and equipment		EA	1,006,336	-
50.06	Central Control	1	LS	3,000,000	3,000,000
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50			RF		898,636,556
60	ROW, LAND, EXISTING IMPROVEMENTS	67,074	\$0	-	-
60.01	PURCHASE OR LEASE OF REAL ESTATE		LS	-	-
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES		0	-	-
70	VEHICLES		\$0		-
70.01	LIGHT RAIL		EA	-	-
70.02	HEAVY RAIL		EA	-	-
70.03	COMMUTER RAIL		0	-	-
70.04	BUS		0	-	-
70.05	OTHER		0	-	-
70.06	NON-REVENUE VEHICLES		LS	-	-
70.07	SPARE PARTS		0	-	-
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Construction \$	Range %	% of Construction	265,097,784
80.01	Environmental	898,636,556	0.00%	0.25%	2,246,591
80.01	Preliminary Engineering	898,636,556	3%-6%	3.00%	26,959,097
80.02	Final Design & Design Services for Construction	898,636,556	7%-12%	7.00%	62,904,559
80.02	Engineering - ROW	-	0.00%	0.60%	-
80.02	Design - Vehicles	-	0.00%	0.00%	-
80.03	Project Management for Design and Construction (Agency)	898,636,556	4%-8%	8.00%	71,890,924
80.03	Agency ROW Costs	-	0.00%	7.00%	-
80.03	Agency Vehicle Cost	-	0.00%	0.00%	-
80.04	Construction Administration & Management	898,636,556	2%-5%	3.00%	26,959,097
80.05	Insurance	898,636,556	4%-6%	2.50%	22,465,914
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	898,636,556	<1%	0.25%	2,246,591
80.07	Surveys, Testing, Investigation, Inspection	898,636,556	2%-3%	2.50%	22,465,914
80.08	Start up and Artwork	898,636,556	0.00%	3.00%	26,959,097
SUBTOTAL CATEGORY 60 - 80			RF		265,097,784
90	UNALLOCATED CONTINGENCY - Construction	898,636,556	10.0%		89,863,656
90	UNALLOCATED CONTINGENCY - Construction AFI	898,636,556	10.0%		89,863,656
90	UNALLOCATED CONTINGENCY - ROW	-	25.0%		-
90	UNALLOCATED CONTINGENCY - Vehicles	-	5.0%		-
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	2,246,591	5.0%		112,330
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	26,959,097	5.0%		1,347,955
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	62,904,559	5.0%		3,145,228
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	-	5.0%		-
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	-	5.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	71,890,924	5.0%		3,594,546
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	-	10.0%		-
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	-	5.0%		-
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	26,959,097	5.0%		1,347,955
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	22,465,914	5.0%		1,123,296
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	2,246,591	5.0%		112,330
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	22,465,914	5.0%		1,123,296
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	26,959,097	5.0%		1,347,955
90.09	UNALLOCATED CONTINGENCY Project Reserve	1,163,734,340	5.0%		58,186,717
SUBTOTAL CATEGORY 90 - Unallocated Contingency			RF	0	251,168,917
TOTAL CATEGORIES 10 - 90			RF		1,414,903,258
100	FINANCE CHARGES (Assume 3/4% of Total)	1,414,903,258	0.75%		10,611,774
GRAND TOTAL ALL CATEGORIES 10-100					1,425,515,032

\$/RF	21.253
Million \$/Mile	112.2

HRT Unit Costs

FTA SCC	DESCRIPTION	UNIT	BASE UNIT COST (\$2011)	Notes	Source
					0.96208 Virginia to Atlanta factor
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)				
10.01	Guideway: At-grade exclusive right-of-way	RF	837	\$2870/ft w/ dual retaining/barrier walls; 40' shoulder-to-shoulder width; cable trays, ballast & track drainage are included	Dulles Metro Rail
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)				
10.03	Guideway: At-grade in mixed traffic				
10.04	Guideway: Aerial structure	RF	18,164	Assumes precast segmental girders; 10' diameter caissons + rock sockets; 20' deep; plinths, walkways, cable tray included	Dulles Metro Rail
10.05	Guideway: Built-up fill				
10.06	Guideway: Underground cut & cover	RF	19,338	Includes SOE, excavation, haulage, CIP concrete, walkways, cable trays, ventilation, etc.	Dulles Metro Rail
10.07	Guideway: Underground tunnel	RF	38,252	Bored Tunnels; includes walkways, cable trays, pumps, ventilation, ventilation shafts, etc.	Dulles Metro Rail
10.08	Guideway: Retained cut or fill	RF	6,276	Unit cost based upon KS's and Cdi's cut fill quantities; factored to Atlanta	See detail
10.09	Track: Direct fixation	RF	433		Dulles Metro Rail
10.10	Track: Embedded	RF	-		
10.11	Track: Ballasted	RF	414	Assumes 40' outside shoulder to shoulder width	Dulles Metro Rail
10.12	Track: Special (switches, turnouts)	RF	212	Includes turnouts, 2x Xovers, & pocket track	Dulles Metro Rail
10.13	Track: Vibration and noise dampening				
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)				
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)	EA			
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform	EA	28,698,671	Assumes 8 car consist; 600' platform length; center platform; factored to Atlanta	Dulles Metro Rail
20.02	Aerial station, stop, shelter, mall, terminal, platform	EA	38,560,000	Assumes 8 car consist; 600' platform length; center platform; factored to Atlanta	Dulles Metro Rail
20.03	Underground station, stop, shelter, mall, terminal, platform	EA	105,828,800	Assumes 8 car consist; 600' platform length; center platform; factored to Atlanta	Dulles Metro Rail
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	EA		Added for Pedestrian tie-ins to existing MARTA Stations - Assumed in addition to 20.01 and 20.02	
20.05	Joint development				
20.06	Automobile parking multi-story structure	Space	16,355	Factored to Atlanta	Dulles Metro Rail
20.07	Elevators, escalators	STA	3,367,280	Per station. Add \$1MM per aerial or underground station; factored to Atlanta	Dulles Metro Rail
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS				
30.01	Administration Building: Office, sales, storage, revenue counting				
30.02	Light Maintenance Facility	SF	481		
30.03	Heavy Maintenance Facility				
30.04	Storage or Maintenance of Way Building			For now use \$650/SF at 1500 SF per Mile	
30.05	Yard and Yard Track				
40	SITWORK AND SPECIAL CONDITIONS				
40.01	Demolition, Clearing, Earthwork	RF	144	Primarily demolition of existing structures. Most earthwork included in SCC 10; factored to Atlanta	
40.02	Site Utilities, Utility Relocation	%	6.0%	CCLRT is 6% but all in street. Use 6%. Includes High Voltage ductbank and cable between stations/substations.	CCLRT & Dulles Metro Rail
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	%	0.10%		
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	%	0.25%		
40.05	Site structures including retaining walls, sound walls	RF	5	Includes miscellaneous project retaining walls	Dulles Metro Rail
40.06	Pedestrian / bike access and accommodation, landscaping	RF	75		
40.07	Automobile, bus, van access ways including roads, parking lots	Space	2,020	\$2100/space x Atlanta factor	
40.08	Temporary Facilities and other indirect costs during construction	%	8.0%	Includes special MOT, relocations, contractor project staffing, etc.	
50	SYSTEMS				
50.01	Train control and signals	RF	423	Atlanta factored	Dulles Metro Rail
50.02	Traffic signals and crossing protection	EA	-	No crossings for HRT	
50.03	Traction power supply: substations	RF	2,222	Atlanta factored	Dulles Metro Rail
50.04	Traction power distribution: catenary and third rail	RF	443	Atlanta factored	Dulles Metro Rail
50.05	Communications	RF	375	Atlanta factored	Dulles Metro Rail
50.06	Fare collection system and equipment	EA	1,006,336	Per station	Dulles Metro Rail
50.07	Central Control	LS	3,000,000		Ansaldo
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50		RF			
60	ROW, LAND, EXISTING IMPROVEMENTS				
60.01	PURCHASE OR LEASE OF REAL ESTATE	LS			
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES				
70	VEHICLES				
70.01	LIGHT RAIL	EA			
70.02	HEAVY RAIL	EA	3,500,000		
70.03	COMMUTER RAIL				
70.04	BUS				
70.05	OTHER				
70.06	NON-REVENUE VEHICLES	LS	5,000,000	Includes rail welder, mobile crane, man-lift, hi-rail vehicles, etc.	
70.07	SPARE PARTS				
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Range %	% of Construction		
80.01	Environmental		0.25%		
80.01	Preliminary Engineering	3%-6%	3.00%		
80.02	Final Design & Design Services for Construction	7%-12%	7.00%		
80.02	Engineering - ROW		0.60%		
80.02	Design - Vehicles		0.00%	Included in vehicle price	
80.03	Project Management for Design and Construction (Agency)	4%-8%	8.00%		
80.03	Agency ROW Costs		7.00%		
80.03	Agency Vehicle Cost		0.00%	Included in vehicle price	
80.04	Construction Administration & Management	2%-5%	3.00%		
80.05	Insurance	4%-6%	2.50%		
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	<1%	0.25%		
80.07	Surveys, Testing, Investigation, Inspection	2%-3%	2.50%		
80.08	Start up and Artwork		3.00%		
SUBTOTAL CATEGORY 60 - 80		RF			
			0.37		
90	UNALLOCATED CONTINGENCY - Construction	10.0%			
90	UNALLOCATED CONTINGENCY - Construction AFI	10.0%			
90	UNALLOCATED CONTINGENCY - ROW	25.0%			
90	UNALLOCATED CONTINGENCY - Vehicles	5.0%			
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	5.0%			
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	5.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	10.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	5.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	5.0%			
90.04	UNALLOCATED CONTINGENCY Professional Services - Insurance	5.0%			
90.05	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	5.0%			
90.06	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	5.0%			
90.07	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	5.0%			
90.08	UNALLOCATED CONTINGENCY Project Reserve	5.0%			
90.09	UNALLOCATED CONTINGENCY Project Reserve	5.0%			
SUBTOTAL CATEGORY 90 - Unallocated Contingency		RF		0	
TOTAL CATEGORIES 10 - 90		RF			
100	FINANCE CHARGES (Assume 3/4% of Total)	0.75%			
GRAND TOTAL ALL CATEGORIES 10-100					

\$/RF
Million \$/Mile

LRT Unit Costs

FTA SCC	DESCRIPTION	UNIT	BASE UNIT COST (\$2011)	Notes	Source
					0.96208 Virginia to Atlanta factor 0.875 Trackway width reduction w/o 3rd rail
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)				
10.01	Guideway: At-grade exclusive right-of-way	RF	557	At-grade, in street section shares existing ROW. Assume 35' shoulder-to-shoulder width. LRT then includes ballast, drainage, one cable trough.	Dulles Metro Rail
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)			For at-grade LRT and BRT on-street and shared, existing ROW, there is no guideway cost.	
10.03	Guideway: At-grade in mixed traffic	RF	130	For at-grade LRT and BRT new/exclusive ROW, guideway cost is 10.01;	
10.04	Guideway: Aerial structure	RF	15,894	Embedded track is in 10.10	Dulles Metro Rail
10.05	Guideway: Built-up fill	RF	1,518	Ballast, walls, cable tray, fill are included.	
10.06	Guideway: Underground cut & cover	RF	16,921		Dulles Metro Rail
10.07	Guideway: Underground tunnel	RF	33,471		Dulles Metro Rail
10.08	Guideway: Retained cut or fill	RF	6,091	Unit cost based upon KS's and Cdi's cut fill quantities for HRT alternative less backfill for 5' less width at 20' average depth at \$50/cy.	See detail
10.09	Track: Direct fixation	RF	379	Less concrete than HRT (no third rail support), Paired with aerial structure	Dulles Metro Rail
10.10	Track: Embedded	TF	409	two tracks need multiplied by 2, Paired with in mixed traffic	Columbia Pike
10.11	Track: Ballasted	RF	362	Paired with at grade exclusive and built up fill	Dulles Metro Rail
10.12	Track: Special (switches, turnouts)	RF	185	Used RF Unit cost from CCLRT	Dulles Metro Rail
10.13	Track: Vibration and noise dampening				
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)				
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)	EA	2,100,000	Cost is assumed same as with BRT at-grade	
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform (LRT/Platform)	EA	3,000,000	2 car consist platform	
20.02	Aerial station, stop, shelter, mall, terminal, platform	EA	6,300,000		
20.03	Underground station, stop, shelter, mall, terminal, platform				
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	EA		Added for Pedestrian tie-ins to existing MARTA Stations - Assumed in addition to 20.01 and 20.02	
20.05	Joint development				
20.06	Automobile parking multi-story structure	Space	16,355	See HRT unit costs	
20.07	Elevators, escalators	STA	3,367,280	Elevators/stairs only included in 20.02	
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS				
30.01	Administration Building: Office, sales, storage, revenue counting				
30.02	Light Maintenance Facility	SF	481		
30.03	Heavy Maintenance Facility	SF	650	For now use \$650/SF at 1500 SF per Mile	
30.04	Storage or Maintenance of Way Building	SF	220		
30.05	Yard and Yard Track	TF	800		Atlantal Street Car Yard
40	SITWORK AND SPECIAL CONDITIONS				
40.01	Demolition, Clearing, Earthwork	RF	126	RF assumed to be equal to at grade length for all	
40.02	Site Utilities, Utility Relocation	%	4.0%	Assumes guideway cost for full length	
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	%	0.1%	Assumes guideway cost for full length	
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	%	0.25%	Assumes guideway cost for full length	
40.05	Site structures including retaining walls, sound walls	RF	5	RF assumed to be equal to at grade length for all	
40.06	Pedestrian / bike access and accommodation, landscaping	RF	75		
40.07	Automobile, bus, van access ways including roads, parking lots	Space	2,020		
40.08	Temporary Facilities and other indirect costs during construction	%	8%		
50	SYSTEMS				
50.01	Train control and signals	RF	300		Used CCLRT but derated for Labor
50.02	Traffic signals and crossing protection	EA	250,000		
50.03	Traction power supply: substations	RF	300		
50.04	Traction power distribution: catenary and third rail	RF	320		Atlanta Street Car
50.05	Communications	RF	170		
50.06	Fare collection system and equipment	EA	284,000	Included in station costs	
50.07	Central Control	LS	3,000,000		
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50		RF			
60	ROW, LAND, EXISTING IMPROVEMENTS				
60.01	PURCHASE OR LEASE OF REAL ESTATE	LS			
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES				
70	VEHICLES				
70.01	LIGHT RAIL	EA	4,000,000		
70.02	HEAVY RAIL				
70.03	COMMUTER RAIL				
70.04	BUS				
70.05	OTHER				
70.06	NON-REVENUE VEHICLES	LS	5,000,000		
70.07	SPARE PARTS		5.00%	enough spares through pre-revenue testing, 5% of total vehicle costs.	
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Range %	% of Construction		
80.01	Environmental		0.25%		
80.01	Preliminary Engineering	3%-6%	3.00%		
80.02	Final Design & Design Services for Construction	7%-12%	7.00%		
80.02	Engineering - ROW		0.60%		
80.02	Design - Vehicles		0.00%	Included in vehicle price	
80.03	Project Management for Design and Construction (Agency)	4%-8%	8.00%		
80.03	Agency ROW Costs		7.00%		
80.03	Agency Vehicle Cost		0.00%	Included in vehicle price	
80.04	Construction Administration & Management	2%-5%	3.00%		
80.05	Insurance	4%-6%	2.50%		
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	<1%	0.25%		
80.07	Surveys, Testing, Investigation, Inspection	2%-3%	2.50%		
80.08	Start up and Artwork		3.00%		
SUBTOTAL CATEGORY 60 - 80		RF			
90	UNALLOCATED CONTINGENCY - Construction	10.0%			
90	UNALLOCATED CONTINGENCY - Construction AFI	10.0%			
90	UNALLOCATED CONTINGENCY - ROW	25.0%			
90	UNALLOCATED CONTINGENCY - Vehicles	5.0%			
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS	5.0%			
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW	5.0%			
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles	5.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction	5.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs	10.0%			
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs	5.0%			
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management	5.0%			
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance	5.0%			
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.	5.0%			
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection	5.0%			
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork	5.0%			
90.09	UNALLOCATED CONTINGENCY Project Reserve	5.0%			
SUBTOTAL CATEGORY 90 - Unallocated Contingency		RF	0		
TOTAL CATEGORIES 10 - 90		RF			
100	FINANCE CHARGES (Assume 3/4% of Total)	0.75%			

BRT Unit Costs

FTA SCC	DESCRIPTION	UNIT	BASE UNIT COST (\$2011)	Notes	Source
					0.96208 Virginia to Atlanta factor 0.85714 Busway width reduction w/o cable tray
10	GUIDEWAY & TRACK ELEMENTS (Route Mile)				
10.01	Guideway: At-grade exclusive right-of-way	RF	280	See detail in 10.01	
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)			For at-grade LRT and BRT on-street and shared, existing ROW, there is no guideway cost.	
10.03	Guideway: At-grade in mixed traffic			For at-grade LRT and BRT new/exclusive ROW, guideway cost is 10.01 \$130 lf.	
10.04	Guideway: Aerial structure	RF	13,860	Assumes BRT width and LRT SF structure cost. Most flexible to accommodate BRT and LRT, and costly configuration. Most basic bridge structure and requires plints and cable trays/emergency walkways.	
10.05	Guideway: Built-up fill	RF	1,152	W/o ballast	
10.06	Guideway: Underground cut & cover				
10.07	Guideway: Underground tunnel	RF	28,689		
10.08	Guideway: Retained cut or fill	RF	5,591	Unit cost based upon KS's and Cdi's cut fill quantities for HRT alternative. Needed for LRT and BRT? Or, is this adequate?	
10.09	Track: Direct fixation				
10.10	Track: Embedded				
10.11	Track: Ballasted				
10.12	Track: Special (switches, turnouts)				
10.13	Track: Vibration and noise dampening				
20	STATION, STOPS, TERMINALS, INTERMODAL (NUMBER)				
20.01 (a)	At-grade station, stop, shelter, mall, terminal, platform (Streetcar-style)	EA	2,100,000		
20.01 (b)	At-grade station, stop, shelter, mall, terminal, platform (LRT/Platform)	EA	3,000,000		
20.02	Aerial station, stop, shelter, mall, terminal, platform	EA	7,200,000		
20.03	Underground station, stop, shelter, mall, terminal, platform				
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	EA		Added for Pedestrian tie-ins to existing MARTA Stations - Assumed in addition to 20.01 and 20.02	
20.05	Joint development				
20.06	Automobile parking multi-story structure	Space	16,355		
20.07	Elevators, escalators	STA	3,367,280	Elevators/stairs only included in 20.02	
30	SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BUILDINGS				
30.01	Administration Building: Office, sales, storage, revenue counting				
30.02	Light Maintenance Facility	SF	450	For now use \$650/SF at 1500 SF per Mile	
30.03	Heavy Maintenance Facility				
30.04	Storage or Maintenance of Way Building				
30.05	Yard and Yard Track				
40	SITWORK AND SPECIAL CONDITIONS				
40.01	Demolition, Clearing, Earthwork	RF	124	RF assumed to be equal to at grade length for all	
40.02	Site Utilities, Utility Relocation	%	4.0%	Assumes guideway cost for full length	
40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	%	0.1%	Assumes guideway cost for full length	
40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	%	0.25%	Assumes guideway cost for full length	
40.05	Site structures including retaining walls, sound walls	RF	5	RF assumed to be equal to at grade length for all	
40.06	Pedestrian / bike access and accommodation, landscaping	RF	75		
40.07	Automobile, bus, van access ways including roads, parking lots	Space	2,020		
40.08	Temporary Facilities and other indirect costs during construction	%	8%		
50	SYSTEMS				
50.01	Train control and signals	RF			Used CCLRT but derated for Labor
50.02	Traffic signals and crossing protection	EA	250,000		
50.03	Traction power supply: substations	RF			
50.04	Traction power distribution: catenary and third rail	RF			
50.05	Communications	RF	120		
50.06	Fare collection system and equipment	EA	284,000	Included in station costs	
50.07	Central Control	LS	1,500,000		
CONSTRUCTION SUBTOTAL CATEGORY 10 - 50		RF			
60	ROW, LAND, EXISTING IMPROVEMENTS				
60.01	PURCHASE OR LEASE OF REAL ESTATE	LS			
60.02	RELOCATION OF EXISTING HOUSEHOLDS & BUSINESSES				
70	VEHICLES				
70.01	LIGHT RAIL				
70.02	HEAVY RAIL				
70.03	COMMUTER RAIL				
70.04	BUS		750,000		
70.05	OTHER				
70.06	NON-REVENUE VEHICLES				
70.07	SPARE PARTS			5%	enough spares through pre-revenue testing. 5% of total vehicle costs.
80	PROFESSIONAL SERVICES (Applied only at Summary Level)	Range %	% of Construction		
80.01	Environmental		0.25%		
80.01	Preliminary Engineering	3%-6%	3.00%		
80.02	Final Design & Design Services for Construction	7%-12%	7.00%		
80.02	Engineering - ROW		0.60%		
80.02	Design - Vehicles		0.00%		
80.03	Project Management for Design and Construction (Agency)	4%-8%	8.00%		
80.03	Agency ROW Costs		7.00%		
80.03	Agency Vehicle Cost		0.00%		
80.04	Construction Administration & Management	2%-5%	3.00%		
80.05	Insurance	4%-6%	2.50%		
80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	<1%	0.25%		
80.07	Surveys, Testing, Investigation, Inspection	2%-3%	2.50%		
80.08	Start up and Artwork		2.00%		
SUBTOTAL CATEGORY 60 - 80		RF			
90	UNALLOCATED CONTINGENCY - Construction		10.0%		
90	UNALLOCATED CONTINGENCY - Construction AFI		10.0%		
90	UNALLOCATED CONTINGENCY - ROW		25.0%		
90	UNALLOCATED CONTINGENCY - Vehicles		5.0%		
90.01	UNALLOCATED CONTINGENCY Professional Services - DEIS		5.0%		
90.01	UNALLOCATED CONTINGENCY Professional Services - Preliminary Engineering		5.0%		
90.02	UNALLOCATED CONTINGENCY Professional Services - Final Design		5.0%		
90.02	UNALLOCATED CONTINGENCY Professional Services - Engineering ROW		5.0%		
90.02	UNALLOCATED CONTINGENCY Professional Services - Design Vehicles		5.0%		
90.03	UNALLOCATED CONTINGENCY Professional Services - Project Management for Design and Construction		5.0%		
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency ROW Costs		10.0%		
90.03	UNALLOCATED CONTINGENCY Professional Services - Agency Vehicle Costs		5.0%		
90.04	UNALLOCATED CONTINGENCY Professional Services - Construction Administration & Management		5.0%		
90.05	UNALLOCATED CONTINGENCY Professional Services - Insurance		5.0%		
90.06	UNALLOCATED CONTINGENCY Professional Services - Legal; Permits; Review Fees by other agencies, cities, etc.		5.0%		
90.07	UNALLOCATED CONTINGENCY Professional Services - Surveys, Testing, Investigation, Inspection		5.0%		
90.08	UNALLOCATED CONTINGENCY Professional Services - Start up & Artwork		5.0%		
90.09	UNALLOCATED CONTINGENCY Project Reserve		5.0%		
SUBTOTAL CATEGORY 90 - Unallocated Contingency		RF	0		
TOTAL CATEGORIES 10 - 90		RF			
100	FINANCE CHARGES (Assume 3/4% of Total)		0.75%		