TASK 14

FINANCIAL ANALYSIS TECHNICAL MEMO

PREPARED BY: QUANDEL CONSULTANTS, LLC

JANUARY 30, 2017

TheRide MDOT Michigan Department of Transportation

SMITHGROUP JJR AECOM . BERGMANN ASSOCIATES . QUANDEL CONSULTANTS

NORTH SOUTH COMMUTER RAIL

North-South Commuter Rail Feasibility Study

Task 14: Financial Analysis Technical Memo

Prepared by Quandel Consultants, LLC for SmithGroupJJR, Inc.

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1. INTRODUCTION AND SCOPE OF WORK

1.1 Introduction

The North-South Commuter Rail Project, (WALLY), is a proposed 27-mile long commuter rail operation on existing tracks that would provide service between Ann Arbor and Howell, with intermediate stops along the way. It has been embraced by a number of public and private organizations in Washtenaw and Livingston counties as a way to expand commuting options in a rapidly growing part of southeast Michigan along the US 23 corridor. The Ann Arbor Area Transportation Authority (AAATA) has taken on the role as the "designated authority" for studying and developing the concept.

This report is one of the deliverables in a feasibility study which will determine in detail the costs of the project and the estimated number of future riders. It will also define the organization needed to build and operate the service, and the prospects for establishing a funding source for the service. It will help drive the community's decision about moving forward with the project.

Quandel Consultants has defined multiple commuter rail system alternatives, operating in the railroad corridor between Ann Arbor and Howell. Two of the more promising alternatives based on ridership estimates include Option 1: Full Service and Option 5B: Shuttle Service. Detailed service plans, capital costs and annual operating costs have been developed for each option and presented in Technical Memos. Ridership estimates have been prepared by AECOM using the FTA's STOPS model. The key parameters of the two most promising options are presented in the following table:

System Parameters		
	Option 1: Full Service	**Option 5B: Shuttle Service (two train sets)**
Capital Cost*	$115.59 million	$58.56 million
Annual Operating Cost**	$12.35 million	$6.23 million
Annual Ridership***	482,000 trips	439,000 trips
Annual Revenue***	$1.148 million	$0.811 million
Service Limits	Downtown Ann Arbor-Howell	Downtown Ann Arbor-Whitmore Lake
Equipment/Speed	Locomotive-Coach-Coach-Cab, 60 mph maximum	Locomotive-Coach-Coach-Cab, 60 mph maximum
Stations	(6) Howell, Genoa Township, Hamburg, Whitmore Lake, Barton Dr and Downtown Ann Arbor	(3) Whitmore Lake, Barton Dr and Downtown Ann Arbor
Revenue Service Operation	Four train sets to Ann Arbor in the AM; four trains sets return to Howell in the PM	Two train sets, making four AM peak direction trips to Ann Arbor and four PM peak direction trips to Whitmore Lake
Weekday/Weekend	Weekday operation only	Weekday operation only
Connecting Bus Service	Dedicated bus service at Barton Drive	Dedicated bus service at Barton Drive
Layover Facility	Full facility in Ann Arbor	Layover track/minimal facility in Ann Arbor
Maintenance Strategy	Overnight/maintenance facility in Howell area	Overnight/layover track/minimal facility in Whitmore Lake, Periodic offsite maintenance at Owosso or another existing facility
Freight Operations	CSX coordination required at the Annpere Interlocking, New freight interchange at Ellsworth Rd	New freight interchange at Ellsworth Rd
Grade Crossing Warning Systems	Gates at all public crossings	Gates at all public crossings
Signal System	Positive Train Control	Positive Train Control
* Adjusted for SCC Format		
** Excluding cost to provide connecting Bus Service in Ann Arbor		
***Initial full year of operation		
All costs are in 2015 dollars		

1.2 Scope of Work

Quandel Consultants is serving as sub-consultant to SmithGroupJJR, the project prime consultant, to implement the following work scope as defined in the contract documents:

Task 14 – Financial Analysis

Develop a cost-effectiveness analysis of each service concept, using techniques consistent with relevant FHWA and FTA guidelines. Include description of recommended approaches to securing funding for the next level of project development, e.g. Environmental Assessment, design development, engineering, land acquisition, preparation of FRA management plans, etc.

Deliverable(s):

1. Submit draft financial analysis

2. Review meeting, refine and submit final financial analysis

2. FTA SMALL STARTS PROGRAM

2.1 Background

The Federal Transit Administration (FTA) provides capital grants to state and local governments to fund the development and construction of fixed guideway transit systems throughout the United States under the FTA's Capital Investment Grants (CIG) program defined in 49 USC 5309. This program was modified by a series of legislative programs including the Transportation Equity Act of the 21st Century (TEA-21) in 1998, SAFETEA-LU in 2005, MAP-21 in 2012 and most recently, the Fixing America's Surface Transportation Act (FAST) in 2015. The original legislation and more recent laws authorize federal transit capital funding, define the procedures by which state and local governments may apply for funding and establish rating scales by which competing projects are evaluated and recommended for funding.

The FTA's CIG program provides three categories of eligible projects: New Starts, Core Capacity and Small Starts. Small Starts projects are those whose sponsors request less than $100 million in federal capital funds and have an anticipated total capital budget of less than $300 million, as defined under FAST. The Small Starts process is intended to be less burdensome on the project sponsors than the New Starts process and is limited to two phases: Project Development (PD) and Construction. [i]

2.2 Application for Entry into Small Starts Project Development

The FTA issued Small Starts Final Interim Policy Guidance in June 2016, stating that project sponsors wishing to enter the Project Development phase must submit, as their application, a letter to the Associate Administrator for FTA's Office of Planning and Environment that includes the following information:

- The name of the study sponsor, any partners involved in the study, and the roles and responsibilities of each
- Identification of a project manager and other key staff that will perform the Project Development work
- A brief description and clear map of the corridor being studied including its length and key activity centers
- Brief description of the transportation problem in the corridor or a statement of purpose and need
- Electronic copies of or weblinks to prior studies done in the corridor
- Identification of a proposed project if one is known and alternatives to that project if any are being considered
- A brief description of current levels of transit service in the corridor today
- Identification of a cost estimate for the project, if available

- The anticipated cost of Project Development, not including the cost of any work done prior to officially entering the PD phase
- Identification of the non-CIG funding available and committed to conduct the Project Development work
- Documentation demonstrating commitment of funds for the Project Development work (e.g. Board resolutions, adopted budgets, approved Capital Improvement Programs, approved Transportation Improvement Programs, letters of commitment)
- An anticipated draft timeline for completing the following activities:
    - compliance with NEPA and related environmental laws;
    - selection of a locally preferred alternative;
    - adoption of the locally preferred alternative in the fiscally constrained long range transportation plan;
    - completion of the activities required to obtain a project rating under the evaluation criteria outlined in the law
    - anticipated receipt of a construction grant agreement from FTA
    - anticipated start of revenue service[ii]

2.3 Project Development

In accord with FAST act requirements, during the PD phase, the project sponsor is responsible for:

- Selecting the locally preferred alternative (LPA)
- Getting the LPA adopted in the fiscally constrained metropolitan transportation plan
- Completing the NEPA process with a Categorical Exclusion, Finding of No Significant Impact or Record of Decision
- Developing sufficient information for the FTA to develop a project rating.[iii]

Achievement of these objectives requires the project sponsor to complete sufficient engineering to develop a reliable cost estimate, scope and schedule. Sponsors must also secure all the non-Section 5309 federal funding and meet FTA requirements for technical capacity, staffing and oversight to apply for a construction grant agreement.[iv]

2.4 Construction Funding

The FTA advises that the project sponsor is not finished once the FTA has recommended the project for funding in its annual report to Congress. In order to request a Construction Grant Agreement, the sponsor must develop and submit the following documents:

- Small Starts Templates used for developing the evaluation criteria and ratings
- Financial plan, including supporting documentation demonstrating all of the non-CIG funding is committed

- Cost estimate provided using the Standard Cost Category Worksheets
- Draft single year grant agreement or SSGA as applicable (consult with FTA for guidance)
- Documentation of project definition and scope with key elements identified and defined to support the level of design
- Cost and integrated project schedule to reflect the level of design
- Contracting plans and documents
- Project Management Products such as Constructability Review and Value Engineering Reports as applicable
- Project Management Plans and Subplans including the following
    - Risk and Contingency Management Plan
    - Documented processes and procedures to manage the project during SSGA/Construction
    - Staffing plans addressing, but not limited to, the following areas: Real Estate, Schedule and Cost controls, Risk Management, Construction Management, Quality Assurance/Quality Control, and Safety and Security
- Completion of all major third party agreements and permits. [v]

It should be noted that these activities will consume both time and resources in advance of the receipt of federal CIG funding.

2.5 Evaluation Criteria and Rating

As a project progresses through PD, the project sponsors submit documentation to the FTA, which enables the agency to evaluate the project for inclusion in the FTA's Annual Report on Funding Recommendations (to Congress). The FTA evaluates the projects in accord with guidance provided under FAST. In 2016, the FTA prepared a ratings worksheet to enable sponsors to see how their project may be evaluated employing the FTA's project justification rating criteria including:

- Mobility improvements
- Environmental benefits
- Congestion relief
- Economic development
- Land use
- Cost effectiveness

The criteria are evaluated on a five point scale (high, medium-high, medium, medium-low, low) and averaged. The FTA also considers the local financial commitment based on the sponsors current financial condition, commitment of capital and operating funds and quality of the financial plan. The project justification criteria and local financial commitment are weighted equally and both must be a

least medium to obtain a medium or better overall rating, a requirement to qualify for FTA's funding recommendation to Congress.

Successful Project Development concludes with the FTA Recommendation to Congress, inclusion of the project in the President's budget, Congressional Appropriation and a Small Starts Grant Agreement, which defines the maximum level of Capital Investment Grant funding commitment.[vi]

3. ANALYSIS OF NORTH SOUTH COMMUTER RAIL ALTERNATIVES

3.1 Worksheets and Computations

The FTA requires that the project capital costs be reported in Standard Cost Category format on worksheet designed specifically for Small Starts Grant Applications. Employing the FTA's Standard Cost Categories requires some modification to the capital cost estimates previously reported in Task Memo 10. The adjustments are presented in Appendix I.

In both the Option 1 Full Service and Option 5B Shuttle Service capital cost estimates, we have removed the costs for procuring buses to provide the connecting service at Barton, as buses, while required to implement the new service to enable commuters to reach their final destinations in Ann Arbor, are a different mode, and presumed to be addressed under another capital funding program. In addition, the funds for "Allocations for Special Elements" have been moved to Professional Services and added to Design Engineering to quantify the costs attributed to Project Development under the Small Starts program. These modifications also serve to reduce estimates for contingency and professional services as these costs have been estimated as a percentage of the expected construction costs. The Appendix I estimate sheets identify the SCC line item numbers to which the costs are assigned. The adjusted Capital Cost Estimates are $115,594,912 and $58,563,606 for Option 1 and Option 5B, respectively.

The FTA's Standard Cost Category Worksheet is included in Appendix II. This worksheet serves to identify the base year costs, allocate contingency and inflate the costs to year of expenditure values based on a proposed schedule and expected inflation rate. The funding allocation between state/local and federal sources is determined by the local sponsor. The FTA has defined years of useful life by class of asset, which enables a calculation of the annualized federal share of the project. This value is used in the numerator of the Cost Effectiveness calculation. The Annualized Federal Shares are $2,195,000 and $1,177,000 for Option 1 and Option 5B, respectively.

Appendix III includes the Ratings Estimation Template. As noted above, the FTA provides this template to allow the project sponsors to evaluate their project during the PD phase, which may serve to enable the project sponsors to configure the project to meet the FTA's evaluation criteria.

The primary objective of this North-South Commuter Rail Project Task 14 Financial Analysis is to compute the Cost Effectiveness Ratio and determine the resultant rating based on the FTA's published guidance. The Cost Effectiveness Ratio is computed simply as the Annualized Federal Share of Project Capital Cost (expressed in current year dollars) divided by the Annualized Linked Trips on the Project and is expressed in $/trip. The FTA assigns ratings as follows:

- High: <$1.00
- Medium-High: $1.01-$1.99
- Medium: $2.00-$3.99
- Medium-Low: $4.00-$5.00
- Low: >$5.00[vii]

The Annual Linked Trips are determined by taking the daily ridership estimates provided by AECOM in the Task 6 Demand for Service memo and employing an annualization factor of 262, which is simply 52 weeks at 5 days per week. This factor has been employed in a similar fashion to determine annual farebox revenues. The base year (2015) Annual Linked Trips for Option 1 total 482,080 based on the daily estimated ridership value of 1,840. Similarly, the base year Annual Linked Trips total 439,112 based on the daily estimated ridership of 1,676 trips for Option 5B.

Daily linked trip data as determined by AECOM has been entered in the Travel Forecasts worksheet of the Ratings Estimate Template. The data entry procedure requires allocating the total daily trips among home based work trips, all other trips and special market trips, as well as an assignment between transit dependent and non-transit dependent users. AECOM provided supplementary data on December 27, 2016 identifying all trips as home based work trips, as service is only provided in the peak hours, and quantifying the transit dependent/non-transit dependent trips as 71/1,769 for Option 1 and 65/1,611 for Option 5B.

As shown in the FTA's Ratings Estimate spreadsheets, the Cost Effectiveness value for Option 1 is $4.55 per trip, which qualifies for a Medium-Low rating. In contrast, the Cost Effectiveness value for Option 5B is $2.68, which qualifies for a Medium rating. The capital cost adjustments, computation of the cost effectiveness value and cost effectiveness ratings for Options 1 and 5B are presented in the following table.

Financial Analysis Summary		
	Option 1: Full Service	**Option 5B: Shuttle Service (two train sets)**
Original Estimate Capital Cost	$122.25 million	$65.22 million
Adjustments to conform to FTA SCC Worksheet		
-Eliminate Bus Cost	($3.90 million)	
-Assign Special Services to PD*		
-Reduction in Contingency	($0.89 million)	($0.89 million)
-Reduction in Prof Services and Environ	($1.29 million)	($1.29 million)
SCC Capital Cost	$115.59 million	$58.56 million
Annualized Federal Share	$2,195,000	$1,177,000
Annual Linked Trips 2015	482,080	439,112
Cost Effectiveness Value**	$4.55	$2.68
Cost Effectiveness Rating	Medium-Low	Medium
* This adjustment serves to eliminate the allowances for contingency and soft costs applied to this service element.		
** Current year 2015		
All costs are in 2015 dollars		

While the FTA favors analysis based on current year ridership estimates, the FTA allows the sponsor to calculate the cost effectiveness based on the predicted ridership in a horizon year (year 10 or 20 years in the future), rather than simply the current year. In such case, the FTA averages the values obtained employing the current year and the horizon year to obtain a score.[viii]

AECOM has provided ridership estimates for the horizon year 2040, which 25 years beyond the base year 2025. Employing the 2040 daily ridership estimates of 2346 for Option 1 and 2419 for Option 5B, yields annual ridership of 614,652 for Option 1 and 633,778 for Option 5B. Dividing by the Annualized Federal Share of Project Capital Cost, $2,195,000 for Option 1 and $1,177,000 for Option 5B, yields 2040 Cost effectiveness Values of $3.57 for Option 1 and $1.86 for Option 5B. Averaging the 2015 and 2040 values yields values of $4.06 for Option 1 and $2.27 for Option 5B. The ratings remain Medium-Low for Option 1 and Medium for Option 5B. The results are presented in the following table.

Cost Effectiveness Averaged over Current and Horizon Years		
	Option 1: Full Service	**Option 5B: Shuttle Service (two train sets)**
SCC Capital Cost	$115.59 million	$58.56 million
Annualized Federal Share	$2,195,000	$1,177,000
Annual Linked Trips 2015	482,080	439,112
Cost Effectiveness Value 2015	$4.55	$2.68
Annual Linked Trips 2040	614,652	633,778
Cost Effectiveness Value 2040	$3.57	$1.86
Cost Effectiveness Value (Average)	$4.06	$2.27
Cost Effectiveness Rating	Medium-Low	Medium

It should be noted that employing a 25 year horizon, rather than the 20 year horizon allowed by FTA, provides slightly better Cost Effectiveness Values, as the ridership estimates reflect a higher level of regional economic and population growth. The calculations are presented in Appendix IV.

The cost effectiveness analysis above has been based on the assumption of a 50/50 split of the SCC project capital cost between federal and state-local funding sources. The FTA allows Small Starts sponsors to seek up to 80% CIG funding, but does not specify a minimum percentage of federal funding. In the case of Option 1, which does not achieve a medium rating under the assumption of a 50/50 split, the project sponsor may elect to increase the value of state-local funding (reducing federal funding proportionately) to achieve a Cost Effectiveness Ratio below $4.00 per trip, thus attaining a Medium rating. In the case of Option 5B, increasing the federal share may serve to reduce the state and local capital requirements, while continuing to achieve a medium rating. Calculations reveal that the Option 1 state-local funding may be increased to approximately 55% to achieve a medium rating. The Option 5B capital and ridership estimates allow the project sponsor to reduce the state-local funding to approximately 20%, while still achieving a medium rating. These values are shown in the following table.

Cost Effectiveness with Funding Split Variations		
	Option 1: Full Service	**Option 5B: Shuttle Service (two train sets)**
SCC Capital Cost	$115.59 million	$58.56 million
Funding Split (Federal/State-Local)	45/55	80/20
Annualized Federal Share	$1,975,000	$1,883,000
Annual Linked Trips 2015	482,080	439,112
Cost Effectiveness Value 2015	$4.10	$4.29
Annual Linked Trips 2040	614,652	633,778
Cost Effectiveness Value 2040	$3.21	$2.97
Cost Effectiveness Value (Average)	$3.66	$3.63
Cost Effectiveness Rating	Medium	Medium

The cost effectiveness calculations performed above employ ridership estimates prepared using the FTA's Simplified Trips-on-Projects Software (STOPS) model. However, the FTA also allows project sponsors to use their local travel forecasting model.[ix] An attempt was made to develop a credible local forecasting model for the Ann Arbor region, but the effort was not successful. If the model is developed at some point in the future, its use may yield greater ridership values, which would serve to alter the cost effectiveness computations.

3.2 Simplifying Assumptions

At this stage of the project planning process, we have not developed sufficient information to populate the Small Starts Worksheets with the accuracy that could be available after some period in Project Development. Specific assumptions and simplifying decisions are as follows:

- The SCC Worksheet requires data entry in current (2016) constant dollars. Our estimates for capital and operating costs are based on work performed primarily in 2015 in nominal 2015 dollars. As inflation over the past year has been modest, no effort has been made to update the estimates to 2016 values.

- The SCC Worksheet requires that contingency values be distributed among the construction cost elements. Our distribution assumptions are presented on the Annualized Cost-Build Worksheet.

- The SCC Worksheet and Ratings Estimate Template require that the Sponsor identify funding sources and segregate among Section 5309, Other Federal, State and Local. We have made the simple assumption that 50% of the capital funding will be provided from the FTA's Small Starts program (5309) and 50% from local sources.

- The SCC Worksheet requires that the sponsor define his planned project implementation schedule. The schedule and assumed inflation rate allow the calculation of Year of Expenditure costs. These calculations do not alter the Cost Effectiveness, which is calculated using base year costs.

- The SCC Worksheet requires that any finance charges incurred prior to the revenue operations date or the fulfilment of the federal CIG funding be included in the Capital Cost. As we have not defined financing, such costs have not been included. This omission is not expected to alter the Cost Effectiveness in a material fashion.

4. CONCLUSION

The work performed to date under this study enables us to make a preliminary estimate of Cost Effectiveness under the FTA's Small Starts program. While our calculations show a Medium Low rating for Option 1 Full Service and a Medium rating for Option 5B Shuttle Service, it is reasonable to anticipate that either Option 1 or Option 5B could achieve the required rating of Medium to qualify for a Small Starts Capital Improvement Grant, provided that local funding support is available. However, Option 5B is anticipated to be a stronger project, as measured by the Cost Effectiveness factor and related Local Financial Commitment.

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[i] Final Interim Policy Guidance Federal Transit Administration Capital Investment Grant Program, June 2016, Small Starts Final Interim Policy Guidance, page 2.

[ii] Ibid, page 5.
[iii] Ibid, page 6.
[iv] Ibid, page 6.
[v] Ibid, page 7.
[vi] Ibid, page 8.
[vii] Ibid, page 13.
[viii] Ibid, page 13.
[ix] Ibid, page 9.

APPENDIX I: CAPITAL COST ESTIMATES

Prepared by Quandel Consultants, LLC for SmithGroupJJR, Inc.
January 30, 2017

APPENDIX I: CAPITAL COST SPREADSHEETS

North-South Commuter Rail

Option 1: Full Service High and Low Estimates

1/13/2016 with update 12/20/2016 for SCC Formatting

			Ellsworth to State St Freight Only	Passenger Service Limits							
	Host Carrier		Ann Arbor RR	Ann Arbor RR	Great Lakes Central RR	Great Lakes Central RR					
	Mileposts From - To		41.75-44.0	44.0-47.5	47.5-57.6	57.6-74.0	Systemwide	JJR/Quandel Cost Total-High Estimate	Small Starts Adjustments	Small Starts Value	Small Starts SCC Entry
	Route Miles		2.25 miles	3.5 miles	10.1 miles	16.4 miles					
	Maximum Authorized Speed			15 MPH (44.0-45.4) 30 MPH (45.4-47.19) 60MPH (47.19-47.5)	60 MPH	60 MPH					
Cost Element	**Unit**	**Unit Cost**	**Quantity**	**Quantity**	**Quantity**	**Quantity**					
Trackwork											
Add Rail Spikes	EA	$ 2		7083	14297	27618		$ 97,997		$ 97,997	
Eliminate Joint (Inspect, Crop, and Weld)	MI	$ 118,519		3.5	10.1	16.4		$ 3,555,556		$ 3,555,556	
Replace Switch Timbers	EA	$ 250			4			$ 1,000		$ 1,000	
Replace Turnout Switch Point	EA	$ 3,500			2			$ 7,000		$ 7,000	
Install Heel Block	EA	$ 1,000			2			$ 2,000		$ 2,000	
Replace Frog	EA	$ 15,000			4	2		$ 90,000		$ 90,000	
Replace Rail with 115 CWR	LFT	$ 70		18480		2000		$ 1,433,600		$ 1,433,600	
Remove Turnouts (Pocket Track)	EA	$ 4,000				1		$ 4,000		$ 4,000	
Construct Track: Ballasted (at-grade)	TF	$ 310	21,477					$ 6,657,827		$ 6,657,827	
Install #10 Turnout - Timber	EA	$ 93,302	4			2		$ 559,812		$ 559,812	
Install Split Point Derail	EA	$ 60,000		1	6	6		$ 780,000		$ 780,000	
Install 50% Tie Replacement	MI	$ 444,000		3.5				$ 1,554,000		$ 1,554,000	
Surface Align and Ballast	MI	$ 100,000		3.5				$ 350,000		$ 350,000	
Install New Guardrail on Washington St. Bridge, MP. 45.48	FT	$ 40		80				$ 3,200		$ 3,200	
Install New Guardrail and Redeck Timbers on Huron St. Bridge, MP 45.55	FT	$ 100		95				$ 9,500		$ 9,500	
Install New Guardrail and Redeck Timbers on Miller Ave., MP 45.69	FT	$ 100		75				$ 7,500		$ 7,500	
Install New Guardrail and Redeck Timbers on Felch St. MP 45.89	FT	$ 100		85				$ 8,500		$ 8,500	
Rebuild Ballast at Private Grade Crossing at MP 55.55	TFT	$ 50			100			$ 5,000		$ 5,000	
Rebuild and Improve Drainage at Crooked Lake Rd MP 69.40	TFT	$ 900				40		$ 36,000		$ 36,000	
Rebuild and Improve Drainage at Chilson Rd MP 65.99	TFT	$ 900				40		$ 36,000		$ 36,000	
Rebuild and Improve Drainage at Private Crossing MP 65.5	TFT	$ 900				20		$ 18,000		$ 18,000	
Sub-total Trackwork (A)								**$ 15,216,492**		**$ 15,216,492**	10.11
Systems											
Install Electric Lock for Industry Turnout	EA	$ 120,000		1	7	5		$ 1,560,000		$ 1,560,000	
Install New Control Point (CP) for Temporal Separation with split point derail with bungalow, switch machine, home and remote signals	EA	$ 700,000		1		2		$ 2,100,000		$ 2,100,000	
Install Crossing Diamond	EA	$ 1,280,000				1		$ 1,280,000		$ 1,280,000	
Install Derail Control Point	EA	$ 700,000		1		1		$ 1,400,000		$ 1,400,000	
Install Intermediate	EA	$ 280,000		2	5	9		$ 4,480,000		$ 4,480,000	
Install Locomotive On-Board Systems (Passenger and Freight)	EA	$ 100,000					12	$ 1,200,000		$ 1,200,000	
Sub-total Hardware								**$ 12,020,000**		$ 12,020,000	
Systems Integration: Communications, Back office, dispatch, PTCDP, PTCSP	EA	82%						$ 9,834,545		$ 9,834,545	
Sub-total Systems +Hardware (B)								**$ 21,854,545**		**$ 21,854,545**	50.01
Crossings											
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Liberty Street, MP 45.4	EA	$ 166,000		1				$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Summit Street, MP 46.09	EA	$ 166,000		1				$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Wright Street, MP 46.57	EA	$ 166,000		1				$ 166,000		$ 166,000	
Reolace Existine Warnine Svstem with New Gates, Flashers, and Bunealow at Lonashore Street. MP 46.6	EA	$ 166.000		1				$ 166.000		$ 166.000	
Reolace Existine Warnine Svstem with New Gates, Flashers. and Bunealow at Pontiac Trail . MP 46.64	EA	$ 166.000		1				$ 166.000		$ 166.000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Bowen Street, MP 46.71	EA	$ 166,000		1				$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Traver Street, MP 46.74	EA	$ 166,000		1				$ 166,000		$ 166,000	
Install Grade Crossing Start Modification at Barton Road, MP 47.19	EA	$ 50,000						$ -		$ -	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Barton Street, MP 47.19	EA	$ 166,000		1				$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Traver Street, MP 48.39	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Pontiac Trail, MP 49.71	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Warren Road, MP 50.02	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Joy Road, MP 50.90	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Northfield Church Road, MP 51.90	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at N. Territorial Road, MP 53.19	EA	$ 166,000			1			$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at S Mile Road, MP 53.91	EA	$ 166,000			1			$ 166,000		$ 166,000	
Reolace Existine Warnine Svstem with New Gates, Flashers. and Bunealow at Main Street. MP 56.35	EA	$ 166.000			1			$ 166.000		$ 166.000	
Install Grade Crossing Start Modification at 8 Mile. MP 57.56	EA	$ 50,000						$ -		$ -	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Hall Road, MP 58.75	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Strawberry Lake Road, MP 59.02	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Hamburg Road, MP 59.45	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Merrill Road, MP 60.53	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Pettys Drive, MP 61.52	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Private-Trail Hamburg Township MP 61.7	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Girard Road, MP 61.84	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Kress Road, MP 62.23	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at M-36, MP 62.52	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Swarthout Road, MP 64.3	EA	$ 166,000				1		$ 166,000		$ 166,000	
Reolace Existine Warnine Svstem with New Gates, Flashers. and Bunealow at Bishop Lake Road. MP 65.36	EA	$ 166.000				1		$ 166.000		$ 166.000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Chilson Road. MP 65.99	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Coon Lake Road, MP 67.73	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Crooked Lake Road, MP 69.40	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Beck Road, MP 71.02	EA	$ 166,000				1		$ 166,000		$ 166,000	
Replace Existing Warning System with New Gates, Flashers, and Bungalow at Barnard Street, MP 73.68	EA	$ 166,000				1		$ 166,000		$ 166,000	
Sub-total Crossings (C)								**$ 5,312,000**		**$ 5,312,000**	50.02
ROW											
Procure Howell Overnight Maintenance and Layover Facility Site	ACRE	$ 20,000				12		$ 240,000		$ 240,000	
Procure Ann Arbor- Washington/Liberty Station Site	ACRE	$ 100,000		1				$ 100,000		$ 100,000	
Procure Ann Arbor-Barton Station Site	ACRE	$ 20,000		1				$ 20,000		$ 20,000	
Procure Whitmore Lake Station Site	ACRE	$ 145,000			4			$ 580,000		$ 580,000	
Procure Hamburg Station Site	ACRE	$ 20,000				4		$ 80,000		$ 80,000	
Procure Genoa Township Station Site	ACRE	$ 20,000				4		$ 80,000		$ 80,000	
Procure Howell Station Site	ACRE	$ 20,000				4		$ 80,000		$ 80,000	
Sub-total ROW (D)								**$ 1,180.000**		**$ 1,180.000**	60.01
Stations/Parking											
Construct Ann Arbor- Washington/Liberty Station	EA	$ 1,000,000		1				$ 1,000,000		$ 1,000,000	
Construct Ann Arbor-Barton Station	EA	$ 750,000		1				$ 750,000		$ 750,000	
Construct Whitmore Lake Station	EA	$ 750,000			1			$ 750,000		$ 750,000	
Construct Hamburg Station	EA	$ 750,000				1		$ 750,000		$ 750,000	
Construct Genoa Township Station	EA	$ 750,000				1		$ 750,000		$ 750,000	
Construct Howell Station	EA	$ 750,000				1		$ 750,000		$ 750,000	
Sub-total Stations/Parking (E)								**$ 4,750,000**		**$ 4,750,000**	20.01
Vehicles											
Procure Locomotives	EA	$ -						$ -		$ -	
Procure Cars (Coaches and Cab Cars)	EA	$						$		$ -	
Procure Hybrid Bus (new)	EA	$ 665,000					6	$ 3,990,000	$ (3,990,000)	$ -	
Procure Agency Automobiles	EA	$ 25,000					10	$ 250,000		$ 250,000	
Sub-total Vehicles (F)								**$ 4,240,000**		**$ 250,000**	70.06
Maintenance Facilities											
Construct Ann Arbor Barton Station and Layover MOC	EA	$ 385,000								$ -	
Construct 8 Mile Station and Layover MOC	EA	$ 2,679,142								$ -	
Construct Ann Arbor Midday Layover Facility	EA	$ 6,967,464		1				$ 6,967,464		$ 6,967,464	30.02
Construct Howell Overnight Layover Facility	EA	$ 16,596,324				1		$ 16,596,324		$ 16,596,324	30.03
Sub-total Maintenance Facilities (G)								**$ 23,563,788**		**$ 23,563,788**	
Allocations for Special Elements											
Development of ADA Compliance Waiver Request 49 CFR 37.42	LS	$ 13,600					1	$ 13,600		$ 13,600	
Development of Modifications to Operating Rules, Timetables, and Timetable Special Instructions 49 CFR 217.7(a)	LS	$ 28,400					1	$ 28,400		$ 28,400	
Developoment of Operational Tests and Inspection Program 49 CFR 217.7©	LS	$ 14,200					1	$ 14,200		$ 14,200	
Developoment of Trainina Proaram on Operatine Rules 49 CFR 217.9©	LS	$ 14,200					1	$ 14,200		$ 14,200	
Develoo Emerzency Preparedness Plan and train emplovees 49 CFR 101 and 201	LS	$ 14,200					1	$ 14,200		$ 14,200	
Modify Conductor Certification Program 49 CFR 242.103	LS	$ 7,100					1	$ 7,100		$ 7,100	
Prepare System Safety Program and Collision Hazard Analysis 49 CFR 270 (proposed rule)	LS	$ 19,600					1	$ 19,600		$ 19,600	
Develop and implement Training and Trial Running Program	LS	$ 74,400					1	$ 74,400		$ 74,400	
Advertising of Service in the Media and Development of Website	LS	$ 17,100					1	$ 17,100		$ 17,100	
Development and Printing of Schedules and User Information	LS	$ 24,200					1	$ 24,200		$ 24,200	
Procure and Train Fare Collection System including Hardware and Software	LS	$ 128,400					1	$ 128,400		$ 128,400	
Develop and implement Local Grade Crossing Safety Advertising Program	LS	$ 23,100					1	$ 23,100		$ 23,100	
Prepare PTCIP	LS	$ 102,000					1	$ 102,000		$ 102,000	
Sub-Total Allocations for Special Elements (H)								**$ 480,500**	$ (480,500)	$ -	
Sub-total Construction Elements (A+B+C+D+E+F+G+H)								**$ 76.597.325**		**$ 72.126.825**	
Contingency											
Contingency		20%						$ 15,319,465		$ 14,425,365	
Sub-total Construction Elements and Contingency								**$ 91,916,790**		**$ 86,552,190**	
Professional Services and Environmental											
Design Engineering	15%							$ 13,787,518		$ 12,982,828	80.01
Allocation for Special Elements								$ -	$ 480,500	$ 480,500	80.01
Insurance and Bonding	2%							$ 1,838,336		$ 1,731,044	80.05
Program Management	4%							$ 3,676,672		$ 3,462,088	80.03
Construction Management & Inspection	10%							$ 9,191,679		$ 8,655,219	80.04
Engineering Services During Construction	2%							$ 1,838,336		$ 1,731,044	80.07
Sub-total Professional Services and Environmental		33%						**$ 30.332.541**		**$ 29.042.723**	
Total Segment Cost								**$ 122,249,330**		**$ 115,594,912**	

Revisions required to enter data in the FTA Small Starts SCC Worksheet

1. Eliminate the cost of buses, as the connecting bus service is a different mode.
2. Shift the "Allocation for Special Elements" cost to Professional Services, as this work is not a capital cost element.
3. These modifications affect the costs for contingency and Professional Services as these elements are computed as a percentage of the cost of construction elements.

	North-South Commuter Rail			Ellsworth to State St Freight Only	Passenger Service Limits									
	Option 5B: Shuttle Service: WL-BD-AA: Two Train Sets	Host Carrier		Ann Arbor RR	Ann Arbor RR	Great Lakes Central RR	8 Mile Layover/Station Track							
	10/14/2016 with update 12/20/2016 for SCC Formatting	Mileposts From - To		41.75-44.0	44.0-47.5	47.5-57.6		**Systemwide**	**JJR/Quandel Cost Total-High Estimate**	**Small Starts Adjustments**	**Small Starts Value**	**Small Starts SCC Entry**		
		Route Miles		2.25 miles	3.5 miles	10.1 miles								
		Maximum Authorized Speed			15 MPH (44.0-45.4) 30 MPH (45.4-47.19) 60MPH (47.19-47.5)	60 MPH								
	Cost Element	**Unit**		**Unit Cost**	**Quantity**	**Quantity**	**Quantity**	**Quantity**						
Trackwork														
	Add Rail Spikes	EA		$ 2		7083	14297			$ 42,760		$ 42,760		
	Eliminate Joint (Inspect, Crop, and Weld)	MI		$ 118,519			10.1			$ 1,197,037		$ 1,197,037		
	Replace Switch Timbers	EA		$ 250			4			$ 1,000		$ 1,000		
	Replace Turnout Switch Point	EA		$ 3,500			2			$ 7,000		$ 7,000		
	Install Heel Block	EA		$ 1,000			2			$ 2,000		$ 2,000		
	Replace Frog	EA		$ 15,000			4			$ 60,000		$ 60,000		
	Replace Rail with 115 CWR	LFT		$ 70		18,480				$ 1,293,600		$ 1,293,600		
	Remove Turnouts (Pocket Track)	EA		$ 4,000						$ -		$ -		
	Construct Track: Ballasted (at-grade)	TF		$ 310	21,477			1013		$ 6,971,857		$ 6,971,857		
	Install #10 Turnout - Timber	EA		$ 93,302	4					$ 373,208		$ 373,208		
	Install Split Point Derail	EA		$ 60,000		1	6	1		$ 480,000		$ 480,000		
	Install 50% Tie Replacement	MI		$ 444,000		3.5				$ 1,554,000		$ 1,554,000		
	Surface Align and Ballast	MI		$ 100,000		3.5				$ 350,000		$ 350,000		
	Install New Guardrail on Washington St. Bridge, MP. 45.48	FT		$ 40		80				$ 3,200		$ 3,200		
	Install New Guardrail and Redeck Timbers on Huron St. Bridge, MP 45.55	FT		$ 100		95				$ 9,500		$ 9,500		
	Install New Guardrail and Redeck Timbers on Miller Ave., MP 45.69	FT		$ 100		75				$ 7,500		$ 7,500		
	Install New Guardrail and Redeck Timbers on Felch St. MP 45.89	FT		$ 100		85				$ 8,500		$ 8,500		
	Rebuild Ballast at Private Grade Crossing at MP 55.55	TFT		$ 50			100			$ 5,000		$ 5,000		
	Rebuild and Improve Drainage at Crooked Lake Rd MP 69.40	TFT		$ 900						$ -		$ -		
	Rebuild and Improve Drainage at Chilson Rd MP 65.99	TFT		$ 900						$ -		$ -		
	Rebuild and Improve Drainage at Private Crossing MP 65.5	TFT		$ 900						$ -		$ -		
Sub-total Trackwork (A)										**$ 12,366,162**		**$ 12,366,162**		10.11
Systems														
	Install Electric Lock for Hand Operated Turnout	EA		$ 120,000		2	5	2		$ 1,080,000		$ 1,080,000		
	Install New Control Point (CP) for Temporal Separation with split point derail with bungalow, switch machine, home and remote	EA		$ 700,000		1	1			$ 1,400,000		$ 1,400,000		
	Install Crossing Diamond	EA		$ 1,280,000						$ -		$ -		
	Install Control Point for End of Siding with Derail	EA		$ 700,000		1	3			$ 2,800,000		$ 2,800,000		
	Install Intermediate	EA		$ 280,000		2	5			$ 1,960,000		$ 1,960,000		
	Install Locomotive On-Board Systems (Passenger and Freight)	EA		$ 100,000					8	$ 800,000		$ 800,000		
Sub-total Hardware										$ 8,040,000		$ 8,040,000		
	Systems Integration: Communications, Back office, dispatch, PTCDP, PTCSP	EA		82%						$ 6,578,182		$ 6,578,182		
Sub-total Systems +Hardware (B)										**$ 14,618,182**		**$ 14,618,182**		50.01
Crossings														
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Liberty Street, MP 45.4	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Summit Street, MP 46.09	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Wright Street, MP 46.57	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Longshore Street, MP 46.6	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Pontiac Trail, MP 46.64	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Bowen Street, MP 46.71	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Traver Street, MP 46.74	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Install Grade Crossing Start Modification at Barton Road, MP 47.19	EA		$ 50,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Barton Street, MP 47.19	EA		$ 166,000		1				$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Traver Street, MP 48.39	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Pontiac Trail, MP 49.71	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Warren Road, MP 50.02	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Joy Road, MP 50.90	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Northfield Church Road, MP 51.90	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at N. Territorial Road, MP 53.19	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at 5 Mile Road, MP 53.91	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Main Street, MP 56.35	EA		$ 166,000			1			$ 166,000		$ 166,000		
	Install Grade Crossing Start Modification at 8 Mile, MP 57.56	EA		$ 50,000			1			$ 50,000		$ 50,000		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Hall Road, MP 58.75	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Strawberry Lake Road, MP 59.02	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Hamburg Road, MP 59.45	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Merrill Road, MP 60.53	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Pettys Drive, MP 61.52	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Private-Trail Hamburg Township MP 61.7	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Girard Road, MP 61.84	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Kress Road, MP 62.23	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at M-36, MP 62.52	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Swarthout Road, MP 64.3	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Bishop Lake Road, MP 65.36	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Chilson Road, MP 65.99	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Coon Lake Road, MP 67.73	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Crooked Lake Road, MP 69.40	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Beck Road, MP 71.02	EA		$ 166,000						$ -		$ -		
	Replace Existing Warning System with New Gates, Flashers, and Bungalow at Barnard Street, MP 73.68	EA		$ 166,000						$ -		$ -		
Sub-total Crossings (C)										**$ 2,706,000**		**$ 2,706,000**		50.02
ROW														
	Procure Howell Overnight Maintenance and Layover Facility Site	ACRE		$ 20,000						$ -		$ -		
	Procure Ann Arbor- Washington/Liberty Station Site	ACRE		$ 100,000		1				$ 100,000		$ 100,000		
	Procure Ann Arbor-Barton Station Site	ACRE		$ 20,000		1				$ 20,000		$ 20,000		
	Procure Whitmore Lake Station Site	ACRE		$ 145,000				4		$ 580,000		$ 580,000		
	Procure Hamburg Station Site	ACRE		$ 20,000						$ -		$ -		
	Procure Genoa Township Station Site	ACRE		$ 20,000						$ -		$ -		
	Procure Howell Station Site	ACRE		$ 20,000						$ -		$ -		
Sub-total ROW (D)										**$ 700,000**		**$ 700,000**		60.01
Stations/Parking														
	Construct Ann Arbor- Washington/Liberty Station	EA		$ 1,000,000		1				$ 1,000,000		$ 1,000,000		
	Construct Ann Arbor-Barton Station	EA		$ 750,000			1			$ 750,000		$ 750,000		
	Construct Whitmore Lake Station	EA		$ 750,000			1			$ 750,000		$ 750,000		
	Construct Hamburg Station	EA		$ 750,000						$ -		$ -		
	Construct Genoa Township Station	EA		$ 750,000						$ -		$ -		
	Construct Howell Station	EA		$ 750,000						$ -		$ -		
Sub-total Stations/Parking (E)										**$ 2,500,000**		**$ 2,500,000**		20.01
Vehicles														
	Procure Locomotives	EA		$ -						$ -		$ -		
	Procure Cars (Coaches and Cab Cars)	EA		$ -						$ -		$ -		
	Procure Hybrid Bus (new)	EA		$ 665,000					6	$ 3,990,000	$ (3,990,000)	$ -		
	Procure Agency Automobiles	EA		$ 25,000					6	$ 150,000		$ 150,000		
		EA								$ -		$ -		
Sub-total Vehicles (F)										**$ 4,140,000**		**$ 150,000**		70.06
Maintenance Facilities														
	Construct Ann Arbor Barton Station and Layover MOC	EA		$ 385,000						$ -		$ -		
	Construct 8 Mile Station and Layover MOC and Abreviated	EA		$ 2,609,642				1		$ 2,609,642		$ 2,609,642		
	Construct Ann Arbor Midday Layover Facility	EA		$ 6,967,464						$ -		$ -		30.02
	Construct Howell Overnight Layover Facility	EA		$ 16,596,324						$ -		$ -		30.03
	Construct Ann Arbor Midday Layover Facility-Abreviated	EA		$ 742,937		1				$ 742,937		$ 742,937		
Sub-total Maintenance Facilities (G)										**$ 3,352,579**		**$ 3,352,579**		
Allocations for Special Elements														
	Development of ADA Compliance Waiver Request 49 CFR 37.42	LS		$ 13,600					1	$ 13,600		$ 13,600		
	Development of Modifications to Operating Rules, Timetables, and Timetable Special Instructions 49 CFR 217.7(a)	LS		$ 28,400					1	$ 28,400		$ 28,400		
	Development of Operational Tests and Inspection Program 49 CFR 217.7©	LS		$ 14,200					1	$ 14,200		$ 14,200		
	Development of Training Program on Operating Rules 49 CFR 217.9©	LS		$ 14,200					1	$ 14,200		$ 14,200		
	Develop Emergency Preparedness Plan and train employees 49 CFR 101 and 201	LS		$ 14,200					1	$ 14,200		$ 14,200		
	Modify Conductor Certification Program 49 CFR 242.103	LS		$ 7,100					1	$ 7,100		$ 7,100		
	Prepare System Safety Program and Collision Hazard Analysis 49 CFR 270 (proposed rule)	LS		$ 19,600					1	$ 19,600		$ 19,600		
	Develop and implement Training and Trial Running Program	LS		$ 74,400					1	$ 74,400		$ 74,400		
	Advertising of Service in the Media and Development of Website	LS		$ 17,100					1	$ 17,100		$ 17,100		
	Development and Printing of Schedules and User Information	LS		$ 24,200					1	$ 24,200		$ 24,200		
	Procure and Train Fare Collection System including Hardware and Software	LS		$ 128,400					1	$ 128,400		$ 128,400		
	Develop and Implement Local Grade Crossing Safety Advertising Program	LS		$ 23,100					1	$ 23,100		$ 23,100		
	Prepare PTCIP	LS		$ 102,000					1	$ 102,000		$ 102,000		
Sub-Total Allocations for Special Elements (H)										**$ 480,500**	$ (480,500)	$ -		
Sub-total Construction Elements (A+B+C+D+E+F+G+H)										**$ 40,863,423**		**$ 36,392,923**		
Contingency														
	Contingency			20%						$ 8,172,685		$ 7,278,585		
Sub-total Construction Elements and Contingency										**$ 49,036,108**		**$ 43,671,508**		
Professional Services and Environmental														
	Design Engineering	15%								$ 7,355,416		$ 6,550,726		80.01
	Allocation for Special Elements									$ -	$ 480,500	$ 480,500		80.01
	Insurance and Bonding	2%								$ 980,722		$ 873,430		80.05
	Program Management	4%								$ 1,961,444		$ 1,746,860		80.03
	Construction Management & Inspection	10%								$ 4,903,611		$ 4,367,151		80.04
	Engineering Services During Construction	2%								$ 980,722		$ 873,430		80.07
Sub-total Professional Services and Environmental				**33%**						**$ 16,181,916**		**$ 14,892,098**		
Total Segment Cost										**$ 65,218,024**		**$ 58,563,606**		

Revisions required to enter data in the FTA Small Starts SCC Worksheet
1. Eliminate the cost of buses, as the connecting bus service is a different mode.

2. Shift the "Allocation for Special Elements" cost to Professional Services, as this work is not a capital cost element.
3. These modifications affect the costs for contingency and Professional Services as these elements are computed as a percentage of the cost of construction elements.

APPENDIX II: FTA SCC WORKSHEETS

MAIN WORKSHEET-BUILD ALTERNATIVE

(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 1, Ann Arbor-Howell, MI — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	15,216	0	**15,216**		**22%**	**13%**	**17,037**
10.01 Guideway: At-grade exclusive right-of-way				0				0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)				0				0
10.03 Guideway: At-grade in mixed traffic				0				0
10.04 Guideway: Aerial structure				0				0
10.05 Guideway: Built-up fill				0				0
10.06 Guideway: Underground cut & cover				0				0
10.07 Guideway: Underground tunnel				0				0
10.08 Guideway: Retained cut or fill				0				0
10.09 Track: Direct fixation				0				0
10.10 Track: Embedded				0				0
10.11 Track: Ballasted	28.40	15,216		15,216				17,037
10.12 Track: Special (switches, turnouts)				0				0
10.13 Track: Vibration and noise dampening				0				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**5**	4,750	0	**4,750**	**$950**	**7%**	**4%**	**5,414**
20.01 At-grade station, stop, shelter, mall, terminal, platform	5	4,750		4,750	$950			5,414
20.02 Aerial station, stop, shelter, mall, terminal, platform				0				0
20.03 Underground station, stop, shelter, mall, terminal, platform				0				0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.				0				0
20.05 Joint development				0				0
20.06 Automobile parking multi-story structure				0				0
20.07 Elevators, escalators				0				0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0.00	23,564	0	**23,564**		**33%**	**20%**	**26,478**
30.01 Administration Building: Office, sales, storage, revenue counting				0				0
30.02 Light Maintenance Facility		6,967		6,967				7,829
30.03 Heavy Maintenance Facility		16,596		16,596				18,649
30.04 Storage or Maintenance of Way Building				0				0
30.05 Yard and Yard Track				0				0
40 SITEWORK & SPECIAL CONDITIONS	0.00	0	0	**0**		**0%**	**0%**	**0**
40.01 Demolition, Clearing, Earthwork				0				#DIV/0!
40.02 Site Utilities, Utility Relocation				0				#DIV/0!
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments				0				#DIV/0!
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks				0				#DIV/0!
40.05 Site structures including retaining walls, sound walls				0				#DIV/0!
40.06 Pedestrian / bike access and accommodation, landscaping				0				#DIV/0!
40.07 Automobile, bus, van accessways including roads, parking lots				0				#DIV/0!
40.08 Temporary Facilities and other indirect costs during construction				0				#DIV/0!
50 SYSTEMS	0.00	27,167	0	**27,167**		**38%**	**24%**	**30,655**
50.01 Train control and signals		21,855		21,855				24,661
50.02 Traffic signals and crossing protection		5,312		5,312				5,994
50.03 Traction power supply: substations				0				0
50.04 Traction power distribution: catenary and third rail				0				0
50.05 Communications				0				0
50.06 Fare collection system and equipment				0				0
50.07 Central Control				0				0
Construction Subtotal (10 - 50)	0.00	70,697	0	**70,697**		**100%**	**61%**	**79,583**
60 ROW, LAND, EXISTING IMPROVEMENTS	0.00	1,180	0	**1,180**			**1%**	**1,289**
60.01 Purchase or lease of real estate		1,180		1,180				1,289
60.02 Relocation of existing households and businesses				0				0
70 VEHICLES (number)	**10**	250	0	**250**	**$25**		**0%**	**290**
70.01 Light Rail				0				0
70.02 Heavy Rail				0				0
70.03 Commuter Rail				0				0
70.04 Bus				0				0
70.05 Other				0				0
70.06 Non-revenue vehicles	10	250		250	$25			290
70.07 Spare parts				0				0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	0.00	29,043	0	**29,043**		**41%**	**25%**	**31,988**
80.01 Project Development		13,463		13,463				14,828
80.02 Engineering (not applicable to Small Starts)								
80.03 Project Management for Design and Construction		3,462		3,462				3,813
80.04 Construction Administration & Management		8,655		8,655				9,533
80.05 Professional Liability and other Non-Construction Insurance		1,731		1,731				1,907
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.				0				0
80.07 Surveys, Testing, Investigation, Inspection		1,731		1,731				1,907
80.08 Start up				0				0
Subtotal (10 - 80)	0.00	101,170	0	**101,170**			**88%**	**113,150**
90 UNALLOCATED CONTINGENCY				**14,425**			**12%**	**15,918**
Subtotal (10 - 90)	0.00			**115,595**			**100%**	**129,068**
100 FINANCE CHARGES				**0**			**0%**	**0**
Total Project Cost (10 - 100)	0.00			**115,595**			**100%**	**129,068**

Allocated Contingency as % of Base Yr Dollars w/o Contingency	0.00%	
Unallocated Contingency as % of Base Yr Dollars w/o Contingency	14.26%	
Total Contingency as % of Base Yr Dollars w/o Contingency	14.26%	
Unallocated Contingency as % of Subtotal (10 - 80)	14.26%	
YOE Construction Cost per Mile (X000)		#DIV/0!
YOE Total Project Cost per Mile Not Including Vehicles (X000)		#DIV/0!
YOE Total Project Cost per Mile (X000)		#DIV/0!

SCHEDULE

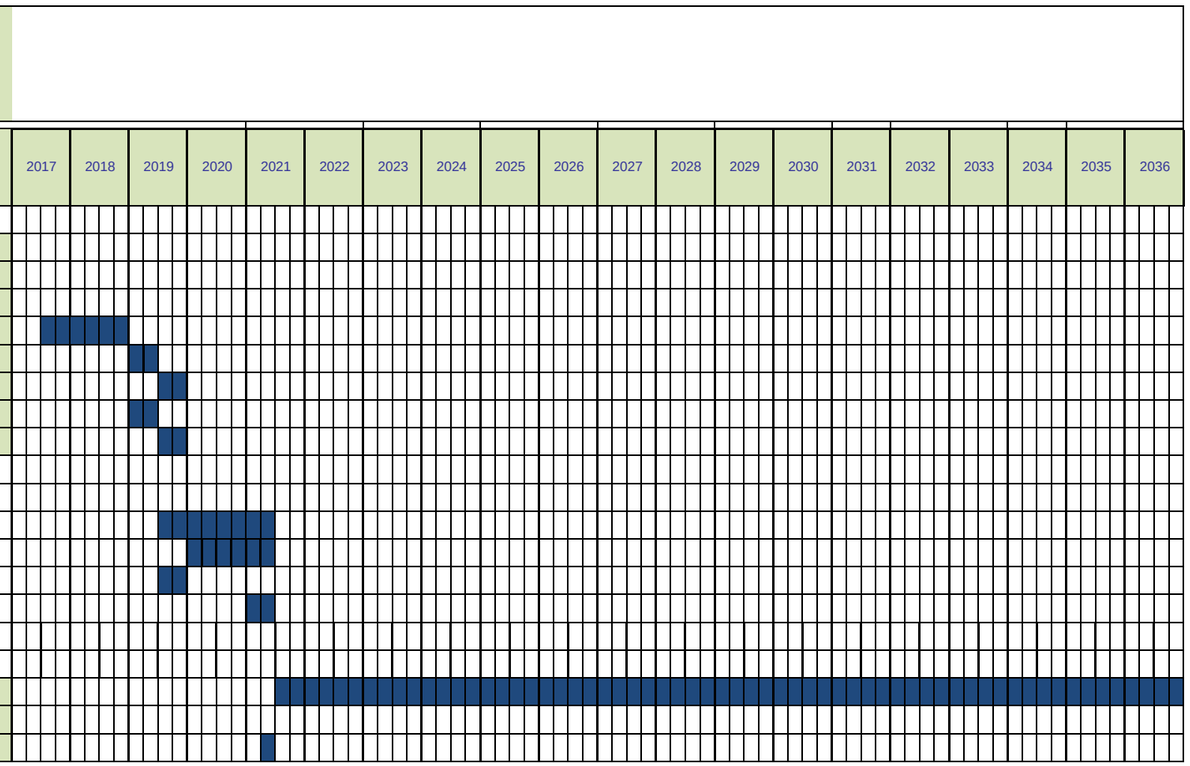
(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 1, Ann Arbor-Hc — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

Insert comments, notes, etc.	Start Date	End Date
Project Development	07/01/17	12/31/19
Design		
Develop cost estimate, schedule, ridership forecast		
Conduct reviews		
Develop NEPA document (DCE/EA/FEIS) and receive determination (CE/FONSI/ROD)		
Develop the contract documents for the Build Alternative		
Acquire real estate; relocate households and businesses		
Submit request / receive FTA approval for SSGA		
Issue requests for bids, make awards of construction contracts		
Construction	07/01/19	07/01/21
Construct fixed infrastructure		
Insert Contract Package Number and Description (i.e. Guideway, Stations, Systems, etc.)		
Insert Contract Package Number and Description (i.e. Guideway, Stations, Systems, etc.)		
Finalize real estate acquisitions and relocations		
Acquire and test vehicles		
Revenue Ops / Closeout of Project	07/01/21	12/31/21
Revenue Service Date	07/01/21	
Revenue Operations		
Fulfillment of the Small Starts funding commitment		
Completion of project close-out, resolution of claims		



ANNUALIZED COST-BUILD ALTERNATIVE (Current Year)

(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 1, Ann Arbor-Howell, MI — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

	Quantity	Total Base Year Dollars (X000)	Cat. 80 Prof. Svc. spread proportionally over Cats. 10 - 50 (X000)	Spread Cat. 90 Unalloc. Cont. according to perceived risks (X000)	Revised Total Base Year Dollars (X000)	Federal Share of Base Year Dollars (based on 50 percent Federal funding share)	Years of Useful Life	Annualization Factor (based on 2% rate) [.02/1 - (1.02)^- no. yrs]	**Annualized Federal Share (X000)**
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	**15,216**	**6,251**	**3,000**	**24,468**	**12,234**			**489**
10.01 Guideway: At-grade exclusive right-of-way	0.00	0	0		0	0	125	0.0218	0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	0.00	0	0		0	0	30	0.0446	0
10.03 Guideway: At-grade in mixed traffic	0.00	0	0		0	0	20	0.0612	0
10.04 Guideway: Aerial structure	0.00	0	0		0	0	80	0.0252	0
10.05 Guideway: Built-up fill	0.00	0	0		0	0	80	0.0252	0
10.06 Guideway: Underground cut & cover	0.00	0	0		0	0	125	0.0218	0
10.07 Guideway: Underground tunnel	0.00	0	0		0	0	125	0.0218	0
10.08 Guideway: Retained cut or fill	0.00	0	0		0	0	125	0.0218	0
10.09 Track: Direct fixation		0	0		0	0	30	0.0446	0
10.10 Track: Embedded		0	0		0	0	20	0.0612	0
10.11 Track: Ballasted		15,216	6,251	3,000	24,468	12,234	35	0.0400	489
10.12 Track: Special (switches, turnouts)		0	0		0	0	30	0.0446	0
10.13 Track: Vibration and noise dampening		0	0		0	0	30	0.0446	0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**5**	**4,750**	**1,951**	**2,000**	**8,701**	**4,351**			**116**
20.01 At-grade station, stop, shelter, mall, terminal, platform	5	4,750	1,951	2,000	8,701	4,351	70	0.0267	116
20.02 Aerial station, stop, shelter, mall, terminal, platform	0	0	0		0	0	70	0.0267	0
20.03 Underground station, stop, shelter, mall, terminal, platform	0	0	0		0	0	125	0.0218	0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	0	0	0		0	0	70	0.0267	0
20.05 Joint development		0	0		0	0	70	0.0267	0
20.06 Automobile parking multi-story structure		0	0		0	0	50	0.0318	0
20.07 Elevators, escalators		0	0		0	0	30	0.0446	0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS		**23,564**	**9,680**	**4,025**	**37,269**	**18,634**			**593**
30.01 Administration Building: Office, sales, storage, revenue counting		0	0		0	0	50	0.0318	0
30.02 Light Maintenance Facility		6,967	2,862	1,400	11,230	5,615	50	0.0318	179
30.03 Heavy Maintenance Facility		16,596	6,818	2,625	26,039	13,020	50	0.0318	414
30.04 Storage or Maintenance of Way Building		0	0		0	0	50	0.0318	0
30.05 Yard and Yard Track		0	0		0	0	80	0.0252	0
40 SITEWORK & SPECIAL CONDITIONS		**0**	**0**	**0**	**0**	**0**			**0**
40.01 Demolition, Clearing, Earthwork		0	0		0	0	125	0.0218	0
40.02 Site Utilities, Utility Relocation		0	0		0	0	125	0.0218	0
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments		0	0		0	0	125	0.0218	0
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks		0	0		0	0	125	0.0218	0
40.05 Site structures including retaining walls, sound walls		0	0		0	0	80	0.0252	0
40.06 Pedestrian / bike access and accommodation, landscaping		0	0		0	0	20	0.0612	0
40.07 Automobile, bus, van accessways including roads, parking lots		0	0		0	0	20	0.0612	0
40.08 Temporary Facilities and other indirect costs during construction		0	0		0	0	100	0.0232	0
50 SYSTEMS		**27,167**	**11,160**	**5,000**	**43,327**	**21,663**			**967**
50.01 Train control and signals		21,855	8,978	4,000	34,833	17,416	30	0.0446	778
50.02 Traffic signals and crossing protection		5,312	2,182	1,000	8,494	4,247	30	0.0446	190
50.03 Traction power supply: substations		0	0		0	0	50	0.0318	0
50.04 Traction power distribution: catenary and third rail		0	0		0	0	30	0.0446	0
50.05 Communications		0	0		0	0	20	0.0612	0
50.06 Fare collection system and equipment		0	0		0	0	25	0.0512	0
50.07 Central Control		0	0		0	0	30	0.0446	0
Construction Subtotal (10 - 50)		**70,697**	**29,043**	**14,025**	**113,765**	**56,882**			**2,166**
60 ROW, LAND, EXISTING IMPROVEMENTS		**1,180**		**400**	**1,580**	**790**			**17**
60.01 Purchase or lease of real estate		1,180		400	1,580	790	125	0.0218	17
60.02 Relocation of existing households and businesses		0			0	0	125	0.0218	0
70 VEHICLES (number)	**10**	**250**		**0**	**250**	**125**			**12**
70.01 Light Rail	0	0			0	0	25	0.0512	0
70.02 Heavy Rail	0	0			0	0	25	0.0512	0
70.03 Commuter Rail	0	0			0	0	25	0.0512	0
70.04 Bus	0	0			0	0	12	0.0946	0
70.05 Other	0	0			0	0	12	0.0946	0
70.06 Non-revenue vehicles	10	250			250	125	12	0.0946	12
70.07 Spare parts	0	0			0	0	12	0.0946	0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)		**29,043**							
80.01 Project Development		13,463							
80.02 Engineering (not applicable to Small Starts)		0							
80.03 Project Management for Design and Construction		3,462							
80.04 Construction Administration & Management		8,655							
80.05 Professional Liability and other Non-Construction Insurance		1,731							
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.		0							
80.07 Surveys, Testing, Investigation, Inspection		1,731							
80.08 Start up		0							
Subtotal (10 - 80)		**101,170**							
90 UNALLOCATED CONTINGENCY		**14,425**							
TOTAL		**115,595**	29,043	14,425	**115,595**	**57,797**			**2,195**

MAIN WORKSHEET-BUILD ALTERNATIVE

(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 5B, Ann Arbor-Howell, MI — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

	Quantity	Base Year Dollars w/o Contingency (X000)	Base Year Dollars Allocated Contingency (X000)	Base Year Dollars TOTAL (X000)	Base Year Dollars Unit Cost (X000)	Base Year Dollars Percentage of Construction Cost	Base Year Dollars Percentage of Total Project Cost	YOE Dollars Total (X000)
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	12,366	0	**12,366**		**35%**	**21%**	**13,834**
10.01 Guideway: At-grade exclusive right-of-way				0				0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)				0				0
10.03 Guideway: At-grade in mixed traffic				0				0
10.04 Guideway: Aerial structure				0				0
10.05 Guideway: Built-up fill				0				0
10.06 Guideway: Underground cut & cover				0				0
10.07 Guideway: Underground tunnel				0				0
10.08 Guideway: Retained cut or fill				0				0
10.09 Track: Direct fixation				0				0
10.10 Track: Embedded				0				0
10.11 Track: Ballasted	11.97	12,366		12,366				13,834
10.12 Track: Special (switches, turnouts)				0				0
10.13 Track: Vibration and noise dampening				0				0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**3**	2,500	0	**2,500**	**$833**	**7%**	**4%**	**2,848**
20.01 At-grade station, stop, shelter, mall, terminal, platform	3	2,500		2,500	$833			2,848
20.02 Aerial station, stop, shelter, mall, terminal, platform				0				0
20.03 Underground station, stop, shelter, mall, terminal, platform				0				0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.				0				0
20.05 Joint development				0				0
20.06 Automobile parking multi-story structure				0				0
20.07 Elevators, escalators				0				0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	0.00	3,353	0	**3,353**		**9%**	**6%**	**3,737**
30.01 Administration Building: Office, sales, storage, revenue counting				0				0
30.02 Light Maintenance Facility		743		743				828
30.03 Heavy Maintenance Facility		2,610		2,610				2,909
30.04 Storage or Maintenance of Way Building				0				0
30.05 Yard and Yard Track				0				0
40 SITEWORK & SPECIAL CONDITIONS	0.00	0	0	**0**		**0%**	**0%**	**0**
40.01 Demolition, Clearing, Earthwork				0				#DIV/0!
40.02 Site Utilities, Utility Relocation				0				#DIV/0!
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments				0				#DIV/0!
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks				0				#DIV/0!
40.05 Site structures including retaining walls, sound walls				0				#DIV/0!
40.06 Pedestrian / bike access and accommodation, landscaping				0				#DIV/0!
40.07 Automobile, bus, van accessways including roads, parking lots				0				#DIV/0!
40.08 Temporary Facilities and other indirect costs during construction				0				#DIV/0!
50 SYSTEMS	0.00	17,324	0	**17,324**		**49%**	**30%**	**19,514**
50.01 Train control and signals		14,618		14,618				16,466
50.02 Traffic signals and crossing protection		2,706		2,706				3,048
50.03 Traction power supply: substations				0				0
50.04 Traction power distribution: catenary and third rail				0				0
50.05 Communications				0				0
50.06 Fare collection system and equipment				0				0
50.07 Central Control				0				0
Construction Subtotal (10 - 50)	0.00	35,543	0	**35,543**		**100%**	**61%**	**39,932**
60 ROW, LAND, EXISTING IMPROVEMENTS	0.00	700	0	**700**			**1%**	**765**
60.01 Purchase or lease of real estate		700		700				765
60.02 Relocation of existing households and businesses				0				0
70 VEHICLES (number)	**6**	150	0	**150**	**$25**		**0%**	**174**
70.01 Light Rail				0				0
70.02 Heavy Rail				0				0
70.03 Commuter Rail				0				0
70.04 Bus				0				0
70.05 Other				0				0
70.06 Non-revenue vehicles	6	150		150	$25			174
70.07 Spare parts				0				0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)	0.00	14,892	0	**14,892**		**42%**	**25%**	**16,423**
80.01 Project Development		7,031		7,031				7,754
80.02 Engineering (not applicable to Small Starts)								
80.03 Project Management for Design and Construction		1,747		1,747				1,926
80.04 Construction Administration & Management		4,367		4,367				4,816
80.05 Professional Liability and other Non-Construction Insurance		873		873				963
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.				0				0
80.07 Surveys, Testing, Investigation, Inspection		873		873				963
80.08 Start up				0				0
Subtotal (10 - 80)	0.00	51,285	0	**51,285**			**88%**	**57,294**
90 UNALLOCATED CONTINGENCY				**7,279**			**12%**	**8,037**
Subtotal (10 - 90)	0.00			**58,564**			**100%**	**65,331**
100 FINANCE CHARGES				**0**			**0%**	**0**
Total Project Cost (10 - 100)	0.00			**58,564**			**100%**	**65,331**

Allocated Contingency as % of Base Yr Dollars w/o Contingency	0.00%
Unallocated Contingency as % of Base Yr Dollars w/o Contingency	14.19%
Total Contingency as % of Base Yr Dollars w/o Contingency	14.19%
Unallocated Contingency as % of Subtotal (10 - 80)	14.19%
YOE Construction Cost per Mile (X000)	#DIV/0!
YOE Total Project Cost per Mile Not Including Vehicles (X000)	#DIV/0!
YOE Total Project Cost per Mile (X000)	#DIV/0!

SCHEDULE

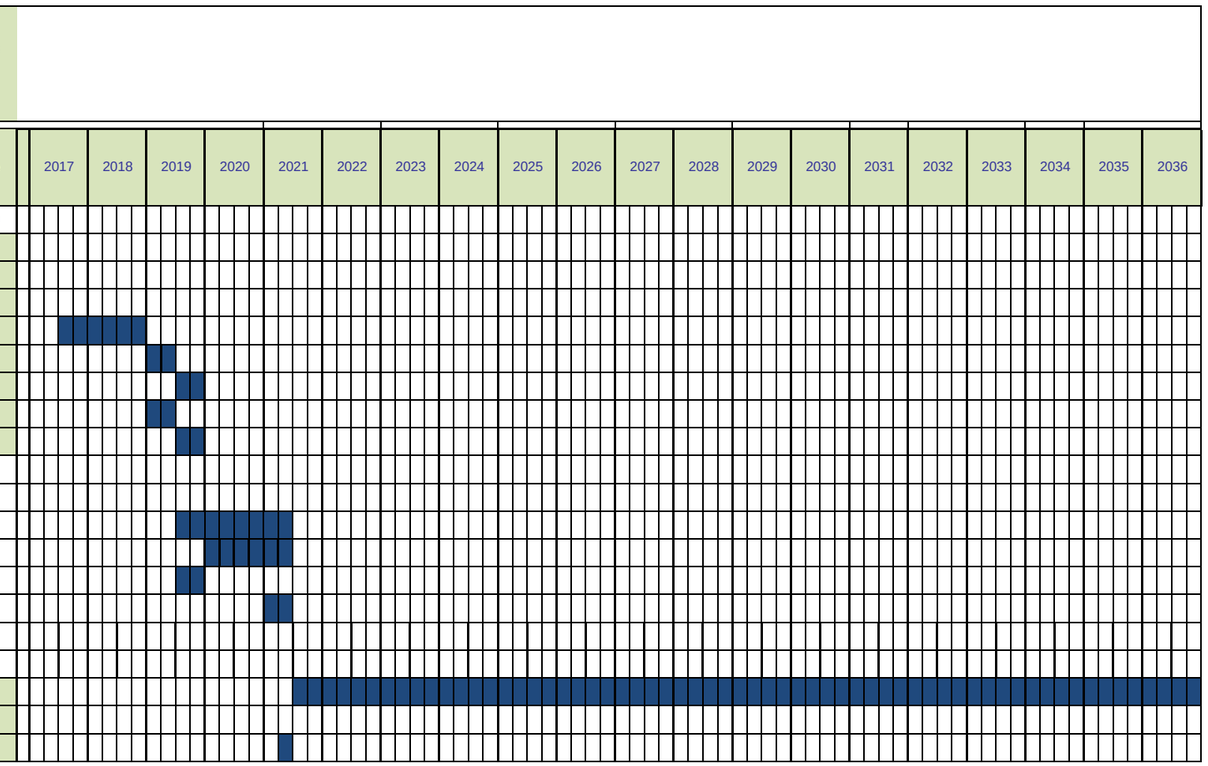
(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 5B, Ann Arbor-H — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

Insert comments, notes, etc.	Start Date	End Date
Project Development	07/01/17	12/31/19
Design		
Develop cost estimate, schedule, ridership forecast		
Conduct reviews		
Develop NEPA document (DCE/EA/FEIS) and receive determination (CE/FONSI/ROD)		
Develop the contract documents for the Build Alternative		
Acquire real estate; relocate households and businesses		
Submit request / receive FTA approval for SSGA		
Issue requests for bids, make awards of construction contracts		
Construction	07/01/19	07/01/21
Construct fixed infrastructure		
Insert Contract Package Number and Description (i.e. Guideway, Stations, Systems, etc.)		
Insert Contract Package Number and Description (i.e. Guideway, Stations, Systems, etc.)		
Finalize real estate acquisitions and relocations		
Acquire and test vehicles		
Revenue Ops / Closeout of Project	07/01/21	12/31/21
Revenue Service Date	07/01/21	
Revenue Operations		
Fulfillment of the Small Starts funding commitment		
Completion of project close-out, resolution of claims		



ANNUALIZED COST-BUILD ALTERNATIVE (Current Year)

(Rev.18, May 2016)

Ann Arbor Area Transit Authority — Today's Date **12/16/16**

North-South Commuter Rail, Option 5B, Ann Arbor-Howell, MI — Yr of Base Year $ 2016

Application for Small Starts Grant Agreement — Yr of Revenue Ops 2021

	Quantity	Total Base Year Dollars (X000)	Cat. 80 Prof. Svc. spread proportionally over Cats. 10 - 50 (X000)	Spread Cat. 90 Unalloc. Cont. according to perceived risks (X000)	Revised Total Base Year Dollars (X000)	Federal Share of Base Year Dollars (based on 80 percent Federal funding share)	Years of Useful Life	Annualization Factor (based on 2% rate) [.02/1 - (1.02)^- no. yrs]	**Annualized Federal Share (X000)**
10 GUIDEWAY & TRACK ELEMENTS (route miles)	**0.00**	**12,366**	**5,181**	**1,979**	**19,526**	**15,621**			**625**
10.01 Guideway: At-grade exclusive right-of-way	0.00	0	0		0	0	125	0.0218	0
10.02 Guideway: At-grade semi-exclusive (allows cross-traffic)	0.00	0	0		0	0	30	0.0446	0
10.03 Guideway: At-grade in mixed traffic	0.00	0	0		0	0	20	0.0612	0
10.04 Guideway: Aerial structure	0.00	0	0		0	0	80	0.0252	0
10.05 Guideway: Built-up fill	0.00	0	0		0	0	80	0.0252	0
10.06 Guideway: Underground cut & cover	0.00	0	0		0	0	125	0.0218	0
10.07 Guideway: Underground tunnel	0.00	0	0		0	0	125	0.0218	0
10.08 Guideway: Retained cut or fill	0.00	0	0		0	0	125	0.0218	0
10.09 Track: Direct fixation		0	0		0	0	30	0.0446	0
10.10 Track: Embedded		0	0		0	0	20	0.0612	0
10.11 Track: Ballasted		12,366	5,181	1,979	19,526	15,621	35	0.0400	625
10.12 Track: Special (switches, turnouts)		0	0		0	0	30	0.0446	0
10.13 Track: Vibration and noise dampening		0	0		0	0	30	0.0446	0
20 STATIONS, STOPS, TERMINALS, INTERMODAL (number)	**3**	**2,500**	**1,047**	**1,000**	**4,547**	**3,638**			**97**
20.01 At-grade station, stop, shelter, mall, terminal, platform	3	2,500	1,047	1,000	4,547	3,638	70	0.0267	97
20.02 Aerial station, stop, shelter, mall, terminal, platform	0	0	0		0	0	70	0.0267	0
20.03 Underground station, stop, shelter, mall, terminal, platform	0	0	0		0	0	125	0.0218	0
20.04 Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	0	0	0		0	0	70	0.0267	0
20.05 Joint development		0	0		0	0	70	0.0267	0
20.06 Automobile parking multi-story structure		0	0		0	0	50	0.0318	0
20.07 Elevators, escalators		0	0		0	0	30	0.0446	0
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS		**3,353**	**1,405**	**1,100**	**5,857**	**4,686**			**149**
30.01 Administration Building: Office, sales, storage, revenue counting		0	0		0	0	50	0.0318	0
30.02 Light Maintenance Facility		743	311	300	1,354	1,083	50	0.0318	34
30.03 Heavy Maintenance Facility		2,610	1,093	800	4,503	3,602	50	0.0318	115
30.04 Storage or Maintenance of Way Building		0	0		0	0	50	0.0318	0
30.05 Yard and Yard Track		0	0		0	0	80	0.0252	0
40 SITEWORK & SPECIAL CONDITIONS		**0**	**0**	**0**	**0**	**0**			**0**
40.01 Demolition, Clearing, Earthwork		0	0		0	0	125	0.0218	0
40.02 Site Utilities, Utility Relocation		0	0		0	0	125	0.0218	0
40.03 Haz. mat'l, contam'd soil removal/mitigation, ground water treatments		0	0		0	0	125	0.0218	0
40.04 Environmental mitigation, e.g. wetlands, historic/archeologic, parks		0	0		0	0	125	0.0218	0
40.05 Site structures including retaining walls, sound walls		0	0		0	0	80	0.0252	0
40.06 Pedestrian / bike access and accommodation, landscaping		0	0		0	0	20	0.0612	0
40.07 Automobile, bus, van accessways including roads, parking lots		0	0		0	0	20	0.0612	0
40.08 Temporary Facilities and other indirect costs during construction		0	0		0	0	100	0.0232	0
50 SYSTEMS		**17,324**	**7,259**	**3,000**	**27,583**	**22,066**			**985**
50.01 Train control and signals		14,618	6,125	2,500	23,243	18,594	30	0.0446	830
50.02 Traffic signals and crossing protection		2,706	1,134	500	4,340	3,472	30	0.0446	155
50.03 Traction power supply: substations		0	0		0	0	50	0.0318	0
50.04 Traction power distribution: catenary and third rail		0	0		0	0	30	0.0446	0
50.05 Communications		0	0		0	0	20	0.0612	0
50.06 Fare collection system and equipment		0	0		0	0	25	0.0512	0
50.07 Central Control		0	0		0	0	30	0.0446	0
Construction Subtotal (10 - 50)		**35,543**	**14,892**	**7,079**	**57,514**	**46,011**			**1,856**
60 ROW, LAND, EXISTING IMPROVEMENTS		**700**		**200**	**900**	**720**			**16**
60.01 Purchase or lease of real estate		700		200	900	720	125	0.0218	16
60.02 Relocation of existing households and businesses		0			0	0	125	0.0218	0
70 VEHICLES (number)	**6**	**150**		**0**	**150**	**120**			**11**
70.01 Light Rail	0	0			0	0	25	0.0512	0
70.02 Heavy Rail	0	0			0	0	25	0.0512	0
70.03 Commuter Rail	0	0			0	0	25	0.0512	0
70.04 Bus	0	0			0	0	12	0.0946	0
70.05 Other	0	0			0	0	12	0.0946	0
70.06 Non-revenue vehicles	6	150			150	120	12	0.0946	11
70.07 Spare parts	0	0			0	0	12	0.0946	0
80 PROFESSIONAL SERVICES (applies to Cats. 10-50)		**14,892**							
80.01 Project Development		7,031							
80.02 Engineering (not applicable to Small Starts)		0							
80.03 Project Management for Design and Construction		1,747							
80.04 Construction Administration & Management		4,367							
80.05 Professional Liability and other Non-Construction Insurance		873							
80.06 Legal; Permits; Review Fees by other agencies, cities, etc.		0							
80.07 Surveys, Testing, Investigation, Inspection		873							
80.08 Start up		0							
Subtotal (10 - 80)		**51,285**							
90 UNALLOCATED CONTINGENCY		**7,279**							
TOTAL		**58,564**	14,892	7,279	**58,564**	**46,851**			**1,883**

APPENDIX III: FTA RATINGS ESTIMATION TEMPLATE

Prepared by Quandel Consultants, LLC for SmithGroupJJR, Inc.
January 30, 2017

SMALL STARTS MOBILITY, COST-EFFECTIVENESS, AND CONGESTION RELIEF TEMPLATE

PROJECT NAME:	North-South Commuter Rail: Option 1

Mobility Improvements

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
1	Annual linked trips on the project with double weight for trips by transit-dependent persons	723,120	---	Travel Forecasts Template, Line 7a + 2 * Line 7b
2	Value used in rating	723,120		If a 10- or 20-year horizon is used: 50 percent * Line 1 current year value + 50 percent * Line 1 horizon year value If no horizon year is used: Line 1 current year value
		LOW		

Cost Effectiveness

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
3	Annualized Federal share of project capital cost (constant 2016 dollars)	$2,195,000	---	Source: SCC Build Annualized worksheet
4	Annual linked trips on the project	482,080	---	Travel Forecasts Template, Line 8a
5	Annualized Federal share of the project per annual linked trip on the project	$4.55	---	Line 6 / Line 5
6	Value used in rating	$4.55		If a 10- or 20-year horizon is used: 50 percent * Line 7 current year value + 50 percent * Line 7 horizon year value If no horizon year is used: Line 7 current year value
		MEDIUM-LOW		

Congestion Relief

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
7	New Weekday Linked Transit Trips	1,840	---	Travel Forecasts Template, Line 9
8	Value used in rating	1,840		If a 10- or 20-year horizon is used: 50 percent * Line 7 current year value + 50 percent * Line 7 horizon year value If no horizon year is used: Line 7 current year value
		MEDIUM-LOW		

SMALL STARTS MOBILITY, COST-EFFECTIVENESS, AND CONGESTION RELIEF TEMPLATE

PROJECT NAME:	North-South Commuter Rail: Option 5B

Mobility Improvements

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
1	Annual linked trips on the project with double weight for trips by transit-dependent persons	658,668	---	Travel Forecasts Template, Line 7a + 2 * Line 7b
2	Value used in rating	658,668		If a 10- or 20-year horizon is used: 50 percent * Line 1 current year value + 50 percent * Line 1 horizon year value If no horizon year is used: Line 1 current year value
		LOW		

Cost Effectiveness

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
3	Annualized Federal share of project capital cost (constant 2016 dollars)	$1,177,000	---	Source: SCC Build Annualized worksheet
4	Annual linked trips on the project	439,112	---	Travel Forecasts Template, Line 8a
5	Annualized Federal share of the project per annual linked trip on the project	$2.68	---	Line 6 / Line 5
6	Value used in rating	$2.68		If a 10- or 20-year horizon is used: 50 percent * Line 7 current year value + 50 percent * Line 7 horizon year value If no horizon year is used: Line 7 current year value
		MEDIUM		

Congestion Relief

Line	Item	Values		Source/Calculation
		Current Year (2016)	Horizon (None)	
7	New Weekday Linked Transit Trips	0	---	Travel Forecasts Template, Line 9
8	Value used in rating	0		If a 10- or 20-year horizon is used: 50 percent * Line 7 current year value + 50 percent * Line 7 horizon year value If no horizon year is used: Line 7 current year value