Appendix H: Infrastructure Report

MACTEC, INC.

Eisenhower West Industrial Land Use Study
City of Alexandria, Virginia
Draft

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INTRODUCTION

The Eisenhower West Industrial Land Use Study compares economic and environmental conditions of existing industrial uses and the proposed redevelopment alternatives. The site is located in Van Dorn Street Metro Station area in particularly along the Norfolk Southern railroad and Van Dorn Street. The study area consisted of Vulcan Materials, Virginia Paving, Norfolk Southern Ethanol Transloading Facility and Covanta Energy from Waste (EFW) Facility. The total site area totals approximately 49.5 acres with 17.7 acres for Vulcan Materials, 11.3 acres for Virginia Paving, 14.2 acres for Norfolk Southern Ethanol Transloading Facility, 6.3 acres for Covanta EFW Facility.

The intent of this infrastructure analysis is to provide preliminary economic costs for infrastructure that may be required for redeveloping the properties. Four hypothetical development futures were studied for the project area that included various levels of redeveloping the site. The findings of our infrastructure analysis have been provided at the end of this Technical Memorandum.

STUDY AREAS

As part of the analysis for the four hypothetical development futures, the four properties were studied to determine the areas that were available for development. A breakdown of the property areas is shown below:

Figure 1- Study Area
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Vulcan Materials – Total Area of 17.7 acres – Developable Area of 10.6 acres

Figure 2 – Vulcan Material
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Virginia Paving – Total Area of 11.3 acres – Developable Area of 3.7 acres

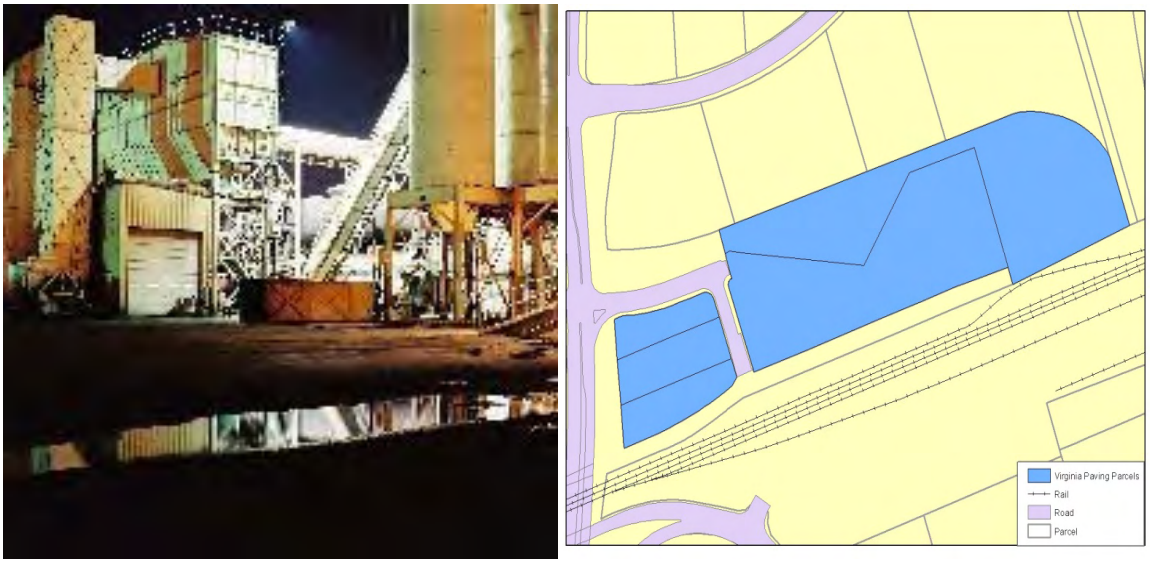


Figure 3- Virginia Paving Company
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Norfolk Southern – Total Area of 14.2 acres – Developable Area of 5.1 acres

Figure 4- Norfolk Southern Ethanol Transloading Facility
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Covanta EFW Facility – Total Area of 6.3 acres – Developable Area of 3.8 acres

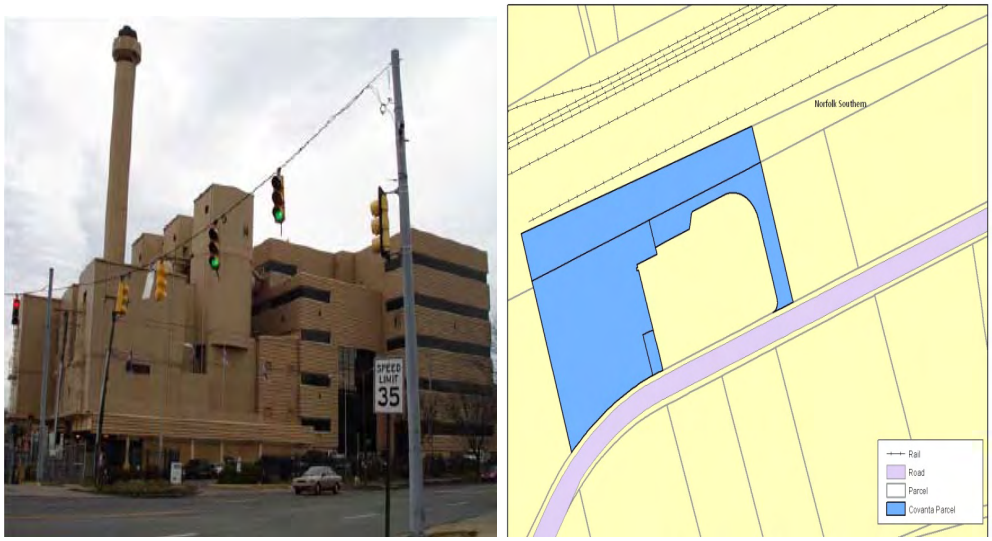


Figure 5- Covanta Energy From Waste (EFW) Facility
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Items that affected developable area included flood plains and buffers.

Alternative A – Baseline: The baseline redevelopment scenario consisted of 50 units per acre for the developable portions of Vulcan Materials and Virginia Paving. This resulted in a developable area of approximately 14.3 acres. The Covanta EFW and the Norfolk Southern site would be developed into 1.1 million square feet of office space over a developable area of approximately 8.9 acres. The total development will provide for 714 residential units, 1.1 million square feet of office space and 50,000 square feet of retail space.

Alternative B – Development with Park: This redevelopment scenario consists of maintaining the assumptions of Alternative A except that Virginia Paving will be developed into a park and open space. This will result in the same amount of office and retail space but will reduce the residential units from 714 to 530 units.

Alternative C – Retain Existing Industrial Uses South of the Rail Line: This redevelopment scenario keeps the Covanta EFW Facility in place due to its benefits to the City of Alexandria. As a result, the development potential for the Norfolk Southern property is diminished. This will result in no office space for redevelopment, 40,000 square feet of retail space and 714 residential units.

Alternative D –Same as Alternative A with a Bridge Over the Freight Line Rails Included: This scenario includes a bridge over the rail lines to better connect the sites. This will result in a higher density for residential from 714 units to 1,121 units (90 units per acre), reduces the office space to 600,000 square feet and retail will remain the same at 50,000 square feet. The cost of the bridge has been estimated at $25,000,000.

METHODOLOGY OF INFRASTRUCTURE ANALYSIS

The infrastructure analysis consisted of determining possible costs for infrastructure installation for water, sewer, stormwater, street and parks. The entire analysis was based on existing GIS information provided by the City of Alexandria, design guidelines provided by collaborating with city staff and on general design assumptions based on standard construction practices or from actual costs generated from similar projects. RS Means Costworks 2009 version (1st Quarter) was used to determine a basis of costs.

Based on the information provided by the City and standard infrastructure design practices, assumptions were made as to what infrastructure requirements would be for the new development. All of these assumptions and criteria used are at a preliminary level of design to help provide a preliminary order of magnitude for the opinion of probable costs. More refined and detailed costing analyses will need to be

prepared as master planning and schematic design of the proposed redevelopment scenario is completed. Assumptions that were made are as follows:

1. A standard block size of 330 feet with 10-foot sidewalks was used in the model. A layout showing the blocks is included in the appendix of this report.

2. All streets are 22 feet wide with 11-foot lanes. A road structure of 1" of granular sub base, 4" aggregate base, 6" asphalt paving base coat, 2" asphalt paving wearing coat and gutter of 6" x 6" x 24" was used to determine costs for roads.

3. A sidewalk structure of 4" aggregate base and 8" of concrete was used to determine the costs for sidewalks.

4. Sanitary sewer was estimated at 36" trunk lines with manholes spaced 300 feet apart at a depth of 8 to 12 feet. Excavation costs were estimated to be an additional 25% to the costs of materials and installation.

5. Storm sewer lines were estimated at 36" reinforced concrete pipe with manholes at a depth of 8 to 12 feet. Excavation costs were estimated to be an additional 25% to the costs of materials and installation.

6. Stormwater Detention: Detention ponds were estimated to cost in the range of $50,000 to $100,000 each. Underground detention systems were estimated to cost in the range of $100,000 to $750,000. These prices are based on actual costs from other development projects.

7. Water lines were estimated at 8" ductile iron pipe. Excavation costs were estimated to be an additional 25% to the costs of materials and installation. All water lines for each area were assumed to be on a loop system tying into water mains on Van Dorn Street. There was no information on existing water main pressures to determine if water mains serving the area will be able to service the redevelopment or if they will have to be upgraded.

8. Fire hydrants were estimated to be placed 300 feet apart.

9. Traffic signals were estimated at a cost of $150,000 based on costs from previous projects.

10. The cost of greenspace for parks was estimated on a per acre basis from costs from recent park projects. This price includes parking, restrooms, trails, benches, playgrounds and information kiosks.

11. Electrical costs shown in the analysis consist of basic electrical services that the local utility provider will not include to bring electrical service into the site along street rights-of-way.

12. Grading Costs are based on mass grading the entire site. Since there are no major topographic changes across the sites, grading quantities were estimated using removal of the top 6 inches of soil.

All costs are based on 2009 prices and do not take into account escalation of prices for the year 2025. Also, the analysis allows for a 20% contingency and a minimum of 15% for design.

RESULTS AND CONCLUSIONS

The results of the infrastructure analysis are as follows:

Table 1 – Summary of Preliminary Opinion of Infrastructure Costs

Development Scenario	Estimated Probable Cost
Alternative A - Baseline	$8,640,044
Alternative B – Development with Park	$9,420,528
Alternative C – Retain Existing Industrial Uses South of the Rail Line	$4,328,461
Alternative D – Same as Alternative A with a Bridge Over the Freight Line Rails	$42,390,044

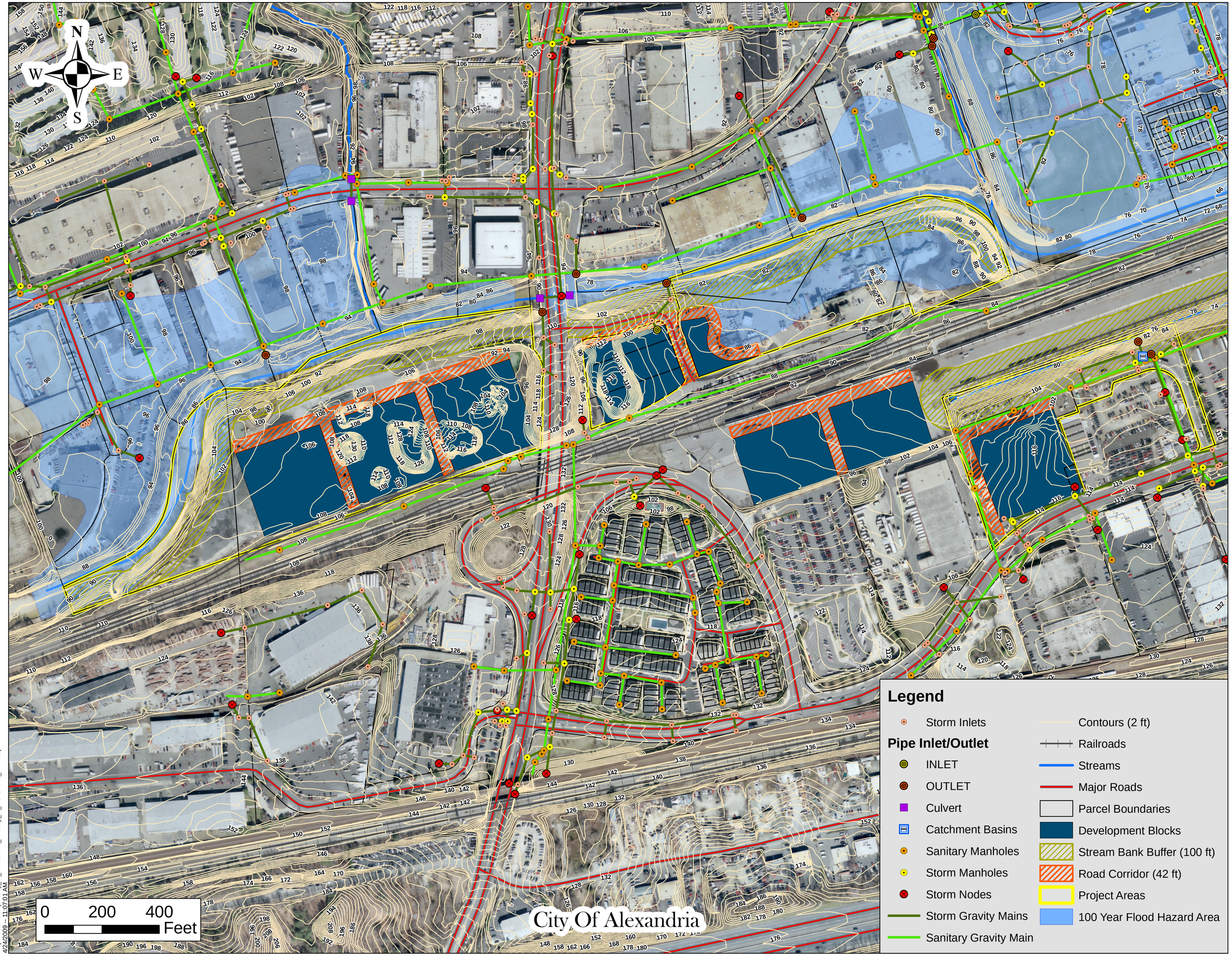
More detailed preliminary estimates of probable costs are included in the appendices along with figures and calculations used to determine preliminary stormwater detention requirements.

Based on the results of this very preliminary infrastructure analysis, it is recommended that if it is decided to proceed with a redevelopment of the properties more extensive studies of the actual conditions of the infrastructure as well as a more detail master plan for the infrastructure should be completed. This will allow for a more detailed opinion of probable costs for the installation of the infrastructure to meet the demands of redevelopment and allow for budget planning implementing providing adequate infrastructure for redevelopment.

Sincerely,

MACTEC ENGINEERING AND CONSULTING, INC.

APPENDIX A



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APPENDIX B

DRAFT

CITY OF ALEXANDRIA EISENHOWER WEST
PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST
ALTERNATIVE A

Parcel	Grading (SY)	Cost of Grading	Roads (LF of 22 ft road)	Cost of Roads	Sidewalks (LF)	Cost Of Sidewalks	Traffic Signals (Unit)	Cost of Traffic Signals	Sanitary Pipe (LF)	Cost of Sanitary Pipe	Sanitary Manholes (unit)	Cost of Sanitary Manholes	Storm Pipe (LF)	Cost of Storm Pipe	Catch Basins (unit)	Cost of Catch Basins	Storm Manholes (unit)	Cost of Storm Inlet Structure	Water Pipe (LF)	Cost of Water Pipe	Butterfly Valves & Connections (unit)	Water Butterfly Valves & Connections	Fire Hydrant Assembly	Cost for Fire Hydrant Assembly	Electrical Service	Cost of Electrical Service	Storm Detention	Cost of Storm Detention
Vulcan Materials	51,180	$ 190,900	1,800	$ 226,998	3,280	$ 34,932	3	$ 450,000	1,970	$ 270,993	13	$ 41,600	1,272	$ 174,976	24	$ 8,214	25	$ 39,200	3,270	$ 321,278	22	$ 243,705	7	$ 17,570	1	$ 10,000	1	$ 100,000
Virginia Paving	17,748	$ 66,199	1,220	$ 153,854	2,440	$ 25,986	2	$ 300,000	1,130	$ 155,443	10	$ 32,000	15	$ 2,063	18	$ 34,385	18	$ 28,224	1,270	$ 124,778	12	$ 132,930	4	$ 10,040	1	$ 10,000	0	$ -
Norfolk Southern	24,851	$ 92,694	1,010	$ 127,371	2,020	$ 21,513	2	$ 300,000	1,580	$ 217,345	10	$ 32,000	1,840	$ 253,110	23	$ 43,936	24	$ 37,632	2,402	$ 235,997	14	$ 155,085	6	$ 15,060	1	$ 10,000	1	$ 100,000
Covanta	18,454	$ 68,834	720	$ 90,799	1,440	$ 15,336	1	$ 150,000	670	$ 92,165	6	$ 19,200	840	$ 115,550	10	$ 19,103	11	$ 17,248	1,070	$ 105,128	8	$ 88,620	4	$ 10,040	1	$ 10,000	1	$ 750,000
TOTALS	**112,232**	**$ 418,627**	**4,750**	**$ 599,023**	**9,180**	**$ 97,767**	**8**	**$ 1,200,000**	**5,350**	**$ 735,946**	**39**	**$ 124,800**	**3,967**	**$ 545,701**	**75**	**$ 105,637**	**78**	**$ 122,304**	**8,012**	**$ 787,179**	**56**	**$ 620,340**	**21**	**$ 52,710**	**4**	**$ 40,000**	**3**	**$ 950,000**
SUBTOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE A																												**$ 6,400,033**
CONTIGENCY (20%)																												**$ 1,280,007**
DESIGN AND ENGINEERING (15%) Min.																												**$ 960,005**
TOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE A																												**$ 8,640,044**

NOTES:

1. Pricing is based on national averages for materials and services as provided by RS Means Costworks 2009 version (1st quarter)
2. Road Structure: 1" Granular Sub base, 4" Aggregate Base, 6" Asphalt Paving Base Coat, 2" Asphalt Paving Wear Coat with cast in place Concrete Curb & Gutter 6" x6"x 24"
3. Sidewalks : 4" Aggregate Base, 8" Concrete
4. Storm and Sanitary Manholes 8' to 12' Deep Concrete Manhole
5. Storm & Sanitary Pipe : 36" RCP
6. Water Pipe 8" Ductile Iron Pipe
7. Storm Water Detention Pond Range of Cost from 50,000 to 100,000
8. Storm Water Underground Detention: Range of Cost 100,000 to 750,000
9. Sewer and Storm Structures includes Cost + 25%, to cover excavation and Backfill
10. Water Pipe includes Cost + 25%, to cover excavation and Backfill
11. Cost do not include escalation due to inflation for construction in 2025.

Prepared By: S. Agudelo

Checked By: T. Hill

MACTEC Project Number: 3383-09-6696
5/8/2009

APPENDIX C

DRAFT

CITY OF ALEXANDRIA EISENHOWER WEST
PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST
ALTERNATIVE B

Parcel	Grading (SY)	Cost of Grading	Roads (LF of 22 ft road)	Cost of Roads	Sidewalks (LF)	Cost Of Sidewalks	Traffic Signals (Unit)	Cost of Traffic Signals	Sanitary Pipe (LF)	Cost of Sanitary Pipe	Sanitary Manholes (unit)	Cost of Sanitary Manholes	Storm Pipe (LF)	Cost of Storm Pipe	Catch Basins (unit)	Cost of Catch Basins	Storm Manholes (unit)	Cost of Storm Inlet Structure	Water Pipe (LF)	Cost of Water Pipe	Butterfly Valves & Connections (unit)	Water Butterfly Valves & Connection	Fire Hydrant Assembly	Cost for Fire Hydrant Assembly	Electrical Service	Cost of Electrical Service	Storm Detention	Cost of Storm Detention	Total Cost for Virginia Paving Open Space Park
Vulcan Materials	51,180	$ 190,900	1,800	$ 226,998	3,280	$ 34,932	3	$ 450,000	1,970	$ 270,993	13	$ 41,600	1,272	$ 174,976	24	$ 8,214	25	$ 39,200	3,270	$ 321,278	22	$ 243,705	7	$ 17,570	1	$ 10,000	1	$ 100,000	
Virginia Paving																$ -													$ 1,654,037
Norfolk Southern	24,851	$ 92,694	1,010	$ 127,371	2,020	$ 21,513	2	$ 300,000	1,580	$ 217,345	10	$ 32,000	1,840	$ 253,110	23	$ 43,936	24	$ 37,632	2,402	$ 235,997	14	$ 155,085	6	$ 15,060	1	$ 10,000	1	$ 100,000	
Covanta	18,454	$ 68,834	720	$ 90,799	1,440	$ 15,336	1	$ 150,000	670	$ 92,165	6	$ 19,200	840	$ 115,550	10	$ 19,103	11	$ 17,248	1,070	$ 105,128	8	$ 88,620	4	$ 10,040	1	$ 10,000	1	$ 750,000	
TOTALS	**94,485**	**$ 352,428**	**3,530**	**$ 445,168**	**6,740**	**$ 71,781**	**6**	**$ 900,000**	**4,220**	**$ 580,503**	**29**	**$ 92,800**	**3,952**	**$ 543,637**	**57**	**$ 71,252**	**60**	**$ 94,080**	**6,742**	**$ 662,402**	**44**	**$ 487,410**	**17**	**$ 42,670**	**3**	**$ 30,000**	**3**	**$ 950,000**	**$ 1,654,037**
SUBTOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE B																												**$ 6,978,169**	
CONTIGENCY (20%)																												**$ 1,395,634**	
DESIGN AND ENGINEERING (15%) Min.																												**$ 1,046,725**	
TOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE B																												**$ 9,420,528**	

NOTES:

1. Pricing is based on national averages for materials and services as provided by RS Means Costworks 2009 version (1st quarter)
2. Road Structure: 1" Granular Sub base, 4" Aggregate Base, 6" Asphalt Paving Base Coat, 2" Asphalt Paving Wear Coat with cast in place Concrete Curb & Gutter 6" x6"x 24"
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5. Storm & Sanitary Pipe : 36" RCP
6. Water Pipe 8" Ductile Iron Pipe
7. Storm Water Detention Pond Range of Cost from 50,000 to 100,000
8. Storm Water Underground Detention: Range of Cost 100,000 to750,000
9. Sewer and Storm Structures includes Cost + 25%, to cover excavation and Backfill
10. Water Pipe includes Cost + 25%, to cover excavation and Backfill
11. Cost do not include escalation due to inflation for construction in 2025.
11. Virginia Paving Site: Open Space Park based on actual cost per acre for other park projects (including parking, restrooms, walking trails, playground, benches, information Kiosk)

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APPENDIX D

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CITY OF ALEXANDRIA EISENHOWER WEST
PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST
ALTERNATIVE C

Parcel	Grading (SY)	Cost of Grading	Roads (LF of 22 ft road)	Cost of Roads	Sidewalks (LF)	Cost Of Sidewalks	Traffic Signals (Unit)	Cost of Traffic Signals	Sanitary Pipe (LF)	Cost of Sanitary Pipe	Sanitary Manholes (unit)	Cost of Sanitary Manholes	Storm Pipe (LF)	Cost of Storm Pipe	Catch Basins (unit)	Cost of Catch Basins	Storm Manholes (unit)	Cost of Storm Inlet Structure	Water Pipe (LF)	Cost of Water Pipe	Butterfly Valves & Connections (unit)	Water Butterfly Valves & Connections	Fire Hydrant Assembly	Cost for Fire Hydrant Assembly	Electrical Service	Cost of Electrical Service	Storm Detention	Cost of Storm Detention
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Virginia Paving	17,748	$ 66,199	1,220	$ 153,854	2,440	$ 25,986	2	$ 300,000	1,130	$ 155,443	10	$ 32,000	15	$ 2,063	18	$ 34,385	18	$ 28,224	1,270	$ 124,778	12	$ 132,930	4	$ 10,040	1	$ 10,000	0	$ -
SUBTOTALS	**68,927**	**$ 257,099**	**3,020**	**$ 380,852**	**5,720**	**$ 60,918**	**5**	**$ 750,000**	**3,100**	**$ 426,436**	**23**	**$ 73,600**	**1,287**	**$ 177,040**	**42**	**$ 42,599**	**43**	**$ 67,424**	**4,540**	**$ 446,055**	**34**	**$ 376,635**	**11**	**$ 27,610**	**2**	**$ 20,000**	**1**	**$ 100,000**
SUBTOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE C																												**$ 3,206,268**
CONTIGENCY (20%)																												**$ 641,254**
DESIGN AND ENGINEERING (15%) Min.																												**$ 480,940**
TOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE C																												**$ 4,328,461**

NOTES:

1. Pricing is based on national averages for materials and services as provided by RS Means Costworks 2009 version (1st quarter)
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3. Sidewalks : 4" Aggregate Base, 8" Concrete
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6. Water Pipe 8" Ductile Iron Pipe
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8. Storm Water Underground Detention: Range of Cost 100,000 to 750,000
9. Sewer and Storm Structures includes Cost + 25%, to cover excavation and Backfill
10. Water Pipe includes Cost + 25%, to cover excavation and Backfill
11. Cost do not include escalation due to inflation for construction in 2025.

Prepared By: S. Agudelo

Checked By: T. Hill

MACTEC Project Number: 3383-09-6696
5/8/2009

APPENDIX E

DRAFT

CITY OF ALEXANDRIA EISENHOWER WEST
PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST
ALTERNATIVE D

Parcel	Grading (SY)	Cost of Grading	Roads (LF of 22 ft road)	Cost of Roads	Sidewalks (LF)	Cost Of Sidewalks	Traffic Signals (Unit)	Cost of Traffic Signals	Sanitary Pipe (LF)	Cost of Sanitary Pipe	Sanitary Manholes (unit)	Cost of Sanitary Manholes	Storm Pipe (LF)	Cost of Storm Pipe	Catch Basins (unit)	Cost of Catch Basins	Storm Manholes (unit)	Cost of Storm Inlet Structure	Water Pipe (LF)	Cost of Water Pipe	Butterfly Valves & Connections (unit)	Water Butterfly Valves & Connection	Fire Hydrant Assembly	Cost for Fire Hydrant Assembly	Electrical Service	Cost of Electrical Service	Storm Detention	Cost of Storm Detention	Cost of Multimodal Bridge
Vulcan Materials	51,180	$ 190,900	1,800	$ 226,998	3,280	$ 34,932	3	$ 450,000	1,970	$ 270,993	13	$ 41,600	1,272	$ 174,976	24	$ 8,214	25	$ 39,200	3,270	$ 321,278	22	$ 243,705	7	$ 17,570	1	$ 10,000	1	$ 100,000	
Virginia Paving	17,748	$ 66,199	1,220	$ 153,854	2,440	$ 25,986	2	$ 300,000	1,130	$ 155,443	10	$ 32,000	15	$ 2,063	18	$ 34,385	18	$ 28,224	1,270	$ 124,778	12	$ 132,930	4	$ 10,040	1	$ 10,000	0	$ -	
Norfolk Southern	24,851	$ 92,694	1,010	$ 127,371	2,020	$ 21,513	2	$ 300,000	1,580	$ 217,345	10	$ 32,000	1,840	$ 253,110	23	$ 43,936	24	$ 37,632	2,402	$ 235,997	14	$ 155,085	6	$ 15,060	1	$ 10,000	1	$ 100,000	
Covanta	18,454	$ 68,834	720	$ 90,799	1,440	$ 15,336	1	$ 150,000	670	$ 92,165	6	$ 19,200	840	$ 115,550	10	$ 19,103	11	$ 17,248	1,070	$ 105,128	8	$ 88,620	4	$ 10,040	1	$ 10,000	1	$ 750,000	
Multimodal Bridge																													$ 25,000,000
SUBTOTALS	**112,232**	**$ 418,627**	**4,750**	**$ 599,023**	**9,180**	**$ 97,767**	**8**	**$1,200,000**	**5,350**	**$ 735,946**	**39**	**$ 124,800**	**3,967**	**$ 545,701**	**75**	**$ 105,637**	**78**	**$ 122,304**	**8,012**	**$ 787,179**	**56**	**$ 620,340**	**21**	**$ 52,710**	**4**	**$ 40,000**	**3**	**$ 950,000**	$ 25,000,000
SUBTOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE D																												**$ 31,400,033**	
CONTIGENCY (20%)																												**$ 6,280,007**	
DESIGN AND ENGINEERING (15%) Min.																												**$ 4,710,005**	
TOTAL PRELIMINARY OPINION OF PROBABLE INFRASTRUCTURE COST FOR ALTERNATIVE D																												**$ 42,390,044**	

NOTES:

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7. Storm Water Detention Pond Range of Cost from 50,000 to 100,000
8. Storm Water Underground Detention: Range of Cost 100,000 to 750,000
9. Sewer and Storm Structures includes Cost + 25%, to cover excavation and Backfill
10. Water Pipe includes Cost + 25%, to cover excavation and Backfill
11. Cost do not include escalation due to inflation for construction in 2025.
12. Adding $25.000.000 multinodal Bridge.

Prepared By: S. Agudelo

Checked By: T. Hill

MACTEC Project Number: 3383-09-6696
5/8/2009