FINAL

Alexandria Industrial Land Use Study
Volume 2: Appendices

Submitted To:
City of Alexandria City Council

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Appendix A: Summary of the Stakeholder Interview Process

This appendix contains:

1. A summary of general stakeholder themes identified through stakeholder interviews
2. A list of the stakeholders interviewed
3. A copy of the interview guide used in the stakeholder interview process

Stakeholder Themes

Purpose of the Study and Process

- Mostly glad that it is happening and interested in the results
- Some questioning of why City is spending the money on this study
- Concern about selection of stakeholders to interview and the impact it might have on study outcomes

Concerns and Issues Related to the Four Industrial Uses and Their Possible Relocation

Related to the Presence of the Industrial Uses

- Air quality and safety issues: do people know what they're breathing? Concern about school location; concern about ethanol transloading, but also acknowledgement of risks related to vehicle transport and other materials that are carried through the area by rail
- Quality of life issues: odors, dust, smells, appearance, how adjacent uses impact property values; inability to control late night trains; need for a buffer between residential and industrial uses; buffer should have been considered when area was developing with residential; need for more neighborhood-based retail
- Lack of pedestrian orientation and connectivity: limited access to Metro – distances not that far put walking is impossible; Metro station is underutilized
- Concern that City's attitude towards industrial uses in the area is too permissive, and Norfolk-Southern's decision-making for locating the ethanol transloading operation here may have taken it into account

Related to Redevelopment

- Industry has a place in the City: Importance of City's self-sufficiency (especially related to being able to handle their own waste); need to retain industry to be a real city; the uses under study are all things a city needs; City has no policy for retaining industry
- Negative impacts of redevelopment; schools are over capacity; no infrastructure is in

place to support redevelopment
- Positive or neutral opinion of existing uses: no issue with current uses if emissions stay low
- Concerns on city's attitude towards business – shouldn't force out or unduly regulate lawfully operating businesses; businesses can be enticed to leave or will leave when it is in their economic interest; certain businesses are being singled out ; legislating after the fact is not fair to the industries
- Business concern over costs related to transportation, and business risks related to transportation (eg , not able to deliver product within small time window, concerns about asphalt quality if it is not delivered at the right temperature).

Other Opinions and Concerns Related to Economic and Environmental Impacts

- Fiscal impacts – both keeping industrial uses and removing them are seen as fiscally unwise
- Jobs impact: Small number of blue collar jobs under consideration not seen as a big impact given the total number of jobs in the city; concern that City is too much of a bedroom community
- SUP process for VA Paving engaged a lot of citizens and made them more aware of the industrial uses around them, lessening their tolerance for them

Vision for the Sites Under Study

- Mixed use redevelopment: residential, with sufficient retail, using station as an anchor; interest in office for fiscal impact; pedestrian oriented; diversity of retail uses; need for park land; will be ripe for development after Landmark/Van Dorn
- Interest in retaining some sort of light industry or green tech business on site.

For the Study to be Considered Fair and Unbiased, It Should:

- Acknowledge the value of all existing uses and industrial uses in general
- Consider all existing uses equally, and not target or single any out
- Bring a full diversity of opinion through random sampling or other means
- Look at all critical costs and quantify benefits of relocation
- Be a technically based study
- Consider fiscal and environmental sustainability
- Consider the importance of land use diversity
- Consider adjacencies and correspondence with existing plans
- Ask the right questions
- Allow the reader of the study to draw his or her own conclusions

Suggestions to Improve Public Outreach

- Access the community through the schools and PTA
- Reach out to a broader range of grassroots organizations, eg, garden clubs, seniors groups, Federation of Civic Associations
- Try a different approach to community interaction – perhaps town forums/open houses, blogs, or greater use of email

List of Stakeholders Interviewed

Alexandria Chamber of Commerce: Kathy Puskar, who presented CoC's official position on the study

Alexandria Federation of Civic Associations: Annabelle Fisher

Brookville Seminary Valley Civic Association: Geoff Gooddale, Susan James

City of Alexandria: Mark Jinks, Rich Baier, William Skrabak, (city attorney, budget person…)

Cameron Station Civic Association: Ingrid Sanden

Cameron Station Homeowners Association: Melinda Lyle

Covanta EFW Facility: Michael Renga, James Klecko

Eisenhower Partnership: Andres Domeyko; additional meeting with board members to discuss history of Eisenhower West area and development trends

Sumners Grove Homeowners Association: John Pecic, Zina Raye

Virginia Paving/Lane Construction Corporation: Denny Luzier, Mark Schiller, John Irvine, Mary Catherine Gibbs (attorney)

Vulcan Materials: David Riensheider, Paul Micklich, Ken Wire (McGuire Woods)

West End Business Association: Wendy Albert, John Porter (Alexandria City Public Schools)

Stakeholder Interview Guide

Part 1: Introduction to BAE and the Study

1.1. Introduction

Thanks for agreeing to sit down with us today to discuss industrial uses in the Eisenhower West area. As you know, BAE has been hired by the City to undertake a study analyzing the costs, impacts and opportunities of redeveloping the industrial uses in Eisenhower West.

As a first step in our outreach effort, my colleague and I are here today conducting separate interviews with a variety of individuals and organizations. We have just started our work, and wanted to initiate our assignment with these interviews, even though we don't yet have any findings to share.

Key points to convey:

- We want to introduce you to us and give you an opportunity to ask questions about the work we are tasked to do.
- We feel that your thoughts and opinions will be useful to us in focusing our efforts and guiding our analysis as we start this assignment.
- We want you to know that we plan to be transparent (no "black box" type of analysis, you'll know the assumptions we're using in our analysis).
- We don't know yet what the findings and conclusions of the study will be.
- Your comments will not be disclosed in our report. Let us know if we should be particularly sensitive in communicating with the city or others on any of the topics you discuss with us, and how the information should be treated.
-

We want to start by telling you briefly about the work we plan to do, then we'll walk you through a few basic questions and hear your thoughts about the topics we're studying.

1.2. The Study

The four uses to be studied are: the energy from waste facility owned and operated by Covanta, the ethanol transloading facility owned and operated by Norfolk Southern, and the Vulcan and Virginia Paving facilities. We will be working closely with another consulting firm, HDR, that will be studying the Covanta facility operations and has specific expertise in energy from waste plants. BAE's team will also include MACTEC Engineering, who will contribute to the technical analysis of environmental conditions and air quality impacts.

Our study has the following components:

1. *Costs and impacts related to the removal of industrial uses*: as part of our study, we will be a) investigating relocation requirements and cost to incent operators to relocate or cease operations; b) studying environmental conditions and estimating order-of-magnitude costs for remediation; c) evaluating the impacts of relocation and redevelopment on air quality and greenhouse gas emissions; and d) estimating economic impacts to the city and its residents of the removal of these uses.
2. *Assessing mixed use redevelopment opportunities:* we will look at the market and financial viability of redevelopment of the area. Based on a market analysis of the area, we will develop alternate redevelopment scenarios (which may include a mix of uses, retaining some industrial uses and/or creating open space), test whether the economics of the market would make these alternatives viable, and if not, assess the conditions that would need to be in place to trigger the type of redevelopment analyzed.

Other points to make about the study:

- This is not a small area plan, but rather a strategic study that gives the community, city staff and elected officials more information about the area.
- Timing: our goal is to have the study completed before Council's summer recess.
- Our scope is already defined.
- The study allows opportunities for community input. In addition to these initial stakeholder sessions, two community meetings will be scheduled and information will be available on the city's website.
- Our focus will be on the analytical tasks to be undertaken as part of the assignment. We're not experts on the past history surrounding these uses, and like to think we offer an outsider's perspective on the issue. That said, we want to understand the background that you think is important to the study, and invite you to share with us what you think is relevant.

Part 2. Interview Questions for the <u>Resident Stakeholder Groups</u>

2.1. Industrial Land Use and the Eisenhower West Area

1. This study looks at four industrial operations in the Eisenhower West area. How do these four business operations affect you? How do they affect the residents your group represents? How do they affect the city and the region?

2. In what ways do you feel that these uses currently affect the neighborhood? How would redevelopment of the industrial uses affect the area?

3. What do you see as the future for this area? What do you think would be most appropriate for the area? Why?

4. Within our scope of work, what are the issues that are most important to you? Are the aspects of these businesses and how they operate that you think we should be aware of?

2.2. The study process

1. In addition to these stakeholder meetings, we plan to have two open public meetings. Do you have any suggestions as to how we can make these meetings most productive? Are there stakeholders you think are critical to the process who we may not be aware of?

2. What criteria would you use to judge whether you think the study is balanced and fair in its assessment?

3. Are there any other topics that you wanted to discuss that we haven't yet?

Thanks for your time today and we look forward to sharing our findings with you over the coming months. Please feel free to contact us if you have any further questions or comments.

Part 2. Interview Questions for the <u>Four Businesses Under Study</u>

2.1. General Business Profile

1. In order to facilitate a comprehensive study, we would like to learn as much about your facility and your business as possible, and we want to give you the opportunity to share information about your company with us. Can you provide us with some general details about what your facility does each day? Do you service clients in the nearby area? What are your operating hours? How many people do you employ?

2. Does your company operate similar facilities elsewhere in the country?

2.2. Eisenhower West Area

1. Are there any advantages that your company gains by being located in this exact location? Is this something that could not be replicated in another area? Are there disadvantages to this location for your business?

2. How does the service you provide affect the Eisenhower West area, the rest of the city and the region?

2.3 The Study Process

1. What criteria would you use to judge whether you think the study is balanced and fair in its assessment?

2. Is there anything we haven't asked about that you would like to share with us? Is there any information about your company that you think would be important to share so that we have an accurate assessment?

3. We understand the importance of confidentiality with business information. Are there conditions under which you would be comfortable sharing your firm's employment and revenue data with us?

Thanks for your time today and we look forward to sharing our findings with you over the coming months. Please feel free to contact us if you have any further questions or comments.

Part 2. Interview Questions for <u>Business and Property Owner Organizations</u>

2.1. The Eisenhower West Area

1. This study looks at four industrial operations in the Eisenhower West area. How do these four business operations affect your members?

2. Are any of these four businesses members of your organization?

3. What would you like to tell us about the membership of your organization? How long have most of your member businesses been in existence?

4. What would you and your members like to see for the Eisenhower West area? What do you think is most appropriate for the area? Do you have any opinions about the potential redevelopment of this area?

2.2. The Study Process

1. In addition to these stakeholder meetings, we plan to have two open public meetings. Do you have any suggestions as to how we can make these meetings the most productive for you and your members? Are there stakeholders you think are critical to the process who we may not be aware of?

2. What criteria would you use to judge whether you think the study is balanced and fair in its assessment?

3. Are there any other topics that you wanted to discuss that we haven't yet?

Thanks for your time today and we look forward to sharing our findings with you over the coming months. Please feel free to contact us if you have any further questions or comments.

Part 2. Interview Questions for <u>City Staff & Elected Officials</u>

2.1. The Industrial Uses/Eisenhower West Area

1. How have you, your staff and/or your department been involved in the issues surrounding the industrial uses under study?

2. Do you have any concerns about the potential relocation of these four businesses or their cessation of activity in Alexandria will have? What about the affects of a potential redevelopment of the area?

3. What affects (positive and/or negative) do you think the uses currently have on the city and/or your constituents? What are your concerns about the current uses?

4. What would you (or your office, or your constituents) like to see for the Eisenhower West area? What do you think is most appropriate for the area

2.2. The Study Process

1. Do you have suggestions for making the public meetings effective? City council officials: Do you feel you or your office needs to maintain involvement in any aspect of the study? Is there information from your office that you think would be useful to our study? Are there stakeholders we may not have contacted that you think should be engaged in the study process?

2. What criteria would you use to judge whether you think the study is balanced and fair in its assessment?

3. Are there any other topics that you wanted to discuss that we haven't yet?

Thanks for your time today and we look forward to sharing our findings with you over the coming months. Please feel free to contact us if you have any further questions or comments.

Appendix B: Information from Norfolk Southern Corporation

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February 20, 2009

Via email and U.S. Mail

Nancy Fox, Vice President
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Dear Ms. Fox:

This letter is in response to an e-mail Norfolk Southern Railway Company's in house counsel received February 9, 2009, from Veronica Davis, an Urban Planner in the City of Alexandria's Department of Planning & Zoning, Neighborhood Planning & Community Development Division. Ms Davis' communication was followed by another e-mail from Karl Moritz, also with the City of Alexandria, inviting Norfolk Southern to participate --in a study ("Redevelopment Study") of the possible redevelopment of certain sites in the western portion of Alexandria's Eisenhower Valley, in particular the sites currently occupied by the Virginia Paving Asphalt plant, the Covanta waste-to-energy facility, the Vulcan facility and the Norfolk Southern ethanol transloading facility. According to the material we have received to date, we understand the Redevelopment Study to have two major components: (1) the costs to the City to relocate each of the listed facilities and (2) the creation of redevelopment scenarios to test whether the proposed relocations are economically feasible for the City.

As you are aware, Norfolk Southern and the City of Alexandria have been involved in litigation in two different forums concerning the presence and operation of the Norfolk Southern facility. Notwithstanding this litigation, Norfolk Southern has repeatedly and consistently attempted to work with the City to address the City's concerns. Just last fall, David Lawson, Vice President Industrial Products responded favorably to a September 24, 2008 letter from Mayor Euille, in which Mayor Euille sought to meet and discuss potential relocation of Norfolk Southern's transloading facility. Because the Mayor sought to discuss relocation, we asked that the City identify potential relocation sites over which it has control. We have not yet received a reply.

Norfolk Southern remains willing to engage in direct discussions with the City concerning possible relocation of its transloading facility, provided that the City is able to

identify another location within the City of Alexandria that is controlled by the City and that has the same transportation qualities and capacity as the Van Dorn Street Yard. We view discussion of the issues raised in the Redevelopment Study – the costs to relocate the facility and the creation of redevelopment scenarios to test whether relocation is economically feasible for the City – as premature inasmuch as the City has not yet identified a potential relocation site that is owned or controlled by the City.

Moreover, the Study seems aimed at a broader mission with regard to the Van Dorn Street rail yard than just the relocation of the ethanol transloading facility. The transloading facility occupies only a portion of a much larger rail yard which for many years has been, and continues to be, a site for several important interstate rail operations. For the past hundred years it has served as an important rail yard for the service of customers in the Alexandria area and in the recent past has served as a prime intermodal facility.

The Van Dorn Street Yard has been, and will continue for the foreseeable future to be, an important link in our interstate rail network operations. Norfolk Southern would be willing to engage in direct discussions with the City with regard to the creation of an alternative rail yard facility on Norfolk Southern rail lines within the City, provided that the City is able to identify another location within the City of Alexandria that is comparable to the Van Dorn Street Yard in both capacity and transportation qualities and that can be made available for our use.

We believe that this process, which was initiated by the Mayor, would best serve the interests of the parties. Should you have questions concerning this, please feel free to address them to me.

Sincerely,

John V. Edwards

Appendix C: Air Quality Analysis Report

Air Quality Assessment
Eisenhower West Industrial Land Use Study

June 2009

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1.0 Introduction

The air quality assessment includes six sections in addition to this Introduction. First, we summarize the air pollutant emissions from the four industrial sources in the Eisenhower West area, both from the industrial operations and related vehicle traffic. In Section 3, we compare the emissions from these four industrial sources to other emission sources in the surrounding community. Baseline air quality levels are summarized and compared to the health-based NAAQS. The fifth subsection summarizes how emissions in the Eisenhower West area will change under each redevelopment alternatives. Finally, we present a qualitative assessment of how ambient air quality levels will change under the different redevelopment alternatives.

1.1 Pollutants of Concern

The Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for common air pollutants. The USEPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible exposure levels. The NAAQS are for particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.

The USEPA also regulates Hazardous Air Pollutants (HAPs), a group of 187 chemicals such as arsenic, benzene, formaldehyde, mercury, and dioxins. Some HAPs are known or suspected to cause cancer. Other HAPs may cause respiratory effects, birth defects, and reproductive and other serious health effects.

A third group of air pollutants, primarily carbon dioxide and methane, are classified as Greenhouse Gases (GHGs). These pollutants are linked to global climate change, and the City is beginning to address GHG emissions through the Environmental Action Plan.

2.0 Baseline Emissions from Industrial Operations in the Study Area

2.1 Description of the Four Industrial Operations

The Covanta Energy-from-Waste Facility is located at 5301 Eisenhower Avenue. The waste is incinerated and the heat is converted into electricity and sold to the Dominion Virginia Power grid. The facility supplies enough electricity to power approximately 20,000 homes in Northern Virginia. The City of Alexandria and Arlington County co-own the energy-from-waste facility, which is operated under contract by Covanta Energy. In response to Clean Air Act requirements, Arlington County funded a $45 million pollution control upgrade in 2000. The retrofit dramatically lowered emissions of both criteria and hazardous air pollutants. The air pollution control equipment improvements consisted of semi-dry flue gas scrubbers injecting lime, fabric filter baghouses, a

nitrogen oxide control system, a mercury control system, and a continuous emissions monitoring (CEM) system. The facility operates under a Title V operating permit that sets emission limitations and all emissions parameters are measured continuously against those limits.

The Alexandria branch of the Virginia Paving Company produces asphalt for projects in and around the City of Alexandria and on projects such as the new Woodrow Wilson Bridge, the Springfield Interchange, I-395, and the Beltway. Hot mix asphalt is produced by heating and mixing liquid asphalt with various aggregates such as rocks, sand, and crushed recycled asphalt pavement. The City issued a revised Special Use Permit (SUP) in November of 2006. The SUP included 78 conditions to improve operational conditions at the facility, enhance environmental protection, and provide the City with the authority to enforce compliance with those conditions. The SUP includes a series of improvements to reduce total emissions from the facility. These projects address not only the emissions from the drum dryer stacks, but also fugitive emissions from material transfer areas, and emissions from diesel powered machinery.

Vulcan Materials Company operates a facility at 701 South Van Dorn Street to stockpile stone and raw materials used for development in the metropolitan area. A concrete recycling facility is also located on the site. The City amended a SUP in 1996 which sets conditions for minimizing fugitive dust emissions from the facility during loading, unloading, and storage operations. Coarse particulate emissions are generated by trucks traveling on plant roads and by wind erosion of aggregate storage piles.

Norfolk Southern Corporation's Ethanol Transloading Facility, which began operation in April 2008. The facility is located at the former Norfolk Southern intermodal terminal in the City's West End. Ethanol cannot travel in pipelines along with gasoline, because it picks up excess water and impurities. As a result, it must be transported via trucks, trains or barges. Norfolk Southern ships liquid ethanol by rail car to its facility, where the material is transloaded (off-loaded by the railroad's contractor into tanker trucks) for final delivery to gasoline tank farms in Springfield and in Fairfax City. Emissions of volatile organic compounds occur as organic vapors in "empty" cargo tanks are displaced to the atmosphere by the liquid being loaded into the tanks. Coarse particulate emissions are generated by trucks traveling on plant roads.

2.2 Criteria Air Pollutant Emissions

Exhibit 1 summarizes the criteria air pollutant emissions from the four industrial facilities in the Eisenhower West area. The Covanta facility is the largest emitter of CO, NOx, and SO2. The Virginia Paving facility is the largest emitter of particulate matter and VOC. The Vulcan Materials facility emits a small amount of particulate matter. The Norfolk Southern facility emits a small amount of VOC.

Exhibit 1 – Stationary Source Emissions from Industrial Sources in the Eisenhower West Area

Facility	Emissions in 2007 (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Covanta Energy-from-Waste Facility[1]	61.8	575.2	2.8	2.8	12.6	2.3
Virginia Paving[1]	12.9	12.5	4.4	4.4	5.2	3.9
Vulcan Materials[2]	0.0	0.0	0.3	<0.1	0.0	0.0
Norfolk Southern Transloading Facility[3]	0.0	0.0	0.0	0.0	0.0	<0.1
Total	**74.7**	**587.7**	**7.6**	**7.3**	**17.8**	**6.2**

[1] Source: http://www.deq.virginia.gov/air/emissions/inventory.html

[2] Calculated using emission factors from AP-42 Section 13.2.5 (Industrial Wind Erosion). Plant area is 11.6 acres.

[3] Calculated using emission factors from AP-42 Section 5.2 (transportation of petroleum liquids). T&ES haul permit limits facility to 20 trucks per day. Each truck holds about 8,000 gallons. Assuming operation for 5 days per week and 52 weeks per year, the maximum amount of ethanol transloaded per year is about 2 million gallons. Trucks are typically controlled with vapor recovery systems that prevent about 95% of the vapors from escaping to the atmosphere.

Criteria Air Pollutants
- CO – carbon monoxide
- NOx – oxides of nitrogen
- PM10 – particulate matter less than 10 microns in diameter
- PM2.5 – particulate matter less than 2.5 microns in diameter
- SO2 – sulfur dioxide
- VOC – volatile organic compounds

2.3 Hazardous Air Pollutant Emissions

Hazardous air pollutants (HAPs), also known as toxic air pollutants or air toxics, are those pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. The USEPA is required to control 187 hazardous air pollutants.

The industrial operations at Vulcan Materials and the Norfolk Southern transloading facility do not generate HAPs. The chemical composition of the emissions from Vulcan Materials is primarily mineral oxides and other naturally occurring crustal materials that are not classified as HAPs. The emissions from Norfolk Southern are primarily ethanol, which is not classified as a HAP.

The Covanta Energy-from-Waste facility is permitted to emit small amounts of metals (cadmium, lead, mercury), acid gases (hydrogen chloride) and organics (dioxins and furans). In response to Clean Air Act requirements, Arlington County funded a $45 million pollution control upgrade in 2000. The retrofit dramatically lowered emissions of both criteria and hazardous air pollutants. The facility achieves emission results that are in compliance with the permitted levels. Exhibit 2 shows the nine-year stack test results of the Covanta facility and compares to the EPA permitted limit. For

seven of the nine priority pollutants, the nine-year average results are greater than 90% below the allowable emissions level.

Exhibit 2 – Covanta Waste to Energy Facility- Stack Test Results through 2009

		NOx	HCL	SO2	CO	Mercury	Cadmium	Dioxins/ Furans	Lead	Particulates
		(ppmdv)	(ppmdv)	(ppmdv)	(ppmdv)	(ug/dscm)	(ug/dscm)	(ng/dscm)	(ug/dscm)	(mg/dscm)
2001	Boiler 1	183.9	2.5	1.5	44.3	0.8	0.33	1.31	3.3	0.91
	Boiler 2	183	1.13	0.8	49	0.77	0.42	3.41	2	3.15
	Boiler 3	184.3	1.74	1.3	42.5	3.8	0.38	1.74	2.5	0.66
	AVERAGE	**183.73**	**1.79**	**1.20**	**45.27**	**1.79**	**0.38**	**2.15**	**2.60**	**1.57**
2002	Boiler 1	184.8	1.2	1.6	51.6	1.2	0.24	0.41	7.2	0.72
	Boiler 2	181.7	0.7	0.5	44.1	1.6	0.17	2.4	2.4	1.2
	Boiler 3	184.2	2.3	0.8	40.5	0.69	0.23	1.2	2.5	0.93
	AVERAGE	**183.57**	**1.40**	**0.97**	**45.40**	**1.16**	**0.21**	**1.34**	**4.03**	**0.95**
2003	Boiler 1	184.2	3.99	1.5	48.1	0.79	0.15		2.1	2.81
	Boiler 2	181.1	0.71	0.7	44.3	0.45	0.18		1.3	1.06
	Boiler 3	184.1	0.79	0.3	42.4	0.52	0.19	14.2	2.4	1.48
	AVERAGE	**183.13**	**1.83**	**0.83**	**44.93**	**0.59**	**0.17**	**14.20**	**1.93**	**1.78**
2004	Boiler 1	184	1.55	6	38	0.35	0.21		2.57	0.965
	Boiler 2	181	1.23	1	49	1.56	0.247	0.578	13.0	1.80
	Boiler 3	185	1.16	1	31	1.96	0.144		3.46	1.41
	AVERAGE	**183.33**	**1.31**	**2.67**	**39.33**	**1.29**	**0.20**	**0.58**	**6.34**	**1.39**

		NOx	HCL	SO2	CO	Mercury	Cadmium	Dioxins/ Furans	Lead	Particulates
		(ppmdv)	(ppmdv)	(ppmdv)	(ppmdv)	(ug/dscm)	(ug/dscm)	(ng/dscm)	(ug/dscm)	(mg/dscm)
2005	Boiler 1	187	1.86	2	47	0.4	0.40	0.382	6.8	0.5
	Boiler 2	186	1.83	1	48	0.4	0.2		4.9	0.8
	Boiler 3	188	1.68	2	39	0.4	0.2		1.9	0.7
	AVERAGE	**187.00**	**1.79**	**1.67**	**44.67**	**0.40**	**0.27**	**0.38**	**4.53**	**0.67**
2006	Boiler 1	187	0.85	1	43	0.38	0.4		7.79	4.84
	Boiler 2	185	0.483	1	47	0.4	0.19		2.51	2.15
	Boiler 3	189	0.529	1	42	0.4	0.57	2.48	12.4	2
	AVERAGE	**187.0**	**0.62**	**1.00**	**44.00**	**0.39**	**0.39**	**2.48**	**7.57**	**3.00**
2007	Boiler 1	187	0.82	1	31	0.38	0.25		2.31	2.03
	Boiler 2	185	0.68	1	36	0.39	0.19	1.42	2.12	2.04
	Boiler 3	189	0.84	1	34	0.59	0.16		1.55	1.33
	AVERAGE	**187.0**	**0.78**	**1.00**	**33.67**	**0.46**	**0.20**	**1.42**	**1.99**	**1.80**
2008	Boiler 1	181	2.96	2	37	0.45	6.60	1.25	9.4	1.46
	Boiler 2	182	3.52	2	30	0.42	0.50		2.6	0.82
	Boiler 3	186	2.43	1	24	1.03	0.16		0.23	0.48
	AVERAGE	**183.0**	**3.0**	**1.67**	**30.3**	**0.63**	**2.4**	**1.25**	**4.1**	**0.9**

		NOx	HCL	SO2	CO	Mercury	Cadmium	Dioxins/ Furans	Lead	Particulates
		(ppmdv)	(ppmdv)	(ppmdv)	(ppmdv)	(ug/dscm)	(ug/dscm)	(ng/dscm)	(ug/dscm)	(mg/dscm)
2009	Boiler 1	159	1.40	2	28	0.184	0.191		2.260	0.483
	Boiler 2	158	2.12	1	25	0.271	0.143		0.894	0.068
	Boiler 3	163	3.53	11	29	0.198	0.256	1.54	3.030	0.155
	AVERAGE	**160**	**2.35**	**1.33**	**27.33**	**0.22**	**0.20**	**1.54**	**2.061**	**0.235**
	EPA EMISSIONS LIMIT	**205**	**29**	**29**	**100**	**80**	**40**	**30**	**440**	**27**
	Percent Below Limit for 2009 Results	**22.0%**	**91.9%**	**95.4%**	**72.7%**	**99.7%**	**99.5%**	**94.9%**	**99.5%**	**99.1%**
	9-Year Average Stack Test Results	**182**	**1.65**	**1.37**	**39.43**	**0.77**	**0.49**	**2.82**	**3.91**	**1.37**
	Percent Below Limit for 9-Yr Avg. Results	**11.2%**	**94.3%**	**95.3%**	**60.6%**	**99.0%**	**98.8%**	**90.6%**	**99.1%**	**94.9$**

Source: Covanta, 2009; BAE, 2009.

Virginia Paving is permitted to combust distillate oil, recycled fuel oil, and natural gas. The recycled fuel oil contains small amounts of arsenic, cadmium, chromium, lead, PCBs, and halogens. Virginia Paving is required to obtain a certification from the recycled/used oil supplier, including sampling and analysis representative of each shipment purchased, to ensure that the levels of these chemicals meet specifications designed to protect human health.

2.4 Greenhouse Gas Emissions

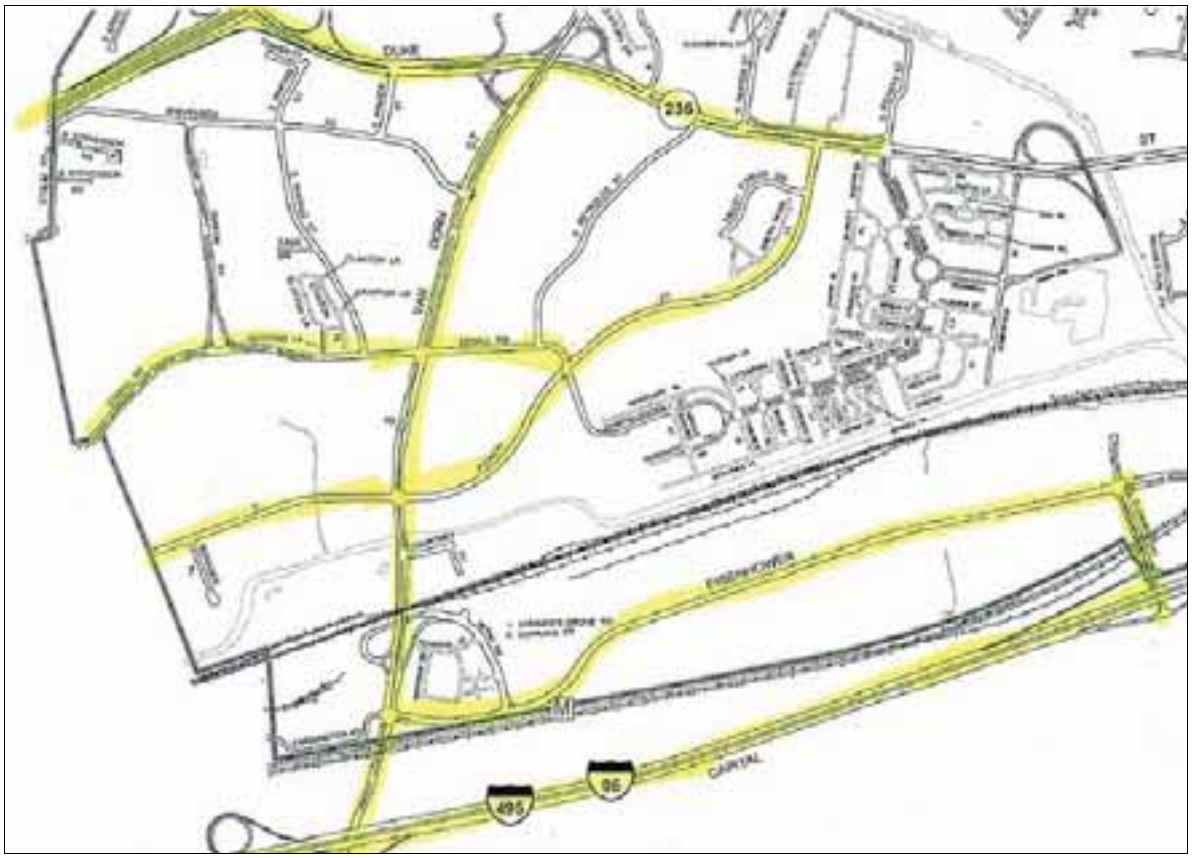
The industrial operations at Vulcan Materials and the Norfolk Southern transloading facility do not generate GHGs. The Virginia Paving facility generates a small amount of GHGs from the combustion of distillate oil, recycled oil, and natural gas. Although the Covanta energy-from-waste facility generates GHGs, disposing of solid waste at the facility helps prevent climate change in several ways: (1) the facility avoids methane production that would occur if the trash was sent directly to a landfill; (2) the facility generates cleaner energy and reduces the amount of electricity generated from fossil fuels; and (3) by recovering steel from the waste stream, the facility reduces the quantity of fossil fuels and energy used for mining and manufacturing raw materials. It is estimated that for every ton of trash combusted, nearly one ton less of carbon dioxide equivalent is released into the air due to avoided methane from land disposal, fossil fuel power generation, and metals productions.

3.0 Baseline Emissions from Vehicles in the Study Area

We evaluated emissions from vehicle traffic in the Eisenhower West area. Emissions were calculated for vehicle traffic associated with the industrial operations as well as emissions from all types of vehicle traffic.

The study area boundaries for the purposes of the emissions analysis are shown in Exhibit 3 (note that portions of I-395 and I-95/I-495 in Fairfax County are not shown on the map). The southern boundary is the segment of the Capital Beltway from Clermont Avenue to I-395/I-495/I-95 Springfield Interchange. The western boundary is the segment of I-395 from the Springfield Interchange to Route 236/Duke Street. The northern boundary is Duke Street from I-395 to North Pickett Street. The eastern boundary is the line connecting the Duke Street/North Pickett intersection and the Clermont Avenue/Capital Beltway Interchange. Included in the study area are South Van Dorn Street, South Pickett Street, and Edsall Road.

Exhibit 3 – Roadways Included in Eisenhower West Area



3.1 General Public Traffic Data

The Virginia Department of Transportation (VDOT) operates a Traffic Monitoring System and produces a number of reports of vehicle traffic on the public roads of Virginia. For the roadways in the study area, we obtained the 2007 annual average daily traffic (AADT) and link length for the major roadway segments in the study area. We calculated the annual vehicle miles travelled (VMT) on each segment using the following equation:

*Annual VMT (miles/year) = AADT (vehicles/day) * Link Length (miles) * 365 days/year*

A summary of the traffic data from all vehicles is shown in Exhibit 4.

Exhibit 4 – 2007 Traffic Data for All Vehicles on Major Roadways in the Eisenhower West Area

Route Alias	Link Length	Start Label	End Label	AADT	Annual VMT
Capital Beltway NB	1.54	29-613 Van Dorn St	Eisenhower Ave Connector	74,000	41,595,399
Capital Beltway SB	1.20	29-613 Van Dorn St	Eisenhower Ave Connector	64,000	28,032,001
Capital Beltway NB	0.96	I-495	29-613 Van Dorn St	78,000	27,331,199
Capital Beltway SB	1.22	I-495	29-613 Van Dorn St	68,000	30,280,401
I-395 NB	1.11	I-495 Capital Beltway	29-648 Edsall Rd	74,000	29,981,100
I-395 NB	0.91	29-648 Edsall Rd	Reversible Lane Ramps	75,000	24,911,251
I-395 NB	0.51	Reversible Ramps	WCL Alexandria	76,000	14,147,400
I-395 NB	0.21	Fairfax County Line	SR 236 Duke St	76,000	5,825,400
I-395 SB	1.01	I-495 Capital Beltway	29-648 Edsall Rd	68,000	25,068,200
I-395 SB	0.69	29-648 Edsall Rd	Reversible Lane Ramps	71,000	17,881,350
I-395 SB	0.42	ReversibleRamps	WCL Alexandria	79,000	12,110,700
I-395 SB	0.71	Fairfax County Line	SR 236 Duke St	79,000	20,472,849
I-395 Reversable	2.83	I-495 Capital Beltway	SR 236 Duke St	29,000	29,955,550
Duke St	0.32	I-395	SR 401 Van Dorn St	67,000	7,825,600
Duke St	0.36	SR 401 Van Dorn St	N Pickett St	42,000	5,518,800
Clermont Ave	0.13	I 95 Ramps	100-6588 Eisenhower Ave	16,000	759,200
Eisenhower Ave	1.14	SR 401 Van Dorn St	Clermont Ave	14,000	5,825,400
Van Dorn St	0.59	I-95; I-495	SCL Alexandria; SR 401;	47,000	10,121,450
Van Dorn St	0.62	SCL Alexandria	Edsall Rd	54,000	12,220,200
Van Dorn St	0.43	Edsall Rd	SR 236 Duke St	37,000	5,807,150
Edsall Rd	0.30	I-395	29-2606 Beryl Rd	30,000	3,285,000
Edsall Rd	1.08	29-2606 Beryl Rd	WCL Alexandria	18,000	7,095,600
Edsall Rd	0.49	WCL Alexandria	Van Dorn St	16,000	2,861,600
Edsall Rd	0.24	Van Dorn St	S Pickett St	11,000	963,600
S Pickett St	0.28	SR 401 Van Dorn St	Dead End	5,900	611,790
S Pickett St	0.36	Van Dorn St	Edsall Rd	12,000	1,576,800
S Pickett St	0.57	Edsall Rd	SR 236 Duke St	16,000	3,328,800
					375,393,790

AADT = Annual Average Daily Traffic (# of vehicles)
VMT = vehicle miles travelled
Data Source: http://virginiadot.org/info/ct-TrafficCounts.asp ; AADT_100_Alexandria_2007.xls and AADT_029_Fairfax_2007.xls

3.2 Industrial Operations Traffic Data

Next, we estimated the truck traffic associated with the four industrial sources. The data used and assumptions made are summarized as follows:

- Covanta. Mr. Michael Renga of Covanta provided the following information on truck traffic associated with Covanta operations. There are about 100-150 refuse trucks per day on weekdays and 30-50 trucks on Saturdays. There are also 10-12 ash hauling trucks per day

and 2-3 ferrous metal hauling trucks per day. Covanta could not provide information on the normal truck routing patterns. We assumed that truck traffic would be allocated to four major routes: from the NW from the Landmark area via Duke Street and S. Van Dorn Street to/from Covanta; from the NE from Duke Street via S. Pickett Street and S. Van Dorn Street; from the SE from Clermont Avenue via Eisenhower Avenue; and from the SW from the Springfield Interchange via the Capital Beltway and S. Van Dorn Street. The annual VMT was estimated to be 144,144 miles.

- Virginia Paving. According to the SUP 2005-0042, there are 20 trucks in its fleet, and 20 trucks operated by independent companies that haul asphalt from its plant. Supporting information for SUP 2005-0042 indicates that the average truck traffic is 292 vehicles per day. We assumed that the facility operates a maximum of 5 days per week and 52 weeks per year, for a total of 260 days per year. We also assumed that the trucks travel to and from various construction sites using South Van Dorn Street and the Capital Beltway. We assumed that half of the trucks will travel from on the Beltway towards the Woodrow Wilson Bridge and the other half will travel on the Beltway towards the Springfield Interchange. The round trip distance traveled within the Eisenhower West study area is about 3.92 and 3.36 miles, respectively. This results in annual VMT of 276,349 miles.
- Vulcan Materials. In SUP 95-0019, the company estimated the average truck loads per day to be between 48 and 60. We used the worst case of 60 trucks per day and assumed that the facility operates a maximum of 5 days per week and 52 weeks per year, for a total of 260 days per year. SUP 95-0019 also specifies that the only acceptable route from points outside the City shall be from the Capital Beltway along South Van Dorn Street. We assumed that the trucks travel to and from various construction sites using South Van Dorn Street and the Capital Beltway. We assumed that half of the trucks will travel from on the Beltway towards the Woodrow Wilson Bridge and the other half will travel on the Beltway towards the Springfield Interchange. The round trip distance traveled within the Eisenhower West study area is about 3.92 and 3.36 miles, respectively. This results in annual VMT of 56,784 miles.
- Norfolk Southern Transloading. T&ES Haul Permit TES2008-01116 specifies that hauling is limited to 20 trucks per day. We assumed that the facility operates a maximum of 5 days per week and 52 weeks per year, for a total of 260 days per year. The trucks travel to and from gasoline tank farms in Springfield and Fairfax City along South Van Dorn Street and the Capital Beltway. The round trip distance traveled within the Eisenhower West study area is about 3.36 miles. This results in annual VMT of 17,472 miles.

A summary of the truck traffic data associated with the industrial operations is shown in Exhibit 5.

Exhibit 5 – Estimated Truck Traffic Associated with the Industrial Operations

Route Alias	Link Length	Start Label	End Label	AADT	Annual VMT
Covanta					
NW Route	1.06	Leaving Covanta via S. Van Dorn to Duke St. to I-395		40	11,024
NW Route	1.06	Arriving Covanta from I-395 via Duke St. to S. Van Dorn		40	11,024
NE Route	1.24	Leaving Covanta via S. Pickett to Duke Street		40	12,896
NE Route	1.24	Arriving Covanta via from Duke Street via S. Pickett to S. Van Dorn		40	12,896
SE Route	1.27	Leaving Covanta via Eisenhower Avenue		40	13,208
SE Route	1.27	Arriving Covanta via Eisenhower Avenue		40	13,208
SW Route	3.36	Leaving Covanta via S. Van Dorn to Springfield Interchange		40	34,944
SW Route	3.36	Arriving Covanta via Springfield Interchange and S. Van Dorn		40	34,944
					144,144
Virginia Paving					
Van Dorn St SB	0.59	Vulcan Materials	Capital Beltway NB	146	22,396
Capital Beltway NB	1.54	Van Dorn St	Eisenhower Ave Connector	146	58,458
Capital Beltway SB	1.20	Eisenhower Ave Connector	Van Dorn St	146	45,552
Van Dorn St NB	0.59	Capital Beltway NB	Vulcan Materials	146	22,396
Van Dorn St SB	0.59	Vulcan Materials	Capital Beltway SB	146	22,396
Capital Beltway SB	1.22	Van Dorn St	Springfield Interchange	146	46,311
Capital Beltway NB	0.96	Springfield Interchange	Van Dorn St	146	36,442
Van Dorn St NB	0.59	Capital Beltway NB	Vulcan Materials	146	22,396
					276,349
Vulcan Materials					
Van Dorn St SB	0.59	Vulcan Materials	Capital Beltway NB	30	4,602
Capital Beltway NB	1.54	Van Dorn St	Eisenhower Ave Connector	30	12,012
Capital Beltway SB	1.20	Eisenhower Ave Connector	Van Dorn St	30	9,360
Van Dorn St NB	0.59	Capital Beltway NB	Vulcan Materials	30	4,602
Van Dorn St SB	0.59	Vulcan Materials	Capital Beltway SB	30	4,602
Capital Beltway SB	1.22	Van Dorn St	Springfield Interchange	30	9,516
Capital Beltway NB	0.96	Springfield Interchange	Van Dorn St	30	7,488
Van Dorn St NB	0.59	Capital Beltway NB	Vulcan Materials	30	4,602
					56,784
Norfolk Southern					
Van Dorn St SB	0.59	Norfolk Southern	Capital Beltway SB	20	3,068
Capital Beltway SB	1.22	Van Dorn St	Springfield Interchange	20	6,344
Capital Beltway NB	0.96	Springfield Interchange	Van Dorn St	20	4,992
Van Dorn St NB	0.59	Capital Beltway NB	Norfolk Southern	20	3,068
					17,472

AADT = Annual Average Daily Traffic (# of vehicles)

VMT = vehicle miles travelled

3.2 Criteria Air Pollutant Emissions

We used standard USEPA emission factor models to predict gram per mile emissions from vehicle traffic. We used the MOBILE6.2 model to predict emissions factors for vehicle exhaust, tire and break wear, and evaporative emissions. Inputs to the MOBILE6.2 model were obtained from the Metropolitan Washington Council of Governments. We used the emission factor equation given in AP-42 Section 13.2.1 (Paved Roads) for predicting particulate emissions of re-entrained road dust.

Exhibit 6 summarizes the criteria air pollutant emissions from the vehicle traffic in the Eisenhower West area. The truck traffic associated with the four industrial facilities accounts for only 0.13 percent of the total VMT and a small percentage of the total emissions in the study area.

Exhibit 6 – Onroad Vehicle Emissions in the Eisenhower West Area

Source	VMT	Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SO2	VOC
All Vehicles in Study Area							
All Vehicles	375,393,790	2,612	553	145	11	4	204
Truck Traffic Associated with Industrial Operations							
Covanta	144,144	0.3	1.2	1.3	0.2	<0.1	0.1
Virginia Paving	276,349	0.6	2.3	2.5	0.4	<0.1	0.1
Vulcan Materials	56,784	0.1	0.5	0.5	0.1	<0.1	<0.1
Norfolk Southern	17,472	<0.1	0.1	0.2	<0.1	<0.1	<0.1
Total	**494,749**	**1.0**	**4.2**	**4.5**	**0.7**	**<0.1**	**0.2**
Contribution from Industrial Source Vehicle Traffic	**0.13%**	**0.04%**	**0.8%**	**3.1%**	**6.3%**	**0.2%**	**0.1%**

3.3 Hazardous Air Pollutant Emissions

Motor vehicles also emit a number of HAPs, both in the exhaust gas and from fuel evaporation. The two primary HAPs emitted from motor vehicles are benzene and methyl tert-butyl ether (MTBE). The truck traffic associated with the four industrial facilities accounts for about 0.031 tons of benzene, compared to 23.2 tons of benzene from all other vehicles in the study area. The truck traffic associated with the four industrial facilities accounts for about 0.034 tons of MTBE, compared to 25.6 tons of MTBE from all other vehicles in the study area.

3.4 Greenhouse Gas Emissions

We also calculated GHG emissions from the vehicle traffic in the Eisenhower West area. The truck traffic associated with the four industrial facilities accounts for about 752 tons of CO2, compared to 216,343 tons of CO2 from all other vehicles in the study area.

4.0 Baseline Emissions in the Study Area Compared to City-Wide Emissions

The previous two sections discussed the emissions from the stationary industrial operations and associated truck traffic in the Eisenhower West area. This section compares the emissions in the study area to the emissions throughout the City of Alexandria. Emission sources into are generally grouped into four major categories, as follows:

- *Point Sources* are comprised of stationary facilities that emit pollutants above a certain threshold, from a stack, vent or similar discrete point of release. In Alexandria, the Mirant Potomac River Generating Station and the Covanta energy-from-waste plant are the top-emitting point sources.
- *Area Sources* consist of numerous small sources diffused over a wide geographical area. Area sources include sources that in and of themselves are insignificant, but in aggregate may comprise significant emissions. Examples would be emissions from small dry cleaners, gasoline stations, home heating boilers, and VOCs volatizing from house painting or consumer products.
- *Mobile Onroad Sources* include internal combustion engines used to propel cars, trucks, buses, and other vehicles on public roadways. Emissions are typically estimated using USEPA emission factor and transportation planning models. Emissions are calculated by road type, vehicle type, and fuel type.
- *Mobile Nonroad Sources* are sources of air pollution from internal combustion engines used to propel trains, airplanes, and marine vessels, or to operate equipment such as forklifts, lawn and garden equipment, portable generators, etc.

Exhibit 7 summarizes the criteria air pollutant emissions in the Eisenhower West study area and the City-wide emissions. Criteria air pollutant emissions from the four industrial sources in the Eisenhower West comprise a very small fraction of the total City-wide emissions.

Exhibit 7 – Emissions in the Eisenhower West Area Compared to City-wide Emissions

ALEXANDRIA	**Emissions (tons/yr)**					
Source Type	**CO**	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**
City of Alexandria						
Point Sources	260	2,937	113	31	3,768	27
Area Sources	1,386	548	2,276	502	543	2,144
Onroad Mobile Sources	9,314	916	26	14	21	601
Nonroad Mobile Sources	7,346	171	19	18	10	446
Total for Alexandria	**18,306**	**4,572**	**2,434**	**564**	**4,342**	**3,218**
Industrial Sources in Eisenhower West Area						
Point Sources	75	588	8	7	18	6
Onroad Mobile Sources	1	4	4	1	<0.1	<0.1
Total for Industrial Sources	**76**	**592**	**12**	**8**	**18**	**6**
Percentage of Total Emissions	**0.4%**	**12.9%**	**0.5%**	**1.4%**	**0.4%**	**0.2%**

The HAP emissions from the industrial sources likewise make up a very small fraction of the City-wide total HAP emissions. For example, the truck traffic associated with the four industrial facilities

accounts for about 0.034 tons of MTBE, compared to 25.6 tons of MTBE from all other vehicles in the study area and 129 tons City-wide. Finally, GHG emissions from the industrial sources also make up a very small fraction of the City-wide total HAP emissions. For example, the truck traffic associated with the four industrial facilities accounts for about 752 tons of CO2, compared to 216,343 tons of CO2 from all other vehicles in the study area and 1.2 million tons City-wide.

5.0 Baseline Ambient Air Quality

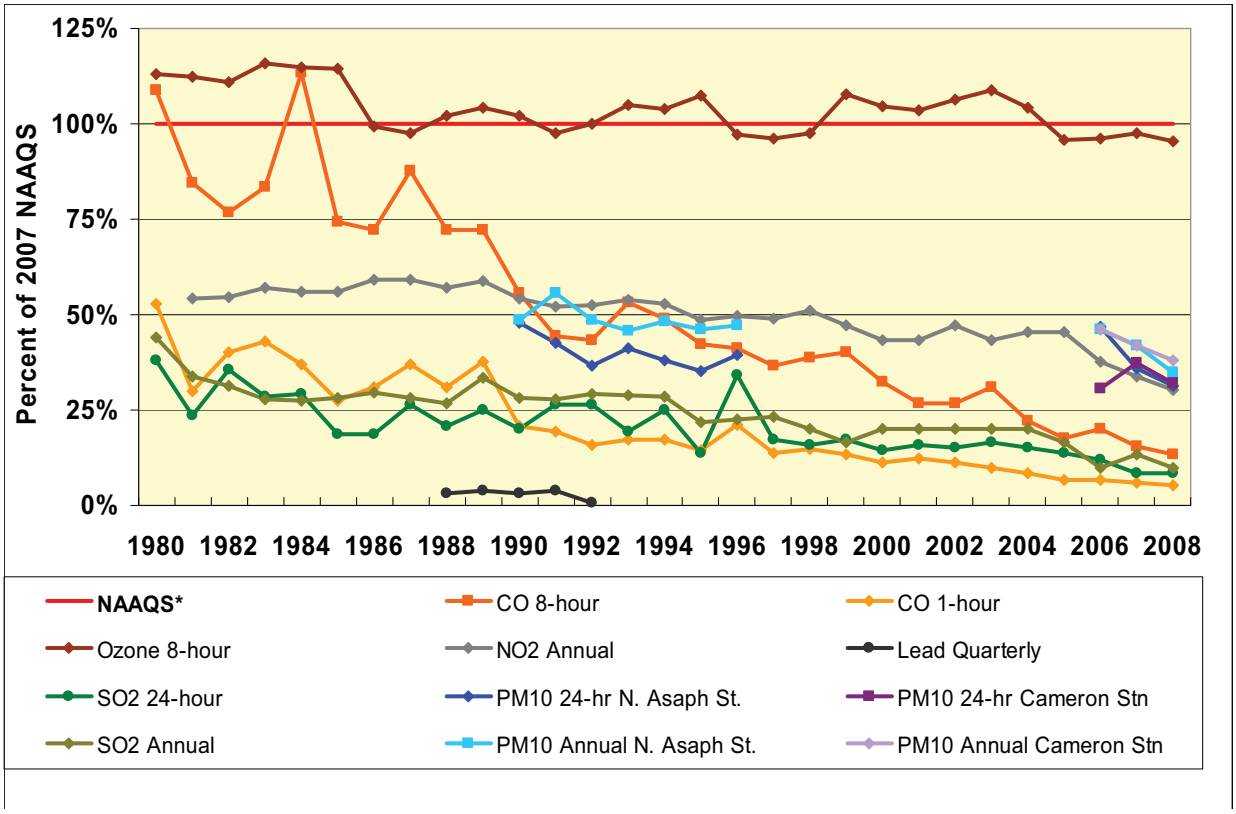
The City of Alexandria has been taking measurements of air quality for nearly 50 years. Alexandria participated in the MWCOG's Oxidant Sampling Network beginning in October, 1961. By the mid-1970s, Alexandria had one of the most sophisticated air monitoring networks in the Metropolitan area. The Office of Environmental Quality (OEQ) currently maintains and operates an ambient air monitoring station at 517 North St. Asaph Street. Carbon monoxide, sulfur dioxide, nitrogen dioxide, and particulate matter (PM_{10}) are measured year round. Ozone is continuously measured during the months of April through September. The City also began monitoring PM_{10} concentrations at a site in Cameron Station in 2006. VADEQ and Arlingon/Fairfax Counties also monitor air quality at locations near Alexandria, including sites in Annandale, Franconia, Mt. Vernon, and Seven Corners.

As shown in Exhibit 8, air quality data collected in Alexandria show that air quality has generally improved since the early 1980s. Since 2005, measured concentrations of all criteria pollutants were better than the NAAQS. Although the ozone concentrations measured in Alexandria were better than the 1997 NAAQS in 2005-2008, Alexandria is part of the Metropolitan Washington region and violations of the NAAQS have been measured at other monitors in the region. Thus, Alexandria is considered to be nonattainment for ozone under the 1997 NAAQS. The USEPA strengthened the NAAQS for ozone in 2008, effectively reducing the levels from 0.084 ppm to 0.075 ppm. Alexandria's ozone levels in 2008 exceeded the new 2008 ozone standard.

There is no VADEQ PM2.5 monitor operating in the city; however, the State operates PM2.5.monitors at nearby sites in Arlington and Fairfax that adequately characterize fine particulate air quality in the city. Mirant also monitors PM2.5 near its facility. Since Alexandria is part of the Metropolitan Washington region and violations of the NAAQS have been measured at other monitors in the region, Alexandria was initially considered to be nonattainment for PM2.5. On January 12, 2009, the USEPA determined that region has attained the 1997 annual PM2.5 NAAQS, based on air quality data for 2004 to 2008. In December 2006, USEPA revised the 24-hour NAAQS for PM2.5 from 65 to 35 µg/m3. In December 2008, USEPA determined that all of Virginia attained the revised 2006 24-hour NAAQS for PM2.5 .

The City began monitoring ambient air for particulate matter in June of 2004 at a new monitoring station located at Armistead Boothe Park, near the Samuel Tucker Elementary School in Cameron Station. The monitoring was conducted to measure the ambient air concentrations of PM10 in the air surrounding Cameron Station. Long-term monitoring at this location started in June of 2006. A comparison of the monitoring results with the NAAQS shows that the ambient PM10 concentrations at Cameron Station are well in compliance with the NAAQS. The highest 24-hour concentration measured to date was 56 µg/m3, well below the 24-hour PM10 standard of 150 µg/m3.

Exhibit 8 - Air Quality Trends in Alexandria 1980 to 2008



Notes: (1) Percent of NAAQS based on NAAQS as of Dec. 31, 2007 (does not reflect revised 2008 ozone or lead standards)

(2) Lead was monitored at Cameron Station from 1988-1992. Measured values were much better than the NAAQS. For that reason, lead monitoring was discontinued in 1992.

(3) PM_{10} monitoring in the City was conducted from 1991 to 1996, discontinued in 1997, and reinstated in 2006.

6.0 Projected Emissions for Each Alternative

Exhibit 9 summarized the redevelopment scenarios and the assumptions made regarding the anticipated changes in air pollution emissions resulting from each alternative. For the industrial stationary sources, we assumed that the emission levels would remain the same but the location of the emissions would change. For the truck traffic associated with the industrial sources, we that

industrial truck traffic in the West End would be eliminated, except for Alternative C where truck traffic for Norfolk Southern and Covanta would be unchanged from the baseline. For vehicle traffic association with new residential / retail / office development, we calculated emissions based on the likely traffic volumes generated by each type of development. Details of the emission calculation methodology and results are presented in the following paragraphs.

Exhibit 9 – Assumptions Regarding Emission Changes for Each Alternative

	2. Redevelopment Alternative			
Source Type	**4. A**	**5. B**	**6. C**	**7. D**
Industrial Stationary Sources	Virginia Paving, Vulcan Materials, Norfolk Southern emission sources relocated to Springfield Covanta EfW facility in Alexandria is closed; solid waste sent to transfer station for ultimate disposal	Virginia Paving, Vulcan Materials, Norfolk Southern emission sources relocated to Springfield Covanta EfW facility in Alexandria is closed; solid waste sent to transfer station for ultimate disposal	Virginia Paving and Vulcan Materials emission sources relocated to Springfield Norfolk Southern and Covanta EfW emission sources retained at existing site	Virginia Paving, Vulcan Materials, Norfolk Southern emission sources relocated to Springfield Covanta EfW facility in Alexandria is closed; solid waste sent to transfer station for ultimate disposal
Industrial Truck Traffic	Virginia Paving / Vulcan Materials Norfolk Southern trucks no long travel on West End roadways Covanta trash trucks travel 25 miles to transfer station; larger trucks haul waste 75 miles	Virginia Paving / Vulcan Materials Norfolk Southern trucks no long travel on West End roadways Covanta trash trucks travel 25 miles to transfer station; larger trucks haul waste 75 miles	Virginia Paving / Vulcan Materials trucks no long travel on West End roadways Norfolk Southern and Covanta trash truck traffic unchanged from current situation	Virginia Paving / Vulcan Materials Norfolk Southern trucks no long travel on West End roadways Covanta trash trucks travel 25 miles to transfer station; larger trucks haul waste 75 miles
Vehicle Traffic Associated with New Development	Residential Units 714 Office Space 1,100,000 sq.ft. Retail Space 50,000 sq.ft.	Residential Units 530 Office Space 1,100,000 sq.ft. Retail Space 50,000 sq.ft.	Residential Units 714 Office Space 0 sq.ft. Retail Space 40,000 sq.ft.	Residential Units 1,121 Office Space 600,000 sq.ft. Retail Space 50,000 sq.ft.

6.1 Estimates of New Traffic Generation by Each Redevelopment Alternative

The new residential/retail/office redevelopment in the West End will create additional vehicle traffic and emissions. We used the 7th Edition of the Institute of Transportation Engineers *Trip Generation Report* to estimate the number of trips generated by each type of redevelopment. The trip generation rates were used to calculate the average daily traffic associated with each type of type of development. For Alternative D which includes transit oriented development (TOD), recent research shows that trip rates associated with TOD development averages around one-half of the rate for non-TOD (source: Transit Cooperative Research Program, *Effects of TOD on Housing, Parking, and Travel*). For Alternative D, we reduced the trip generation rates by 50% to account for the reduced vehicle travel associated with TOD. We assumed that the distance traveled in the West End for each trip would equal the length of South Van Dorn Street from the Beltway to Duke Street (1.64 miles). We calculated the annual vehicle miles travelled (VMT) on each segment using the following equation:

*Annual VMT (miles/year) = AADT (vehicles/day) * Link Length (miles) * 365 days/year*

A summary of the traffic estimates associated with new development is shown in Exhibit 10.

Exhibit 10 – Traffic Estimates for Redevelopment Alternatives

	A	B	C	D
Residential Units	714	530	714	1,121
Office Sq. Ft.	1,100,000	1,100,000	0	600,000
Retail, Sq. Ft	50,000	50,000	40,000	50,000
Trip Generation Rates				
Residential (trips/day per unit)	7.0	7.0	7.0	3.5
Office (trips/day per 1000 Sq. Ft.)	11.0	11.0	11.0	5.5
Retail (trips/day per 1000 Sq. Ft.)	42.9	42.9	42.9	21.5
Average Daily Traffic				
Residential	4,998	3,710	4,998	3,924
Office	12,111	12,111	0	3,303
Retail	2,147	2,147	1,718	1,075
	19,256	**17,968**	**6,716**	**8,302**
Link Length (miles)				
Van Dorn - Beltway to Duke Street	1.64	1.64	1.64	1.64
Annual Vehicle Miles Traveled				
Residential	2,991,803	2,220,806	2,991,803	2,348,607
Office	7,249,645	7,249,645	0	1,977,176
Retail	1,285,194	1,285,194	1,028,155	643,495
	11,526,642	**10,755,645**	**4,019,958**	**4,969,278**

6.2 Emissions Associated with New Traffic Generation

We used standard USEPA emission factor models to predict gram per mile emissions from vehicle traffic. We used the MOBILE6.2 model to predict emissions factors for vehicle exhaust, tire and break wear, and evaporative emissions. Inputs to the MOBILE6.2 model were obtained from the Metropolitan Washington Council of Governments. We used the emission factor equation given in AP-42 Section 13.2.1 (Paved Roads) for predicting particulate emissions of re-entrained road dust.

Exhibit 11 summarizes the criteria, HAP, and GHG emissions from the vehicle traffic associated with new development in the Eisenhower West area. New traffic associated with Alternatives A and B generated roughly 2-3 times more air pollution that Alternatives C and D, depending on the pollutant. Under Alternative C, there is no new office development or associated traffic. Alternative D is the transit oriented development alternative, which generates less traffic than Alternatives A and B.

Exhibit 11 – Emission Estimates for Vehicle Traffic Associated with Redevelopment Alternatives

	Emissions (tons per yr)								
Alternative	**CO**	**NOx**	**PM-10**	**PM-2.5**	**SO2**	**VOC**	**Benzene**	**MTBE**	**CO2**
A - Residential	15.6	3.4	1.2	0.1	0.0	1.8	0.2	0.2	4,548
A - Office	37.8	8.4	2.8	0.2	0.1	4.3	0.4	0.5	11,020
A - Retail	6.7	1.5	0.5	0.0	0.0	0.8	0.1	0.1	1,954
	60.1	**13.3**	**4.4**	**0.3**	**0.1**	**6.9**	**0.7**	**0.8**	**17,522**
B - Residential	11.6	2.6	0.9	0.1	0.0	1.3	0.1	0.2	3,376
B - Office	37.8	8.4	2.8	0.2	0.1	4.3	0.4	0.5	11,020
B - Retail	6.7	1.5	0.5	0.0	0.0	0.8	0.1	0.1	1,954
	56.1	**12.4**	**4.1**	**0.3**	**0.1**	**6.5**	**0.7**	**0.7**	**16,350**
C - Residential	15.6	3.4	1.2	0.1	0.0	1.8	0.2	0.2	4,548
C - Office	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
C - Retail	5.4	1.2	0.4	0.0	0.0	0.6	0.1	0.1	1,563
	21.0	**4.6**	**1.5**	**0.1**	**0.0**	**2.4**	**0.2**	**0.3**	**6,111**
D - Residential	12.2	2.7	0.9	0.1	0.02	1.4	0.1	0.2	3,570
D - Office	10.3	2.3	0.8	0.1	0.02	1.2	0.1	0.1	3,006
D – Retail	3.4	0.7	0.2	0.0	0.01	0.4	0.0	0.0	978
	25.9	**5.7**	**1.9**	**0.1**	**0.05**	**3.0**	**0.3**	**0.3**	**7,554**

6.3 Comparison of Emission Changes for Each Redevelopment Alternative

Exhibits 12 to 15 summarize the criteria air pollutant emissions for each alternative. The top half of the charts show the emissions after redevelopment for the industrial stationary sources, the industrial vehicle traffic, and the new vehicle traffic associated redevelopment. Alternatives A, B, and D show fairly similar net decreases in emissions due to the relocation of all four industrial sources. Alternative C shows less of a reduction since Covanta will continue to operate at its current location under this alternative. HAP and GHG emissions will have the same relative changes as for criteria emissions.

Beyond the immediate Eisenhower West area, emissions from industrial operations will increase in the Springfield area due to the relocation of the Virginia Paving, Vulcan Materials, and Norfolk Southern. Emissions from the truck traffic associated with these facilities will remain the same since they will be serving the same customer base from facilities only four miles from their current locations.

Since a suitable alternative disposing of solid waste at Covanta has not been identified, it is not possible to quantify the regional change in emissions from alternative waste disposal options. If the solid waste is transferred to another energy-from-waste facility, there would be no net change from the waste combustion process. However, there would be increased emissions from the truck traffic associated with the transfer the solid waste to another facility, perhaps as far away as 120 miles. This emission increase from truck traffic will be about 88 tons per year of NOx, 15 tons per year of PM2.5, and 16,000 tons per year of CO2.

Exhibit 12 – Emission Estimates in the Study Area for Alternative A

	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Emissions in West End Study Area After Redevelopment						
Industrial Stationary Sources						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Industrial Vehicle Traffic						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Vehicle Traffic from New Residential, Retail, Office						
Residential	15.6	3.4	1.2	0.1	0.0	1.8
Office	37.8	8.4	2.8	0.2	0.1	4.3
Retail	6.7	1.5	0.5	0.0	0.0	0.8
Sub-Total	**60.1**	**13.3**	**4.4**	**0.3**	**0.1**	**6.9**
West End Total	**60.1**	**13.3**	**4.4**	**0.3**	**0.1**	**6.9**
Net Change in Emissions in West End Study Area						
Industrial Stationary Sources						
Covanta	-61.8	-575	-2.8	-2.8	-12.6	-2.3
Virginia Paving	-12.9	-12.5	-4.4	-4.4	-5.2	-3.9
Vulcan Materials	0.0	0.0	-0.3	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**-74.7**	**-588**	**-7.6**	**-7.3**	**-17.8**	**-6.2**
Industrial Vehicle Traffic						
Covanta	-0.3	-1.2	-1.3	-0.2	0.0	-0.1
Virginia Paving	-0.6	-2.3	-2.5	-0.4	0.0	-0.1
Vulcan Materials	-0.1	-0.5	-0.5	-0.1	0.0	0.0
Norfolk Southern	0.0	-0.1	-0.2	0.0	0.0	0.0
Sub-Total	**-1.0**	**-4.2**	**-4.5**	**-0.7**	**0.0**	**-0.2**
Vehicle Traffic from New Residential, Retail, Office						
Residential	15.6	3.4	1.2	0.1	0.0	1.8
Office	37.8	8.4	2.8	0.2	0.1	4.3
Retail	6.7	1.5	0.5	0.0	0.0	0.8
Sub-Total	**60.1**	**13.3**	**4.4**	**0.3**	**0.1**	**6.9**
West End Total	**-15.6**	**-579**	**-7.6**	**-7.6**	**-17.7**	**0.6**

Exhibit 13 – Emission Estimates in the Study Area for Alternative B

	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Emissions in West End Study Area After Redevelopment						
Industrial Stationary Sources						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Industrial Vehicle Traffic						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Vehicle Traffic from New Residential, Retail, Office						
Residential	11.6	2.6	0.9	0.1	0.0	1.3
Office	37.8	8.4	2.8	0.2	0.1	4.3
Retail	6.7	1.5	0.5	0.0	0.0	0.8
Sub-Total	**56.1**	**12.4**	**4.1**	**0.3**	**0.1**	**6.5**
West End Total	**56.1**	**12.4**	**4.1**	**0.3**	**0.1**	**6.5**
Net Change in Emissions in West End Study Area						
Industrial Stationary Sources						
Covanta	-61.8	-575	-2.8	-2.8	-12.6	-2.3
Virginia Paving	-12.9	-12.5	-4.4	-4.4	-5.2	-3.9
Vulcan Materials	0.0	0.0	-0.3	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**-74.7**	**-588**	**-7.6**	**-7.3**	**-17.8**	**-6.2**
Industrial Vehicle Traffic						
Covanta	-0.3	-1.2	-1.3	-0.2	0.0	-0.1
Virginia Paving	-0.6	-2.3	-2.5	-0.4	0.0	-0.1
Vulcan Materials	-0.1	-0.5	-0.5	-0.1	0.0	0.0
Norfolk Southern	0.0	-0.1	-0.2	0.0	0.0	0.0
Sub-Total	**-1.0**	**-4.2**	**-4.5**	**-0.7**	**0.0**	**-0.2**
Vehicle Traffic from New Residential, Retail, Office						
Residential	11.6	2.6	0.9	0.1	0.0	1.3
Office	37.8	8.4	2.8	0.2	0.1	4.3
Retail	6.7	1.5	0.5	0.0	0.0	0.8
Sub-Total	**56.1**	**12.4**	**4.1**	**0.3**	**0.1**	**6.5**
West End Total	**-19.6**	**-579**	**-7.9**	**-7.7**	**-17.7**	**0.1**

Exhibit 14 – Emission Estimates in the Study Area for Alternative C

	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Emissions in West End Study Area After Redevelopment						
Industrial Stationary Sources						
Covanta	61.8	575	2.8	2.8	12.6	2.3
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**61.8**	**575**	**2.8**	**2.8**	**12.6**	**2.3**
Industrial Vehicle Traffic						
Covanta	0.3	1.2	1.3	0.2	0.0	0.1
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.3**	**1.2**	**1.3**	**0.2**	**0.0**	**0.1**
Vehicle Traffic from New Residential, Retail, Office						
Residential	15.6	3.4	1.2	0.1	0.0	1.8
Office	0.0	0.0	0.0	0.0	0.0	0.0
Retail	5.4	1.2	0.4	0.0	0.0	0.6
Sub-Total	**21.0**	**4.6**	**1.5**	**0.1**	**0.0**	**2.4**
West End Total	**83.0**	**581**	**5.7**	**3.2**	**12.7**	**4.8**
Net Change in Emissions in West End Study Area						
Industrial Stationary Sources						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	-12.9	-12.5	-4.4	-4.4	-5.2	-3.9
Vulcan Materials	0.0	0.0	-0.3	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**-12.9**	**-12.5**	**-4.7**	**-4.4**	**-5.2**	**-3.9**
Industrial Vehicle Traffic						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	-0.6	-2.3	-2.5	-0.4	0.0	-0.1
Vulcan Materials	-0.1	-0.5	-0.5	-0.1	0.0	0.0
Norfolk Southern	0.0	-0.1	-0.2	0.0	0.0	0.0
Sub-Total	**-0.7**	**-3.0**	**-3.2**	**-0.5**	**0.0**	**-0.1**
Vehicle Traffic from New Residential, Retail, Office						
Residential	15.6	3.4	1.2	0.1	0.0	1.8
Office	0.0	0.0	0.0	0.0	0.0	0.0
Retail	5.4	1.2	0.4	0.0	0.0	0.6
Sub-Total	**21.0**	**4.6**	**1.5**	**0.1**	**0.0**	**2.4**
West End Total	**7.3**	**-10.8**	**-6.4**	**-4.8**	**-5.1**	**-1.6**

Exhibit 15 – Emission Estimates in the Study Area for Alternative D

	Emissions (tons/yr)					
	CO	NOx	PM10	PM2.5	SO2	VOC
Emissions in West End Study Area After Redevelopment						
Industrial Stationary Sources						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Industrial Vehicle Traffic						
Covanta	0.0	0.0	0.0	0.0	0.0	0.0
Virginia Paving	0.0	0.0	0.0	0.0	0.0	0.0
Vulcan Materials	0.0	0.0	0.0	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Vehicle Traffic from New Residential, Retail, Office						
Residential	12.2	2.7	0.9	0.1	0.0	1.4
Office	10.3	2.3	0.8	0.1	0.0	1.2
Retail	3.4	0.7	0.2	0.0	0.0	0.4
Sub-Total	**25.9**	**5.7**	**1.9**	**0.1**	**0.0**	**3.0**
West End Total	**25.9**	**5.7**	**1.9**	**0.1**	**0.0**	**3.0**
Net Change in Emissions in West End Study Area						
Industrial Stationary Sources						
Covanta	-61.8	-575	-2.8	-2.8	-12.6	-2.3
Virginia Paving	-12.9	-12.5	-4.4	-4.4	-5.2	-3.9
Vulcan Materials	0.0	0.0	-0.3	0.0	0.0	0.0
Norfolk Southern	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total	**-74.7**	**-588**	**-7.6**	**-7.3**	**-17.8**	**-6.2**
Industrial Vehicle Traffic						
Covanta	-0.3	-1.2	-1.3	-0.2	0.0	-0.1
Virginia Paving	-0.6	-2.3	-2.5	-0.4	0.0	-0.1
Vulcan Materials	-0.1	-0.5	-0.5	-0.1	0.0	0.0
Norfolk Southern	0.0	-0.1	-0.2	0.0	0.0	0.0
Sub-Total	**-1.0**	**-4.2**	**-4.5**	**-0.7**	**0.0**	**-0.2**
Vehicle Traffic from New Residential, Retail, Office						
Residential	12.2	2.7	0.9	0.1	0.0	1.4
Office	10.3	2.3	0.8	0.1	0.0	1.2
Retail	3.4	0.7	0.2	0.0	0.0	0.4
Sub-Total	**25.9**	**5.7**	**1.9**	**0.1**	**0.0**	**3.0**
West End Total	**-49.8**	**-586**	**-10.2**	**-7.8**	**-17.8**	**-3.4**

7.0 Projected Ambient Air Quality for Each Alternative

It was beyond the scope of this study to perform a quantitative air quality modeling analysis or risk assessment of each alternative. Based upon the estimated changes in emissions under each alternative, a qualitative assessment of changes in air quality was made with the following conclusions:

Alternative A. Since all four industrial facilities will be relocated outside of the Eisenhower West area, emissions in the area will be reduced and air quality in the immediate area will show a small improvement. For example, recent air quality modeling of the Virginia Paving facility shows that its annual impact on PM10 air quality in Cameron Station is less that 1 µg/m3. In comparison, the annual PM10 concentration measured in Cameron Station during 2008 was 19 $\mu g/m^3$ and the NAAQS was 50 $\mu g/m^3$. Relocating the Virginia Paving facility will improve PM10 air quality in Cameron Station by about 5 percent. Similar improvements in PM 2.5 air quality are also expected. Since the emissions from Covanta are exhausted through a 210 foot stack, its emissions are widely dispersed and relocating Covanta would result in a very small improvement in PM10 in the Eisenhower West area. There would also be increased emissions from the truck traffic associated with the transfer the solid waste to another facility, perhaps as far away as 120 miles. The emissions associated with this new truck traffic would slightly degrade air quality in the northern Virginia region. Finally, the addition of new emissions from vehicle traffic associated with new residential, retail, and office space would result in a small degradation of air quality in the Eisenhower West area.

Alternative B. This alternative is similar to Alternative A, except that the Virginia Paving site would be redeveloped as a park. The air quality impacts of Alternative B are very similar to Alternative A.

Alternative C. Since Covanta remains at its current site under this alternative, the air quality improvements in the Eisenhower West area will not be as noticeable as under the other alternatives.

Alternative D. This alternative is similar to Alternative A, except the transit oriented redevelopment will occur which will result in less new vehicle traffic in the area. Since emissions from vehicle traffic associated with new development will be less, this Alternative is the best in terms of air quality impacts in the immediate Eisenhower West area.

Appendix D: Cessation Valuation Exercise

Vulcan Materials Van Dorn Yard	
Price/Sales Ratio Methodology	
Firmwide Price/Sales Ratio as of 5/27/09	1.31
Van Dorn Yard Estimated Revenues (a)	$12,750,000
Unadjusted Value based on Price/Sales Ratio	**$16,702,500**
Enterprise Value Multiple Methodology	
Firmwide Trailing 12 Month Revenues	$3,430,000,000
EBITDA (b)	$733,420,000
EBITDA Margin (as % of Revenues)	21%
Van Dorn Yard Estimated Revenues (a)	$12,750,000
Estimated EBITDA based on firm EBITDA margin	$2,726,270
Industry Avg EV/EBITDA (c)	6.00
Estimated Enterprise Value based on firm EV/EBITDA Multiple	**$16,357,618**
Virginia Paving	
Price/Sales Ratio Methodology	
Granite Construction (GVA) (d)	
Price/Sales Ratio	0.56
Virginia Paving Van Dorn Estimated Revenues	$43,199,431
Unadjusted Value based on Comparable Firm Price/Sales Ratio	**$24,392,403**
Enterprise Value Multiple Methodology	
Firmwide Trailing 12 Month Revenues	$2,674,240,000
EBITDA (b)	$277,290,000
EBITDA Margin (as % of Revenues)	10%
Virginia Paving Van Dorn Estimated Revenues	$43,199,431
Estimated EBITDA based on firm EBITDA margin	$4,479,318
Industry Avg EV/EBITDA (c)	6.00
Estimated Enterprise Value based on firm EV/EBITDA Multiple	**$26,875,905**

Notes:
(a) Assumes 500,000 tons of aggregate sold (based on interviews with Vulcan Materials) at $25.50 per ton
(b) EBITDA = earnings before interest, taxes, depreciation, and amortization
(c) EV = Enterprise Value = Market Cap plus debt minus cash; represents theoretical takeover value
(d) This is a publicly-traded comparable in a similar business as Virginia Paving

Sources: Vulcan Materials, 2009; Virginia Paving, 2009; Yahoo! Finance, 2009; Credit Suisse First Boston 2009; BAE, 2009

Appendix E: Market Analysis

Purpose

This market analysis explores the past, current and future economic, demographic, and real estate market trends in and around the West End of Alexandria, where the four existing industrial uses are located. The analysis provides information on market opportunities and constraints that inform the potential for future redevelopment of the four existing industrial uses as mixed use, transit-oriented development. The construction of the redevelopment scenario, in its four alternatives, relied upon the long term building needs suggested by the market findings. This analysis also investigates current market conditions, such as occupancy rates and sales prices, that support the revenue assumptions used in developing the financial model that evaluates the financial viability of redevelopment.

This analysis focuses on unmet demand for office and residential space over a relatively long time frame, given the current market conditions and the large size of the site that would be available for redevelopment. The potential for new neighborhood- and transit-serving retail, also a desired component in a mixed use development, is profiled as well.

Market Area Studied

The Market Area is the geographic focus of analysis, the area in which most demand will be generated and where competing office, retail and residential development will be found. The Market Area includes the City of Alexandria, Arlington County, Fairfax County, and the cities of Fairfax and Falls Church. A secondary market area, also known as the metro area, consists of inner-ring jurisdictions of the Washington DC metropolitan area: the City of Falls Church, the City of Alexandria, Fairfax City, Fairfax County, Arlington County in Virginia, as well as Prince George's County and Montgomery County, Maryland, and Washington, D.C. In some instances there is also an analysis of the Study Area, comprising the four subject industrial uses and adjacent residential and commercial uses, consists of Census Tracts 200.401 and 200.402. Figure E-1 delineates the boundaries of the Study Area.

Figure E-1: Study Area

Source: City of Alexandria, 2009; ESRI; BAE, 2009.

Metro Area Demographic and Economic Trends

Regional Growth Forecast

Table E-1 shows the projected increases in population, employment, and households in the Metropolitan, D.C. area, published by the Metropolitan Washington Council of Governments as the Round 7.1 cooperative forecast. The forecast may not take into account the full impact of the current economic downturn; a revised cooperative forecast is expected to be approved in the second half of 2009. The forecast covers the period from 2005 to 2030. The Market Area represents roughly 30 percent of the metro area's jobs, households, and population. Following traditional national planning trends, outer-ring suburbs, such as Loudoun County, Virginia, and Frederick County, Maryland, are expected to experience the highest increase of population, employment, and households. From 2005 to 2030, there is a projected 63 percent increase in the number of households in outer Washington, D.C. suburbs.

Table E-1: Washington Region Jobs, Households, and Population: Trends and Future Forecasts, 2000-2030

Jobs	2000	2005	Change 2000-2005	Perent of Total, 2005	Forecast 2030	Change 2005-2030	Percent Change 2005-2030	Percent of Total, 2030
Market Area (a)	887,130	943,322	56,192	30.9%	1,307,156	363,834	39%	30.9%
City of Alexandria	*89,273*	*105,741*	*16,468*	*3.5%*	*141,496*	*35,755*	34%	*3.3%*
Study Area (b)	*11,726*	*11,842*	*116*	*0.4%*	*19,629*	*7,787*	66%	*0.5%*
District of Columbia	743,594	745,300	1,706	24.4%	881,420	136,120	18%	20.9%
Central Jurisdictions (c)	1,015,454	1,045,916	30,462	34.3%	1,281,365	235,449	23%	30.3%
Inner Suburbs (d)	1,427,848	1,490,591	62,743	48.9%	2,095,599	605,008	41%	49.6%
Outer Suburbs (e)	401,589	513,109	111,520	16.8%	848,389	335,280	65%	20.1%
MSA Total	**2,844,891**	**3,049,616**	**204,725**	**100%**	**4,225,353**	**1,175,737**	39%	**100%**
Population								
Market Area	1,319,323	1,411,517	92,194	28.3%	1,789,491	377,974	27%	27.2%
City of Alexandria	*128,283*	*135,854*	*7,571*	*2.7%*	*171,086*	*35,232*	26%	*2.6%*
Study Area	*16,307*	*19,240*	*2,933*	*0.4%*	*28,097*	*8,857*	46%	*0.4%*
District of Columbia	572,059	577,834	5,775	11.6%	714,057	136,223	24%	10.9%
Central Jurisdictions	890,656	912,943	22,287	18.3%	1,127,636	214,693	24%	17.1%
Inner Suburbs	2,682,121	2,867,291	185,170	57.5%	3,513,783	646,492	23%	53.4%
Outer Suburbs	979,119	1,206,662	227,543	24.2%	1,938,368	731,706	61%	29.5%
MSA Total	**4,551,896**	**4,986,896**	**435,000**	**100%**	**6,579,787**	**1,592,891**	32%	**100%**
Households								
Market Area	511,924	549,249	37,325	29.3%	704,878	155,629	28%	27.8%
City of Alexandria	*61,889*	*66,337*	*4,448*	*3.5%*	*86,950*	*20,613*	31%	*3.4%*
Study Area	*8,241*	*9,946*	*1,705*	*0.5%*	*15,270*	*5,324*	54%	*0.6%*
District of Columbia	248,338	253,615	5,277	13.5%	325,748	72,133	28%	12.9%
Central Jurisdictions	397,128	412,178	15,050	22.0%	530,505	118,327	29%	20.9%
Inner Suburbs	976,291	1,045,003	68,712	55.7%	1,319,235	274,232	26%	52.1%
Outer Suburbs	336,982	419,602	82,620	22.4%	684,184	264,582	63%	27.0%
MSA Total	**1,710,401**	**1,876,783**	**166,382**	**100%**	**2,533,924**	**657,141**	35%	**100%**

Notes:
(a) Includes the City of Alexandria, Arlington County, Fairfax County, Fairfax City, and the City of Falls Church, Virginia.
(b) Includes TAZ levels 1376, 1377, 1378, 1379, 1380, 1381, and 1382 in the City of Alexandria.
(c) Includes the District of Columbia, Arlington County, and the City of Alexandria, Virginia.
(d) Includes Montgomery County (MD), Prince George's County (MD), Fairfax County (VA), and Fairfax City (VA).
(e) Includes Frederick County (MD), Loudoun County (VA), Prince William County (VA), the City of Manassas (VA), the City of Manassas Park (VA), Stafford County (VA), Charles County (MD), and Calvert County (MD).
(f) Forecasts are from Round 7.1 Forecasts.

Source: Metropolitan Washington COG; City of Alexandria, 2009; BAE 2009.

Employment growth is expected in the market area from 2005 to 2030, growing from 943,322 jobs in 2005 to 1,307,156 jobs in 2030, and increase of about 364,000 jobs. Of the areas examined, the Study Area is projected to have the highest percentage increase in employment, growing by 66 percent, from 11,842 jobs in 2005 to 19,629 jobs in 2030. This percentage growth slightly exceeds the high growth rate of the outer ring suburbs.

Study Area Trends

Table E-2 below shows the current demographics and trends for the Study Area, the City of Alexandria, the Market Area, and the Metro DC Area. A pattern typical of more urbanized areas is present in the Study Area and Alexandria: smaller household sizes and a higher proportion of renters than suburban and fringe areas in the Metro Area. Since 1990, the median household income grew 69 percent in the Study Area. This is comparable to the Metro Area as a whole. However, income growth in the City of Alexandria was 79 percent. This provides some evidence that the Study Area has been able to attract or retain its more moderate household incomes, while quickly rising incomes in the City as a whole is likely correlated with housing values affordable to fewer households.

Household growth in the Study Area has been rapid since 1990, reflecting the development of large housing projects like Cameron Station and Summers Grove. Homeownership rates have remained fairly steady during that time period.

Commuting Patterns

According to 2000 U.S. Census data, only a small portion of workers residing in the Market Area work in the Study Area, not surprising given its small size. Sixty-three percent live in Market Area jurisdictions, with the greatest percentage, 38 percent, residing in Fairfax County. Table E-3 provides detail on the residence location for Market Area workers.

Table E-4 below presents the workplace of Market Area residents. Similarly, about 60 percent of Market Area residents work in the Northern Virginia Market Area. However, there is also a substantial commutation of residents to Washington DC, a pattern not repeated by DC residents reverse-commuting to the Northern Virginia Market Area in any substantial percentage.

Table E-2: Demographic Trends, 1990-2008

	1990	2000	2008	Annual Average Change 1990-2008
Population				
Study Area (a)	12,052	16,307	20,992	3.1%
City of Alexandria	111,183	128,283	135,581	1.1%
Market Area (b)	1,129,903	1,319,360	1,390,213	1.2%
Metro DC Area (c)	3,223,098	3,566,275	3,759,225	0.9%
Households				
Study Area	6,261	8,241	10,097	2.7%
City of Alexandria	53,280	61,889	63,965	1.0%
Market Area	435,702	511,461	537,508	1.2%
Metro DC Area	1,225,575	1,370,974	1,448,162	0.9%
Average Household Size				
Study Area	1.91	1.97	2.07	0.4%
City of Alexandria	2.04	2.04	2.09	0.1%
Market Area	2.54	2.55	2.56	0.0%
Metro DC Area	2.56	2.54	2.54	0.0%
Homeownership Rate				
Study Area	35.9%	34.4%	35.6%	
City of Alexandria	40.5%	40.0%	39.5%	
Market Area	62.7%	62.4%	61.7%	
Metro DC Area	58.0%	59.9%	60.0%	
Median Household Income (d)				
Study Area	$41,294	$54,504	$69,834	3.0%
City of Alexandria	$42,562	$57,551	$76,088	3.3%
Market Area	$54,883	$74,562	$94,362	3.1%
Metro DC Area	$47,288	$64,080	$80,550	3.0%

Notes:
(a) Includes Census Tracts 200401 and 200402 in Alexandria, Virginia.
(b) Includes the City of Alexandria, Arlington County, Fairfax County, the City of Falls Church, and Fairfax City, Virginia.
(c) Includes the City of Falls Church, the City of Alexandria, Fairfax City, Arlington County, and
Fairfax County, VA; Montgomery County, Prince George's County, MD; and the District of Columbia.
(d) Data used is sample data; it does not include the entire population.

Source: United States Census, 1990, 2000; Claritas, Inc, 2009; BAE, 2009.

Table E-3: Place of Residence for Market Area Workers, 2000

	Percent
Virginia	**80.1%**
Study Area (a)	7.3%
Northern Virginia	62.9%
City of Alexandria	*19.9%*
Arlington County	*4.7%*
Falls Church	*0.2%*
Fairfax County	*37.9%*
Fairfax City	*0.2%*
Loudoun County	0.7%
Prince William County	11.0%
Manassas City	*0.6%*
Manassas Park City	*0.0%*
Elsewhere in Virginia	4.9%
Maryland	**14.8%**
District of Columbia	**3.7%**
Other States/Abroad	**1.4%**
Total (b)	**100%**
Workers In-Commuting	**92.7%**

Notes:
(a) Includes Census Tracts 200401 and 200402 in Alexandria, Virginia.
(b) Data used is sample data.

Source: United State Census Transportation Planning Package, 2000; BAE, 2009.

Table E-4: Place of Work for Market Area Residents, 2000

	Percent
Virginia	**64.0%**
Study Area (a)	7.7%
Inside Market Area	60.7%
City of Alexandria	*21.0%*
Arlington County	*16.8%*
Falls Church	*0.4%*
Fairfax County	*21.0%*
Fairfax City	*1.4%*
Loudoun County	1.5%
Prince William County	0.9%
Manassas City	*0.0%*
Manassas Park City	*0.0%*
Elsewhere in Virginia	1.0%
Maryland	**6.8%**
District of Columbia	**28.2%**
Other States/Abroad	**1.0%**
Total (b)	**100%**
Workers Out-Commuting	**92.3%**

Notes:
(a) Includes Census Tracts 200401 and 200402 in Alexandria, Virginia.
(b) Data used is sample data.

Source: United State Census Transportation Planning Package, 2000; BAE, 2009.

Tables E-5 and E-6 below shows the mode of transportation of Market Area residents and workers. For both data sets, the results are similar: overwhelmingly, people choose to drive alone or carpool, rather than taking public transportation. A noticeable deviation from general market area commuting characteristics is in the commuting patterns of Arlington County workers: 14 percent used public transportation, compared to seven percent of Alexandria workers. The creation of more transit-oriented developments such as Carlyle in Alexandria in recent years may be shifting the modal split towards public transportation for Alexandria residents and workers since 2000.

Table E-5: Mode of Transportation of Market Area Residents Who Work Inside the Market Area, 2000

	Drove Alone		Carpooled		Public Transportation		Other		Worked from Home		Total	
Place of Work	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
City of Alexandria	37,415	71.2%	5,829	11.1%	3,677	7.0%	2,934	5.6%	2,690	5.1%	**52,545**	**100%**
Arlington County	56,850	59.6%	14,750	15.5%	13,309	13.9%	6,617	6.9%	3,890	4.1%	**95,416**	**100%**
Falls Church	4,895	75.0%	865	13.3%	201	3.1%	270	4.1%	295	4.5%	**6,526**	**100%**
Fairfax County	251,195	78.6%	29,984	9.4%	8,029	2.5%	8,553	2.7%	22,025	6.9%	**319,786**	**100%**
Fairfax City	16,515	81.0%	2,158	10.6%	629	3.1%	727	3.6%	350	1.7%	**20,379**	**100%**

Notes:
Data used is sample data.

Source: United States Census Transportation Planning Package, 2000; BAE, 2009.

Table E-6: Mode of Transportation of Market Area Workers Who Live Inside the Market Area, 2000

	Drove Alone		Carpooled		Public Transportation		Other		Worked from Home		Total	
Place of Residence	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
City of Alexandria	30,390	65.9%	5,457	11.8%	4,769	10.3%	2,787	6.0%	2,690	5.8%	**46,093**	**100%**
Arlington County	38,610	62.4%	6,342	10.2%	6,574	10.6%	6,480	10.5%	3,890	6.3%	**61,896**	**100%**
Falls Church	2,610	71.2%	325	8.9%	203	5.5%	235	6.4%	295	8.0%	**3,668**	**100%**
Fairfax County	288,480	77.1%	40,659	10.9%	13,868	3.7%	9,119	2.4%	22,025	5.9%	**374,151**	**100%**
Fairfax City	6,780	76.7%	803	9.1%	431	4.9%	480	5.4%	350	4.0%	**8,844**	**100%**

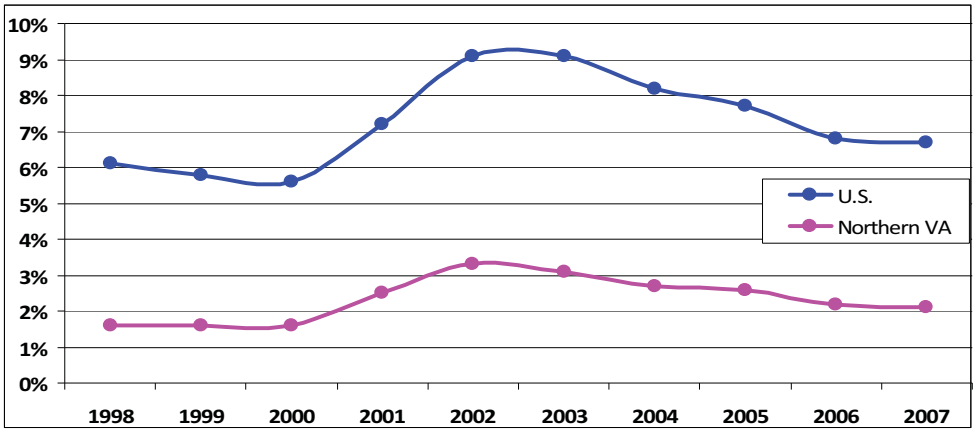
Notes:
Data used is sample data.

Source: U.S. Census Transportation Planning Package, 2000; BAE, 2009.

Employment Trends

While recognizing the cyclical nature of economic growth, and the impact that the current economic downturn has on real estate development, this market analysis focuses on a longer-term view of the regional and economic structure and employment base. Figure E-2 compares the Northern Virginia unemployment rate over a 10 year period ending in 2007 (prior to registering the employment impacts of the current economic downturn).

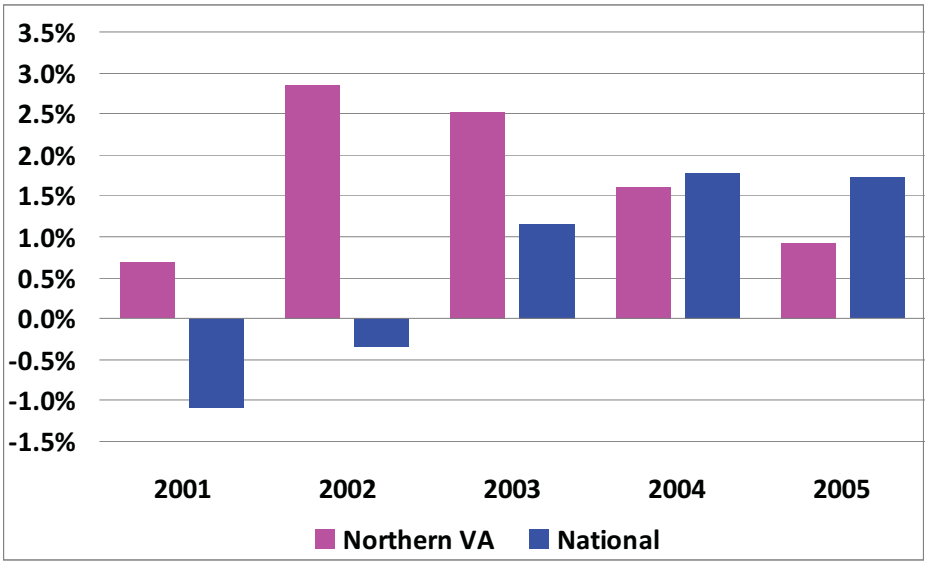
Figure E-2: Unemployment Rate, Northern Virginia & United States



Source: Virginia Employment Commission, 2009; United States Current Population Survey, 2009; BAE, 2009.

A view of the Northern Virginia job base shows a similar pattern as resident-based unemployment statistics, demonstrating the relative stability of the local economy over time. While the percentage of annual job growth did not always meet the national average in the economic expansion occurring since 2003, the area also did not shed as high a percentage of jobs during the previous economic downturn at the start of the decade. See Figure E-3.

Figure E-3: Percent Change in Employment, Northern VA and U.S., 2001-2005



Source: Virginia Employment Commission, 2009; U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages, 2009; BAE, 2009.

Real Estate Supply

Office Market Conditions

Table E-7 provides statistics on Alexandria's supply of office space in comparison to the Market Area. Alexandria currently constitutes approximately 12 percent of the Market Area office space, a share of the market area's office space that has remained relatively constant over time. Since the early part of the decade, Alexandria has regained some of the Market Area share lost in the mid to late 1990's. Construction and absorption of space in Alexandria has fluctuated widely, but Alexandria has absorbed, on average, 327,000 square feet of rentable square feet net per year. Vacancy in Alexandria office space overall is relatively healthy, at 8.5 percent, an improvement over vacancy rates in recent years.

Table E-7: Inventory of Office Space, City of Alexandria and Market Area, 1993-2008

	Market Area (a)		City of Alexandria				
Year	Total RBA	Total Buildings	Total RBA	% of Market Area RBA	Total Buildings	Total Net Absorption	Vacancy Rate, Q4
1993	119,921,591	2,470	15,038,694	12.5%	686	218,217	11.6%
1994	119,965,768	2,474	15,044,706	12.5%	688	140,951	11.0%
1995	121,192,225	2,482	15,048,423	12.4%	689	63,315	9.6%
1996	121,907,381	2,486	15,048,423	12.3%	689	182,639	9.4%
1997	122,513,344	2,493	15,291,330	12.5%	692	492,842	8.4%
1998	126,141,101	2,531	15,583,352	12.4%	696	477,489	4.9%
1999	132,854,970	2,576	15,855,440	11.9%	698	355,071	4.7%
2000	139,548,024	2,628	16,288,264	11.7%	702	10,987	6.4%
2001	146,319,151	2,676	16,483,884	11.3%	704	(403,276)	7.8%
2002	152,106,747	2,710	16,749,334	11.0%	706	278,267	9.4%
2003	153,787,287	2,720	17,372,325	11.3%	710	716,406	9.0%
2004	156,895,092	2,739	19,278,458	12.3%	714	1,414,460	7.6%
2005	158,656,042	2,750	19,611,987	12.4%	715	697,318	8.9%
2006	162,563,994	2,783	19,950,400	12.3%	719	169,092	9.5%
2007	165,865,490	2,812	19,961,942	12.0%	720	153,141	8.8%
2008	170,364,671	2,840	20,432,056	12.0%	724	266,995	8.5%

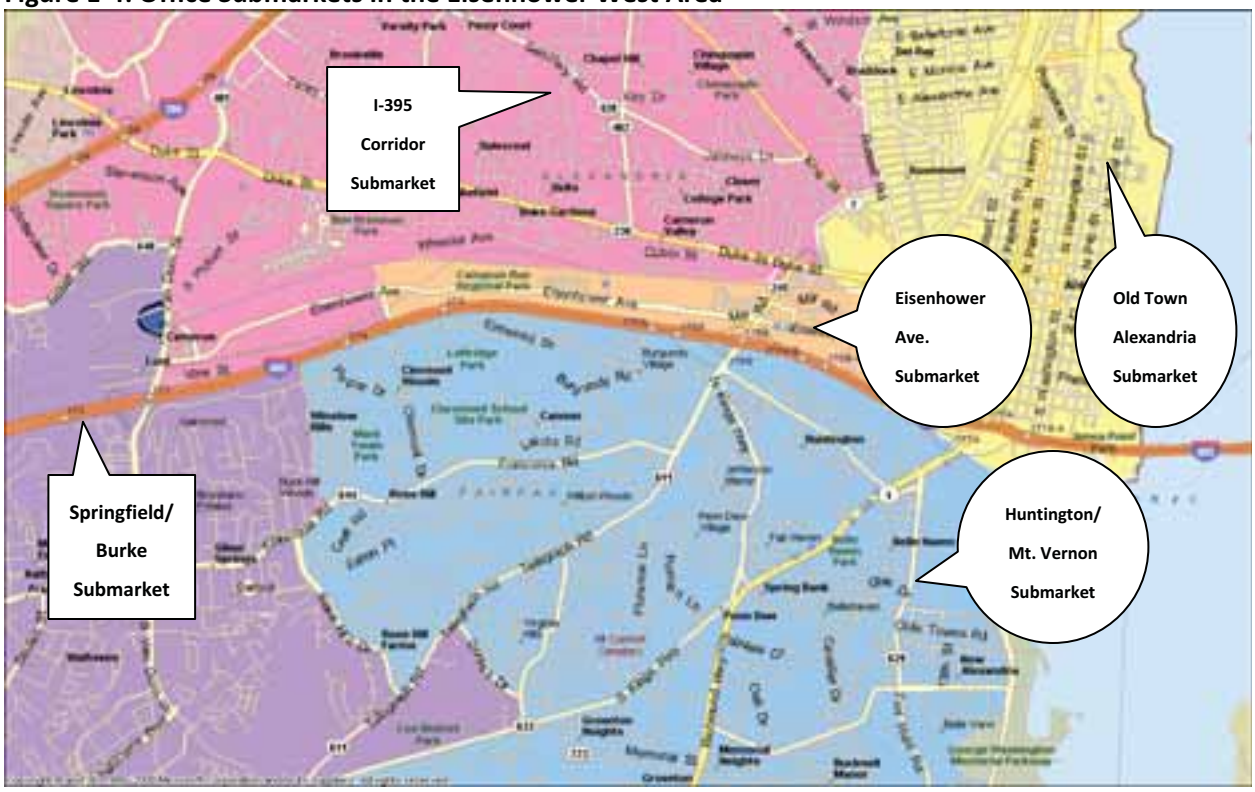
Notes:

(a) Includes the City of Alexandria, Arlington County, Fairfax County, Fairfax City, and the City of Falls Church, Virginia.

Source: CoStar, 2009; Alexandria Economic Development Partnership, 2009; BAE, 2009.

CoStar, the database of office property data, classifies local office space into several submarkets, some of which extend beyond Alexandria's borders. The Study Area is located at the western edge of the Eisenhower Avenue submarket, which includes the Eisenhower East/Carlyle area. Other local submarkets that would be most competitive with new office space in the Study Area are the I-395 and Old Town submarkets. Figure E-4 delineates the submarket boundaries in the areas closest to the Study Area.

Figure E-4: Office Submarkets in the Eisenhower West Area



Source: Microsoft, 2009; CoStar, 2009; BAE, 2009.

Table E-8 compares statistics for the Eisenhower, Old Town and I-395 submarkets. Eisenhower is currently the smallest submarket, but it contains the bulk of office space built since 2000, reflecting the redevelopment activity in Carlyle/Eisenhower East. The Eisenhower submarket also has the highest average lease rates and lowest overall vacancy rates, although its Class A space is not as fully occupied as Class A space in the other two submarkets.

Table E-8: Competitive Office Submarkets, First Quarter 2009

	Total RBA	Current Vacancy Rate	RBA Added Since 2000	Average Lease Rate
I-395				
Class A	4,988,530	6.1%	1,319,622	$30.03/fs
Class B	3,564,697	21.1%	79,628	$25.32/fs
Class C	1,017,762	3.0%	0	$21.13/fs
Total	9,570,989		1,399,250	
Eisenhower				
Class A	3,350,436	10.3%	27,893,508	$37.64/fs
Class B	1,717,506	2.4%	0	$24.47/fs
Class C	28,591	0.0%	0	-
Total	5,096,533		27,893,508	
Old Town				
Class A	4,575,441	9.8%	969,106	$34.80/fs
Class B	4,446,472	8.2%	35,694	$28.74/fs
Class C	1,466,578	3.4%	1,960	$26.59/fs
Total	10,488,491		1,006,760	

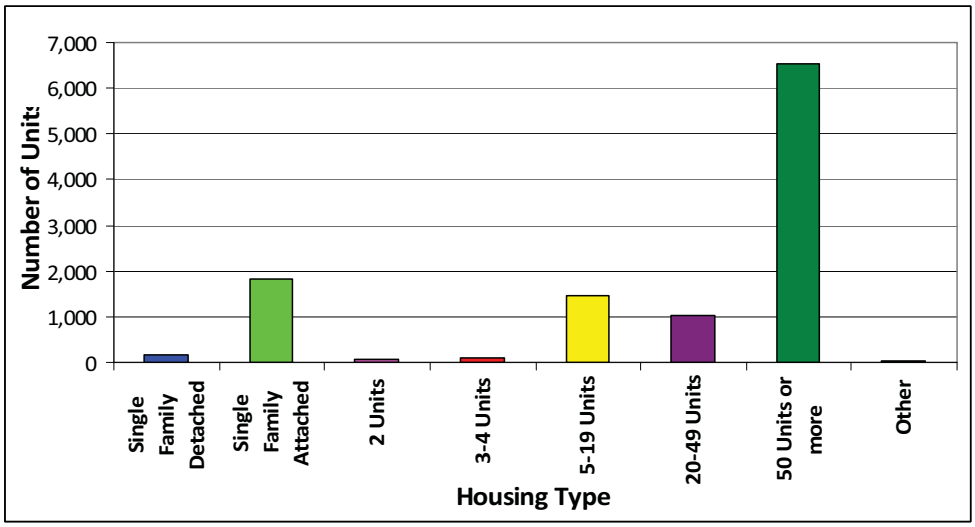
Source: CoStar, 2009; Alexandria Economic Development Partnership, 2009; BAE, 2009.

For Sale and Rental Housing

Study Area Housing Stock

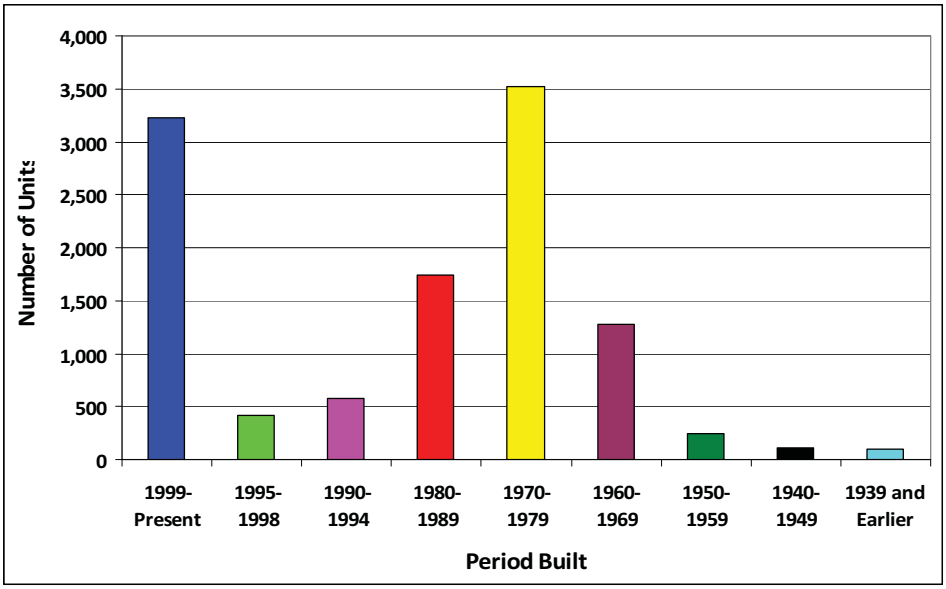
Figures E-5 and E-6 describe the characteristics of existing Study Area housing stock. Housing is diverse, but essentially split into housing built in the past 10 years, and housing built prior to 1980. Most housing units (6,529) are located in buildings of 50 units or more, reflecting the recent large developments such as Cameron Station, or are characterized as single-family attached dwellings. While 31 percent of the housing units in the Study Area were built between 1970 and 1979, almost 30 percent of the units have been built since 1999.

Figure E-5: Housing Types in the Study Area



Source: Claritas, Inc, 2009; BAE, 2009.

Figure E-6: Age of Housing Stock in Study Area



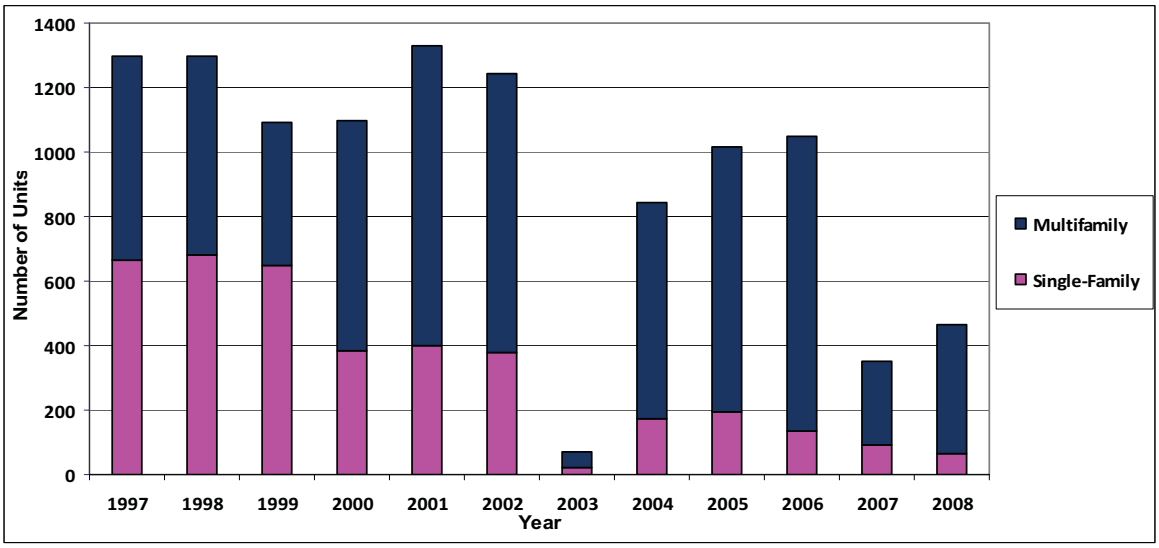
Source: Claritas, Inc., 2009; BAE, 2009.

Historical Building Trends

Building permit data serves as a measurement of development activity in an area. From 1997-2002, the City of Alexandria experienced its highest levels of permits issued of the entire period

studied, including the recent housing boom. Alexandria has been averaging 931 new units permitted annually over the past 12 years, with single-family units representing a smaller percentage of total permits each year. Single-family permits have been fairly steadily declining since 1997. This is to be expected, given Alexandria's proximity to Washington, D.C., dwindling supply of vacant land, and its long development history. The number of multifamily permits approved each year varies, but has been gradually increasing. In recent years, the increase in multifamily permits can be attributed to, at least part, the significant investment in rental and condominium development in the Carlyle/Eisenhower East area of the City.

Figure E-7: Residential Building Permits Issued, City of Alexandria, 1997-2008



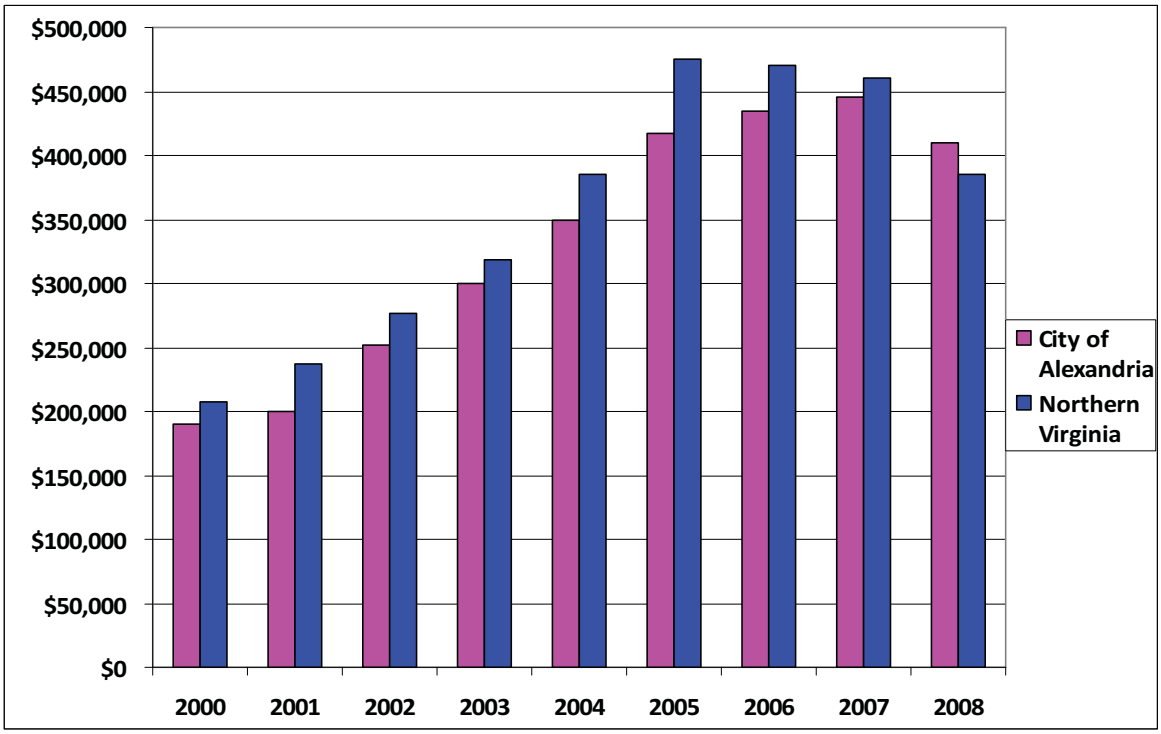
Source: U.S. Department of Housing and Urban Development, 2009; BAE, 2009.

For-Sale Housing Market

Residential sales data for the City of Alexandria, as well as the zip code 22304 in Alexandria, were obtained from Metropolitan Regional Information Systems, the region's multiple listing service for residential properties. Median sales price in 2008 was $410,000 in Alexandria, down from $445,725 in 2007; $385,000 in 2008 in Northern Virginia, down from $460,000 in 2007. Overall, Alexandria's median housing value has lagged behind Northern Virginia, but interestingly, the median value in 2008 topped the Northern Virginia median, suggesting that Alexandria has thus far has had more success in its housing values during the current real estate market decline.

Prices generally peaked in 2005 and have softened since then, but condominiums, 2 bedroom, and 3 bedroom townhouses sell on average for more than twice the price averaged ten years ago.

Figure E-8: Median Housing Value Growth/Decline in the City of Alexandria, 2000-2008



Source: Metropolitan Regional Information Statistics, 2009; BAE, 2009.

Six months of recent housing resale data for zip code 22304, where the Study Area is located, is shown in Table E-9. For comparison purposes, Table E-10 displays home sales in 2007, when the real estate market was in slightly better health than its current condition and the greater number of sales provides a more thorough picture of market activity. During the past six months, most homes sold were condominiums priced below $250,000. Most single-family homes that were sold, however, had sale prices between $400,000 and $600,000. The prevalence of sales below $250,000 is most likely a sign of uncertainty in the real estate market and the difficulty in obtaining mortgages. In 2007, condominium sales made up the majority of transactions, but there was a fuller range of sales prices among condominiums and single-family homes. Resale prices for three bedroom single-family houses in 2007 clustered between $500,000 and $600,000. Some condominiums in the zip code achieved the same price, but the majority of condominium resales were under $300,000. Current asking prices for Cameron Station units for sale range from $244 to $321 per square foot.

Table E-9: Residential Resales for Zip Code 22304, September 2008 to February 2009

	All Units		Single-Family Homes			
Price	Number of Units	Percent of Total	2 or Fewer Bedrooms	3 Bedrooms	4 or More Bedrooms	Condominiums
Under $250,000	92	43.6%	2	2	0	88
$250,000-$299,999	30	14.2%	1	6	2	21
$300,000-$349,999	16	7.6%	2	3	1	10
$350,000-$399,999	9	4.3%	1	4	0	4
$400,000-$449,999	18	8.5%	3	8	1	6
$450,000-$499,999	11	5.2%	1	4	1	5
$500,000-$599,999	18	8.5%	1	12	4	1
$600,000-$699,999	5	2.4%	0	2	3	0
$700,000-$799,999	4	1.9%	0	3	1	0
$800,000-$899,999	5	2.4%	0	0	5	0
$900,000-$999,999	1	0.5%	0	0	1	0
$1,000,000 or more	2	0.9%	0	0	2	0
Total	**211**	**100%**	**11**	**44**	**21**	**135**

Notes:
Data is for home sales from September 1, 2008 to February 28, 2009.

Source: Metropolitan Regional Information Systems, 2009; BAE, 2009.

Table E-10: Residential Resales for Zip Code 22304, January 1 to December 31, 2007

	All Units		Single-Family Homes			
Price	Number of Units	Percent of Total	2 or Fewer Bedrooms	3 Bedrooms	4 or More Bedrooms	Condominiums
Under $250,000	106	18.1%	0	0	0	106
$250,000-$299,999	102	17.4%	3	1	0	98
$300,000-$349,999	56	9.6%	5	0	0	51
$350,000-$399,999	45	7.7%	6	13	1	25
$400,000-$449,999	36	6.2%	6	8	3	19
$450,000-$499,999	51	8.7%	0	22	4	25
$500,000-$599,999	97	16.6%	2	68	18	9
$600,000-$699,999	39	6.7%	0	31	8	0
$700,000-$799,999	15	2.6%	0	4	11	0
$800,000-$899,999	15	2.6%	0	2	13	0
$900,000-$999,999	10	1.7%	0	2	8	0
$1,000,000 or more	13	2.2%	0	0	11	2
Total	**585**	**100%**	**22**	**151**	**77**	**335**

Source: Metropolitan Regional Information Systems, 2009; BAE, 2009.

Table E-11: Asking Prices in Cameron Station, May 2009

Address	Asking Price	Square Feet	Price per Square Foot	Type	Number of Bedrooms
4907 John Ticer Drive	$949,900	3,319	$286.20	Detached	3
5156 Knapp Place	$899,500	3,471	$259.15	Detached	4
130 Tull Place	$838,000	2,864	$292.60	Townhome	4
108 Cameron Station Boulevard	$610,000	2,502	$243.80	Townhome	3
5106 Grimm Drive	$545,000	2,116	$257.56	Townhome	3
417 Cameron Station Boulevard #51	$439,000	1,516	$289.58	Condominium	2
400 Cameron Station Boulevard #G10	$386,200	1,203	$321.03	Condominium	2

Source: Realtor.com, 2009; BAE, 2009.

Rental Housing Market

There are several apartment complexes in the general vicinity of the industrial uses, many located in the Carlyle/Eisenhower East area of Alexandria. The complexes are of varying age and quality. Table E-12 shows the competitive market rate apartment complexes located near the industrial uses. Complexes located closest to the industrial uses consist mainly of low-rise, garden-style apartments. Carlyle/Eisenhower East complexes generally are newer construction and above seven floors. Community features such as a swimming pool and fitness center are available in all of the complexes surveyed.

Rents ranged from $1.39 per square foot for a 1,274 square foot unit to $3.23 per square foot for an 870 square foot unit. The apartment complexes in the Carlyle/Eisenhower East area commanded higher rents per square foot. Apartment complexes in both areas boasted metro accessibility as an advantage. The amount of utilities included varied widely, from no utilities included in the rent, to everything included except for electric and cable television.

Vacancy rates at the complexes were generally healthy, averaging nine percent, indicating a relatively healthy market. Carlyle/Eisenhower East may present a more attractive option to prospective renters, as the average vacancy rate for those complexes was four percent, compared to the ten percent vacancy rate for the apartment complex located immediately near the industrial uses.

Table E-12: Apartment Complexes in Alexandria, Virginia

Project/Address	Number of Units	Floor Plans	Rental Rates (a)	Utilities	Size (in SF)	Price per Square Foot	Vacancy	Comments/Features
Avalon at Cameron Court	460	1 BR/1 BA	$1,565 - $1,700	None included.	694 - 828	$1.89 - $2.45	N/A	Swimming pool, conference room, fitness center
2700 Williamsburg Street		1 BR/1 BA/Loft	$1,885		944	$2.00		
Alexandria, VA 22314		1 BR/1 BA/Garage	$1,890		841	$2.25		
703.567.5399		2 BR/2 BA	$1,665 - $1,810		1,072 - 1,170	$1.42 - $1.69		
		2 BR/2 BA/Garage	$1,895		1,072	$1.77		
		2 BR/2 BA/Loft	$1,915		1,250	$1.53		
The Reserve at Eisenhower	226	1 BR/1 BA	$1,440 - $1,495	Everything included except for	747	$1.93 - $2.00	10%	Swimming pool, business center, fitness center
5000 Eisenhower Avenue		1 BR/1 BA	$1,450 - $2,000	for cable and electric	909	$1.60 - $2.20		
Alexandria, VA 22304		1 BR/1 BA	$1,485		763 - 862	$1.72 - $1.95		
		1 BR/1 BA	$1,495 - $1,550		792	$1.89 - $1.96		
		1 BR/1 BA	$1,570 - $1,600		881	$1.78 - $1.82		
		1 BR/1 BA	$1,785		1,016	$1.76		
		2 BR/2 BA	$1,450 - $2,000		1,201 - 1,320	$1.10 - $1.67		
		2 BR/2 BA	$1,620		1,085	$1.49		
		2 BR/2 BA	$1,635		1,048	$1.56		
		2 BR/2 BA	$1,670		1,115	$1.50		
		2 BR/2 BA	$1,680		1,103	$1.52		
		2 BR/2 BA	$1,710		1,151	$1.49		
		2 BR/2 BA	$1,735		1,110	$1.56		
		2 BR/2 BA	$1,750		1,150	$1.52		
		2 BR/2 BA/Loft	$1,765		1,274	$1.39		
		2 BR/2 BA/Loft	$1,780		1,258	$1.41		
		2 BR/2 BA/Loft	$1,825		1,275	$1.43		
		2 BR/2 BA/Loft	$1,885		1,231	$1.53		
		2 BR/2 BA/Loft	$1,965		1,339	$1.47		
Carlyle Place Apartments	326	1 BR/1 BA	$1,950 - $2,175	Everything included except for	791	$2.47 - $2.75	6%	Swimming pool, fitness center
2251 Eisenhower Avenue		1 BR/1 BA	$2,000 - $2,275	for cable and electric	826	$2.42 - $2.75		
Alexandria, VA 22314		1 BR/1 BA	$2,025 - $2,150		736	$2.75 - $2.92		
703.706.0076		1 BR/1 BA	$2,175 - $2,200		777	$2.80 - $2.83		
		2 BR/1 BA	$2,250 - $2,575		1,057	$2.13 - $2.44		
		2 BR/1 BA	$2,300 - $2,450		1,028	$2.24 - $2.38		
		2 BR/2 BA	$2,225 - $2,500		1,087	$2.05 - $2.30		
		2 BR/2 BA	$2,525 - $2,850		1,343	$1.88 - $2.12		
		2 BR/2 BA	$2,550 - $2,875		1,254	$2.03 - $2.29		
		2 BR/2 BA	$2,600 - $2,850		1,297	$2.00 - $2.20		
		2 BR/2 BA	$2,775 - $3,175		1,475	$1.88 - $2.15		
		2 BR/2 BA	$2,775 - $2,975		1,264	$2.20 - $2.35		
		2 BR/2.5 BA	$3,875 - $3,950		1,909	$2.03 - $2.07		
		3 BR/2 BA	$3,325 - $3,850		1,817	$1.83 - $2.12		
		3 BR/2 BA	$3,575 - $3,625		1,730	$2.07 - $2.10		
		3 BR/2.5 BA	$3,000		1,609	$1.86		
		3 BR/2.5 BA	$3,675 - $3,875		1,862	$1.97 - $2.08		
Meridian at Carlyle	403	Studio	$1,385 - $1,750	Only trash included	550 - 565	$2.45 - $3.18	2%	Fitness center, pool, clubhouse
401 Holland Lane		1 BR/1 BA w/ den	$1,590 - $2,000		620 - 870	$1.83 - $3.23		
Alexandria, VA 22314		1 BR/1 BA w/ den	$1,940 - $2,200		N/A	N/A		
866.301.6359 ext. 3434		2 BR/2 BA	$2,175 - $2,700		970 - 1,100	$1.98 - $2.78		

Notes:
(a) Rental rates listed are for the week of April 27, 2009.

Source: Avalon Bay, 2009; rent.com, 2009; Telephone Interviews; BAE, 2009.

Retail Supply

The CoStar database reports average rent for retail space at $31.87 per square foot, triple net (net of taxes, utilities maintenance) in April 2009. A 3.6 percent vacancy rate indicates that the market is very healthy.

The need for additional retail depends upon the growth of consumer demand from additional households and employees in an area. Retail development can also take advantage of existing spending that takes place further away from where households reside, by capturing a greater share of the immediate area's household expenditures.

Several recent planning efforts have produced retail market analyses which look at the area's current and future demand that could support local retail. These reports indicate that the current supply of retail in the West End and Landmark/Van Dorn planning area could be supplemented with additional retail offerings supported from existing demand. RCLCO prepared a City-wide retail market assessment in connection with land bay approvals for Potomac Yard[1]. According to the study, in 2008 there was an estimated $28 million in existing retail demand annually from residents and employees in that could be captured by additional retail development in the West End, and $290 million annually in leaking expenditures that could be captured within Alexandria. A study prepared by the Gibbs Planning Group[2] as part of the Landmark/Van Dorn planning process identified specific retail opportunities for new retail development in the Van Dorn corridor. In total, the study estimated that the area could support over one million additional square feet of retail over what exists today from regional demand, drawing consumer expenditures from a potential trade area of over 820,000.

These studies were not prepared specifically to analyze retail opportunities at the Study Site, but support a general argument that there is sufficient retail opportunity for a limited amount of ground floor retail as part of a mixed use development program, even when only existing demand is considered. The redevelopment of the Landmark/Van Dorn area will add more households and employees that will increase demand, as well as provide significantly more retail offerings through new retail construction. Furthermore, the potential redevelopment of the Study site as office and retail uses will generate demand for a limited amount of ground floor retail.

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[1] Retail Market Feasibility Study for Planned Retail Developments at Potomac Yard; Alexandria, Virginia. Prepared by RCLCO for RREEF, McCaffrey Interests and MRP Realty, October 2008.

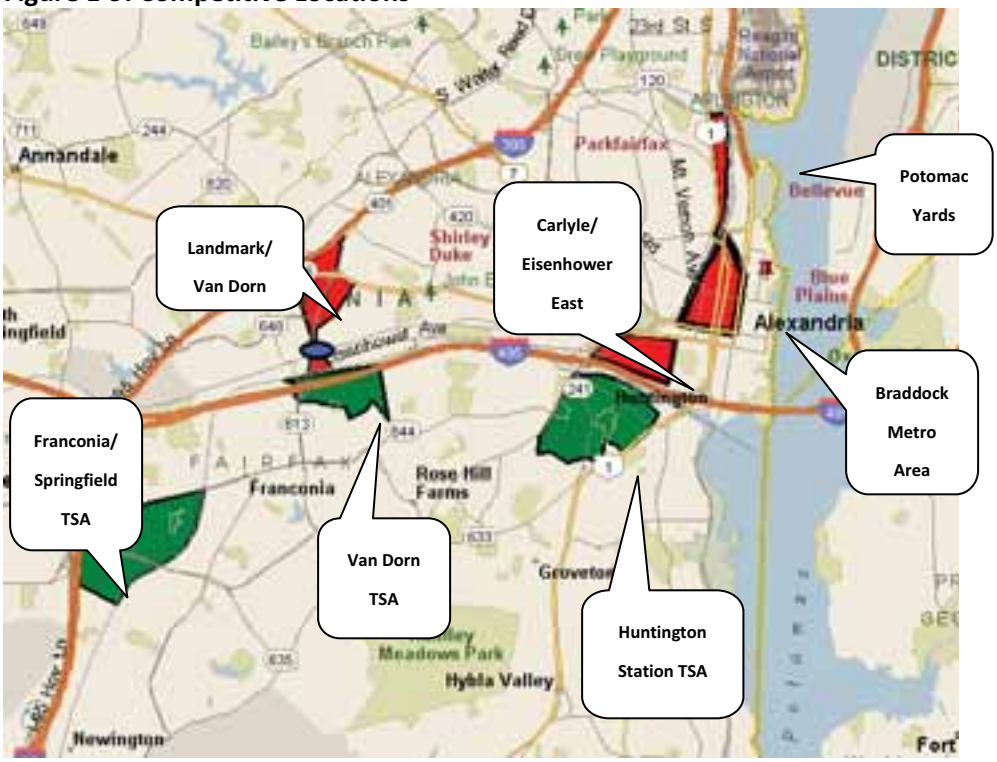
[2] *Van Dorn Corridor Retail Market Study* by Gibbs Planning Group, November 11, 2008.

Long Term Competitive Environment

Several areas in Alexandria and in close proximity to the Study Site are available to capture the long term projected growth of households and employment in the area. Figure E-9 identifies four redevelopment areas in Alexandria and three near the Study Site in Fairfax County.
These sites could be considered to be in competition with mixed use development on the Study Site, as the seven areas represent the long-term pipeline of supply that is to meet future demand that will be seeking space in an area close to the Study Site. The impact that the competing future supply represented by these seven areas has on the Study Site's redevelopment depends upon several factors, including:

- The amount and type of future demand and the extent to which demand can be met by the competition;
- The attractiveness of the competing sites, considering their vehicle and transit access, location and adjacent uses, and other factors; and
- The readiness of competing areas to meet demand with development entitlements currently in place.

Figure E-9: Competitive Locations



Source: Microsoft, 2009; City of Alexandria, 2009; Fairfax County, 2009; BAE, 2009.

The strengths and weaknesses of each competing redevelopment area are described below:

Potomac Yard. Potomac Yard encompasses 295 acres of former railroad land which has begun redevelopment. Key to Potomac Yard's attractiveness is its central location on the Alexandria/Arlington County border. It is close to the Pentagon, Crystal City, Ronald Reagan Washington National Airport, and Washington DC, as well as established areas of Alexandria such as Old Town Del Ray. However, Potomac Yard does not currently have Metro access, although the feasibility of adding a station on the blue/yellow line to serve Potomac Yard is currently under study, and it does not have direct highway access. Nevertheless, its strengths put Potomac Yard in a good position to capture short term growth. With land bay approvals in place and recent development activity, momentum is building for future development.

Carlyle/Eisenhower East. This 230 acre area south of Old Town has seen significant redevelopment activity since the early part of the decade, when the Patent and Trademark Office (PTO) moved to the area as an anchor of 2.5 million square feet of office space. Although it is the most established of the competitive development areas, maturing with a mix of both office and residential buildings, it still has the potential to deliver hundreds of new residential units in the future. It is served by Metro access from the King Street and Eisenhower stations. Other strengths include its proximity to Old Town and excellent access to the Capital Beltway. Existing buildings command some of the highest rents and sales prices in the area, and Carlyle is likely to continue to build out and maintain its position as the City's top-tier redevelopment area.

Landmark/Van Dorn. Recognizing the redevelopment opportunities associated with the aging Landmark Mall, the City initiated a small area planning process for this retail-anchored corridor of South Van Dorn Street immediately north of the Study Site. A small area plan was completed in early 2009, and the first site plan approval recently went to the Planning Commission for a multi-family residential development on Pickett Street at the end of the planning area closest to the Study Site. The area has direct access to I-395 and is accessible to the Capital Beltway from South Van Dorn Street. The plan envisions an improved connection to the Van Dorn Metro station through enhanced rubber-tire transit, by express bus, street car or bus rapid transit along South Van Dorn Street. Although located further from the core of Washington DC and the close-in areas of Arlington and Alexandria than either Potomac Yard, Braddock Road Metro area or Eisenhower East, the Landmark/Van Dorn area offers a significant amount of new residential, office, hotel and retail space on redevelopable retail sites to accommodate the City's mid to long term growth.

Braddock Road Metro Station Area. The area around the Braddock Road Metro station has been the subject of transit-oriented redevelopment planning efforts. The Braddock Metro

Neighborhood Plan, completed in 2008, identified infill development opportunities on 17 sites and recommended public space improvements. A subsequent Braddock East planning process further defined the development potential for several public housing sites, envisioned as mixed-income housing, within the Braddock Metro area. The area's close-in location, superior transit accessibility and unique identity make it attractive for redevelopment, and the area can provide the City with thousands of new housing units. The plan envisions a 20-year build out period.

Huntington Transit Station Area (TSA). The area surrounding the Huntington Metro station is one of a number of areas that Fairfax County has considered for transit-oriented redevelopment. The Huntington TSA, located around the Huntington Metro station at the end of the yellow line, is predominantly residential in character but offers some opportunities for higher density development on vacant or underutilized properties. Fairfax County amended its Comprehensive Plan to allow for higher density development, predominantly residential. Given its location, the quality of its transit access and proximity to the Capital Beltway, this area could be directly competitive with the Study Site.

Springfield Franconia TSA. At the terminus of the Metro blue line, this area is another site designated by Fairfax County for future redevelopment as a Transit Station Area (TSA). Currently it is characterized by commercial uses and low density residential. A vision for the area's future, incorporated into the Fairfax County Comprehensive Plan, anticipates the redevelopment of the Springfield Mall into a mixed use town center, and a former GSA warehouse also presents a significant redevelopment opportunity. The site has many strengths, including excellent transit access by Metrorail and VRE and connections to I-95 and other major thoroughfares. Additionally, the site is expected to capture the benefits of the influx of jobs to nearby Fort Belvoir as a result of BRAC activity. Despite its more distant location this redevelopment area could capture growth in the short to mid term.

Van Dorn TSA. This is an area south of the Study Site, adjacent to the Van Dorn Metro station but removed from direct station access by the rail line and the Capital Beltway. The Fairfax County Comprehensive Plan recognizes the value of transit-oriented development in the area, but identifies a number of constraints to the area's redevelopment, including the need for road and highway access improvements and environmentally sensitive lands. The Comprehensive Plan allows development in the TSA at an FAR of 1.0 but does not further define a development program. Vine Street, located north of the Beltway and immediately adjacent to the rail line, is identified as the focal point of any new redevelopment. According to Fairfax County planning staff, development interest in the Vine Street area has prompted an amendment process for the county Comprehensive Plan, expected to occur in Fall 2009.

Table E-13 breaks down the future development envelope available from the competing areas

described above. Because no detailed planning has occurred for the Fairfax County Van Dorn TSA, it is not included.

Table E-13: Future Development Potential of Competitive Redevelopment Areas

		Remaining Buildout	
Residential Potential	**Existing (sf)**	**Low**	**High**
Potomac Yard (a)	641	1,042	1,042
Carlyle/Eisenhower East (b)	2,962	602	602
Landmark/Van Dorn (c)	2,735	1,545	6,153
Braddock (d)	N/A	3,183	3,183
Huntginton Transit Station Area	5,184	1,621	2,072
Franconia-Springfield Transit Station Area	1,701	548	967
Total	**13,223**	**8,541**	**14,019**

		Remaining Buildout	
Office Potential	**Existing (sf)**	**Low (sf)**	**High (sf)**
Potomac Yard (e)	765,000	1,100,000	1,100,000
Carlyle/Eisenhower East	6,683,075	68,425	68,425
Landmark/Van Dorn	45,136	3,955,000	5,249,000
Braddock (f)	N/A	268,500	293,500
Huntginton Transit Station Area	201,298	325,000	645,000
Franconia-Springfield Transit Station Area	563,796	240,000	3,610,000
Total	**8,258,305**	**5,956,925**	**10,965,925**

		Remaining Buildout	
Retail Potential	**Existing (sf)**	**Low (sf)**	**High (sf)**
Potomac Yard	795,000	135,000	135,000
Carlyle/Eisenhower East (g)	958,598	61,902	61,902
Landmark/Van Dorn	1,361,767	32,000	463,000
Braddock (h)	N/A	50,000	75,000
Huntginton Transit Station Area	108,982	197,924	387,000
Franconia-Springfield Transit Station Area (i)	2,330,709	(469,000)	(469,000)
Total	**5,555,056**	**7,826**	**652,902**

Notes:
(a) Estimated at an average unit size of 1,100 square feet. Existing includes project under construction.
(b) All Carlyle existing numbers reflect projects under construction, with final approval, and preliminary approval. Estimated at an average unit size of 1,100 square feet.
(c) Estimated at an average unit size of 1,100 square feet. Buildout includes redevelopment blocks only.
(d) Estimated at an average unit size of 1,100 square feet. Includes Braddock East and Braddock Metro areas.
(e) Existing includes project under construction.
(f) 405,000 sf of existing office, retail, and light industrial uses.
(g) Includes hotels.
(h) 405,000 sf of existing office, retail, and light industrial uses.
(i) Redevelopment will allow less retail square footage than currently exists.

Source: Fairfax County, 2009; City of Alexandria, 2009; BAE, 2009.

Summary of Market Findings

Alexandria, as part of the Northern Virginia jurisdictions that form the Washington DC metropolitan area, is thriving and can expect future development. The potential offered by redevelopment of areas around high quality transit will allow Alexandria to continue to grow in the future, and maintain or exceed its projected share of Northern Virginia's long term employment and household growth.

An analysis of long-term demand and supply in and around Alexandria suggests some conclusions related to the market potential for the Study Site.

- Development potential for the Study Site is likely mid to long term rather than short term. Several other redevelopment areas are more "ripe" for development to meet immediate and short term demand. While a catalyst project like the move of a significant federal agency tenant to the Victory Center on Eisenhower Avenue could create some demand pressure on the Study Site, Potomac Yard and Carlyle/Eisenhower East are more likely to meet upcoming development demand due to their superior locations and existing development momentum. Springfield-Franconia could benefit in the short term from the expansion of Fort Belvoir (which will receive jobs moved out of Alexandria).

- The development envelope represented by competing development areas contains more than an adequate supply of office space to meet Alexandria's anticipated office needs for the next 15 to 20 years at least. Most of the development envelope for office space is within Alexandria, particularly at Landmark/Van Dorn and Potomac Yard. These two areas alone allow for a minimum of five million and a maximum of over 6.2 million square feet of space. It is possible that Alexandria could deliver office space more quickly than its historical net absorption trends suggest (one million square feet every three years), through increasing the pace of job growth or the removal of older, obsolete space from the inventory. Through the planning for substantial new office development opportunities through redevelopment, the City has set the stage to reach its objective of restoring the balance of property tax base between non-residential and residential uses.

- Housing development will lead the future redevelopment of the Study Site. By reviewing historical building permit trends and future household growth projections, the development envelope represents much less of the projected long term housing demand than office demand. Therefore, it is more likely that pressure for new

housing will push the redevelopment of the Study Site more quickly than pressure for office new office construction.

- Consumer demand generated by new households and jobs at and north of the Study Site will generate additional demand for retail space, on top of the unmet demand currently thought to exist in the Eisenhower West area. A limited amount of ground floor retail as part of the potential redevelopment of the study site, intended to provide amenities mainly to occupants of the new development, will be a small portion of the total amount of retail space that will exist in the area.

Appendix F: Financial Analysis

Analysis

Purpose and Methodology

The purpose of the financial analysis is to determine if the redevelopment alternatives make sense from the perspective of a private developer/landowner engaging in the real estate development process. Ultimately, if the alternatives do not prove to be financially feasible (i.e., the costs associated with development outweigh the revenues from sales and leasing of property), redevelopment of the land by private developers is highly unlikely to occur without subsidies or other incentives. The analysis helps identify which alternative, if any, yields the best financial performance, and would therefore have the highest likelihood of occurring in the future. The analysis also helps compare the value of each alternative to other alternatives, as well as the magnitude of value change for each individual parcel across alternatives. Finally, for those redevelopment alternatives that prove to be financially feasible, the positive incremental change in land values derived from the financial analysis can be compared to the additional costs associated with redevelopment, including the relocation of existing operations on the parcels.

The methodology of the financial analysis takes the perspective of the landowner/developer, and involves calculating the residual land value for the individual parcels under each alternative, which is what the land becomes worth given how much and what type of new development is constructed on it. In essence, the residual land value represents the value "left over" after building costs and developer profit are subtracted from project revenues, and describes the most a developer could afford to pay for the land to build the project profitably.

Certain land uses (e.g., office, residential, retail, or industrial) can yield different residual land values on a given parcel of land depending on a variety of factors. These factors can include location, market conditions (i.e., historical, current, and future supply and demand conditions), zoning laws (i.e., what land uses can be built on the site, and how intense or dense can they be, how much of the land is developable at all, etc.), construction costs, and site specific conditions that can impact overall redevelopment costs (e.g., environmental remediation, demolition, infrastructure improvements, etc.). Changes in any of these factors can have an impact on the overall residual land value. For example, if a hypothetical parcel of land is currently zoned for lower density industrial uses, and the zoning changes to allow high density residential development, the land may likely have a dramatically higher value, based on the new revenue potential that the alternative development scenario allows, depending on market conditions and development costs. Alternatively, if a given redevelopment scenario proves unprofitable (e.g. construction costs are too high and/or achievable sales prices/lease rates are too low, or the site requires extensive redevelopment costs), it may yield a negative residual land value, or a residual

land value that is less than what the land is currently valued at today.

Other than Norfolk Southern, the parcels are assessed at 100 percent of their market value in accordance with Virginia law. Therefore, a comparison of current assessed land values to the calculated residual land values derived from the financial analysis provides a determination of financial feasibility for each parcel of land in light of what will be built under each redevelopment alternative.

The method used to analyze the financial feasibility of the four scenarios is a "static" pro forma that calculates the residual land value after determining development revenues, a variety of costs, and developer profit. This methodology presents a snapshot of the revenues and costs of a development project at buildout as opposed to a stream of revenues and costs over time that are discounted back to present value. This approach facilitates the comparison of multiple development scenarios and strips out the impact of time. The analysis assumes 2009 dollars, and time is only accounted for in the estimate of interest in the construction loan cost category (described below in the Assumptions section).

It is important to note that the financial analysis is preliminary and that a developer considering development on the site(s) would commission a detailed land plan which would allow for more refined financial feasibility analysis. However, this analysis provides order-of-magnitude findings and conclusions that help determine if the redevelopment alternatives are worth further consideration and analysis.

Assumptions

The financial analysis incorporates a variety of revenue and cost assumptions, some of which are consistent across all four redevelopment alternatives as well as some that vary by scenario and/or parcel. These various assumptions are summarized below by category, and include sources where applicable. They are based on a variety of sources including but not limited to the market analysis component of this engagement, interviews with developers, construction cost reference guides, and BAE experience in this and other markets.

Revenue Assumptions in Each Redevelopment Alternative

Revenue assumptions that are consistent across all four redevelopment alternatives include the achievable sales and rents for the residential and commercial land uses. The achievable residential prices, rents, sizes, and revenues per square foot are detailed in the following table:

Table F-1: Common Assumptions: Residential Revenue

Unit Type	Average Sales Price/ Monthly Rent	Average Size (SF)	Average $/SF
Multifamily For-Sale	$385,000	1,050	$367
Townhomes	$550,000	1,900	$289
Multifamily Rental	$2,300	1,050	$2.19

Source: BAE Market Analysis, 2009.

The residential assumptions stem from market research, and incorporate historical market-level trends, analysis of nearby comparable properties, and surveys of rental apartment communities in the surrounding area. This pricing is relatively conservative based on historical trends in the local and regional market. The analysis also assumes that the breakdown of multifamily units between those that are classified as for sale versus those that are rental apartments is 75 percent for sale and 25 percent rental in each alternative. Furthermore, the stabilized occupancy for the rental units is assumed to be 95 percent. Alternative D does incorporate a premium to these revenue streams of 5 percent for TOD which is conservative based on BAE's experience in other markets.

Those commercial revenue assumptions that are consistent across all redevelopment alternatives are shown in the following table:

Table F-2: Common Assumptions: Commercial Revenue

Land Use	Lease Rate (Monthly/Sq. Ft. NNN)	Stabilized Occupancy
Office	$3.20	90%
Retail	$2.75	90%

Source: BAE Market Analysis, 2009.

The commercial revenue assumptions are also based on market research and assume construction quality consistent with nearby office submarkets such as that found in the Carlyle/Eisenhower East commercial submarket. The market analysis incorporates a variety of quantitative and qualitative data including historical commercial trends in nearby submarkets, the city of Alexandria as a whole, as well as the close-in Northern Virginia region.

Cost Assumptions in Each Redevelopment Alternative

Cost assumptions that are consistent in each redevelopment alternative include hard costs for the various land uses, soft costs, and financing costs, detailed in the following table.

Table F-1: Common Assumptions: Hard Costs, Soft Costs, and Financing Costs

Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Mid Rise Multifamily Construction Costs (per sq. ft.)	$185
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Soft Costs (as % of hard and site costs)	20%
Developer Profit (as % of total development cost)	12%
Financing Costs	
Interest Rate	8%
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%

Source: Developer Interviews, 2009; RS Means Square Foot Costs, 2009; BAE, 2009.

These cost assumptions are based on a variety of resources and, in light of the longer-term potential timing of redevelopment, are designed to mitigate the short-term effect of the current recessionary environment. As such, they take into account quotes from contractors during both the peak of the regional real estate cycle as well as more recent cost quotes that are far lower due to the current economic climate.

Along with these common cost assumptions, the estimated cost to conduct environmental remediation is the same under each redevelopment alternative, but varies by parcel, as shown in the following table. Estimates are preliminary, based on review of publicly available materials and a visual inspection of some, but not all, of the sites. No soil testing was performed. Costs could be higher than these estimates.

Table F-2: Environmental Remediation Assumptions by Parcel

Parcel	Minimum	Maximum	Midpoint
Vulcan	$32,000	$49,000	$40,500
Virginia Paving	$401,000	$816,000	$608,500
Norfolk Southern	$65,000	$95,000	$80,000
Covanta	$141,000	$207,000	$174,000

Source: MACTEC, 2009; BAE, 2009.

The financial analysis incorporates the midpoint of the above range for environmental remediation.

Demolition costs are also assumed to be consistent in each scenario, with one exception, as shown in Table 12:

TableF-3: Demolition Costs by Parcel and Redevelopment Alternative

	Vulcan	Virginia Paving	Norfolk Southern	Covanta
Alternative A	$0	$100,000	$0	$15,000,000
Alternative B	$0	$100,000	$0	$15,000,000
Alternative C	$0	$100,000	$0	$0
Alternative D	$0	$100,000	$0	$15,000,000

Source: BAE, 2009.

The analysis assumes no costs for demolition for both Vulcan and Norfolk Southern since there are no major existing structures requiring extensive deconstruction. It also includes $100,000 in demolition related costs for some of the existing building space on the Virginia Paving parcel. Demolition costs for Covanta are estimated to be approximately $15 million, although in Alternative C, the cost to provide "architectural enhancement" of the Covanta structure is estimated at $7.5 million.

Lastly, current values of the parcels represent a key assumption in analyzing the results of the financial analysis. In each alternative, current value of the parcels represent the measuring stick to determine whether value is being created by the redevelopment alternative in question. However, while the comparison of current value to redevelopment value by parcel appears "black and white" in terms of decision making, there are certain alternative-specific issues that go beyond this simple comparison. These issues include major costs of assumed infrastructure (e.g., the $25 million bridge in Alternative D or the $7.5 million architectural enhancement of the Covanta plant in Alternative C), as well as the potential costs for relocation or cessation of current operations. Nevertheless, the current values of the parcels represent a good starting point to measure the financial performance of any redevelopment.

Other than Norfolk Southern, the properties are assessed at 100 percent of their market value in

accordance with Virginia law. As such, the most recent assessment by the city of Alexandria, which takes into account comparable sales in the area, should represent an accurate estimate of the value of each parcel (land and improvements), and is detailed below. Norfolk Southern's land is not taxed by the city. Furthermore, the acreage consists of an area that is currently undevelopable, and zoned as a rail right-of-way area. Therefore, although Norfolk Southern is using the land for business operations, it is not necessarily developable for conventional land uses at this time, and could be assumed to have zero value. However, the assessment value placed on the property by state tax assessors could represent the functional value of the property, if the site's current lack of development potential is disregarded. The state tax assessor values the property in calculating an "in lieu" payment which it shares with the city, calculated as an average of nearby site values. This method yields an alternate value of $19.3 million using the most recent land assessments for Covanta and Virginia Paving. Using this value in the analysis represents a more conservative approach rather than using a zero value, and it used throughout the financial analysis.

TableF-4: Current Parcel Values

	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Estimated Current Value (a)	$14,827,000	$13,162,000	$36,676,000	$19,283,000

Notes:
(a) Based on most recent tax assessments which are 100% of estimated fair market value, except for Norfolk Southern.

Source: City of Alexandria, 2009; Virginia Department of Taxation, 2009; BAE, 2009.

Alternative-Specific Assumptions

Beyond the common assumptions, certain revenue and cost assumptions vary by redevelopment alternative as well as by parcel, contingent upon the major differences between the various alternatives. Between the four alternatives, Alternative A represents the template from which the three other alternatives differ in various ways. The Alternative B program is the same as Alternative A except for the Virginia Paving parcel, which will be converted to park space rather than being developed with the mixed use program of residential and retail space found in Alternative A. Alternative C is the same as Alternative A but does not deliver redeveloped land uses on the Covanta or Norfolk Southern parcels. And Alternative D represents the furthest departure from the Alternative A template, with a denser, TOD-oriented program assumed for some of the parcels. These key differences drive some of the changes is cost assumptions shown in the following categories.

On- and off-site improvements vary slightly based on the above modifications by alternative:

TableF- 5: On- and Off-Site Improvement Costs by Parcel and Redevelopment Alternative

	Vulcan	Virginia Paving	Covanta	Norfolk Southern
Alternative A	$2,875,600	$1,452,500	$2,095,200	$2,216,400
Alternative B	$2,875,600	$2,233,000	$2,095,200	$2,216,400
Alternative C	$2,875,600	$1,452,500	$0	$0
Alternative D	$2,875,600	$1,452,500	$2,095,200	$2,216,400

SOURCE: MACTEC, 2009; BAE, 2009.

This cost category consists of a number of site development and infrastructure related costs, including the following:

- Site grading
- Road construction
- Sidewalk construction
- Traffic signals
- Sanitary pipe
- Sanitary manholes
- Storm pipe
- Catch basins
- Storm manholes
- Water pipe
- Butterfly valves and connections
- Fire hydrants
- Electrical service
- Storm detention

The park space delivered on the Virginia Paving parcel in Alternative B costs more in site improvements than the other alternatives which is counterintuitive. However, these costs ultimately include all costs involved with delivering the park (e.g. parking, restrooms, walking trails, playgrounds, benches, and other miscellaneous items such as an information kiosk), whereas the improvement costs for the other alternatives represent just the beginning of what will be delivered on the parcels. Details of these costs for each alternative can be found in Appendix G.

Results

The results of the financial analysis indicate that certain redevelopment alternatives may be financially feasible, but with numerous caveats attached to this preliminary conclusion. First, although the redevelopment alternatives do result in a combined higher residual land value relative to currently assessed values, no alternative has an outcome in which all four parcels have residual land values that are greater than their current values. In other words, the positive

incremental residual values for some parcels serve to offset the loss in value on other parcels. This mix of results by parcel suggests that if one of the redevelopment alternatives were pursued in the future, that the key stakeholders involved in the redevelopment would need to create potentially complex deal/transaction structures in which the different landowners share in the proceeds of the redevelopment. For the purposes of this exercise, the financial analysis simply calculates the resulting change in value based on the defined program in each alternative.

The second major caveat is that although these conclusions indicate positive redevelopment potential from a financial perspective, any positive incremental change in land value must be further weighed against the costs associated with relocating or cessation of the existing operations on the parcels. Final conclusions on the financial viability of redevelopment need to incorporate the findings from this residual land value analysis, the ultimate costs of relocation/cessation, as well as the fiscal impact of the redevelopment scenarios to the city, discussed in later sections.

General Findings by Parcel

While the results of the financial analysis vary by redevelopment alternative, certain parcel-specific site characteristics and constraints result in findings that are relatively consistent across each alternative. The following general findings by parcel serve to inform the overall alternative performance described later.

Vulcan. In each redevelopment alternative, Vulcan achieves strong redevelopment values that are substantially higher than its currently assessed value. This strong financial performance is due to a variety of factors that combine to make it the most "ready now" parcel for redevelopment. The parcel has minimal undevelopable area, minimal environmental remediation costs, no demolition costs, and each alternative delivers a healthy amount of residential units on the parcel.

Virginia Paving. In three out of the four scenarios, the redevelopment of Virginia Paving yields a lower residual land value than it is currently valued at today. Unlike Vulcan's land, the Virginia Paving site requires more substantial costs associated with environmental remediation and demolition. Furthermore, only a small percentage of the land would be available for redevelopment, as the majority of the land lies in the 100-year flood plain and the resource protection area. These constraints limit the amount of new development that can be delivered on the site and ultimately result in the lower residual value.

Covanta. In each alternative, redevelopment of the Covanta site involves a major loss in value. This loss is due entirely to the fact that the current land and improvements have a very high value,

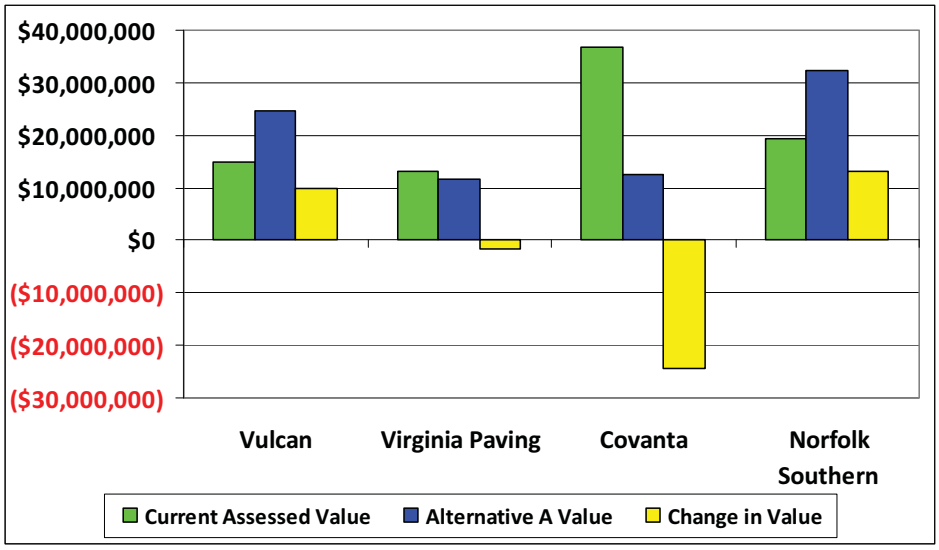
as measured by their tax assessment. The plant itself has an assessed value of $26 million, which is used in this analysis,[1] and demolition of it would cost an additional $15 million. As such, any alternative that incorporates the redevelopment of Covanta faces a $41 million hurdle from the start, before factoring in costs of relocating the facility or the cost of creating a new solid waste disposal infrastructure. It is important to note that Alexandria and Arlington will jointly own the property and improvements in 2025, and their decision-making about the value of the plant will involve many more considerations than just the financial implications of a change in land value.

Norfolk Southern. Given that Norfolk Southern's parcel has no current value and only minor costs associated with redevelopment, the analysis yields a higher residual land value under each redevelopment alternative. However, using the more conservative assumption that the land has a $19 million value still yields positive redevelopment results in each scenario.

Alternative A

Alternative A yields an overall change in residual land value of negative $2.2 million, with $10.2 million for Vulcan, negative $1.2 million for Virginia Paving, $13.1 million for Norfolk Southern, and negative $24.3 million for Covanta, as shown in the following chart.

Figure F-1: Financial Performance of Alternative A



Source: BAE, 2009.

Although the scenario yields a wide range of results by parcel, the overall value is slightly negative

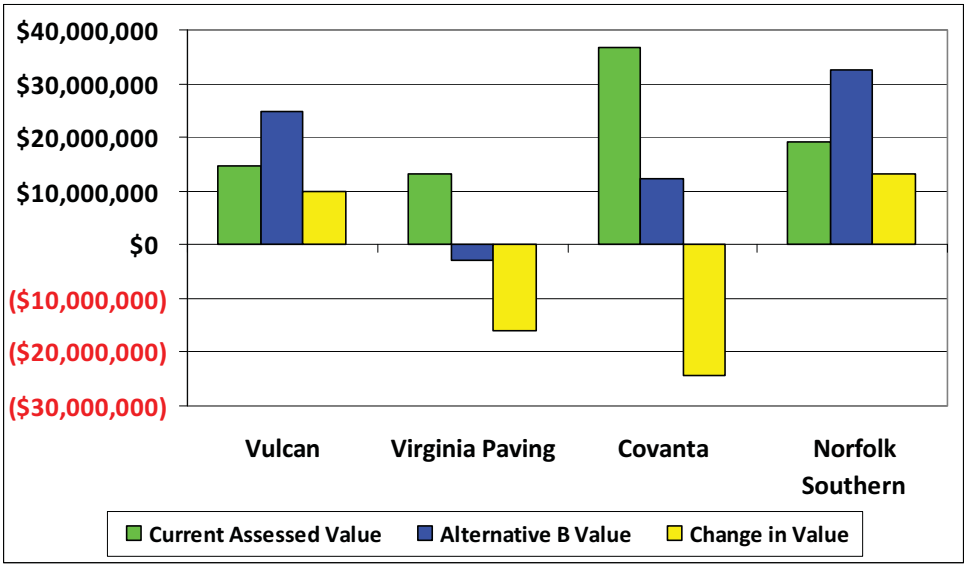
[1] It is also important to consider that the plant received $43 million retrofit in2001 for an advanced pollution control system.

for the redevelopment as a whole, due for the most part by the substantial loss of value from redeveloping the Covanta parcel. The removal of the Covanta parcel from the scenario yields an overall increase in land value of $22 million for the three remaining parcels although the potential to redevelop the Norfolk Southern parcel without Covanta is limited.

Alternative B

Alternative B yields an overall change in residual land value of negative $17.1 million, with $10.2 million for Vulcan, negative $16.1 million for Virginia Paving, $13.1 million for Norfolk Southern, and negative $24.3 million for Covanta, as shown below (Figure 10).

Figure F-2: Financial Performance of Alternative B



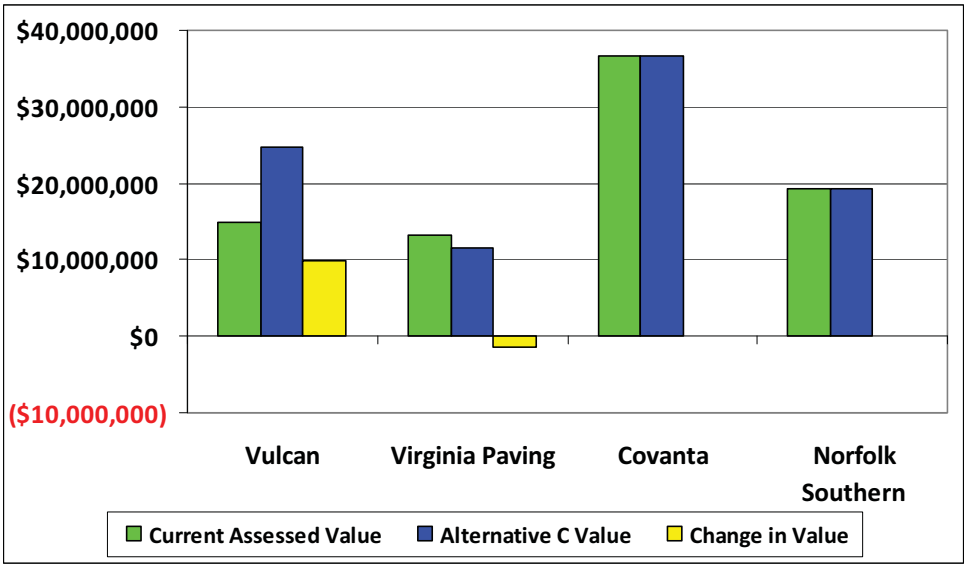
Source: BAE, 2009.

Consistent with the defined alternative, the only value that changes is that of Virginia Paving. The change from constructing mixed use residential and retail uses to that of park space results in a negative residual land value for the parcel.

Alternative C

Alternative C yields a change in value of $10.2 million for Vulcan, negative $1.2 million for Virginia Paving, and no change in value in the Norfolk Southern and Covanta parcels, as shown below.

Figure F-3: Financial Performance of Alternative C



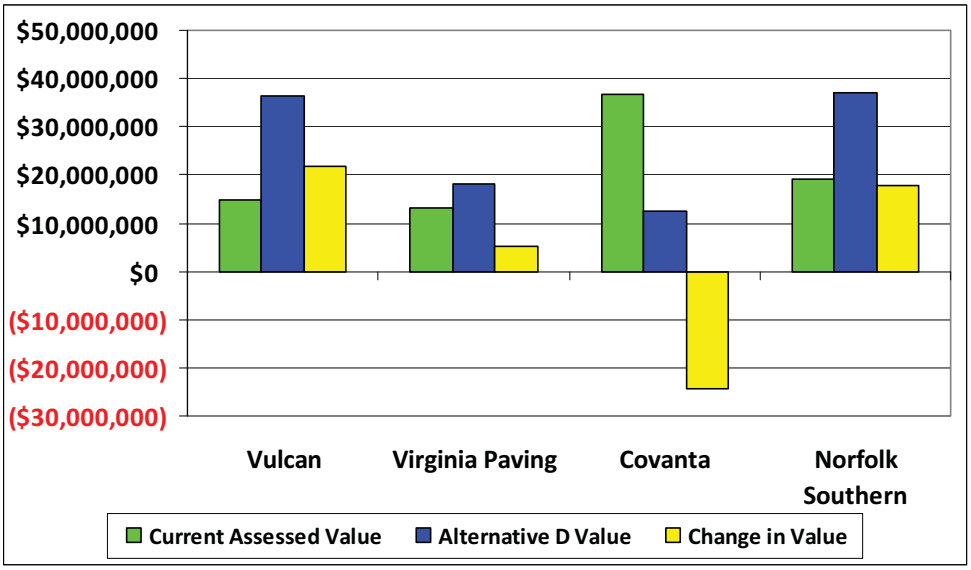
Source: BAE, 2009.

Vulcan and Virginia Paving show the same results for Alternative A, and no development occurs on the Norfolk Southern and Covanta parcels. As such, the overall change in parcel value for Virginia Paving and Vulcan is $9 million.

Alternative D

Alternative D yields an overall change in residual land value of $20.9 million, although this calculation does not include a project-wide negative $25 million for a multi-modal bridge. Parcel specific incremental value changes are $22 million for Vulcan, $5.3 million for Virginia Paving, $17.9 million for Norfolk Southern, and negative $24.2 million for Covanta, as shown in the following chart.

Figure F-4: Financial Performance of Alternative D

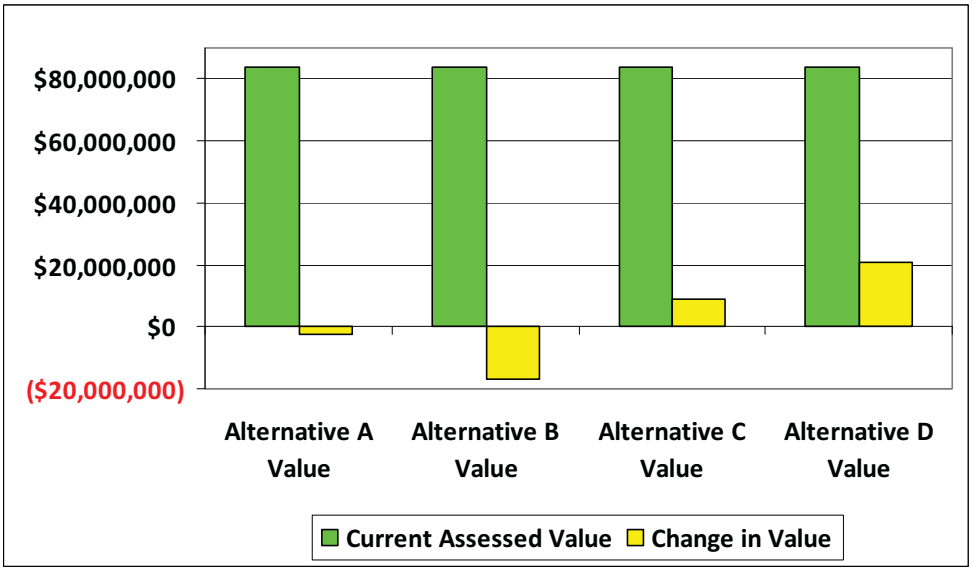


Source: BAE, 2009.

Other than Covanta, which still suffers from its $41 million redevelopment hurdle, the parcels experience a higher residual land value relative to the other alternatives. This positive result is primarily due to the attributes of TOD, which includes a 5 percent premium on sale prices and lease rates, as well as a denser overall development, yielding a larger development program as a whole. However, the $25 million bridge offsets these gains in value.

These preliminary financial findings indicate that Alternative C may be viable before factoring in relocation/cessation costs. The following chart highlights the combined incremental change in land value by redevelopment alternative, before factoring costs associated with relocation, cessation, the $7.5 million architectural enhancement of Covanta or the multi-modal bridge in Alternative D.

FigureF-5: Comparison of Total Residual Land Value by Alternative



Source: BAE, 2009.

Alternative C and D experience an improvement in residual land value, while Alternatives A and B show decreases in value. These lower residual land values indicate that the alternatives do not "pencil" from a preliminary financial analysis perspective, although Alternative A is only slightly negative, indicating that minor changes in the scenario may yield positive results. In each scenario, the redevelopment of the Covanta parcel creates a large enough loss in value to more than offset the positive incremental changes on the remaining parcels, indicating that Covanta's inclusion in any redevelopment scenario does not make financial sense.

Financial Feasibility and Relocation/Cessation Costs

Although the redevelopment alternatives pass this preliminary financial test, suggesting the financial viability from the perspective of the landowner/developer, the decision to redevelop also hinges on the project's ability to cover the costs associated with relocation and/or cessation of existing businesses on the parcels, as well as major project-wide costs that may not be borne by the property owners, including the multi-model bridge in Alternative D and the architectural enhancement of Covanta in each scenario. Not only do the alternatives have to show positive incremental change in land values, this change has to be sufficiently positive to cover these costs associated with redevelopment, relocation and/or cessation to proceed further without public subsidy.

Table 8 summarizes potential costs associated with the removal of three of the existing uses. Estimated relocation costs and business cessation cost ranges were calculated for Vulcan

Materials and Virginia Paving. For the Covanta facility, the cost of the construction for a transfer station to replace the facility was considered the most cost effective alternative. The estimated costs would be $9 to $10 million for the facility, plus a minimum of $1.3 million for transfer trailers. Additional costs would include tractors to haul the waste, soft costs, and land costs. For Norfolk Southern, no relocation sites for the transloading facility were found that would compare to the current location, and the cost to incent Norfolk Southern's disposal of the property is difficult to estimate because no good methods for valuing the transloading operation were found.

TableF-6: Potential Range of Business Relocation and Cessation Costs

	Vulcan Materials	Virginia Paving	Covanta A/A/ Facility
Business Relocation			
Land Purchase (a)	$15 million	$9 million to $13 million	n/a
Relocation Costs	$500,000	$1.5 million	n/a
Business Cessation (b)	$15 to $17 million	$23 to $27 million	$11.5 million plus land, tractors and soft costs

Notes:

(a) Estimated land purchase costs calculated as a range including the rounded current assessed value of their existing land and a $1 million per acre cost for the land required for relocation.

(b) Business cessation for Covanta facility covers the cost to build a transfer station to replace the existing facility.

Source: BAE, 2009

Given this imbalance in financial return relative to the costs associated with relocation/cessation for the various landowners, there is currently not sufficient financial incentive for redevelopment to take place across the study area. Given the preliminary estimates in the change in land value for the Vulcan property, compared to potential relocation or business cessation costs, Vulcan Materials may find a financial benefit to selling its site if the proper zoning were in place to facilitate redevelopment. Otherwise, any redevelopment under current conditions would require some sort of public subsidy to bridge the gap between the financial return detailed above and the current relocation/cessation costs. The following section details the costs and benefits of these redevelopment alternatives to the city of Alexandria, and the strongly positive net fiscal impact of the alternatives may indicate one potential source to bridge this gap.

Documentation

The following tables provide additional detail on development assumptions and findings.

Table F-7: Summary Findings: All Alternatives

	Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
Estimated Current Value (a)	$14,827,000	$13,162,000	$36,676,000	$19,283,000	$64,670,000
Alternative A Value	$24,718,000	$11,651,000	$12,389,000	$32,423,000	$48,758,000
Change in Value	$9,891,000	($1,511,000)	($24,287,000)	$13,140,000	($2,767,000)
Alternative B Value	$24,713,000	($2,942,000)	$12,385,000	$32,419,000	$34,156,000
Change in Value	$9,886,000	($16,104,000)	($24,291,000)	$13,136,000	($17,373,000)
Alternative C Value	$24,718,000	$11,651,000	$36,676,000	$19,283,000	$73,045,000
Change in Value	$9,891,000	($1,511,000)	$0	$0	$8,375,000
Alternative D Value	$36,500,000	$18,187,000	$12,464,000	$37,162,000	$67,151,000
Change in Value	$21,673,000	$5,025,000	($24,212,000)	$17,879,000	$2,481,000

Notes:
(a) Based on most recent tax assessments which are 100% of estimated fair market value

Source: City of Alexandria, 2009; BAE, 2009.

Table F-10: Parcel Size

Site	Address	Size (SF)	Acres	Land Assessment	Building Assessment
Vulcan Yard	698 Burnside Place	170,228	3.9	$1,688,300	n/a
Vulcan Yard	701 S Van Dorn Street	600,488	13.8	$13,138,700	n/a
Vulcan Total		**770,716**	**17.7**	**$14,827,000**	**n/a**
Virginia Paving	720 Van Dorn Street	23,322	0.5	$615,450	n/a
Virginia Paving	730 Van Dorn Street	34,533	0.8	$911,300	n/a
Virginia Paving	750 Van Dorn Street	31,095	0.7	$820,600	n/a
Virginia Paving (Land)	5603 Courtney Avenue	212,828	4.9	$5,615,040	n/a
Virginia Paving (Office/Warehouse)	5601 Courtney Avenue	189,537	4.4	$5,002,200	$197,100
Virginia Paving Total		**491,315**	**11.3**	**$12,964,590**	**$197,100**
Covanta Waste-to-Energy	5301 Eisenhower Avenue	142,197	3.3	$5,641,700	$21,000,000
Covanta Waste-to-Energy	5281 Eisenhower Avenue	90,325	2.1	$3,583,700	n/a
Covanta Waste-to-Energy	5263 Eisenhower Avenue	4,036	0.1	$160,200	n/a
Covanta Waste-to-Energy	5225 Eisenhower Avenue	36,876	0.8	$1,463,100	n/a
Covanta Waste-to-Energy Total		**273,434**	**6.3**	**$10,848,700**	**$25,827,351**
Norfolk Southern (a)		**619,260**	14.2	$19,282,952	0

Notes:
(a) Includes portions of a rail spur that can be abandoned if the transloading facility ceases operation, as well as a two acre parcel owned by Norfolk Southern.

Source: City of Alexandria Geographic Information Systems, 2009; City of Alexandria Real Estate Department, 2009; ESRI; BAE, 2009.

Table F-11: Projected Construction Costs

Land Use	Hard Costs Per Sq. Ft.	Location Factor	Total Costs Per Sq. Ft.
Office, Class A (a)	$149.32	0.95	$141.85
Retail (b)	$108.70	0.95	$103.26
Townhouse (c)	$103.80	1.07	$111.07
Multifamily (d)	$155.82	0.95	$148.03

Notes:
(a) Assumes a 200,000 sf 11-20-story office building, consisting of double glazed heat absorbing tinted plate glass panels and a steel frame, less six percent architectural fees.
(b) Assumes a 10,000 sf building, consisting of a brick face on concrete block and steel joists, less eight percent architectural fees.
(c) Assumes a 2,100 sf three-story townhouse, consisting of a brick veneer and wood frame.
(d) Assumes an approximately 45,000 sf four-story apartment building, consisting of a brick face with concrete block back-up and a steel frame, less seven percent architectural fees.

Source: R.S. Means, 2009; BAE, 2009.

Table F-12: Common Assumptions Across All Alternatives

		Parcel 1		Parcel 2		
		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
Site Characteristics						
Site Area, Sq.Ft.		770,716.0	491,315.0	273,434	619,260	2,154,725
Site Area, Acres		17.7	11.3	6.3	14.2	49.5
Developable Area Excluding Protected Areas		10.6	3.7	3.8	5.1	23.2
Current Assessed Value		$14,827,000	$13,162,000	$36,676,000	$19,283,000	83,948,000
Densities (a)						
Residential Densities -Developable Area Gross						
Midrise Multifamily (DU/acre)	90					
Multifamily (DU/acre)	65					
Townhome (DU/acre)	20					
Office FAR -(Developable Area Gross)	2.0					
Residential Component (b)						
Multifamily Tenure						
% For-Sale Units	75%					
% Rental Units	25%					
Multifamily For-Sale						
Unit Size		1,050	1,050	1,050	1,050	
Sale Price		$385,000	$385,000	$385,000	$385,000	
$/Sq. Ft.		$367	$367	$367	$367	
Townhomes						
Unit Size		1,900	1,900	1,900	1,900	
Sale Price		$550,000	$550,000	$550,000	$550,000	
$/Sq. Ft.		$289	$289	$289	$289	
Multifamily Rental						
Unit Size		1,050	1,050	1,050	1,050	
Monthly Rent		$2,300	$2,300	$2,300	$2,300	
$/Sq. Ft.		$2.19	$2.19	$2.19	$2.19	
Stabilized Occupancy %		95%	95%	95%	95%	
Cap Rate		7.0%	7.0%	7.0%	7.0%	
TOD Premium		0.0%	5.0%	5.0%	5.0%	
Commercial Component (b)						
Office						
Leasable %		95%	95%	95%	95%	
Lease Rate (Monthly/Sq. Ft. NNN)		$3.20	$3.20	$3.20	$3.20	
Cap Rate		7.5%	7.5%	7.5%	7.5%	
Retail						
Leasable %		95%	95%	95%	95%	
Lease Rate (Monthly/Sq. Ft. NNN)		$2.75	$2.75	$2.75	$2.75	
Cap Rate		7.5%	7.5%	7.5%	7.5%	
Parking Requirements (a)						
Townhomes (2-Car Garage Assumed, Additional 15%)		15%	15%	15%	15%	
Multifamily (per Unit)		1.4	1.4	1.4	1.4	
Multifamily (per Unit, w/Metro Bridge)		1.0	1.0	1.0	1.0	
Multifamily Visitor Parking		15%	15%	15%	15%	
Office (per 1,000 Sq. Ft)		2.03	2.03	2.03	2.03	
Office Near Metro (per 1,000 Sq. Ft)		1.67	1.67	1.67	1.67	
Retail (Per 1,000 Sq. Ft.)		3.0	3.0	3.0	3.0	
Hard and Soft Costs (c)						
Multifamily Construction Costs (per sq. ft.)		$145	$145	$145	$145	
Mid Rise Multifamily Construction Costs (per sq. ft.)		$185	$185	$185	$185	
Townhome Construction Costs (per sq. ft.)		$110	$110	$110	$110	
Office Construction Costs (per sq. ft.)		$135	$135	$135	$135	
Retail Construction Costs (per sq. ft.)		$145	$145	$135	$135	
Office Tenant Improvement Allowance (per GLA)		$40	$40	$40	$40	
Retail Tenant Improvement Allowance (per GLA)		$10	$10	$10	$10	
Cost/Parking Space - Underground		$32,000	$32,000	$32,000	$32,000	
Cost/Parking Space - Structured		$22,000	$22,000	$22,000	$22,000	
Cost/Parking Space - Surface		$5,000	$5,000	$5,000	$5,000	
Soft Costs (as % of hard and site costs)		20%	20%	20%	20%	
Developer Profit (as % of total development cost)		12%	12%	12%	12%	
Financing Costs (d)						
Interest Rate		8.0%	8.0%	8.0%	8.0%	
Initial Construction Loan Fee (Points)		2.0%	2.0%	2.0%	2.0%	
Average Outstanding Balance		60%	60.0%	60.0%	60.0%	
Loan to Cost Ratio		80%	80.0%	80.0%	80.0%	

Notes:
(a) Based on City of Alexandria recommendations.
(b) Based on BAE market analysis.
(c) Based on Korpacz building types defined on Table A-3.

Source: Korpacz; City of Alexandria, 2009; BAE, 2009.

Table F-13: Developable Site Area and Density Calculations, All Alternatives

	Vulcan	Virginia Paving	Norfolk Southern	Covanta	Total
Site Characteristics					
Site Area, Sq.Ft.	770,716	491,315	619,260	273,434	2,154,725
Site Area, Acres	17.7	11.3	14.2	6.3	49.5
RPA, Sq. Ft.	285,855	171,857	395,602	107,346	960,660
Estimated Flood Plain Coverage Outside RPA	5%	50%	0%	0%	
Developable Site Area, Sq. Ft.	460,618	159,729	223,658	166,088	1,010,093
Developable Site Area, Acres	10.6	3.7	5.1	3.8	23.2
Percent of Site Undevelopable	40%	67%	64%	39%	53%
Alternative A					
Residential Units	530	184	0	0	714
Gross Residential Density (du/acre)	30	16	0	0	
Residential Density - Developable Site Area (du/acre)	50	50	0	0	
FAR (Residential & Commercial Gross)	0.8	0.5	1.0	1.9	0.9
FAR (Residential & Commercial Developable Area)	1.4	1.5	2.7	3.1	2.0
Alternative B					
Residential Units	530	0	0	0	530
Gross Residential Density (du/acre)	30	0	0	0	
Residential Density - Developable Site Area (du/acre)	50	0	0	0	
FAR (Residential & Commercial Gross)	0.8	0	1.0	1.9	0.8
FAR (Residential & Commercial Developable Area)	1.4	0	2.7	3.1	1.7
Alternative C					
Residential Units	530	184	0	0	714
Gross Residential Density (du/acre)	30	16	0	0	
Residential Density - Developable Site Area (du/acre)	50	50	0	0	
FAR (Residential & Commercial Gross)	0.8	0.5	0	0	0.4
FAR (Residential & Commercial Developable Area)	1.4	1.5	0	0	0.9
Alternative D					
Residential Units	449	156	347	206	1,158
Gross Residential Density (du/acre)	25	14	24	33	
Residential Density - Developable Site Area (du/acre)	43	43	68	54	
FAR (Residential & Commercial Gross)	0.8	0.4	1.2	1.7	0.9
FAR (Residential & Commercial Developable Area)	1.3	1.3	3.2	2.9	2.0

Source: City of Alexandria, 2009; BAE, 2009.

Table F-14: Alternative A Summary: Findings, Development Program, and Assumptions

		Parcel 1		Parcel 2		
		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
TOTAL NET REVENUE						
Total Net Revenue		*$193,613,866*	*$71,781,541*	*$209,384,750*	*$248,952,250*	*$723,732,406*
Net Residential Sales Revenue		$186,507,866	$64,675,541	$0	$0	*$251,183,406*
Net Commercial Sales Revenue		$7,106,000	$7,106,000	$209,384,750	$248,952,250	*$472,549,000*
Total Development Cost		*$168,896,183*	*$60,130,426*	*$196,995,836*	*$216,528,927*	*$642,551,372*
Residual Land Value (Revenue Less Costs)		**$24,717,683**	**$11,651,114**	**$12,388,914**	**$32,423,323**	**$81,181,035**
Current Assessed Value for Land at Site		**$14,827,000**	**$13,162,000**	**$36,676,000**	**$19,283,000**	**$83,948,000**
Incremental Value/(Financing Gap)		**$9,891,000**	**-$1,511,000**	**-$24,287,000**	**$13,140,000**	**-$2,767,000**
SCENARIO-SPECIFIC ASSUMPTIONS						
Site Characteristics						
Open Space						
Gross DU/Acre - Parcel 1 Developable Area		50	50	0	0	50
Commercial Gross FAR - Parcel 2		0.03	0.04	1.9	1.0	
Residential Component (Parcel 1)						
Land Breakdown						
Multifamily Share		67%				
Townhome Share		33%				
Total Number of Units		530	184	0	0	714
Multifamily For-Sale		345	120	0	0	465
Townhomes		70	24	0	0	94
Multifamily Rental		115	40	0	0	155
Commercial Component						
Office Sq. Ft.		0	0	500,000	600,000	1,100,000
Leasable Area - (95% Occupancy)		0	0	475,000	570,000	1,045,000
Retail Sq. Ft.		20,000	20,000	7,500	2,500	50,000
Leasable Area - (95% Occupancy)		19,000	19,000	7,125	2,375	47,500
Parking Requirements						
Parking Spaces		726	291	1,038	1,226	3,279
Underground	100%	645	224	1015	1218	3,101
Structured	0%	0	0	0	0	0
Surface		81	67	23	8	178
SCENARIO-SPECIFIC COST ASSUMPTIONS						
Hard and Soft Costs						
On & Off-Site Improvements		$2,875,600	$1,452,500	$2,095,200	$2,216,400	
On & Off-Site Improvements (per acre)		$162,500	$128,800	$333,800	$155,900	
Redevelopment Costs						
Demolition		$0	$100,000	$15,000,000	$0	
Environmental Remediation		$40,500	$608,500	$174,000	$80,000	
Financing Assumptions						
Period of Initial Loan (Months)		28	10	20	24	

Source: City of Alexandria, 2009; MACTEC, 2009; BAE, 2009.

Table F-15: Alternative B Summary: Findings, Development Program, and Assumptions

		Parcel 1		Parcel 2		
		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
TOTAL NET REVENUE						
Total Net Revenue		*$193,613,866*	*$0*	*$209,384,750*	*$248,952,250*	*$651,950,866*
Net Residential Sales Revenue		$186,507,866	$0	$0	$0	*$186,507,866*
Net Commercial Sales Revenue		$7,106,000	$0	$209,384,750	$248,952,250	*$465,443,000*
Total Development Cost		*$168,901,143*	*$2,941,750*	*$196,999,708*	*$216,533,576*	*$585,376,177*
Residual Land Value (Revenue Less Costs)		**$24,712,723**	**-$2,941,750**	**$12,385,042**	**$32,418,674**	**$66,574,689**
Current Assessed Value for Land at Site		**$14,827,000**	**$13,162,000**	**$36,676,000**	**$19,283,000**	**$83,948,000**
Incremental Value/(Financing Gap)		**$9,886,000**	**-$16,104,000**	**-$24,291,000**	**$13,136,000**	**-$17,373,000**
SCENARIO-SPECIFIC ASSUMPTIONS						
Site Characteristics						
Open Space						
Gross DU/Acre - Parcel 1 Developable Area		50	0	0	0	18
Commercial Gross FAR - Parcel 2		0.03	0.00	1.9	1.0	
Residential Component (Parcel 1)						
Land Breakdown						
Multifamily Share		67%	0%			
Townhome Share		33%	0%			
Total Number of Units		530	0	0	0	530
Multifamily For-Sale		345	0	0	0	345
Townhomes		70	0	0	0	70
Multifamily Rental		115	0	0	0	115
Commercial Component						
Office Sq. Ft.		0	0	500,000	600,000	1,100,000
Leasable Area - (95% Occupancy)		0	0	475,000	570,000	1,045,000
Retail Sq. Ft.		20,000	0	7,500	2,500	30,000
Leasable Area - (95% Occupancy)		19,000	0	7,125	2,375	28,500
Parking Requirements						
Parking Spaces		726	0	1,038	1,226	2,989
Underground	#	645	0	1015	1218	2,878
Structured	#	0	0	0	0	0
Surface		81	0	23	8	111
SCENARIO-SPECIFIC COST ASSUMPTIONS						
Hard and Soft Costs						
On & Off-Site Improvements		$2,875,600	$2,233,000	$2,095,200	$2,216,400	
On & Off-Site Improvements (per acre)		$162,500	$198,000	$333,800	$155,900	
Redevelopment Costs						
Demolition		$0	$100,000	$15,000,000	$0	
Environmental Remediation		$40,500	$608,500	$174,000	$80,000	
Financing Assumptions						
Period of Initial Loan (Months)		28	0	20	24	

Source: City of Alexandria, 2009; BAE, 2009.

Table F-16: Alternative C Summary: Findings, Development Program, and Assumptions

		Parcel 1		Parcel 2		
		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
TOTAL NET REVENUE						
Total Net Revenue		*$193,613,866*	*$71,781,541*	*$0*	*$0*	*$265,395,406*
Net Residential Sales Revenue		$186,507,866	$64,675,541	$0	$0	*$251,183,406*
Net Commercial Sales Revenue		$7,106,000	$7,106,000	$0	$0	*$14,212,000*
Total Development Cost		*$168,896,183*	*$60,130,426*	*$7,500,000*	*$0*	*$236,526,609*
Residual Land Value (Revenue Less Costs)		**$24,717,683**	**$11,651,114**	**$29,176,000**	**$19,283,000**	**$84,827,797**
Current Assessed Value for Land at Site		**$14,827,000**	**$13,162,000**	**$36,676,000**	**$19,283,000**	**$83,948,000**
Incremental Value/(Financing Gap)		**$9,891,000**	**-$1,511,000**	**-$7,500,000**	**$0**	**$880,000**
SCENARIO-SPECIFIC ASSUMPTIONS						
Site Characteristics						
Open Space						
Gross DU/Acre - Parcel 1 Developable Area		50	50	0	0	50
Commercial Gross FAR - Parcel 2		0.03	0.04	0.00	0.00	
Residential Component (Parcel 1)						
Land Breakdown						
Multifamily Share	67%					
Townhome Share	33%					
Total Number of Units		530	184	0	0	714
Multifamily For-Sale		345	120	0	0	465
Townhomes		70	24	0	0	94
Multifamily Rental		115	40	0	0	155
Commercial Component						
Office Sq. Ft.		0	0	0	0	0
Leasable Area - (95% Occupancy)		0	0	0	0	0
Retail Sq. Ft.		20,000	20,000	0	0	40,000
Leasable Area - (95% Occupancy)		19,000	19,000	0	0	38,000
Parking Requirements						
Parking Spaces		726	291	0	0	1,016
Underground	100%	645	224	0	0	868
Structured	0%	0	0	0	0	0
Surface		81	67	0	0	148
SCENARIO-SPECIFIC COST ASSUMPTIONS						
Hard and Soft Costs						
On & Off-Site Improvements		$2,875,600	$1,452,500	$0	$0	
On & Off-Site Improvements (per acre)		$162,500	$128,800	$0	$0	
Redevelopment Costs						
Demolition/Architectural Enhancement (a)		$0	$100,000	$7,500,000	$0	
Environmental Remediation		$40,500	$608,500	$0	$0	
Financing Assumptions						
Period of Initial Loan (Months)		28	10	0	0	

Notes:
(a) Includes $7,500,000 to architecturally enhance Covanta (HDR).

Source: HDR, 2009; City of Alexandria, 2009; BAE, 2009.

Table F-17: Alternative D Summary: Findings, Development Program, and Assumptions

		Parcel 1		Parcel 2		
		Vulcan	Virginia Paving	Covanta	Norfolk Southern	Total
TOTAL NET REVENUE						
Total Net Revenue		*$174,328,740*	*$68,348,717*	*$181,763,814*	*$271,438,401*	*$695,879,671*
Net Residential Sales Revenue		$167,222,740	$60,887,417	$70,437,826	$118,566,538	*$417,114,521*
Net Commercial Sales Revenue		$7,106,000	$7,461,300	$111,325,988	$152,871,863	*$278,765,150*
Total Development Cost		*$137,828,758*	*$50,162,146*	*$169,300,128*	*$234,276,140*	*$591,567,172*
Bridge Cost						*$25,000,000*
Residual Land Value (Revenue Less Costs)		**$36,499,982**	**$18,186,571**	**$12,463,686**	**$37,162,261**	**$79,312,499**
Current Assessed Value for Land at Site		**$14,827,000**	**$13,162,000**	**$36,676,000**	**$19,283,000**	**$83,948,000**
Incremental Value/(Financing Gap)		**$21,673,000**	**$5,025,000**	**-$24,212,000**	**$17,879,000**	**-$4,635,501**
SCENARIO-SPECIFIC ASSUMPTIONS						
Site Characteristics						
Open Space						
Gross DU/Acre - Parcel 1 Developable Area		43	43	54	68	40
Commercial Gross FAR - Parcel 2		0.03	0.04	0.91	0.57	
Residential Component						
Percent of Developable Land Used as Residential				60%	75%	
Land Breakdown						
Low Rise Multifamily Share		50%	50%	0	0	
Townhome Share		50%	50%	N/A	N/A	
Mid Rise Multifamily Share		N/A	N/A	100%	100%	
Total Number of Units		449	156	206	347	1,158
Multifamily For-Sale		258	89	154	260	761
Townhomes		106	37			142
Multifamily Rental		86	30	51	87	254
Commercial Component						
Office Sq. Ft.		0	0	250,000	350,000	600,000
Leasable Area - (95% Occupancy)		0	0	237,500	332,500	570,000
Retail Sq. Ft.		20,000	20,000	7,500	2,500	50,000
Leasable Area - (95% Occupancy)		19,000	19,000	7,125	2,375	47,500
Parking Requirements						
Parking Spaces		435	190	646	939	2,210
Underground	100%	344	119	623	931	2,017
Structured	0%	0	0	0	0	0
Surface		92	71	23	8	193
SCENARIO-SPECIFIC COST ASSUMPTIONS						
Hard and Soft Costs						
On & Off-Site Improvements		$2,875,600	$1,452,500	$2,095,200	$2,216,400	
On & Off-Site Improvements (per acre)		$162,500	$128,800	$333,800	$155,900	
Redevelopment Costs						
Demolition		$0	$100,000	$15,000,000	$0	
Environmental Remediation		$40,500	$608,500	$174,000	$80,000	
Financing Assumptions						
Period of Initial Loan (Months)		24	8	10	17	

Source: City of Alexandria, 2009; BAE, 2009.

Table F-18: Pro-Forma for Alternative A, Vulcan Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	770,716
Site Area, Acres	17.7
Gross DU/Acre	50
Residential Component	
Total Number of Units	530
Multifamily For-Sale	
Total Units	345
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	70
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	115
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	616,140
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	20,000
Leasable %	95%
Leasable Area	19,000
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	645
Structured	0
Surface	81

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$162,500
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,447,125
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$40,500
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	28
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$136,487,121
Amount of Loan	$109,189,697

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$84,699,219
Office Construction Costs	$0
Retail Construction Costs	$2,900,000
On & Off-Site Improvements	$2,875,146
Tenant Improvement Allowances	$190,000
Impact Fees	$2,447,125
Parking Costs	$21,035,633
Other Soft Costs	$22,339,999
Redevelopment Costs	$40,500
Financing Costs	
Interest on Construction Loan	$12,088,748
Points on Construction Loan	$2,183,794
Developer Profit	$18,096,020
Total Development Cost	**$168,896,183**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$171,357,729
Less Commissions/Marketing	5%	-$8,567,886
Net Residential Sales Revenue		$162,789,842
Annual Office Lease Revenue		$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$627,000
Less Vacancy	10%	-$62,700
Less Commissions/Marketing	5%	-$31,350
Annual Net Operating Income		$532,950
Net Retail Sales Revenue		$7,106,000
Annual Residential Rental Revenue		$3,018,658
Less Direct and Fixed Expenses	45%	-$1,358,396
Annual Net Operating Income		$1,660,262
Net Residential Rental Revenue		$23,718,023
Total Net Revenue		$193,613,866
Less Development Costs		-$168,896,183
Residual Land Value		**$24,717,683**
Land Value/ Sq. Ft.		**$32.07**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-19: Pro-Forma for Alternative A, Virginia Paving Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	491,315
Site Area, Acres	11.3
Gross DU/Acre	50
Residential Component	
Total Number of Units	184
Multifamily For-Sale	
Total Units	120
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	24
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	40
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	213,660
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	20,000
Leasable %	95%
Leasable Area	19,000
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	224
Structured	0
Surface	67

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$128,800
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$929,565
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$100,000
Environmental Remediation	$608,500
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	10
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$50,614,966
Amount of Loan	$40,491,973

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$29,371,242
Office Construction Costs	$0
Retail Construction Costs	$2,900,000
On & Off-Site Improvements	$1,452,740
Tenant Improvement Allowances	$190,000
Impact Fees	$929,565
Parking Costs	$7,490,518
Other Soft Costs	$8,280,900
Redevelopment Costs	$708,500
Financing Costs	
Interest on Construction Loan	$1,554,574
Points on Construction Loan	$809,839
Developer Profit	$6,442,546
Total Development Cost	**$60,130,426**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$59,421,911
Less Commissions/Marketing	5%	-$2,971,096
Net Residential Sales Revenue		$56,450,815
Annual Office Lease Revenue		$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$627,000
Less Vacancy	10%	-$62,700
Less Commissions/Marketing	5%	-$31,350
Annual Net Operating Income		$532,950
Net Retail Sales Revenue		$7,106,000
Annual Residential Rental Revenue		$1,046,783
Less Direct and Fixed Expenses	45%	-$471,052
Annual Net Operating Income		$575,731
Net Residential Rental Revenue		$8,224,725
Total Net Revenue		$71,781,541
Less Development Costs		-$60,130,426
Residual Land Value		**$11,651,114**
Land Value/ Sq. Ft.		**$23.71**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-20: Pro-Forma for Alternative A, Covanta Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	273,434
Site Area, Acres	6.3
Gross DU/Acre	0
Residential Component	
Total Number of Units	0
Multifamily For-Sale	
Total Units	0
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	0
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	0
Commercial Component	
Office Sq. Ft.	500,000
Leasable %	95%
Leasable Area	475,000
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	7,500
Leasable %	95%
Leasable Area	7,125
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	1015
Structured	0
Surface	23

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$333,800
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$1,952,268
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$15,000,000
Environmental Remediation	$174,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	20
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$148,678,156
Amount of Loan	$118,942,525

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$0
Office Construction Costs	$67,500,000
Retail Construction Costs	$1,012,500
On & Off-Site Improvements	$2,095,323
Tenant Improvement Allowances	$19,071,250
Impact Fees	$1,952,268
Parking Costs	$32,592,500
Other Soft Costs	$24,454,315
Redevelopment Costs	$15,174,000
Financing Costs	
Interest on Construction Loan	$9,658,133
Points on Construction Loan	$2,378,850
Developer Profit	$21,106,697
Total Development Cost	**$196,995,836**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$0
Less Commissions/Marketing	5%	$0
Net Residential Sales Revenue		$0
Annual Office Lease Revenue		$18,240,000
Less Vacancy	10%	-$1,824,000
Less Commissions/Marketing	5%	-$912,000
Annual Net Operating Income		$15,504,000
Net Office Sales Revenue		$206,720,000
Annual Retail Lease Revenue		$235,125
Less Vacancy	10%	-$23,513
Less Commissions/Marketing	5%	-$11,756
Annual Net Operating Income		$199,856
Net Retail Sales Revenue		$2,664,750
Annual Residential Rental Revenue		$0
Less Direct and Fixed Expenses	45%	$0
Annual Net Operating Income		$0
Net Residential Rental Revenue		$0
Total Net Revenue		$209,384,750
Less Development Costs		-$196,995,836
Residual Land Value		**$12,388,914**
Land Value/ Sq. Ft.		**$45.31**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-21: Pro-Forma for Alternative A, Norfolk Southern Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	619,260
Site Area, Acres	14.2
Gross DU/Acre	0
Residential Component	
Total Number of Units	0
Multifamily For-Sale	
Total Units	0
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	0
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	0
Commercial Component	
Office Sq. Ft.	600,000
Leasable %	95%
Leasable Area	570,000
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	2,500
Leasable %	95%
Leasable Area	2,375
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	1218
Structured	0
Surface	8

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$155,900
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,317,717
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$80,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	24
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$176,786,994
Amount of Loan	$141,429,595

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$0
Office Construction Costs	$81,000,000
Retail Construction Costs	$337,500
On & Off-Site Improvements	$2,216,314
Tenant Improvement Allowances	$22,823,750
Impact Fees	$2,317,717
Parking Costs	$39,013,500
Other Soft Costs	$29,078,213
Redevelopment Costs	$80,000
Financing Costs	
Interest on Construction Loan	$13,633,813
Points on Construction Loan	$2,828,592
Developer Profit	$23,199,528
Total Development Cost	**$216,528,927**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$0
Less Commissions/Marketing	5%	$0
Net Residential Sales Revenue		$0
Annual Office Lease Revenue		$21,888,000
Less Vacancy	10%	-$2,188,800
Less Commissions/Marketing	5%	-$1,094,400
Annual Net Operating Income		$18,604,800
Net Office Sales Revenue		$248,064,000
Annual Retail Lease Revenue		$78,375
Less Vacancy	10%	-$7,838
Less Commissions/Marketing	5%	-$3,919
Annual Net Operating Income		$66,619
Net Retail Sales Revenue		$888,250
Annual Residential Rental Revenue		$0
Less Direct and Fixed Expenses	45%	$0
Annual Net Operating Income		$0
Net Residential Rental Revenue		$0
Total Net Revenue		$248,952,250
Less Development Costs		-$216,528,927
Residual Land Value		**$32,423,323**
Land Value/ Sq. Ft.		**$52.36**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-22: Pro-Forma for Alternative B, Vulcan Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	770,716
Site Area, Acres	17.7
Gross DU/Acre	50
Residential Component	
Total Number of Units	530
Multifamily For-Sale	
Total Units	345
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	70
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	115
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	616,140
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	20,000
Leasable %	95%
Leasable Area	19,000
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	645
Structured	0
Surface	81

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$162,500
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,451,134
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$40,500
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	28
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$136,491,130
Amount of Loan	$109,192,904

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$84,699,219
Office Construction Costs	$0
Retail Construction Costs	$2,900,000
On & Off-Site Improvements	$2,875,146
Tenant Improvement Allowances	$190,000
Impact Fees	$2,451,134
Parking Costs	$21,035,633
Other Soft Costs	$22,339,999
Redevelopment Costs	$40,500
Financing Costs	
Interest on Construction Loan	$12,089,103
Points on Construction Loan	$2,183,858
Developer Profit	$18,096,551
Total Development Cost	**$168,901,143**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$171,357,729
Less Commissions/Marketing	5%	-$8,567,886
Net Residential Sales Revenue		$162,789,842
Annual Office Lease Revenue		$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$627,000
Less Vacancy	10%	-$62,700
Less Commissions/Marketing	5%	-$31,350
Annual Net Operating Income		$532,950
Net Retail Sales Revenue		$7,106,000
Annual Residential Rental Revenue		$3,018,658
Less Direct and Fixed Expenses	45%	-$1,358,396
Annual Net Operating Income		$1,660,262
Net Residential Rental Revenue		$23,718,023
Total Net Revenue		$193,613,866
Less Development Costs		-$168,901,143
Residual Land Value		**$24,712,723**
Land Value/ Sq. Ft.		**$32.06**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-23: Pro-Forma for Alternative B, Virginia Paving Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	491,315
Site Area, Acres	11.3
Gross DU/Acre	0
Residential Component	
Total Number of Units	0
Multifamily For-Sale	
Total Units	0
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	0
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	0
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	0
Structured	0
Surface	0

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$198,000
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$0
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	0%
Developer Profit (as % of Total Development Cost)	0%
Demolition	$100,000
Environmental Remediation	$608,500
Financing Costs	
Interest Rate	0%
Period of Initial Loan (Months)	6
Initial Construction Loan Fee (Points)	0%
Average Outstanding Balance	0%
Loan to Cost Ratio	0%
Hard & Soft Costs, Site Costs	$2,233,250
Amount of Loan	$0

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$0
Office Construction Costs	$0
Retail Construction Costs	$0
On & Off-Site Improvements	$2,233,250
Tenant Improvement Allowances	$0
Impact Fees	$0
Parking Costs	$0
Other Soft Costs	$0
Redevelopment Costs	$708,500
Financing Costs	
Interest on Construction Loan	$0
Points on Construction Loan	$0
Developer Profit	$0
Total Development Cost	**$2,941,750**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$0
Less Commissions/Marketing	5%	$0
Net Residential Sales Revenue		$0
Annual Office Lease Revenue		$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Retail Sales Revenue		$0
Annual Residential Rental Revenue		$0
Less Direct and Fixed Expenses	45%	$0
Annual Net Operating Income		$0
Net Residential Rental Revenue		$0
Total Net Revenue		$0
Less Development Costs		-2,941,750
Residual Land Value		**-2,941,750**
Land Value/ Sq. Ft.		**-5.99**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-24: Pro-Forma for Alternative B, Covanta Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	273,434
Site Area, Acres	6.3
Gross DU/Acre	0
Residential Component	
Total Number of Units	0
Multifamily For-Sale	
Total Units	0
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	0
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	0
Commercial Component	
Office Sq. Ft.	500,000
Leasable %	95%
Leasable Area	475,000
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	7,500
Leasable %	95%
Leasable Area	7,125
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	1015
Structured	0
Surface	23

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$333,800
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$1,955,467
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$15,000,000
Environmental Remediation	$174,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	20
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$148,681,354
Amount of Loan	$118,945,083

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$0
Office Construction Costs	$67,500,000
Retail Construction Costs	$1,012,500
On & Off-Site Improvements	$2,095,323
Tenant Improvement Allowances	$19,071,250
Impact Fees	$1,955,467
Parking Costs	$32,592,500
Other Soft Costs	$24,454,315
Redevelopment Costs	$15,174,000
Financing Costs	
Interest on Construction Loan	$9,658,341
Points on Construction Loan	$2,378,902
Developer Profit	$21,107,112
Total Development Cost	**$196,999,708**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$0
Less Commissions/Marketing	5%	$0
Net Residential Sales Revenue		$0
Annual Office Lease Revenue		$18,240,000
Less Vacancy	10%	-1824000
Less Commissions/Marketing	5%	-912000
Annual Net Operating Income		$15,504,000
Net Office Sales Revenue		$206,720,000
Annual Retail Lease Revenue		$235,125
Less Vacancy	10%	-$23,513
Less Commissions/Marketing	5%	-$11,756
Annual Net Operating Income		$199,856
Net Retail Sales Revenue		$2,664,750
Annual Residential Rental Revenue		$0
Less Direct and Fixed Expenses	45%	$0
Annual Net Operating Income		$0
Net Residential Rental Revenue		$0
Total Net Revenue		$209,384,750
Less Development Costs		-196999708
Residual Land Value		**$12,385,042**
Land Value/ Sq. Ft.		**$45.29**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-25: Pro-Forma for Alternative B, Norfolk Southern Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	619,260
Site Area, Acres	14.2
Gross DU/Acre	0
Residential Component	
Total Number of Units	0
Multifamily For-Sale	
Total Units	0
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	0
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	0
Commercial Component	
Office Sq. Ft.	600,000
Leasable %	95%
Leasable Area	570,000
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	2,500
Leasable %	95%
Leasable Area	2,375
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	1218
Structured	0
Surface	8

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$155,900
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,321,515
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$80,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	24
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$176,790,791
Amount of Loan	$141,432,633

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$0
Office Construction Costs	$81,000,000
Retail Construction Costs	$337,500
On & Off-Site Improvements	$2,216,314
Tenant Improvement Allowances	$22,823,750
Impact Fees	$2,321,515
Parking Costs	$39,013,500
Other Soft Costs	$29,078,213
Redevelopment Costs	$80,000
Financing Costs	
Interest on Construction Loan	$13,634,106
Points on Construction Loan	$2,828,653
Developer Profit	$23,200,026
Total Development Cost	**$216,533,576**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$0
Less Commissions/Marketing	5%	$0
Net Residential Sales Revenue		$0
Annual Office Lease Revenue		$21,888,000
Less Vacancy	10%	-$2,188,800
Less Commissions/Marketing	5%	-$1,094,400
Annual Net Operating Income		$18,604,800
Net Office Sales Revenue		$248,064,000
Annual Retail Lease Revenue		$78,375
Less Vacancy	10%	-$7,838
Less Commissions/Marketing	5%	-$3,919
Annual Net Operating Income		$66,619
Net Retail Sales Revenue		$888,250
Annual Residential Rental Revenue		$0
Less Direct and Fixed Expenses	45%	$0
Annual Net Operating Income		$0
Net Residential Rental Revenue		$0
Total Net Revenue		$248,952,250
Less Development Costs		-$216,533,576
Residual Land Value		**$32,418,674**
Land Value/ Sq. Ft.		**$52.35**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-26: Pro-Forma for Alternative D, Vulcan Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	770,716
Site Area, Acres	17.7
Gross DU/Acre	43
Residential Component	
Total Number of Units	449
Multifamily For-Sale	
Total Units	258
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	106
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	86
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	561,761
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	20,000
Leasable %	95%
Leasable Area	19,000
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	344
Structured	0
Surface	92

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$162,500
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,283,863
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$40,500
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	24
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$112,497,317
Amount of Loan	$89,997,854

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$74,423,478
Office Construction Costs	$0
Retail Construction Costs	$2,900,000
On & Off-Site Improvements	$2,875,146
Tenant Improvement Allowances	$190,000
Impact Fees	$2,283,863
Parking Costs	$11,455,921
Other Soft Costs	$18,368,909
Redevelopment Costs	$40,500
Financing Costs	
Interest on Construction Loan	$8,723,617
Points on Construction Loan	$1,799,957
Developer Profit	$14,767,367
Total Development Cost	**$137,828,758**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$157,392,339
Plus TOD Premium	0%	$0
Less Commissions/Marketing	5%	-$7,869,617
Net Residential Sales Revenue		$149,522,722
Annual Office Lease Revenue		$0
Plus TOD Premium	0%	$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$627,000
Plus TOD Premium	0%	$0
Less Vacancy	10%	-$62,700
Less Commissions/Marketing	5%	-$31,350
Annual Net Operating Income		$532,950
Net Retail Sales Revenue		$7,106,000
Annual Residential Rental Revenue		$2,252,729
Plus TOD Premium	0%	$0
Less Direct and Fixed Expenses	45%	-$1,013,728
Annual Net Operating Income		$1,239,001
Net Residential Rental Revenue		$17,700,017
Total Net Revenue		$174,328,740
Less Development Costs		-$137,828,758
Residual Land Value		**$36,499,982**
Land Value/ Sq. Ft.		**$47.36**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-27: Pro-Forma for Alternative D, Virginia Paving Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	491,315
Site Area, Acres	11.3
Gross DU/Acre	43
Residential Component	
Total Number of Units	156
Multifamily For-Sale	
Total Units	89
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	37
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	30
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	194,803
Commercial Component	
Office Sq. Ft.	0
Leasable %	95%
Leasable Area	0
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	20,000
Leasable %	95%
Leasable Area	19,000
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	119
Structured	0
Surface	71

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$145
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$145
On & Off-Site Improvements (per acre)	$128,800
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$843,266
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$100,000
Environmental Remediation	$608,500
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	8
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$42,266,311
Amount of Loan	$33,813,049

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$25,807,912
Office Construction Costs	$0
Retail Construction Costs	$2,900,000
On & Off-Site Improvements	$1,452,740
Tenant Improvement Allowances	$190,000
Impact Fees	$843,266
Parking Costs	$4,168,551
Other Soft Costs	$6,903,841
Redevelopment Costs	$708,500
Financing Costs	
Interest on Construction Loan	$1,136,558
Points on Construction Loan	$676,261
Developer Profit	$5,374,516
Total Development Cost	**$50,162,146**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$54,579,117
Plus TOD Premium	5%	$2,728,956
Less Commissions/Marketing	5%	-$2,865,404
Net Residential Sales Revenue		$54,442,669
Annual Office Lease Revenue		$0
Plus TOD Premium	5%	$0
Less Vacancy	10%	$0
Less Commissions/Marketing	5%	$0
Annual Net Operating Income		$0
Net Office Sales Revenue		$0
Annual Retail Lease Revenue		$627,000
Plus TOD Premium	5%	$31,350
Less Vacancy	10%	-$65,835
Less Commissions/Marketing	5%	-$32,918
Annual Net Operating Income		$559,598
Net Retail Sales Revenue		$7,461,300
Annual Residential Rental Revenue		$781,182
Plus TOD Premium	5%	$39,059
Less Direct and Fixed Expenses	45%	-$369,108
Annual Net Operating Income		$451,132
Net Residential Rental Revenue		$6,444,748
Total Net Revenue		$68,348,717
Less Development Costs		-$50,162,146
Residual Land Value		**$18,186,571**
Land Value/ Sq. Ft.		**$37.02**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-28: Pro-Forma for Alternative D, Covanta Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	273,434
Site Area, Acres	6.3
Gross DU/Acre	54
Residential Component	
Total Number of Units	206
Multifamily For-Sale	
Total Units	154
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	51
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	216,189
Commercial Component	
Office Sq. Ft.	250,000
Leasable %	95%
Leasable Area	237,500
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	7,500
Leasable %	95%
Leasable Area	7,125
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	623
Structured	0
Surface	23

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$185
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$333,800
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$1,859,595
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$15,000,000
Environmental Remediation	$174,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	10
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$129,641,762
Amount of Loan	$103,713,409

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$39,994,951
Office Construction Costs	$33,750,000
Retail Construction Costs	$1,012,500
On & Off-Site Improvements	$2,095,323
Tenant Improvement Allowances	$9,571,250
Impact Fees	$1,859,595
Parking Costs	$20,061,115
Other Soft Costs	$21,297,028
Redevelopment Costs	$15,174,000
Financing Costs	
Interest on Construction Loan	$4,270,798
Points on Construction Loan	$2,074,268
Developer Profit	$18,139,299
Total Development Cost	**$169,300,128**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$59,451,955
Plus TOD Premium	5%	$2,972,598
Less Commissions/Marketing	5%	-$3,121,228
Net Residential Sales Revenue		$59,303,325
Annual Office Lease Revenue		$9,120,000
Plus TOD Premium	5%	$456,000
Less Vacancy	10%	-$957,600
Less Commissions/Marketing	5%	-$478,800
Annual Net Operating Income		$8,139,600
Net Office Sales Revenue		$108,528,000
Annual Retail Lease Revenue		$235,125
Plus TOD Premium	5%	$11,756
Less Vacancy	10%	-$24,688
Less Commissions/Marketing	5%	-$12,344
Annual Net Operating Income		$209,849
Net Retail Sales Revenue		$2,797,988
Annual Residential Rental Revenue		$1,349,637
Plus TOD Premium	5%	$67,482
Less Direct and Fixed Expenses	45%	-$637,703
Annual Net Operating Income		$779,415
Net Residential Rental Revenue		$11,134,502
Total Net Revenue		$181,763,814
Less Development Costs		-$169,300,128
Residual Land Value		**$12,463,686**
Land Value/ Sq. Ft.		**$45.58**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Table F-29: Pro-Forma for Alternative D, Norfolk Southern Site

PROJECT DETAILS	
Site Characteristics	
Site Area, Sq.Ft.	619,260
Site Area, Acres	14.2
Gross DU/Acre	68
Residential Component	
Total Number of Units	347
Multifamily For-Sale	
Total Units	260
Avg. Unit Size	1,050
Avg. Sale Price	$385,000
Townhomes	
Total Units	0
Avg. Unit Size	1,900
Avg. Sale Price	$550,000
Multifamily Rental	
Total Units	87
Avg. Unit Size	1,050
Avg. Monthly Rent	2,300
Stabilized Occupancy	95%
Cap Rate	7%
Total Residential Sq. Ft.	363,906
Commercial Component	
Office Sq. Ft.	350,000
Leasable %	95%
Leasable Area	332,500
Lease Rate (Monthly/Sq. Ft. NNN)	$3.20
Cap Rate	7.5%
Retail Sq. Ft.	2,500
Leasable %	95%
Leasable Area	2,375
Lease Rate (Monthly/Sq. Ft. NNN)	$2.75
Cap Rate	7.5%
Parking	
Underground	931
Structured	0
Surface	8

COST ASSUMPTIONS	
Hard and Soft Costs	
Multifamily Construction Costs (per sq. ft.)	$185
Townhome Construction Costs (per sq. ft.)	$110
Office Construction Costs (per sq. ft.)	$135
Retail Construction Costs (per sq. ft.)	$135
On & Off-Site Improvements (per acre)	$155,900
Office Tenant Improvement Allowance (per GLA)	$40
Retail Tenant Improvement Allowance (per GLA)	$10
Impact Fees	$2,812,448
Cost/Parking Space - Underground	$32,000
Cost/Parking Space - Structured	$22,000
Cost/Parking Space - Surface	$5,000
Other Soft Costs (as % of hard costs, site costs)	20%
Developer Profit (as % of Total Development Cost)	12%
Demolition	$0
Environmental Remediation	$80,000
Financing Costs	
Interest Rate	8%
Period of Initial Loan (Months)	17
Initial Construction Loan Fee (Points)	2%
Average Outstanding Balance	60%
Loan to Cost Ratio	80%
Hard & Soft Costs, Site Costs	$195,151,111
Amount of Loan	$156,120,888

DEVELOPMENT COST SUMMARY	
Hard and Soft Costs	
Residential Construction Costs	$67,322,675
Office Construction Costs	$47,250,000
Retail Construction Costs	$337,500
On & Off-Site Improvements	$2,216,314
Tenant Improvement Allowances	$13,323,750
Impact Fees	$2,812,448
Parking Costs	$29,831,979
Other Soft Costs	$32,056,444
Redevelopment Costs	$80,000
Financing Costs	
Interest on Construction Loan	$10,821,597
Points on Construction Loan	$3,122,418
Developer Profit	$25,101,015
Total Development Cost	**$234,276,140**

LAND VALUE ANALYSIS		
Gross For-Sale Residential Sales Revenue		$100,074,247
Plus TOD Premium	5%	$5,003,712
Less Commissions/Marketing	5%	-$5,253,898
Net Residential Sales Revenue		$99,824,062
Annual Office Lease Revenue		$12,768,000
Plus TOD Premium	5%	$638,400
Less Vacancy	10%	-$1,340,640
Less Commissions/Marketing	5%	-$670,320
Annual Net Operating Income		$11,395,440
Net Office Sales Revenue		$151,939,200
Annual Retail Lease Revenue		$78,375
Plus TOD Premium	5%	$3,919
Less Vacancy	10%	-$8,229
Less Commissions/Marketing	5%	-$4,115
Annual Net Operating Income		$69,950
Net Retail Sales Revenue		$932,663
Annual Residential Rental Revenue		$2,271,815
Plus TOD Premium	5%	$113,591
Less Direct and Fixed Expenses	45%	-$1,073,433
Annual Net Operating Income		$1,311,973
Net Residential Rental Revenue		$18,742,477
Total Net Revenue		$271,438,401
Less Development Costs		-$234,276,140
Residual Land Value		**$37,162,261**
Land Value/ Sq. Ft.		**$60.01**

Source: City of Alexandria, 2009; RS Means, 2009; Korpacz, 2009; MACTEC, 2009; BAE, 2009.

Appendix G: Fiscal Impact Analysis

Analysis

The fiscal impact analysis calculates the changes to the City of Alexandria's revenues and costs stemming from the defined redevelopment alternatives. It serves to shed light on how the defined alternatives' changes to the residential and business population on the parcels would impact the City's fiscal performance. The analysis provides one more data point in the redevelopment decision-making process and answers the question as to whether any of the redevelopment alternatives are good for the City from a fiscal perspective.

Methodology

The fiscal impact analysis focuses on projecting the balance of city revenues and city service costs associated with the redevelopment alternatives at buildout. It incorporates the revenue and cost categories found in the City's General Fund, and projects the increased costs and revenues based on the estimated increase in residential and business population in each redevelopment alternative. The primary focus of the fiscal impact analysis is on the City of Alexandria's General Fund, which receives the City's revenues for operational expenditures and funds the City's primary public services. An important caveat to note is that the fiscal impact analysis only considers the change in ongoing revenues and costs. One time costs, such as infrastructure improvements, are identified in the financial analysis.

This analysis uses a combination of techniques to estimate the increases in costs and revenues. Where possible, the increases in revenues are modeled following the manner in which they are collected and allocated to the City. For example, increases in property tax revenues are based on an estimate of the increase in assessed valuation associated with a given project component. In other cases, where this type of detailed modeling is not possible due to lack of adequate data, the analysis utilizes revenue multipliers that represent the City's current average revenue per service population[1]. The same general approach applies to the service cost portions of the model. Generally, this methodology presents a reasonably conservative analysis of the potential fiscal impacts of the alternatives.

Key Assumptions

The following outlines some of the key assumptions used in the fiscal impact analysis:

- The City of Alexandria's approved budget for Fiscal Year 2010 provides the basis for cost and revenue calculations and assumptions.

[1] Service population equals the resident population plus one half of the number of employees. This scaling of employees represents the lower service demand of employees relative to residents.

- Resident and Service Population Assumptions – In light of the redevelopment alternatives and the amounts of residential units and commercial square footage, the alternatives amount in increased residential population and employees based on the following assumptions: 2.04 persons per household, 1 employee per 250 square feet of office space, and 1 employee per 500 square feet of retail space. This results in the following totals for resident population, employment, and service population in the redevelopment alternatives:

Table G-1: Resident and Population Assumptions

	Alternative A	Alternative B	Alternative C	Alternative D	Baseline
Total Projected Resident Population	1,457	1,082	1,457	2,362	0
Total Projected Employment	4,500	4,460	80	2,500	233
Total Projected Service Population	3,707	3,312	1,497	3,612	117

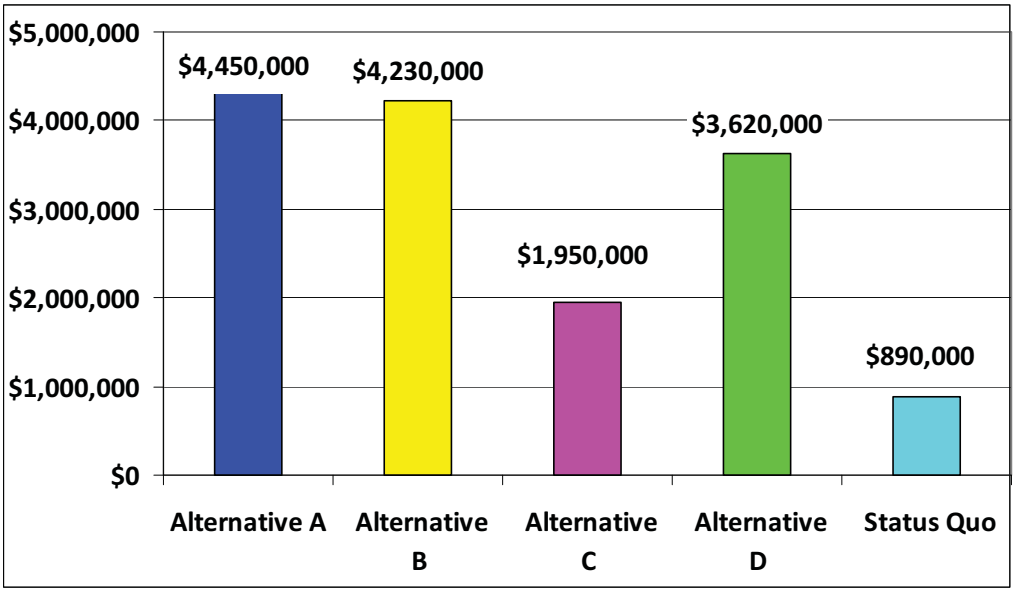
Source: BAE, 2009.

  - The Baseline calculations incorporate the current estimated number of employees working on the four parcels. The City has provided estimated revenues that are derived from the four existing land uses, and where possible the fiscal impact analysis forecasts service costs based on the estimated service population

Net Fiscal Impact

The four redevelopment alternatives all yield strong positive annual net fiscal impacts. This positive net fiscal impact is primarily a result of the increase in the Real Property Tax category, because each scenario results in the delivery of hundreds of new residential units as well as large amounts of taxable commercial property. Although the City receives some property tax revenue from the existing uses, it is a small fraction of the amount that would be received under the redevelopment alternatives. The net fiscal impact by scenario is detailed below.

Figure G-1: Net Fiscal Impact by Scenario



Source: BAE, 2009.

Alternatives A and B yield the highest positive annual fiscal impact ($4.5 and $4.2 million per year) because these programs deliver the most office space, which is the most fiscally positive land use. Alternative B is slightly lower than Alternative A because less residential development occurs, and the park space delivered on the Virginia Paving parcel requires additional city costs to maintain and operate. Although Alternative D has the highest amount of residential units, it results in a lower fiscal impact ($3.6 million per year) relative to A and C due to the drop in office square footage from 1.1 million square feet to 600,000. Alternative C results in the lowest fiscal impact of the four scenarios because the exclusion of Covanta and Norfolk Southern result in the smallest development program. Although it yields the lowest annual fiscal impact of $1.95 million per year, it is still more than twice that of the existing uses, which result in $890,000 in annual net fiscal impact.

Projected Revenues

The fiscal impact analysis calculates revenues that the City of Alexandria would receive, factoring in the following revenue categories:

- Real Property Taxes
- Business License Fees
- Penalties and Interest
- Recordation
- Personal Property Taxes

- Utility Taxes
- Cigarette Taxes
- Restaurant Food Taxes
- Communication Service Taxes
- Licenses, Permits, and Fees
- Fines & Forfeitures
- Charges for Services
- Miscellaneous Revenues
- Sales Taxes
- Motor Vehicle License Fees
- Admissions Taxes

In each alternative, the Real Property Tax category represents two thirds or more of the revenues to the City. The City charges $.887 per $100 of assessed value for real residential and commercial property. The assumed values of the residential and commercial properties are based on the financial and market analysis of this engagement. The details of the Real Property Tax calculation are shown in Table 17:

Table G-2: Projected Tax Revenue for Each Redevelopment Alternative

For-Sale Residences	Alternative A	Alternative B	Alternative C	Alternative D	Status Quo
Multifamily Units	465	345	465	761	0
Average Price per Unit	$385,000	$385,000	$385,000	$385,000	$0
Total Multifamily Value	$179,084,060	$132,972,900	$179,084,060	$293,171,023	$0
Townhome Units	94	70	94	142	0
Average Price per Unit	$550,000	$550,000	$550,000	$550,000	$0
Total Townhomes Value	$51,695,579	$38,384,829	$51,695,579	$78,326,635	$0
Total Residential Value	$230,779,639	$171,357,729	$230,779,639	$371,497,658	$0
Property Tax Revenues $.887 per $100	$2,047,015	$1,519,943	$2,047,015	$3,295,184	$0
Commercial Properties (including Rental Apartments)					
Rental Apartment Value	$31,942,749	$23,718,023	$31,942,749	$18,481,199	$0
Office Value	$454,784,000	$454,784,000	$248,064,000	$454,784,000	$0
Retail Value	$17,765,000	$10,659,000	$10,659,000	$17,765,000	$0
Industrial Value	$0	$0	$0	$0	$38,842,649
Total Commercial Value	$504,491,749	$489,161,023	$290,665,749	$491,030,199	$38,842,649
Property Tax Revenues $.887 per $100	$4,474,842	$4,338,858	$2,578,205	$4,355,438	$344,534
Total Annual Real Property Revenues	**$6,521,857**	**$5,858,801**	**$4,625,221**	**$7,650,622**	**$344,534**

Source: City of Alexandria, 2009; BAE Market Analysis, 2009.

The commercial properties are valued based on applying a capitalization rate to their stabilized occupancy, as part of the financial analysis exercise.

Additional detail on the remaining revenue categories can be found in Documentation section

that follows the analysis.

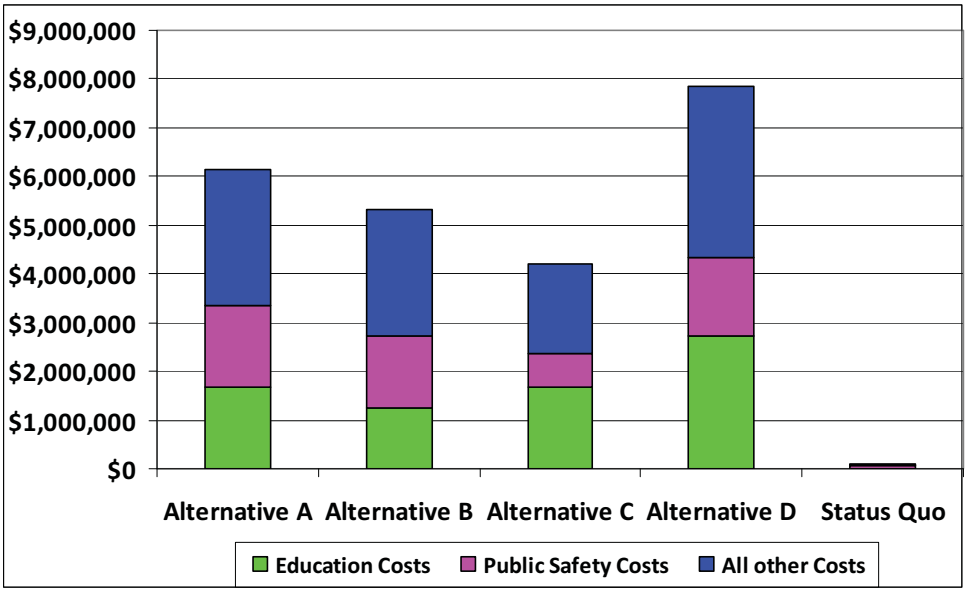
Projected Service Costs

The City of Alexandria would incur increased costs for providing the following services to the additional residents and employees in each redevelopment alternative:

- Fire
- Police
- Library
- Schools
- Other Educational Activities
- Recreation, Parks, and Cultural Activities
- Additional Park Management (to manage park space in Alternative B)
- Other Recreational Activities
- Code Administration
- Planning and Zoning
- Economic Development Activities
- Historic Alexandria
- Transit Subsidies
- Transportation and Environmental Services
- Health/Human Services
- Human Services Contribution Funds including the Children's Fund, Youth Fund, and Community Partnership Fund
- Mental Health, Retardation, and Substance Abuse

In each redevelopment alternative, the costs associated with providing schools and public safety (fire and police), combine to represent over half of the total cost to the City. The cost to the school system is assumed to be $1,154 per resident, based on the most recent budget. The costs of the public safety categories of fire and police are based on service population since these categories do provide service to employees along with residents, and amount to $449 per service population member.

FigureG-2: Service Costs for Each Redevelopment Alternative



Source: BAE, 2009.

The details of the fiscal cost assumptions and calculations can be found in the following documentation .

Documentation

Table G-3: Projected Net Fiscal Impact

Annual Revenues		**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Total Annual Real Property Revenues		$6,521,857	$5,858,801	$4,625,221	$7,650,622	
Total Projected Service Pop. Revenues		$1,874,606	$1,674,783	$757,012	$1,826,461	
Total Projected Resident Pop. Revenues		$665,190	$493,915	$665,190	$1,078,283	
Total Projected Business License Revenues		$1,434,705	$1,421,952	$25,506	$797,059	
Total Projected Penalties and Interest		$39,225	$35,025	$28,214	$46,624	
Total Projected Recordation Revenues		$60,831	$54,317	$43,754	$72,304	
Subtotal: Revenues (a)		**$10,596,415**	**$9,538,794**	**$6,144,897**	**$11,471,353**	**$995,000**
Annual General Fund Costs		**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Total Projected Service Population Costs		$1,182,242	$1,056,221	$477,418	$1,151,879	$37,155
Total Projected Resident Population Costs		$2,499,883	$1,856,205	$2,499,883	$4,052,347	$0
Total Projected Public Safety Costs		$1,663,284	$1,485,986	$671,674	$1,620,565	$52,273
Total Projected Park/Open Space Costs		$0	$221,215	$0	$0	$0
Subtotal: General Fund Costs		$5,345,409	$4,619,628	$3,648,976	$6,824,792	$89,427
Additional General Gov't/Legislative Costs	15%	$801,811	$692,944	$547,346	$1,023,719	$13,414
Subtotal: Costs		**$6,147,221**	**$5,312,572**	**$4,196,322**	**$7,848,510**	**$102,841**
Net Annual Fiscal Impact		**$4,449,194**	**$4,226,222**	**$1,948,574**	**$3,622,843**	**$892,159**

Notes
(a) Baseline revenues based on City of Alexandria actual tax revenues

Source: City of Alexandria, 2009; BAE, 2009.

Table G-4: Existing Service Population

City of Alexandria	2010
Population	142,588
Households	70,541
Persons Per Housing Unit	2.04
Employment	101,310
Service Population (a)	193,243

Note:
(a) Service population equals the population plus one half the employment population to represent employment uses' lower demand for municipal services.

Sources: City of Alexandria, 2009; Virginia Employment Commission, 2008; BAE, 2009.

Table G-5: Development Alternatives

Land Use		Alternative A	Alternative B	Alternative C	Alternative D	Status Quo
Residential Units		714	530	714	1,158	
MF For Sale		465	345	465	761	
Townhomes		94	70	94	142	
MF Rental		155	115	155	254	
Office, Square Feet		1,100,000	1,100,000	0	600,000	
Retail, Square Feet		50,000	30,000	40,000	50,000	
	Assumption					
Residents		1,457	1,082	1,457	2,362	
MF For Sale	2.04 persons/unit	949	705	949	1,553	
Townhomes	2.04 persons/unit	192	142	192	291	
MF Rental	2.04 persons/unit	316	235	316	518	
Office, Employees	1 worker/250 sq. ft.	4,400	4,400	0	2,400	
Retail, Employees	1 worker/500 sq. ft.	100	60	80	100	
Total Projected Resident Population		**1,457**	**1,082**	**1,457**	**2,362**	**0**
Total Projected Employment		**4,500**	**4,460**	**80**	**2,500**	**233**
Total Projected Service Population		**3,707**	**3,312**	**1,497**	**3,612**	**117**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-6: Projected Real Property Tax Revenues

For-Sale Residences	Alternative A	Alternative B	Alternative C	Alternative D	Status Quo
Multifamily Units	465	345	465	761	0
Average Price per Unit	$385,000	$385,000	$385,000	$385,000	$0
Total Multifamily Value	$179,084,060	$132,972,900	$179,084,060	$293,171,023	$0
Townhome Units	94	70	94	142	0
Average Price per Unit	$550,000	$550,000	$550,000	$550,000	$0
Total Townhomes Value	$51,695,579	$38,384,829	$51,695,579	$78,326,635	$0
Total Residential Value	$230,779,639	$171,357,729	$230,779,639	$371,497,658	$0
Property Tax Revenues $.887 per $100	$2,047,015	$1,519,943	$2,047,015	$3,295,184	$0
Commercial Properties (including Rental Apartments)					
Rental Apartment Value	$31,942,749	$23,718,023	$31,942,749	$18,481,199	$0
Office Value	$454,784,000	$454,784,000	$248,064,000	$454,784,000	$0
Retail Value	$17,765,000	$10,659,000	$10,659,000	$17,765,000	$0
Industrial Value	$0	$0	$0	$0	$38,842,649
Total Commercial Value	$504,491,749	$489,161,023	$290,665,749	$491,030,199	$38,842,649
Property Tax Revenues $.887 per $100	$4,474,842	$4,338,858	$2,578,205	$4,355,438	$344,534
Total Annual Real Property Revenues	**$6,521,857**	**$5,858,801**	**$4,625,221**	**$7,650,622**	**$344,534**

Source: City of Alexandria, 2009; BAE Market Analysis, 2009.

Table G-7: Projected Revenues from Service Population

2010 Service Population	193,243	Rev./Service Pop.				
FY 2010 Personal Property Tax Revenues	$31,100,000	$160.94				
FY 2010 Utility Tax Revenues	$10,600,000	$54.85				
FY 2010 Cigarette Revenues	$2,800,000	$14.49				
FY 2010 Restaurant Food Revenues	$15,300,000	$79.17				
FY 2010 Communications Service Revenues	$12,000,000	$62.10				
FY 2010 Other Miscellaneous Tax Revenues	$2,230,000	$11.54				
FY 2010 Licenses, Permits, and Fee Revenues	$5,727,760	$29.64				
FY 2010 Fines & Forfeitures Revenues	$4,552,050	$23.56				
FY 2010 Charges for Services Revenues	$12,640,834	$65.41				
FY 2010 Miscellaneous Revenues	$772,151	$4.00				
Annual Revenue per Population	**$97,722,795**	**$505.70**				
Projected Revenues	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**	
Projected Service Population	3,707	3,312	1,497	3,612	117	
Total Projected Service Pop. Revenues	**$1,874,606**	**$1,674,783**	**$757,012**	**$1,826,461**	**$58,914**	

Source: City of Alexandria, 2009; BAE, 2009.

Table G-8: Projected Revenues from Resident Population

2010 Resident Population	142,588	Rev./Service Pop.			
FY 2010 Local Sales Tax Revenues (a)	23,400,000	$164.11			
FY 2010 Motor Vehicle License Revenues	$31,100,000	$218.11			
FY 2010 Admissions Revenues	$10,600,000	$74.34			
Annual Revenue per Resident Population	**$65,100,000**	**$456.56**			
Projected Revenues	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Resident Population	1,457	1,082	1,457	2,362	0
Total Projected Resident Pop. Revenues	**$665,190**	**$493,915**	**$665,190**	**$1,078,283**	**$0**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-9: Projected Revenues from Business Licenses

2010 Employee Population	101,310	Rev./Emp. Pop.			
FY 2010 Business License Revenues	$32,300,000	$318.82			
Annual Revenue per Employee Population	**$32,300,000**	**$318.82**			
Projected Revenues	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Employee Population	4,500	4,460	80	2,500	233
Total Projected Business License Revenues	**$1,434,705**	**$1,421,952**	**$25,506**	**$797,059**	**$74,286**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-10: Projected Revenues from Penalties and Interest (as % of Property Tax Revenues)

FY 2010 Real Property Tax Revenue		$290,997,724				
FY 2010 Personal Property Tax Revenue		$31,100,000				
Total FY 2010 Property Tax Revenue		$322,097,724				
FY 2010 Penalties and Interest		$1,870,000				
FY 2010 Penalties and Interest as % of Total Prop. Tax Rev.		**0.58%**				
Projected Property Tax Revenues		**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Real Property Tax (a)		$6,521,857	$5,858,801	$4,625,221	$7,650,622	$344,534
Projected Resident Population		1,457	1,082	1,457	2,362	0
Projected Personal Property Tax Rev/Serv. Pop.		$160.94	$160.94	$160.94	$160.94	$160.94
Projected Personal Property Tax Revenue		$234,479	$174,105	$234,479	$380,094	$0
Total Projected Property Tax Revenues		$6,756,337	$6,032,906	$4,859,700	$8,030,716	$344,534
Total Projected Penalties and Interest	**0.58%**	**$39,225**	**$35,025**	**$28,214**	**$46,624**	**$2,000**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-11: Projected Revenues from Recordation (as % of Property Tax Revenues)

FY 2010 Real Property Tax Revenue		$290,997,724				
FY 2010 Personal Property Tax Revenue		$31,100,000				
Total FY 2010 Property Tax Revenue		$322,097,724				
FY 2010 Recordation Revenues		$2,900,000				
FY 2010 Penalties and Interest as % of Total Prop. Tax Rev.		**0.90%**				
Projected Property Tax Revenues		**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Real Property Tax (a)		$6,521,857	$5,858,801	$4,625,221	$7,650,622	$344,534
Projected Resident Population		1,457	1,082	1,457	2,362	0
Projected Personal Property Tax Rev/Serv. Pop.		$160.94	$160.94	$160.94	$160.94	$160.94
Projected Personal Property Tax Revenue		$234,479	$174,105	$234,479	$380,094	$0
Total Projected Property Tax Revenues		$6,756,337	$6,032,906	$4,859,700	$8,030,716	$344,534
Total Projected Recordation Revenues	**0.90%**	**$60,831**	**$54,317**	**$43,754**	**$72,304**	**$3,102**
Source: City of Alexandria, 2009; BAE, 2009.						

Table G-12: Projected One-Time Revenues from Impact Fees

		Alternative A	Alternative B	Alternative C	Alternative D
Total Commercial and Residential Square Footage		1,987,784	1,746,140	869,799	1,986,659
Total Construction Costs		$269,720,461	$237,449,219	$119,870,461	$295,699,017
Planning & Zoning					
Development Site Plan/Special Use Permit ($2,000)		$2,000	$2,000	$2,000	$2,000
+ $10/100SF (Maximum $30,000)		$30,000	$30,000	$30,000	$30,000
Final Site Plan Reviews ($3,000)		$3,000	$3,000	$3,000	$3,000
+ $12/100SF (Maximum $30,000)		$30,000	$30,000	$30,000	$30,000
Total Planning & Zoning Revenues		$65,000	$65,000	$65,000	$65,000
Housing					
Voluntary Housing Contribution ($1.50/SF)	$1.50	$2,981,676	$2,619,210	$1,304,699	$2,979,989
Transportation and Environmental Services					
Eisenhower Improvement Fund ($1.50/SF)	$1.50	$2,981,676	$2,619,210	$1,304,699	$2,979,989
Code					
Construction Fees ($6.00/$1,000 of Const. Cost)	$6.00	$1,618,323	$1,424,695	$719,223	$1,774,194
Total One-Time Development Impact Fees		**$7,646,675**	**$6,728,115**	**$3,393,621**	**$7,799,172**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-13: Projected Costs from Service Population

2009 Service Population	193,243	Cost/Service Pop.			
FY 2010 General Fund Code Administration Costs	$6,995,739	$36.20			
FY 2010 General Fund Planning and Zoning Costs	$5,409,792	$27.99			
FY 2010 General Fund Economic Development Activities Costs	$3,221,153	$16.67			
FY 2010 General Fund Historic Alexandria Costs	$2,554,331	$13.22			
FY 2010 General Fund Transit Subsidies Costs	$16,054,474	$83.08			
FY 2010 General Fund Trans. & Environmental Services Costs	$27,394,521	$141.76			
Annual Costs per Service Population	**$61,630,010**	**$318.92**			
Projected Sevice Population Costs	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Service Population	3,707	3,312	1,497	3,612	117
Total Projected Service Population Costs	**$1,182,242**	**$1,056,221**	**$477,418**	**$1,151,879**	**$37,155**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-14: Projected Costs from Resident Population

2009 Resident Population	142,588	Cost/Resident Pop.			
FY 2010 General Fund Health Costs	$6,870,274	$48.18			
FY 2010 General Fund Other Health Costs	$1,038,600	$7.28			
FY 2010 General Fund Human Services Costs	$27,773,777	$194.78			
FY 2010 General Fund Human Services Contributions					
Children's Fund	$854,480	$5.99			
Youth Fund	$261,041	$1.83			
Community Partnership Fund	$799,577	$5.61			
FY 2010 General Fund Mental Health, Retardation and Substance Abuse Costs	$17,149,339	$120.27			
FY 2010 General Fund Rec, Parks, & Cultural Activities Costs	$18,919,041	$132.68			
FY 2010 General Fund Other Recreational Activities Costs	$288,814	$2.03			
FY 2010 General Fund Library Costs	$6,093,498	$42.73			
FY 2010 General Fund Schools Costs	$164,594,674	$1,154.34			
FY 2010 General Fund Other Educational Activities Costs	$12,304	$0.09			
Annual Costs per Resident Population	**$244,655,419**	**$1,715.82**			
Projected Resident Population Costs	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Resident Population	1,457	1,082	1,457	2,362	0
Total Projected Resident Population Costs	**$2,499,883**	**$1,856,205**	**$2,499,883**	**$4,052,347**	**$0**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-15: Projected Public Safety Costs

2009 Service Population	193243	Cost/Service Pop.			
FY 2010 General Fund Fire Costs	$32,709,142	$169.26			
FY 2010 General Fund Police Costs	$53,997,444	$279.43			
Annual Public Safety Costs per Service Population	**$86,706,586**	**$448.69**			
Projected Public Safety Costs	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected Service Population	3,707	3,312	1,497	3,612	117
Total Projected Public Safety Costs	**$1,663,284**	**$1,485,986**	**$671,674**	**$1,620,565**	**$52,273**

Source: City of Alexandria, 2009; BAE, 2009.

Table G-16: Projected Additional Rec, Parks, Cultural Activities Costs from Park/Open Space Management

Total Acreage Managed	964.62				
FY 2010 General Fund Rec, Parks, & Cultural Activities Costs	$18,919,041				
Annual Rec, Parks, & Cultural Activities Costs/Acre	**$19,613**				
Projected Park Space Costs	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative D**	**Status Quo**
Projected City-Managed Park/Open Space (acres)	0	11	0	0	0
Total Projected Park/Open Space Costs	**$0**	**$221,215**	**$0**	**$0**	**$0**

Source: City of Alexandria, 2009; BAE, 2009.

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

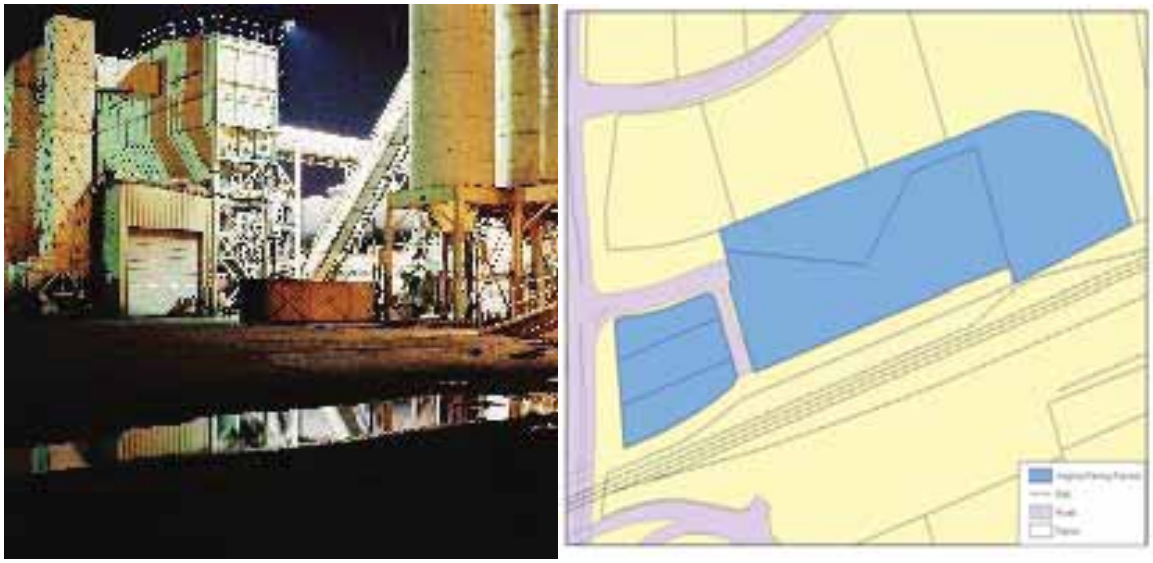


Figure 3- Virginia Paving Company
Source: City of Alexandria, 2009; ESRI; BAE, 2009.

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

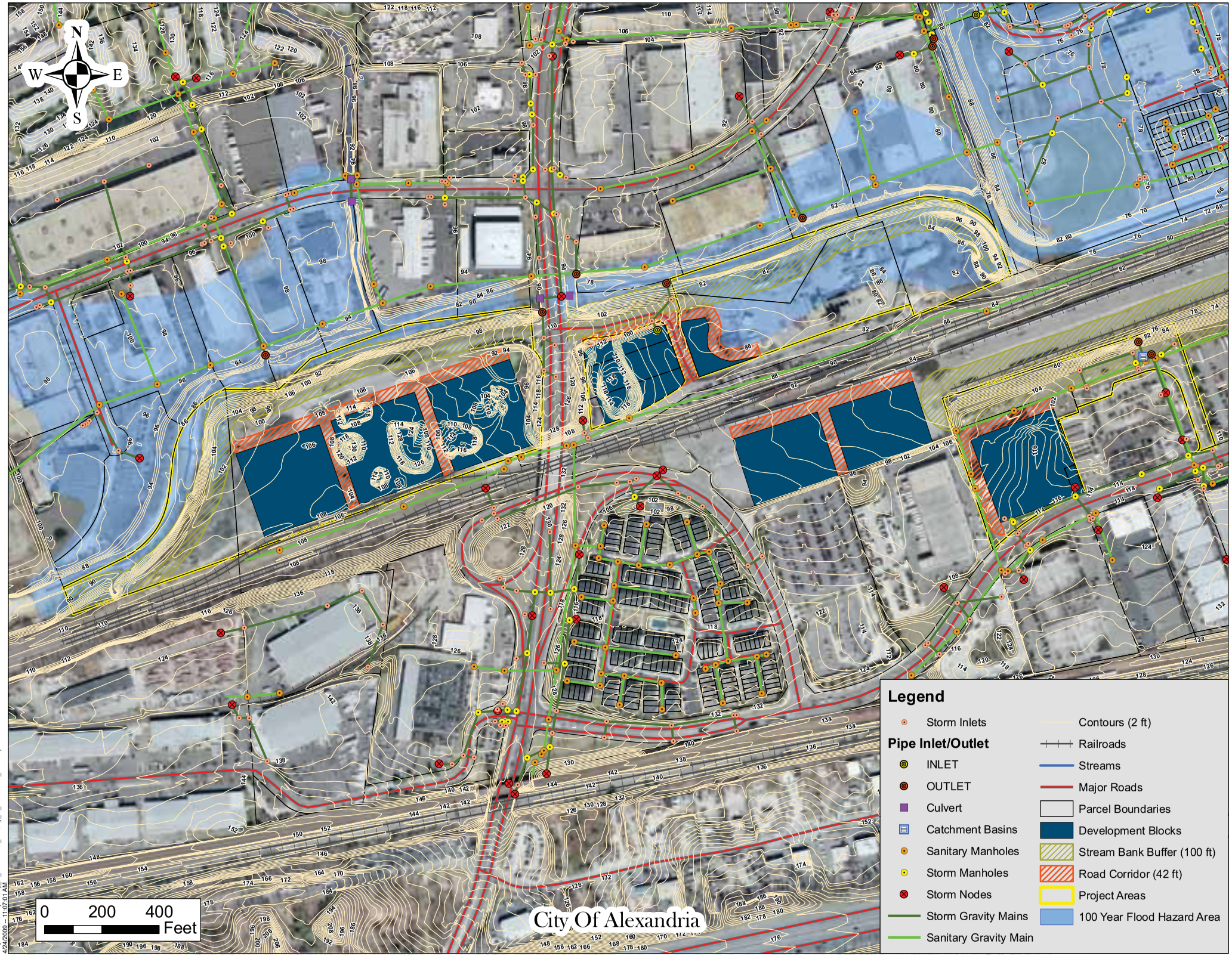
More detailed preliminary estimates of probable costs are included in the appendices along with figures and calculations used to determine preliminary stormwater detention requirements.

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

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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"
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 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)

Prepared By: S. Agudelo

Checked By: T. Hill

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

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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
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	$ -
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)
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 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:
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.
12. Adding $25.000.000 multinodal Bridge.

Prepared By: S. Agudelo

Checked By: T. Hill

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