ROCK CREEK WATERSHED PLANNING

ALTERNATIVE FUTURES STUDY

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Prepared for

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TABLE OF CONTENTS

APPENDICES

B. Site Development

C. Regional and National Resource Summary

D. Metcalf Avenue Mixed-Use Development Economic Analysis

LIST OF FIGURES

LIST OF TABLES

COMMON ABBREVIATIONS

AC	Acre
APWA	American Public Works Association
BMP	Best Management Practice
CU	Copper
CY	Cubic Yard
EA	Each
FBC	Form Based Codes
HC	Hydrocarbons
IRR	Internal Rate of Return
LEED	Leadership in Energy and Environmental Design
LF	Linear Foot
LID	Low Impact Development
LS	Level of Service
LS	Lump Sum

MARC	Mid-America Regional Council
NPDES	National Pollutant Discharge Elimination System
NPV	Net Present Value
PB	Lead
ROI	Return on Investment
SF	Square Foot
SLAMM	Source Loading and Management Model
SSI	Sustainable Sites Initiative
SY	Square Yard
TKN	Total Kjehldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
USGBC	United States Green Building Council
VR	Value Rating
WQ	Water Quality
ZN	Zinc

ES EXECUTIVE SUMMARY

SUSTAINABLE MUNICIPAL STORMWATER MANAGEMENT

For many communities, a combination of factors are bringing stormwater management issues to the forefront, motivating cities to prioritize capital expenditures, to develop monitoring processes, to increase public awareness, and to adopt new design standards.

These driving factors include

- mandatory compliance programs with the National Pollutant Discharge Elimination System (NPDES)
- aging infrastructure
- streambank erosion and flooding
- heightened community interest in water quality and sustainable landscapes

LOW IMPACT DEVELOPMENT IS AN EFFECTIVE AND SUSTAINABLE APPROACH

Low Impact Development (LID) is a comprehensive urban planning and design approach that aims to mimic natural hydrological processes in new development by maintaining and enhancing natural pre-development hydrologic conditions in a watershed.

Low Impact Development approaches include

- reducing hardscaped impervious areas
- maximizing open spaces
- preserving mature vegetation
- incorporating natural site elements such as stream corridors and forests
- decentralized stormwater management with integrated Best Management Practices (BMPs) upstream to manage rain where it falls.

LOW IMPACT DEVELOPMENT MEETS STORMWATER CHALLENGES NATURALLY

Through the use of innovative LID techniques, a developed site may retain the hydrologic and ecological functions of its natural, predevelopment state. Appropriate LID techniques and integrated BMPs have successfully mitigated many common stormwater management problems while addressing regulatory and compliance imperatives to improve water quality.

Study Goals

Along with the 2007 Rock Creek Watershed Feasibility Study, this study aims to

(1) compare the life-cycle cost and benefit of LID and traditional redevelopment in the Midwest

(2) analyze the return on investment for both LID and traditional redevelopment

(3) recommend adaptations to City of Mission policies and ordinances

Life cycle costs and water quality benefits of LID scenarios are compared with traditional development scenarios to help evaluate the cost-effectiveness of LID and to inform the City's future policies and design criteria.

Comparing LID and traditional redevelopment:

Mixed-Use Commercial, Multi-Family Development, Typical Residence

To evaluate a variety of redevelopment opportunities, three sites were selected that represent a mixed-use commercial redevelopment, a multi-family development, and a typical single-family residence. The study used a tiered approach to alternative site concepts.

The base LID design scenario (LID Scenario 1) satisfies the regional American Public Works Association (APWA) Manual for Best Management Practices for Stormwater Quality (BMP Manual) and regional stormwater drainage design standards. The second, more comprehensive LID scenario (LID Scenario 2) meets the regional Best Management Practices manual design standards and exceeds the regional stormwater drainage design criteria.

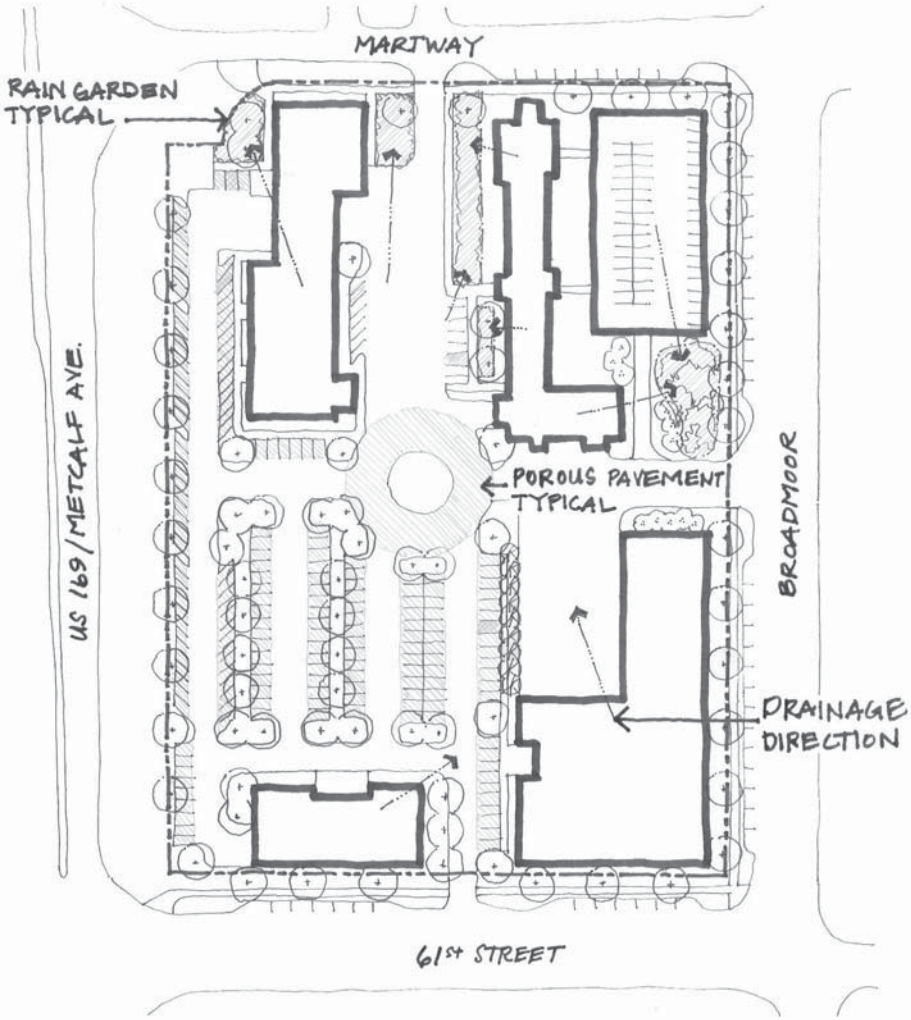
LID practices considered for each site included

- site planning to reduce stormwater runoff
- policy options to reduce impervious surfaces
- native landscaping to increase infiltration of rainfall
- structural stormwater BMPs to capture, infiltrate, and treat the runoff that would be generated as a result of the proposed development plans
- potential reduction of both suspended and dissolved contaminants.

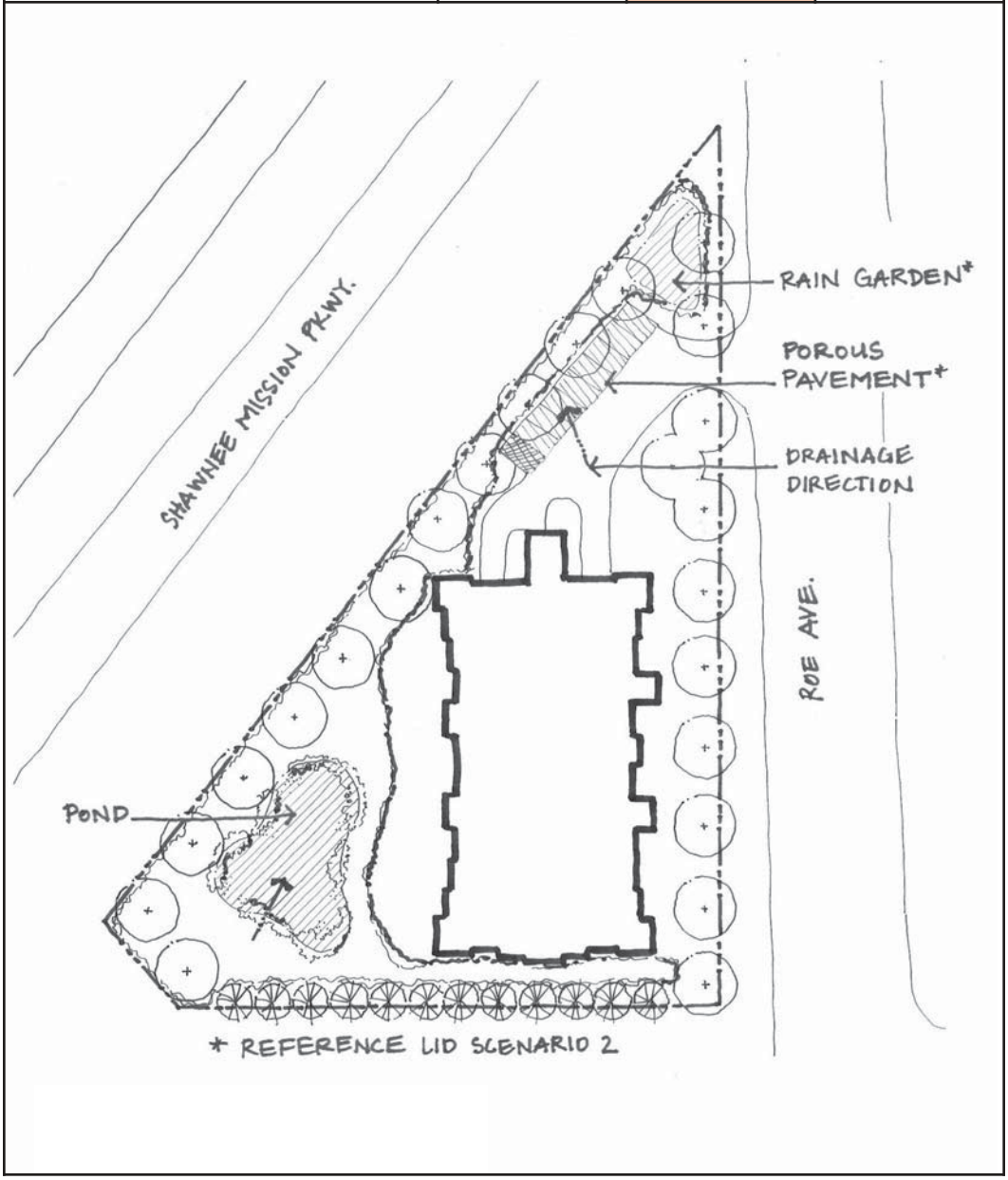
LID Scenario 1 is recommended for cost effective water quality benefits

For all three sites, LID Scenario 1 is the recommended alternative because the capital expenditures and the return on investment are comparable to traditional development and the water quality benefits are significant. In the case of the Metcalf Avenue redevelopment, application of the BMP Manual and APWA 5600 to develop LID Scenario 1 resulted in a site desgin that also satisfied the peak discharge and total runoff volume requirements of LID Scenario 2. In Scenario 2, the more comprehensive application of LID at the Roe Avenue site, runoff is reduced, but development costs increase without proportionate water quality benefits.

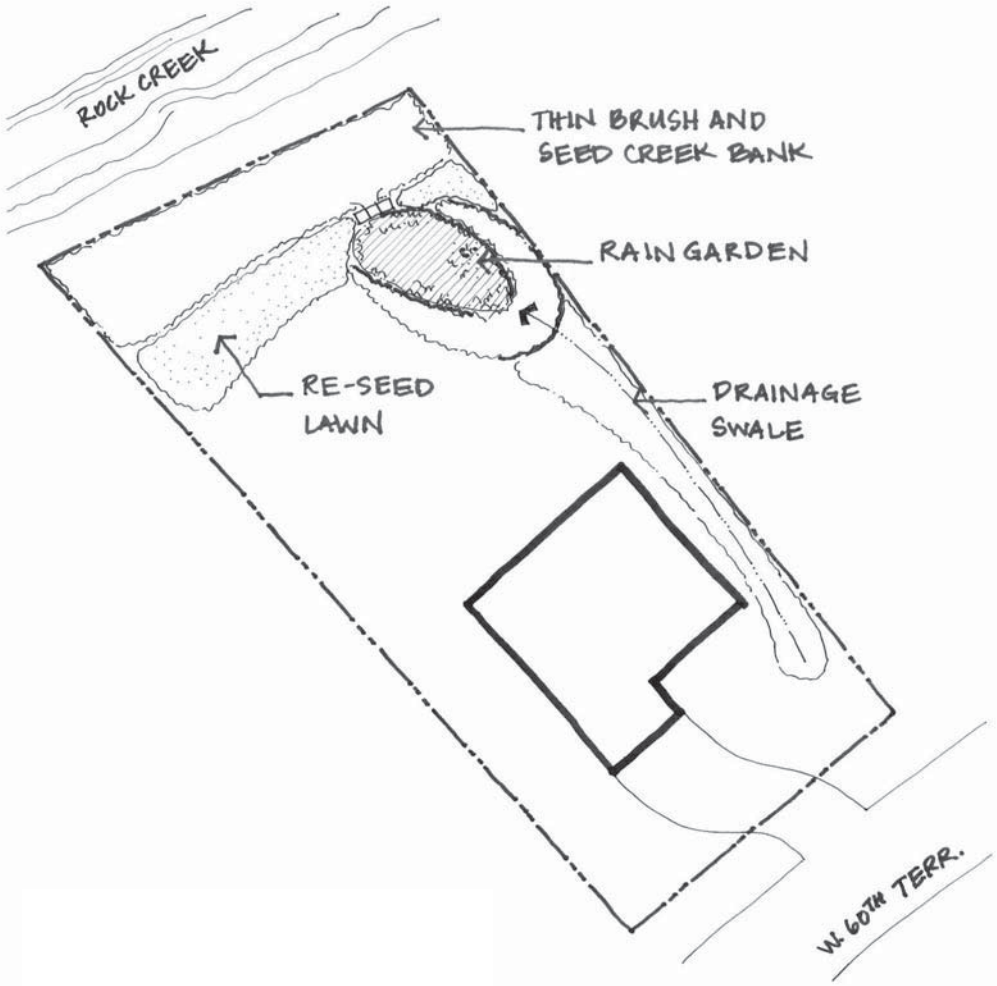
SITE 1: METCALF AVENUE MIXED-USE DEVELOPMENT			
	TRADITIONAL	**LID SCENARIO 1**	
Financial Impacts			
Capital Cost	$ 2,937,800	$ 3,032,700	
50 Year Net Present Value	$ 4,004,300	$ 4,019,600	
10 Year Return on Investment	10.76%	10.69%	
Water Quality Impacts – *Annual Cumulative Discharge*			
Total Suspended Solids	2305 lb	678 lb	
Total Phosphorus	13.6 lb	5.4 lb	



SITE 2: ROE AVENUE MULTI-FAMILY DEVELOPMENT			
	TRADITIONAL	**LID SCENARIO 1**	**LID SCENARIO 2**
Financial Impacts			
Capital Cost	$ 474,600	$ 450,400	$ 499,300
50 Year Net Present Value	$ 1,057,400	$ 997,800	$ 1,080,200
5 Year Return on Investment	12.42%	12.97%	11.94%
Water Quality Impacts – *Annual Cumulative Discharge*			
Total Suspended Solids	1800 lb	1548 lb	1515 lb
Total Phosphorus	8.9 lb	8.5 lb	8.0 lb



SITE 3: TYPICAL RESIDENCE			
	TRADITIONAL	**RAIN GARDEN RETROFIT**	**TOTAL SITE RETROFIT**
Financial Impacts			
Capital Cost	Existing Layout	$ 1,000	$ 4,800
Water Quality Impacts – *Annual Cumulative Discharge*			
Total Suspended Solids	59.9 lb	30.7 lb	19.6 lb
Total Phosphorus	0.20 lb	0.15 lb	0.10 lb



THE STUDY DETAILS FOUR MAJOR CONCLUSIONS

1. To increase LID and to realize the potential water quality benefits identified in this study, the most significant step for the City is to adopt the regional American Public Works Association (APWA) *Manual for Best Management Practices for Stormwater Quality*.
2. Developers' return on investment for LID is not significantly different from that of traditional development approaches, so developer incentives for LID are not justified.
3. The majority of the landscape in the City of Mission is residential and is not subject to major redevelopment. An incentives program for homeowners could encourage residential retrofits that would lead to significant water quality benefits.
4. City of Mission Codes are LID-compatible and can be further enhanced. Proposed amendments and adoption of regional standards would not only allow but require the use of improved stormwater and environmental management practices.

To increase the use of LID practices in the City of Mission and to realize the water quality benefits outlined in this study, key changes to municipal codes include

a. Adopt the APWA *Manual for Best Management Practices for Stormwater Quality*.

b. Amend existing parking and loading regulations to reduce the parking maximum cap currently enforced by the City and require mitigation (such as pervious pavement or native landscaping) for excess parking.

c. Amend ordinances regarding landscaping and vegetation to include a plant materials palette of attractive, low-maintenance native vegetation that would allow developers to use areas landscaped with native vegetation as Best Management Practices.

1 INTRODUCTION

The cities of Mission, Roeland Park, Fairway, Prairie Village, Mission Hills, Westwood, and Overland Park are located in the northeastern corner of Johnson County, KS, which lies in the Rock Creek Watershed. The aging of flood control infrastructure and the high percentage of impervious surfaces throughout the watershed have had a detrimental effect on the area's water quality and stream stability. As part of Johnson County, one of the top growth areas in the state with significant **redevelopment, opportunities for implementation of projects and standards that help to reduce stormwater runoff and improve water quality is of prime importance.** Updating city ordinances and policies to include newly developed stormwater best management practices (BMPs) and innovative low impact development (LID) strategies is a key to success. While guidance documents on both regional and national levels provide design criteria and examples, they do not include comparative analysis of the life cycle costs and benefits between **traditional and LID methods. This study provides a comparative analysis of life cycle costs, return on investment, and water quality impacts.**

The City of Mission received Planning Assistance to States funding in 2007 from the Corps of Engineers for preparation of comprehensive plans of development, use, and conservation of water and land. The main planning document, prepared in 2007, discusses both structural and non-structural strategies, including alterations to streams, vegetation practices, BMPs, and public education applicable to water resource management.

The Alternative Futures Study, as an addition to the Rock Creek Watershed Study, is intended to accomplish the following:

(1) compare the life-cycle cost and benefit of LID versus traditional redevelopment

(2) analyze the return on investment for LID and traditional redevelopment

(3) inform policy and ordinance recommendations for the City of Mission

To evaluate a variety of redevelopment opportunities, three sites were selected as highlighted on Figure 1 below: a mixed use commercial redevelopment at Metcalf Avenue, a multi family development at Roe Avenue, and a typical suburban single family residence in Mission.

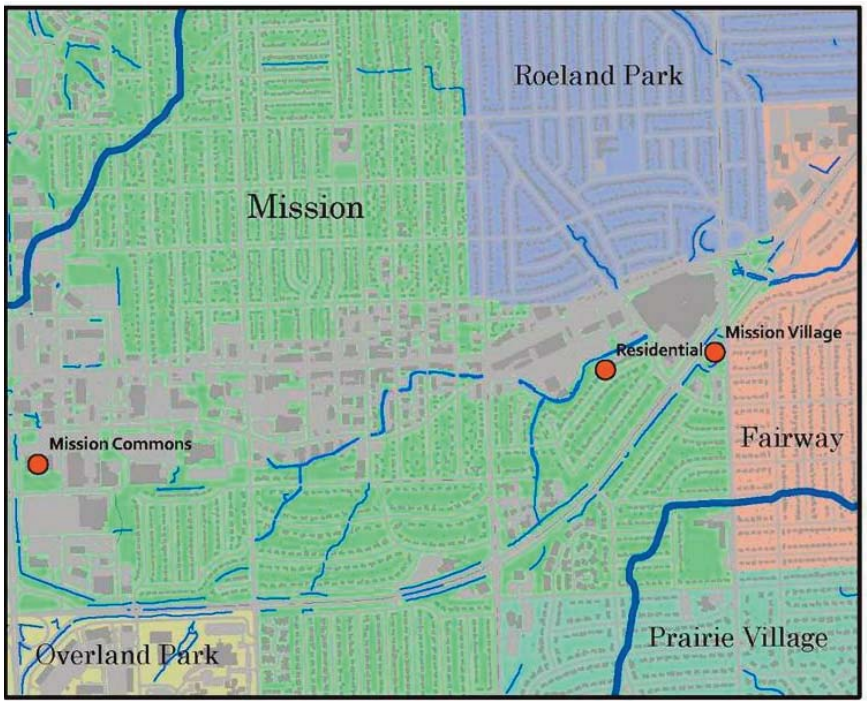


Figure 1. Rock Creek Watershed and Selected Study Sites

Like many municipalities in the region, the City of Mission is an NPDES Phase II community, which requires it to develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants to the maximum extent practicable. To meet these requirements, the City has taken steps to develop stormwater management criteria and to formally adopt the regional APWA design standard for storm drainage systems and facilities (Section 5600). This standard demands the use of stormwater

management measures to control runoff from new development or redevelopment sites. In the case of Mission, where the secondary drainage collection system is aging, undersized, and degraded, the APWA standards limit peak discharge from the 1-year, 10-year, and 100-year storm events to predevelopment peak flows because the flooding is likely to be exacerbated by redevelopment. Additional City of Mission criteria stipulate for all major sites (larger than 0.5 acre), runoff from improved impervious areas may not exceed the runoff under unimproved conditions. Typically, these criteria are met by detention.

Successful stormwater management benefits not only the residents of Mission, but also the downstream communities. LID practices minimize site disturbance and maximize infiltration, improving the quality of runoff and lessening the erosive impact of flows from smaller channel-forming storm events. The City of Mission encourages regional municipalities, planning commissions, and developers to apply the results and recommendations of this assessment to their ordinances, development practices, and future studies.

2 REGIONAL AND NATIONAL LID LITERATURE REVIEW

Overall, the case studies from other communities demonstrate that **implementing LID practices for stormwater management is cost-competitive with conventional practices.** These studies document that LID practices result in significant savings to developers by reducing the amount of infrastructure and the extent of site disturbance. When design costs are compared, benefits in water quality and quantity management effectiveness are generally excluded. LID offers numerous benefits that have been qualitatively noted but not compared with construction costs. Such benefits may include **reduced flooding, increased property values, and improved water quality.** Life cycle cost analysis that takes into account operations and maintenance costs and further, a return on investment analysis, offers the most comprehensive assessment of LID economics.

The majority of published studies evaluate LID for new developments but offer little information on the use of LID in urban retrofits or redevelopment. The few studies that included LID retrofits noted that the density of development limits the extent to which BMPs and LID can be used. The applicability and cost-effectiveness of LID for redevelopment appears to need significant additional research. **By joining life-cycle cost,**

Figure 2. LID Site in Pierce County, Washington

return on investment, and water quality benefit analyses, this study fulfills a resource gap at both regional and national levels.

A summary of local, regional, and national studies is presented in Appendix C.

Figure 3. LID Demonstration Project, Washington State University

3 BACKGROUND

This study focuses on three representative sites in the City of Mission and compares the life cycle cost, return on investment, and water quality benefits of traditional and low impact development scenarios for each site. Low Impact Development (LID) is a comprehensive land use planning and engineering design approach focused on maintaining and enhancing the pre-development hydrologic regime of watersheds as new development proceeds. The components of the LID approach include reducing the impervious area created by development, maximizing open space, preserving mature vegetation, incorporating natural site elements such as stream corridors and forests, and decentralizing stormwater management by applying best management practices (BMPs) in the upstream portions of the watershed. Through the use of innovative LID, stormwater on a developed site may be managed in a manner that retains the predevelopment hydrologic and ecological functions of the site.

LOW IMPACT DEVELOPMENT (LID) is a comprehensive land use planning and engineering design approach focused on maintaining and enhancing the pre-development hydrologic regime of watersheds as new development proceeds.

Figure 4. NRCS Rain Garden Illustration

STUDY COMPONENTS

1. Economic Analysis
2. Stormwater Design Criteria
3. Water Quality Modeling

Several assumptions were developed to quantitatively compare and contrast the differences between LID and traditional stormwater management design. The study components are three fold: detailed economic analysis, stormwater quantity and quality design criteria for traditional and LID scenarios, and water quality modeling for the different development practices.

A. ECONOMIC ANALYSIS

The life cycle cost and the potential return on investment (ROI) were used to evaluate the economic impacts of both traditional development and LID. The ROI analysis incorporates the life cycle costs of each proposed development scenario and provides a means to **compare the economic viability.**

B. STORMWATER VOLUME AND QUALITY

Site design and stormwater management criteria have been historically based on analyses of various storm events and ensuring sufficient conveyance capacity for peak discharges. Over the past decades, additiona design criteria have emerged to address water quality. Regional standards and design criteria are driven by national policy to include conservation, control of non-point source pollution, and community education. Existing Kansas water quality standards, however, do not specify limits for pollutants in stormwater. The current water quality criteria for total suspended solids (TSS) and total phosphorus (TP) are narrative recommendations, rather than quantified limits that may be regulated. The quantities of these contaminants in runoff cannot be allowed to rise to levels where they would interfere with aquatic life.

Figure 5. Bioretention Swales

Typically, LID principles are applied to new developments. The proposed sites evaluated in this study include different levels of existing development that represent a variety of redevelopment opportunities. In addition to economic benefits, this analysis includes comparison of the volume quantity and and quality of runoff from specific and cumulative rain events. Several criteria were developed to quantitatively compare and contrast the differences between LID and traditional stormwater management design practices. Some constraints are the same for development sites:

- Development codes regarding building density and parking requirements
- The percentage of impervious area
- The storm events evaluated
- The regulatory standards for control of peak flows

LID SCENARIO 1:
satisfies the regional BMP Manual Level of Service method and APWA 5600.

LID SCENARIO 2:
meets the typical LID site design standards as well as the APWA 5600. Typical LID site design maintains predevelopment hydrologic conditions: peak discharge and volume of runoff for the 2- and 10-year design storm events.

Figure 6. Bioretention Cell

LID practices aimed at managing stormwater before it enters a piped system, reducing runoff by promoting infiltration. To compare and contrast both traditional and LID sites, different hydrologic and hydraulic conditions are considered. Three site design standards: the regional BMP Manual, LID, and Leadership in Energy and Environmental Design (LEED) were used in the design scenarios for each site. Both traditional and LID sites are designed to comply with APWA 5600. The traditional design scenario meets existing stormwater management criteria stipulated in APWA 5600. The first LID design scenario satisfies the regional BMP Manual and APWA

5600. The second LID scenario meets the traditional LID site design standards as well as APWA 5600. These design standards are explained in Appendix A.

C. MODEL SELECTION

To evaluate the capability of LID and traditional stormwater management scenarios to improve water quality, three models were investigated: P8, SLAMM, and XP-SWMM. Based upon the review, one model was selected for this study. The independent models are described in Appendix A.

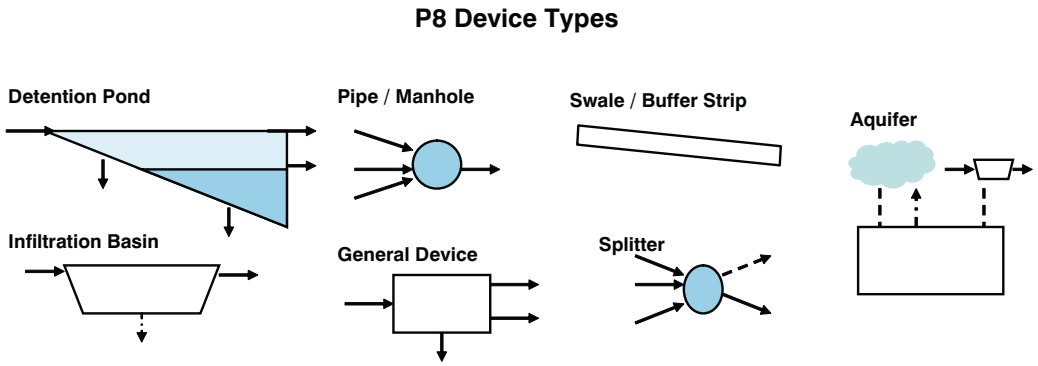


Figure 7. Device Types in P8 Model

The P8 model, which was selected for the water quality modeling, is designed specifically for site analysis whereas SLAMM, another model, is better suited to modeling at the watershed level. The P8 model is also calibrated to Midwestern watersheds, thus it is better aligned for the conditions in Mission. The P8 model measures changes in water quality that result from settling of suspended solids, dissolved solids, and associated contaminants. These contaminants can be completely removed from the system through infiltration, and the model includes a particle removal scale factor that may be adjusted to represent the effects of vegetation on particle removal rates. Plants can increase particle removal rates under a given hydraulic regime through biological mechanisms. While Black & Veatch has developed a comprehensive XP-SWMM model of the secondary stormwater drainage infrastructure in the City, this model is not a public domain product and therefore would not be readily available to the City for evaluation of future sites. Assumptions for selected sites and associated scenarios are presented in Appendix B.

4 PRESENTATION AND DISCUSSION OF RESULTS

The life cycle costs and water quality benefits of the low impact development (LID) scenarios are compared with traditional development scenarios to help **evaluate the cost-effectiveness** of LID approaches and to inform future policies and design criteria. Results of the economic analysis and water quality modeling are presented and compared at the site level. To evaluate a variety of redevelopment opportunities, three sites were selected that represent a mixed-use commercial redevelopment at Metcalf Avenue, a multi-family development at Roe Avenue, and a typical suburban single-family residence. The net present value (NPV) of capital and maintenance costs and return on investment (ROI) are reported for the development scenarios. A reasonable target ROI, synonymous with internal rate of return (IRR), is between 9 and 12 percent. In both the mixed-use commercial and the multi-family residential cases, at least one LID scenario yields a return on investment that is comparable to the traditional development scenario. A typical residential site was evaluated with LID retrofits rather than as a complete redevelopment. Therefore, only capital expenditures were taken into account and compared. The capital costs may be offset by homeowner involvement, by an incentives program, or the city provision of resources such as plants and mulch.

For all sites, **total suspended solids (TSS) and total phosphorus (TP) concentrations are used as indicators of water quality improvement, because they represent the potential removal of both suspended and dissolved contaminants**. TSS include both sediment and organic material suspended in water. Phosphorus is the

TOTAL SUSPENDED SOLIDS: both sediment and organic material suspended in water

PHOSPHORUS: limiting nutrient for algae growth in fresh water and increased quantities can result in higher rates of eutrophication.

HEAVY METALS AND HYDRO-CARBONS: typically found from automobile wear, parking lots, and roof shingles

limiting nutrient for algae growth in fresh water, **and higher concentrations can result in higher rates of eutrophication. Other commonly found pollutants include heavy metals such as copper (Cu), lead (Pb), zinc (Zn), and hydrocarbons (HC). Heavy metals and hydrocarbons** in stormwater typically come from automobile leaks and general wear, parking lots, and roof shingles.

A. SITE 1. METCALF AVENUE MIXED-USE DEVELOPMENT

The Metcalf Avenue Mixed-Use Development site represents 6.2-acres in the city's West Gateway district. It encompasses an entire block bounded by Martway on the north, 61st Street on the south, Broadmoor to the east and Metcalf Avenue to the west. The site was selected for this study because it represents multi-use commercial redevelopment opportunities in Mission's Gateway district. It also serves as a case study of how low impact development (LID) concepts can be integrated with density and the form-based codes that define new development in this area.

The conceptual site plan of dense development consists of 75% impervious surfaces and includes a proposed hotel, office, bank, restaurant, retail, and limited housing opportunities. **The traditional scenario included underground detention** to control the peak discharge of stormwater runoff. A combination of **porous pavement, rain gardens, and smaller underground detention were used in the LID scenario** to meet stormwater volume and quality criteria. **Application of the BMP Manual and APWA 5600 to develop LID Scenario 1 resulted in a site design that also satisfied the peak discharge and total runoff volume requirements of LID Scenario 2.** The results of the water quality and economic analyses are presented in the following section.

Figure 8. Metcalf Avenue Mixed-Use Development: Existing Site

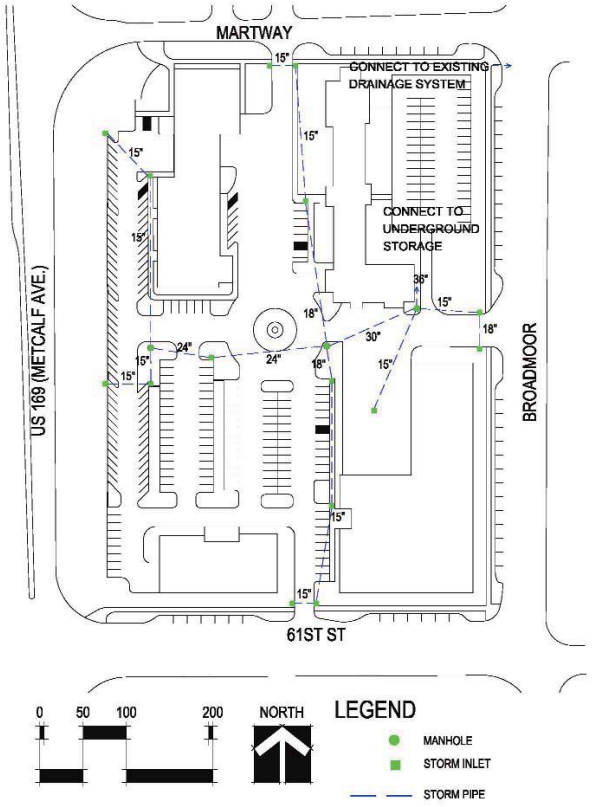


Figure 9. Metcalf Avenue Mixed-Use Development: Traditional Site Layout

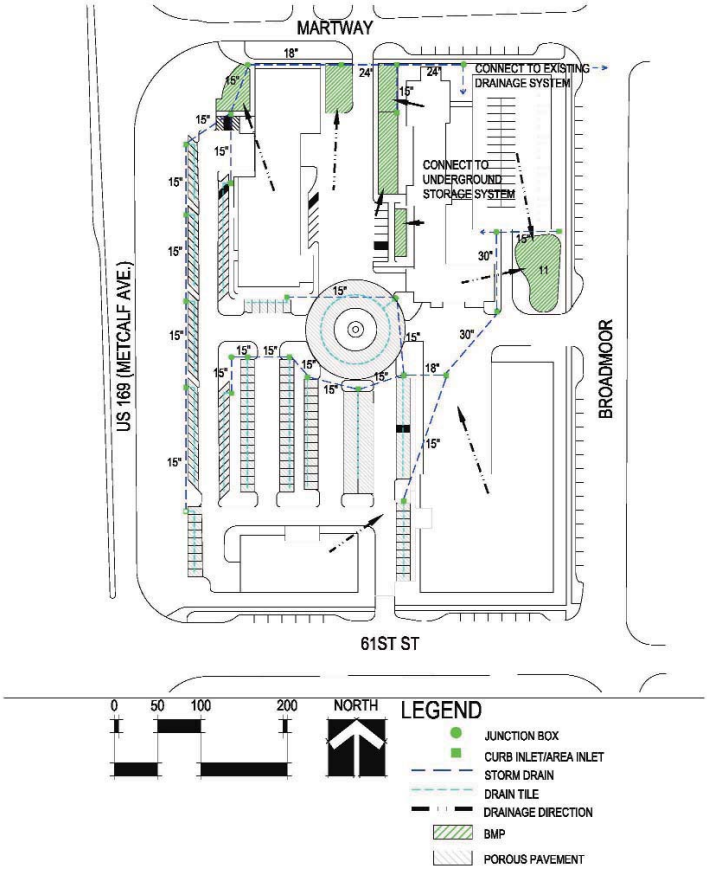


Figure 10. Metcalf Avenue Mixed-Use Development: LID Site Layout

1. Water Quality Comparison

The percentages of reduction of commonly found pollutants in the runoff from specific design storm events were evaluated for each scenario. A **design storm** is a selected storm event that has a probability of **occurrence once within a given number of years** (i.e. the 2-year event will occur once every two years). The water quality (WQ) event is a design storm event that is specific to this region of Kansas. The **WQ event produces a volume of runoff equal or less than 90% of the volume of all 24-hour storms** on an annual basis. In Mission, the WQ event is a 1.37-inch rain event. Because of infiltration of runoff, the low impact development scenario offers a significantly higher level of treatment than the traditional scenario. Also, the detention time required by the stormwater best management practices (BMPs) is longer than the detention time required to manage peak flows which results in larger volumes of settled particles.

DESIGN STORM: occurs once within a given number of years

WQ EVENT: produces a volume of runoff equal or less than 90% of the volume of all 24-hour storms

Table 1. Metcalf Avenue Mixed-Use Development Water Quality Pollutant Percent Reductions

TRADITIONAL SITE DESIGN					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	56%	53%	55%	55%	48%
Nutrients					
Total Phosphorus (TP)	23%	18%	15%	14%	10%
Total Kjeldahl Nitrogen (TKN)	20%	16%	12%	11%	8%
Heavy Metals					
Copper (Cu)	42%	37%	29%	26%	22%
Lead (Pb)	52%	47%	44%	42%	36%
Zinc (Zn)	5%	3%	2%	2%	1%
Hydrocarbons (HC)	52%	47%	44%	42%	36%

LID SCENARIO 1					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	88%	84%	81%	80%	72%
Nutrients					
Total Phosphorus (TP)	65%	55%	39%	35%	28%
Total Kjeldahl Nitrogen (TKN)	59%	48%	32%	29%	22%
Heavy Metals					
Copper (Cu)	71%	62%	46%	42%	35%
Lead (Pb)	82%	76%	66%	63%	55%
Zinc (Zn)	30%	21%	12%	10%	7%
Hydrocarbons (Hc)	82%	76%	66%	63%	55%

A comprehensive approach to evaluate each scenario is to calculate the cumulative impacts over a given time period rather than looking at a single design storm event. To evaluate the performance of the site over the course of an entire year, 2008-2009 regional rainfall data was applied and the cumulative capture of total suspended solids (TSS) and total phosphorus (TP) was documented.

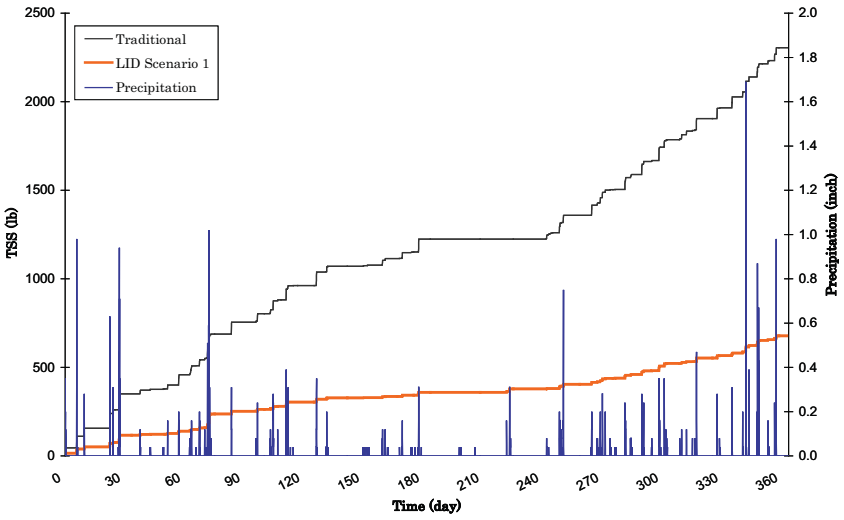


Figure 11. Metcalf Avenue Mixed-Use Development: Cumulative TSS Discharge (2008-2009)

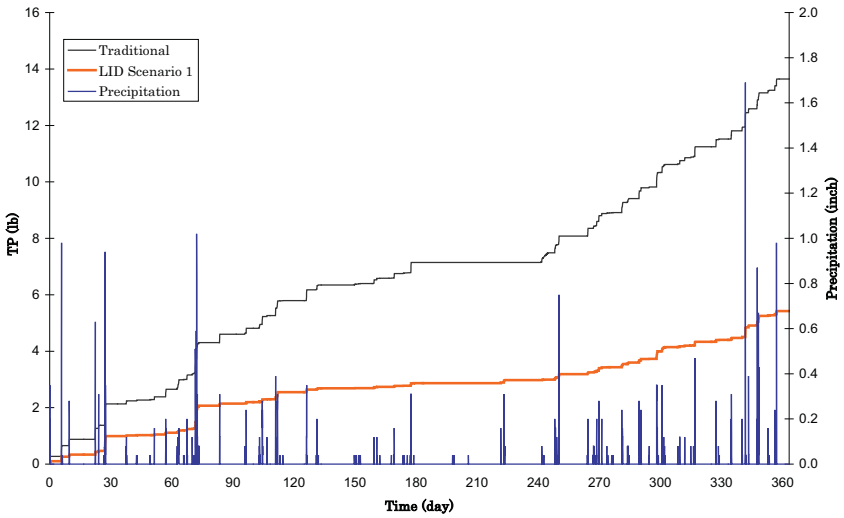


Figure 12. Metcalf Avenue Mixed-Use Development: Cumulative TP Discharge (2008-2009)

Under the LID Scenario 1, the cumulative discharge of total suspended solids (TSS) was reduced by 70% more than what was achieved by the traditional site design over the course of one year. A similar reduction was achieved for total phosphorus (TP). Under LID Scenario 1, the quantity of total suspended solids decreased from 2305 lb in the traditional scenario to 678 lb (a difference of 1627 lb) and the quantity of total phosphorus decreased from 13.6 lb under the traditional scenario to 5.4 lb (a difference of 8.2 lb) over the course of one year. The reduced concentrations of pollutants in runoff were the result of infiltration facilities provided in the LID scenario.

When compared to the traditional site runoff, LID Scenario 1 results in a decrease of 1627 lb of suspended solids, equivalent to 40 large bags of soil....

2. Cost Comparison

The traditional and the LID scenario were compared by life cycle cost analysis and evaluation of the return on investment after 10 years, a typical timeframe for an investment developer to sell the property. The life cycle cost analysis results in a net present value (NPV) of costs for each scenario. The NPV serves as the most comprehensive method of assessing the relative cost of the capital improvements to the site under each scenario. **The net present value is a function of the capital expenditures, maintenance costs, discount rate, and design life.**

Figure 13. Pervious Pavement (Gaia Engineering, 2009)

The largest difference between the capital costs of the traditional and the LID scenario at the Metcalf Avenue Mixed-Use Development is the higher cost of the pervious pavement and associated materials, excavation due to the gravel layer underneath pavement, and stormwater infrastructure. The higher costs under the LID scenario are slightly offset by the smaller underground storage volume necessary to manage peak flows.

Table 2. Metcalf Avenue Mixed-Use Development:Cost Comparison Summary

	TRADITIONAL	LID SCENARIO 1	
Capital Site Improvements			
Mobilization	$ 300,000	$ 300,000	
Site Prep	$ 305,960	$ 313,060	
Stormwater Conveyance and Storage	$ 332,639	$ 367,703	
Landscaping	$ 379,446	$ 335,547	
Access	$ 903,367	$ 976,854	
Contingency	$ 333,212	$ 343,975	
Construction Documents	$ 383,194	$ 395,571	
Total Capital Expenditure	**$ 2,937,818**	**$ 3,032,709**	
Yearly Maintenance (Cost per Year)			
Frequent Maintenance	$ 25,268	$ 21,456	
Infrequent Maintenance (Annualized)	$ 10,012	$ 13,607	
Total Maintenance Expenditure	**$ 35,280**	**$ 35,063**	
NPV (50 Year) on Site Development Costs	**$ 4,004,300**	**$ 4,019,600**	
10-year ROI on Total Investment	**10.76%**	**10.69%**	

Site design capital expense, maintenance, and return on investment for the LID scenario are comparable to those for the traditional site. The differences in cost are attributed to stormwater conveyance and storage, landscaping, and access. The higher stormwater conveyance and storage costs that include additional structures to accommodate the new BMPs are slightly offset by the use of a smaller underground detention vault. The lower landscaping cost reflects the reduced need for irrigation and the replacement of traditional turf with rain gardens. Access expenses are higher due to the use of pervious pavement rather than asphalt on a 0.77 acre portion of the site. After 50 years, the net present value (NPV) of site development costs of the LID and traditional scenarios will be comparable. Because of the small difference between the capital costs of the two scenarios, **the return on investment for the traditional and the LID scenario will also be comparable - within 10% of one another**. Other cost components associated with site development (i.e. building costs) dwarf the site development costs. A small change in the site development costs does not significantly change the return on investment (ROI) for a developer. The ROI analysis assumes that the site will be sold after 10 years, as is typical of market patterns in northeast Johnson County. Site layouts for both the traditional and the LID scenarios and additional details of the cost summary are provided in the appendices.

3. Site Summary and Recommendation

The LID Scenario 1 site design optimizes the water quality benefits and return on investment for the Metcalf Avenue Mixed-Use Development. This scenario reflects a design that meets the standards of the regional BMP manual, APWA 5600, and in addition, typical LID critera. A comparison of the capital cost with the percent reductions of total suspended solids and total phosphorus in the recommended LID scenario versus those in the traditional scenario over the course of an entire year is presented in Figure 14.

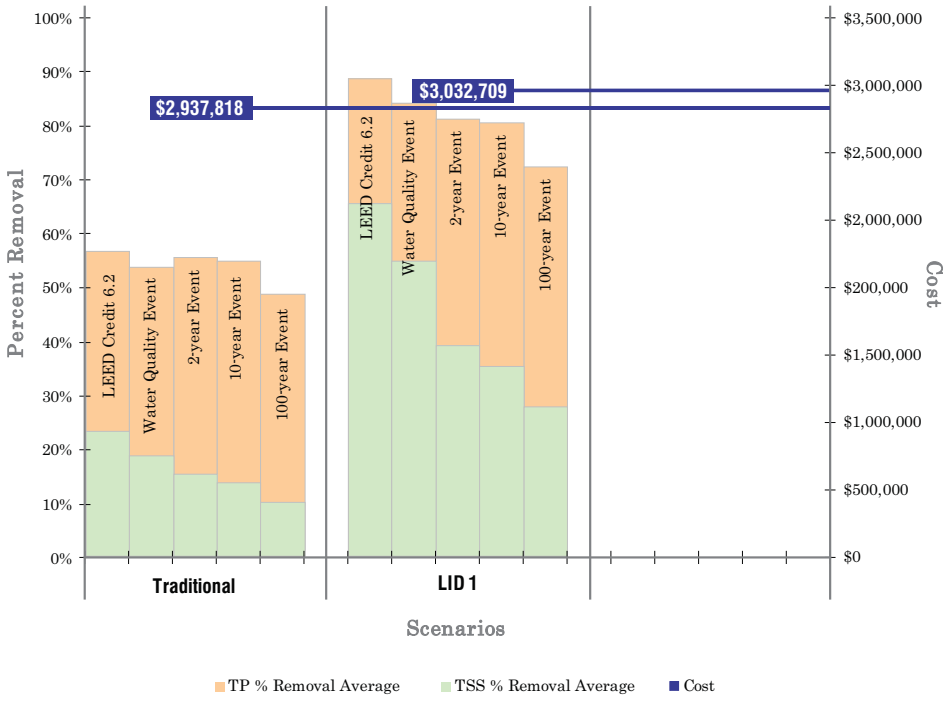


Figure 14. Cost Benefit Comparison of Metcalf Avenue Mixed-Use Development Scenarios

Capital expenses for the LID Scenario 1 site are within 5% of those for the traditional scenario and the return on investment (ROI) is comparable. Under the LID scenario, the cumulative discharge of TSS was over 70% lower than the discharge under the traditional scenario in the course of one year. The cumulative discharge of TP was reduced similarly. The LID Scenario 1 site design optimizes the water quality benefits and provides a target ROI for the Metcalf Avenue site.

B. SITE 2. ROE AVENUE MULTI-FAMILY DEVELOPMENT

The conceptual Roe Avenue development covers approximately one acre of undeveloped land between Shawnee Mission Parkway and Roe Avenue. The conceptual plan for traditional development proposed a large condominium with underground parking, and traditional landscaping including a water feature. The modified low impact development (LID) scenarios include use of the same water feature as a detention device. The LID scenarios also include native vegetation, a rain garden, and pervious paving to facilitate infiltration of stormwater runoff.

1. Water Quality Comparison

The overall percent reductions of common pollutants in runoff from specific design storm events were evaluated for each scenario. Both LID scenarios result in a higher level of treatment because a portion of runoff infiltrates on- site. On this site, the water quality results are affected by runoff to the pond from an upstream drainage area. This pond is used as a treatment credit for the site in order to comply with the standards of both APWA and the BMP Manual.

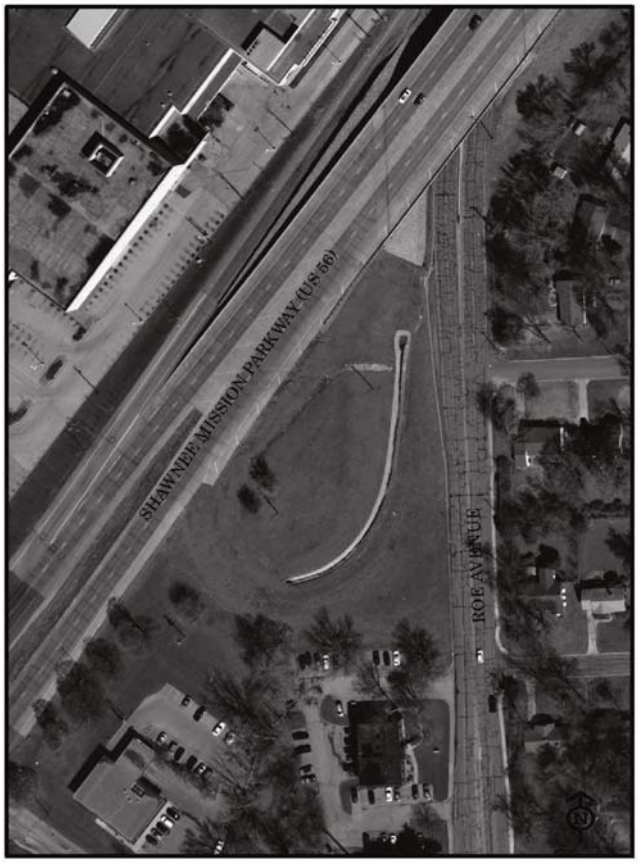


Figure 15. Roe Avenue Multi-Family Development: Existing Site

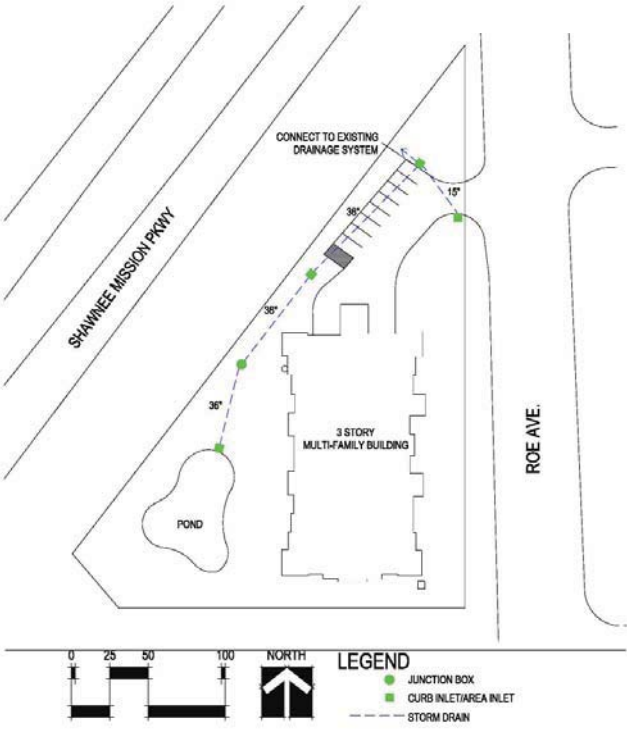


Figure 16. Roe Avenue Multi-Family Development: Traditional Site Layout

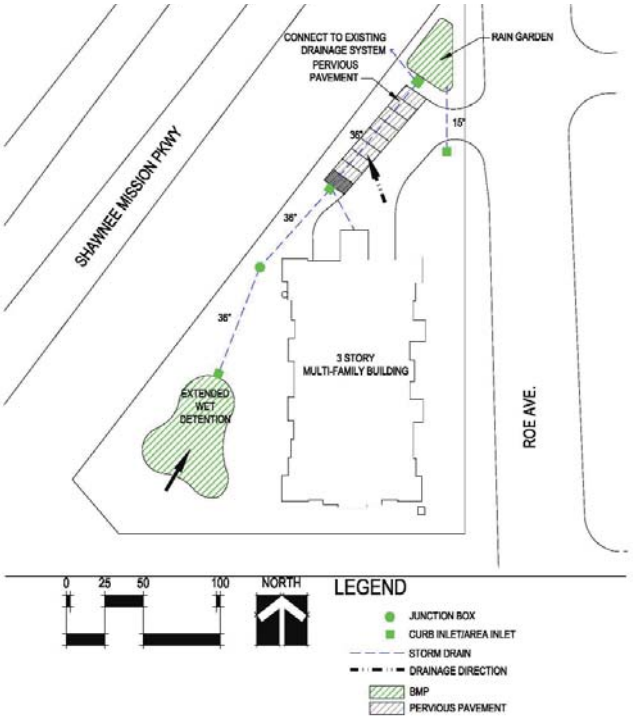


Figure 17. Roe Avenue Multi-Family Development: LID Site Layout

Table 3. Roe Avenue Multi-Family Development Water Quality Pollutant Percent Reductions

TRADITIONAL SITE DESIGN					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	47%	45%	48%	46%	35%
Nutrients					
Total Phosphorus (TP)	21%	17%	14%	12%	8%
Total Kjeldahl Nitrogen (TKN)	18%	15%	11%	10%	7%
Heavy Metals					
Copper (Cu)	36%	31%	24%	22%	20%
Lead (Pb)	43%	40%	38%	36%	29%
Zinc (Zn)	4%	3%	2%	1%	1%
Hydrocarbons (HC)	43%	40%	38%	36%	29%

LID SCENARIO 1					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	56%	54%	56%	54%	41%
Nutrients					
Total Phosphorus (TP)	26%	21%	17%	15%	10%
Total Kjeldahl Nitrogen (TKN)	23%	18%	13%	12%	8%
Heavy Metals					
Copper (Cu)	43%	37%	29%	26%	23%
Lead (Pb)	52%	48%	44%	42%	34%
Zinc (Zn)	6%	4%	2%	2%	2%
Hydrocarbons (HC)	52%	48%	44%	42%	34%

LID SCENARIO 2					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	56%	53%	56%	54%	44%
Nutrients					
Total Phosphorus (TP)	28%	23%	18%	16%	12%
Total Kjeldahl Nitrogen (TKN)	25%	20%	15%	13%	10%
Heavy Metals					
Copper (Cu)	43%	37%	29%	27%	25%
Lead (Pb)	52%	48%	44%	42%	36%
Zinc (Zn)	7%	5%	3%	3%	2%
Hydrocarbons (HC)	52%	48%	44%	42%	36%

To observe water quality trends over the course of a year, 2008-2009 regional rainfall data was applied and the cumulative capture of total suspended solids (TSS) and total phosphorus (TP) was assessed. Both low impact development (LID) scenarios removed substantial quantities of TSS and TP. **When compared to the traditional model, the LID scenarios reduced the cumulative discharge of TSS by nearly 15% over the course of one year. The reduction of cumulative discharge of TP off-site was reduced by approximately 5% over the course of one year when compared to the traditional scenario**. The cumulative percent reductions appear to be less significant because there is a 6-acre watershed upstream of the Roe Avenue development that dilutes the reductions of pollutants – characteristics of runoff from the larger area outweigh the runoff from the smaller 1-acre site. The phosphorus removal is lessened because the majority of water quality improvements are achieved through detention rather than infiltration strategies and the dissolved contaminants pass through the system.

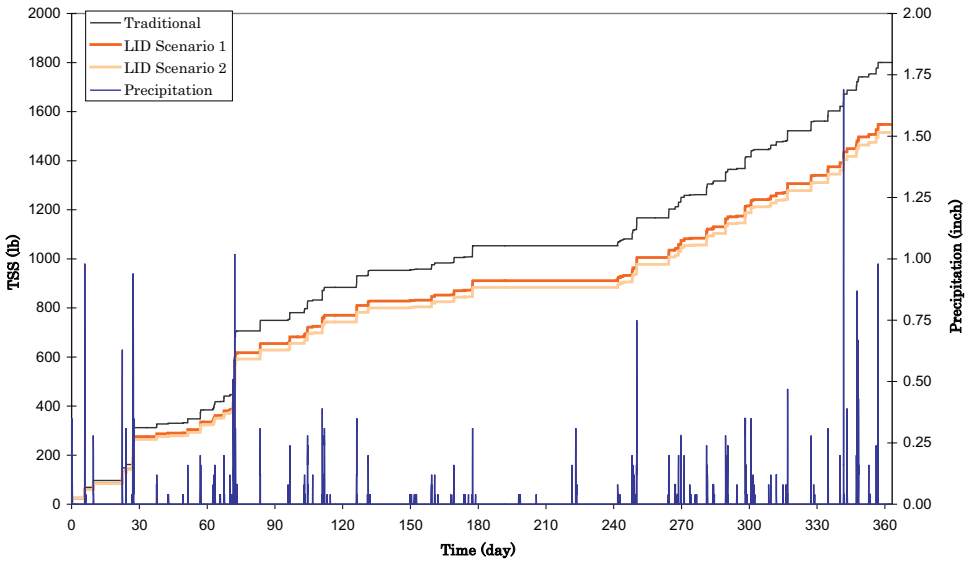


Figure 18. Roe Avenue Multi-Family Development: Cumulative TSS Discharge (2008-2009)

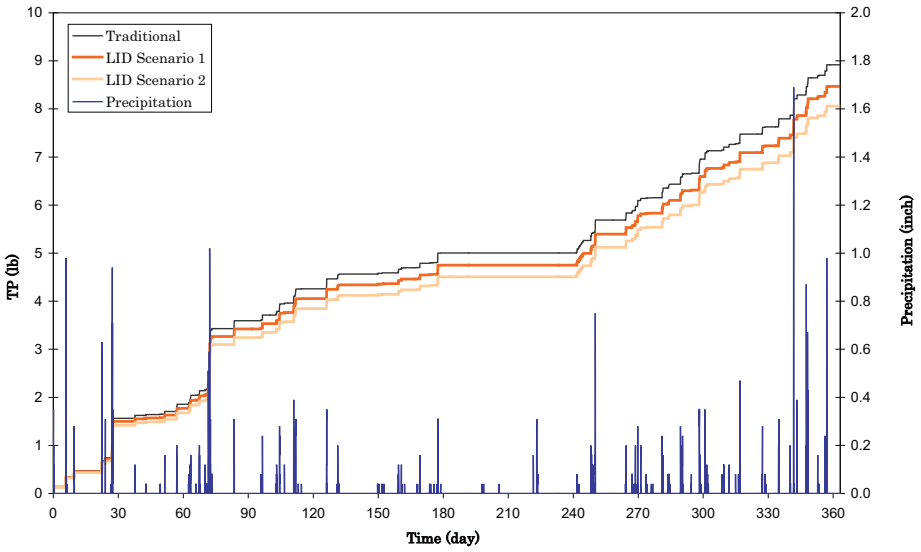


Figure 19. Roe Avenue Multi-Family Development: Cumulative TP Discharge (2008-2009)

2. Cost Comparison

The traditional and low impact development (LID) scenarios were compared using life cycle cost analysis and evaluating the return on investment (ROI) under various ownership durations. The life cycle cost analysis results in a net present value (NPV) of costs for each scenario. Landscaping modifications to LID Scenario 1 resulted in a cost reduction compared to traditional development. Porous pavement, extensive underground infiltration into gravel beds, and a small rain garden were necessary to accomplish the design criteria applied in LID Scenario 2 and resulted in an increase in capital and maintenance expenses.

Table 4. Roe Avenue Multi-Family Development Cost Comparison Summary

	TRADITIONAL	LID SCENARIO 1	LID SCENARIO 2
Capital Site Improvements			
Mobilization	$ 35,000	$ 35,000	$ 35,000
Site Prep	$ 57,800	$ 57,800	$ 59,711
Stormwater Conveyance and Storage	$ 61,470	$ 61,470	$ 64,110
Landscaping	$ 150,443	$ 132,137	$ 142,259
Access	$ 54,137	$ 54,137	$ 76,456
Contingency	$ 53,828	$ 51,082	$ 56,630
Construction Documents	$ 61,902	$ 58,744	$ 65,125
Total Capital Expenditure	**$ 474,579**	**$ 450,369**	**$ 499,290**
Yearly Maintenance (Cost per Year)			
Frequent Maintenance	$ 17,882	$ 16,952	$ 17,607
Infrequent Maintenance (Annualized)	$ 536	$ 316	$ 838
Total Maintenance Expenditure	**$ 18,418**	**$ 17,268**	**$ 24,970**
NPV (50 Year) on Site Development Costs	**$ 1,057,400**	**$ 997,800**	**$ 1,080,200**
5-year ROI on Total Investment	**12.42%**	**12.97%**	**11.94%**

The LID Scenario 1 site design provides for the least capital expense and maintenance costs when compared to the traditional and LID Scenario 2 layouts. The differences in cost are associated with landscaping. The decrease in landscaping costs is associated with a significantly smaller irrigation system. In the LID Scenarios, it is assumed that native shrubs and other perennials are installed and do not require permanent irrigation systems. The ROI analysis assumes that all the condos will be sold in the first five years. Therefore, maintenance savings after five years is passed on to the condo owners at that point. LID Scenario 1 increases ROI for the developer by approximately 4% of the traditional ROI, whereas the additional requirements in LID Scenario 2 decrease the ROI. Site layouts for both the traditional and LID scenarios and additional detail to the cost summary are provided in Appendix E.

3. Site Summary and Recommendation

The LID Scenario 1 site design optimizes the water quality benefits and return on investment (ROI) for the Roe Avenue site. This scenario reflects a design that accounts for regional BMP manual standards. This LID design has less capital cost and increases the ROI by approximately 4% when compared to the traditional site. The figure below compares the capital cost with percent reduction of total suspended solids and total phosphorus in each LID scenario compared to the traditional scenario over the course of an entire year.

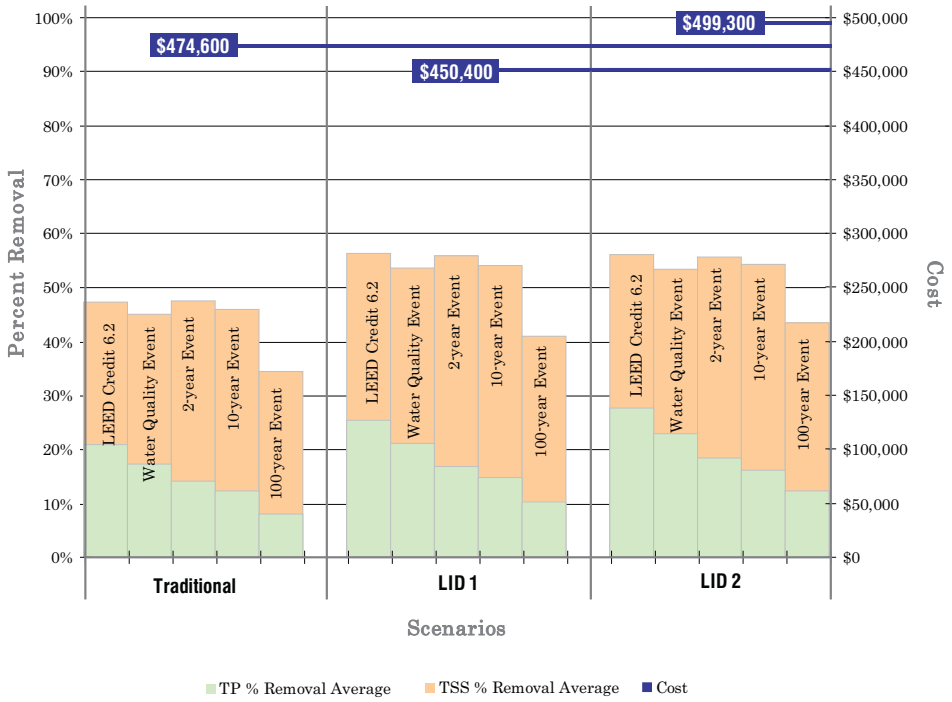


Figure 20. Cost Benefit Comparison of Roe Avenue Multi-Family Development Scenarios

When compared to the traditional model, the LID scenarios reduced the cumulative discharge of TSS off-site by nearly 15% of those in the traditional scenario over the course of one year. The reduction of cumulative discharge of TP off-site was reduced by approximately 5% of those in the traditional scenario over the course of one year.

C. SITE 3. RESIDENTIAL:

The residential market is not anticipated as a major redevelopment focus in Mission; however, approximately 67% of land in the City is zoned residential (1080 acres). Single family residences make up about 60% of all residentially zoned area (635 acres). Currently, there are not guiding criteria for stormwater management in the case of redeveloping a single residential lot. The City has an opportunity to develop incentives and programs for individual homeowners to retrofit their properties in order to have cumulative water quality benefits across the City.

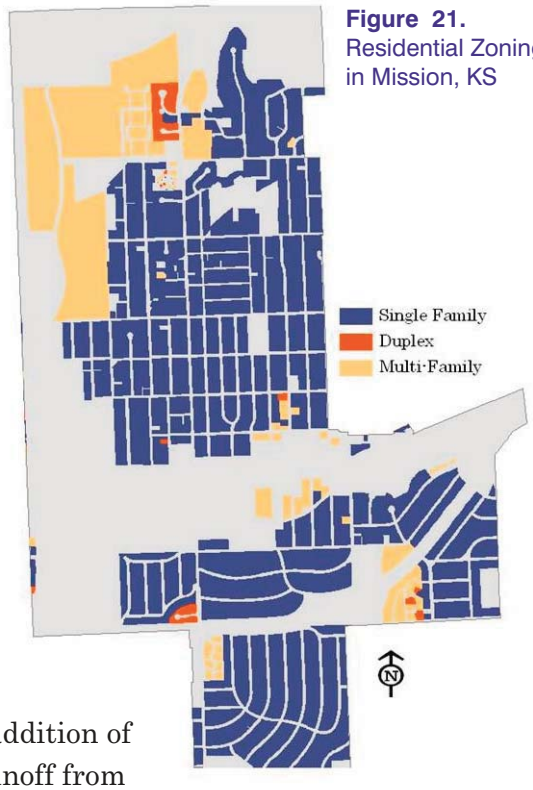


Figure 21. Residential Zoning in Mission, KS

A typical residential site was selected to determine the cost impacts and water quality benefits of one commonly applied low impact development practice: a rain garden. The existing conditions of the site were assumed to reflect traditional development patterns. The initial retrofit option evaluated was the addition of a rain garden to treat approximately half of the site's runoff from a one-inch rainfall. **The sizes of residential rain gardens are dependent on three factors: the amount of space available for a garden, the kind of soil, and the amount of runoff to be treated. A common approach is to size the garden to retain runoff from a one-inch rainfall.** On a typical Mission residential, which is approximately 35% impervious, the first LID scenario presents a 175 square foot rain garden to treat one-inch of rainfall that runs off of half of a typical 1400 square foot roof. The second, more comprehensive, retrofit was developed to enhance existing drainage patterns, infiltration, and incorporate a larger rain garden of 425 square feet with the capacity to treat runoff from the entire site.

RESIDENTIAL RAIN GARDEN FACTORS:

1. **amount of space available**
2. **soil type**
3. **amount of runoff to be treated**

1. Water Quality Comparison

Overall percent reductions of commonly found pollutants were evaluated for each scenario during specific design storm events. As there is no water quality treatment on the traditional site, these values represent a direct improvement over the traditional scenario.

Table 5. Residential Water Quality Pollutant Percent Reductions

RESIDENTIAL - LID SCENARIO 1					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	*	100%	67%	58%	46%
Nutrients					
Total Phosphorus (TP)	*	43%	23%	22%	16%
Total Kjeldahl Nitrogen (TKN)	*	43%	18%	18%	14%
Heavy Metals					
Copper (CU)	*	44%	33%	37%	37%
Lead (PB)	*	49%	52%	50%	43%
Zinc (ZN)	*	41%	5%	4%	4%
Hydrocarbons (HC)	*	49%	52%	50%	43%

RESIDENTIAL - LID SCENARIO 2					
Variable	LEED 6.2	WQ Event	2-year	10-year	100-year
	0.75 inch	1.37 inch	2.93 inch	3.60 inch	5.29 inch
Total Suspended Solids (TSS)	*	99%	83%	74%	60%
Nutrients					
Total Phosphorus (TP)	*	13%	37%	38%	31%
Total Kjeldahl Nitrogen (TKN)	*	12%	30%	32%	28%
Heavy Metals					
Copper (CU)	*	14%	43%	49%	49%
Lead (PB)	*	24%	66%	65%	57%
Zinc (ZN)	*	9%	8%	8%	9%
Hydrocarbons (HC)	*	24%	66%	65%	57%

*All runoff is captured on site and infiltrates.

LID Scenario 1 presents a shallower and significantly smaller rain garden when compared to LID Scenario 2. Stormwater runoff comes into contact with the rain garden soil, quickly filters out contaminants during small storm events, and therefore yields higher removal rates during the water quality event. During larger storm events, however, the larger rain garden and drainage swale in LID Scenario 2 consistently removes a higher percentage of contaminants.

To evaluate the performance of the site over the course of an entire year, 2008-2009 regional rainfall data was applied and the cumulative capture of total suspended solids (TSS) and total phosphorus (TP) was evaluated. The LID scenarios removed substantial quantities of TSS. The smaller rain garden in LID Scenario 1 reduced the cumulative discharge of TSS by

approximately 50% of that in the traditional scenario, 30 lb and the larger rain garden in LID Scenario 2 reduced TSS by 68 % of that in the traditional scenario, 40 lb. The amount of total phosphorus (TP) in runoff from a typical residential site is very small, less than 0.2 lb in all the scenarios and therefore the potential for improvement is limited. The larger rain garden in LID Scenario 2 provides a higher level of treatment because more runoff is infiltrated on site.

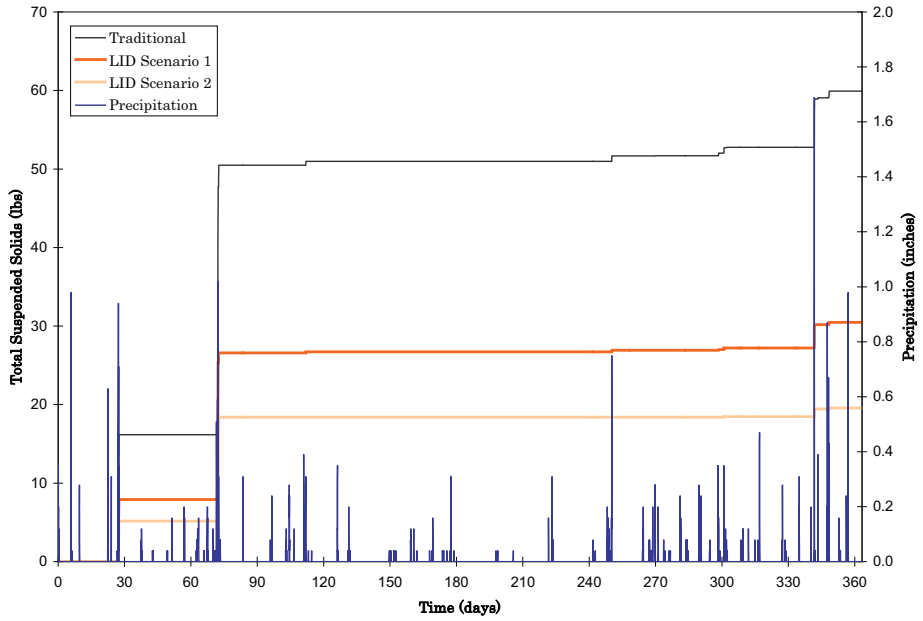


Figure 22. Residential Site: Cumulative TSS Discharge (2008-2009)

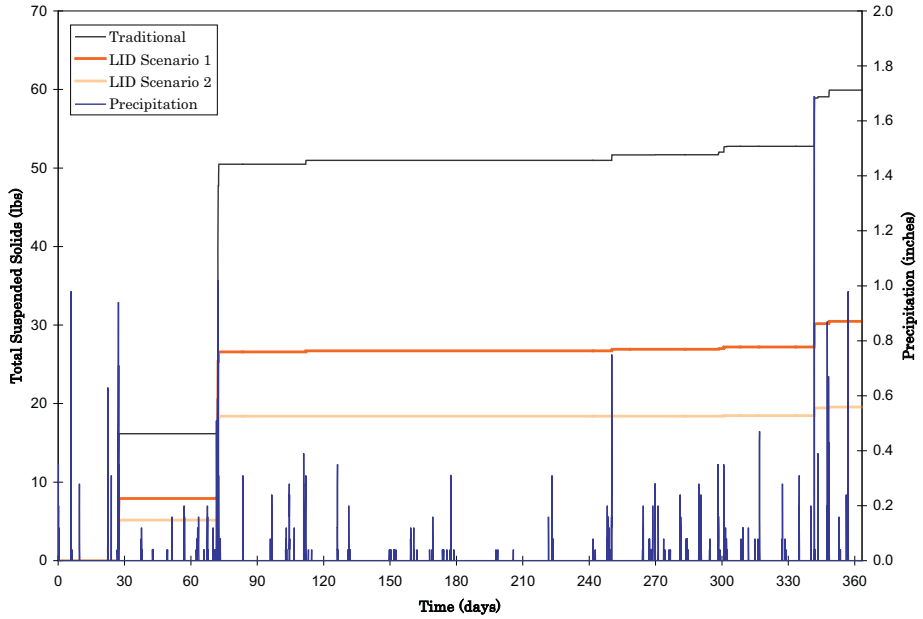


Figure 23. Residential Site: Cumulative TP Discharge (2008-2009)

2. Cost Comparison

The residential site was evaluated as an LID retrofit to an existing site rather than as a redevelopment. Existing residential properties are more likely to be retrofitted with best management practices than be completely redeveloped. The approximate expenditure associated with different LID retrofits of an average residential property is presented below.

LID Scenario 1 includes a shallower and significantly smaller rain garden when compared to LID Scenario 2 and can be installed at a much smaller cost.

Table 6. Residential Cost Comparison Summary

CAPITAL SITE IMPROVEMENTS	LID SCENARIO 1	LID SCENARIO 2
Mobilization	$ -	$ -
Site Prep	$ 233	$ 768
Stormwater Conveyance and Storage	$ -	$ 850
Landscaping	$ 656	$ 2,033
Access	$ -	$ -
Contingency	$ 133	$ 548
Construction Documents	$ -	$ 630
Total	**$ 1,022**	**$ 4,829**

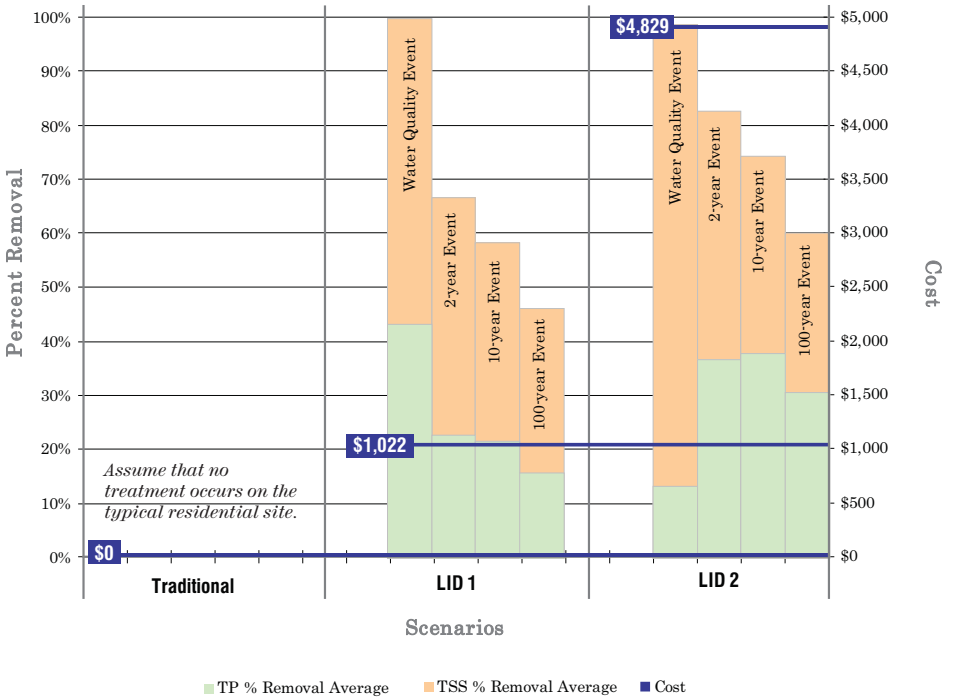


Figure 24. Cost Benefit Comparison at Residential Scenarios

3. Site Summary and Recommendation

The evaluation provides the capital costs of two different rain gardens and the water quality benefits that may be achieved on a single site. The water quality benefits on a residential site are significant for the City, the majority of which is residentially zoned. These results may be used to inform and develop an incentive program for residential rain gardens.

The smaller rain garden in LID Scenario 1 reduced the cumulative discharge of TSS by approximately 50% of that in the traditional scenario (30 lb of suspended solids), and the larger rain garden in LID Scenario 2 reduced TSS by 68% of that in the traditional scenario (40 lb of suspended solids). **The Scenario 1 rain garden, treating runoff from approximately one half of the impervious area on the site, is most cost effective for a typical residence in Mission.** Costs associated with the rain garden in LID Scenario 1 can be further reduced by homeowner involvement in construction, an incentives program, and provision of resources by the City, such as planting material and mulch through Public Works as described in Appendix I.

5 CODE AND ORDINANCE RECOMMENDATIONS

To complement the analysis of alternate development scenarios, existing codes and ordinances and potential amendments and adoptions were evaluated. Codes and ordinances define a standard of development in a municipality, the values of a community. Amendment and adaptation of codes and ordinances to include new successful design criteria and standards is an integral part of progress.

A. EXISTING ORDINANCE REVIEW

Current development in the City of Mission is guided by several documents, ordinances, and design criteria. Site layout and stormwater management are addressed in general codes and ordinances that provide varying levels of detail. The following documents comprise the guidance and criteria used by developers and City planning to layout sites and stormwater management plans:

- Mission Municipal Code Section 500, Article X
  Adoption of APWA Storm Drainage and Erosion Control Criteria
  Adoption of the 2004 City of Mission Stormwater Management Criteria
- Mission Municipal Code Section 500, XI (Stormwater Pollution Prevention)
- Mission Municipal Code Section 425 (Parking and Loading Regulations)
- Form Based Code for the West Gateway Study Area, 2007
- East Gateway Redevelopment Plan, as amended in 2008

The City has not officially adopted the regional guidance document for best management practices, APWA *Manual of Best Management Practices for Stormwater Quality*.

1. Stormwater Management Criteria

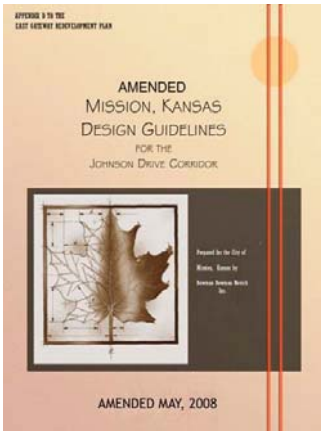
The City Public Works has adopted APWA 5600 Design Criteria and developed a City of Mission Stormwater Management Criteria document, published in 2004. The APWA 5600 design criteria provides uniform procedures for design of storm drainage systems in the Kansas City metropolitan area. This guidance document addresses water quantity issues based on rainfall and land characteristics typical in the Kansas City region. These issues include conveyance, flow rates, and construction design parameters of storm drainage infrastructure. The 2004 Stormwater Management Criteria outlines the submittal requirements for development within the City. These criteria specify acceptable pipe materials, necessary easements, detention, and maintenance requirements.

2. Site Design Guidelines and Form-Based Code

FBCs guide development in the public realm by controlling the physical form of the private realm. FBC regulates development to achieve a specific urban form and place rather than focusing on the specific use of a building or property. In the City of Mission, these codes shape community form and character with an emphasis on pedestrian-scale, mixed use urbanism. FBC addresses the relationship between building facades and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks. Greater attention is also paid to streetscape and a design-focused public participation process.

The City Municipal Code identifies the West Gateway as an overlay district where FBC is established to achieve a specific public purpose. The FBC for the West Gateway Study Area is meant to create a pedestrian-friendly environment and to promote redevelopment and revitalization. It addresses transitions between urban and neighborhood edges, building types, open space, street character, and parking. The overlay district encompasses the Metcalf Avenue site, evaluated in this study. This district and associated codes allows for higher development density, ground-level retail uses, and optimal locations for office and residential uses. The FBC and the Municipal Code are complementary and the FBC supersedes the Municipal Code for the overlay district.

In addition to FBC, the *Mission Kansas Design Guidelines for the Johnson Drive Corridor* was developed in 2008 to provide clear direction for evaluating future developments with regard to design integrity and the City goals for the district. These guidelines are focused on promoting architecture that is compatible with neighboring buildings, encouraging a diversity of uses, activities, creating pedestrian connections, and providing landscape features and screening to minimize surface parking. All new developments within the corridor, except residential, are required to submit development plans for review to assess compliance with these design guidelines. These guidelines were not applied to the conceptual scenarios evaluated in this study.



B. PRIORITIZED RECOMMENDATIONS

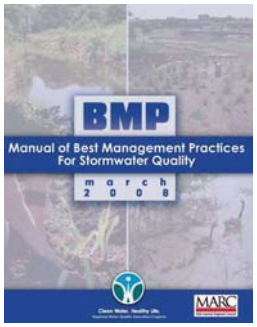
The City may incorporate additional language to amend current codes and ordinances by direct modification to existing standards and criteria or by adoption of a separate document. The documents summarized in the preceding section comprise the guidance and criteria used by developers and City planning to layout sites and stormwater management plans. These documents may be directly amended to incorporate and allow LID practices and BMP strategies in redevelopment. Ordinance language from other regional municipalities is provided in this section, however, the City must engage with an attorney for amendments or additions to its existing municipal code.

The conclusions drawn from this report comparing traditional and LID redevelopment scenarios provide a foundation for the City to amend existing design criteria, ordinances and codes to incorporate LID practices and BMP strategies. Additional modifications may be necessary to clarify minor inconsistencies, however, no major inherent conflicts were identified between existing development codes and ordinances and the proposed changes discussed in this section. Proposed amendments are prioritized and include adoption of the most recent BMP manual, preservation of open space, parking requirements, material specification, plant material palette, and a listing of potential variances to consider on a site-specific basis.

Best Management Practices

The study analysis includes LID Scenario 1 to demonstrate water quality and cost impacts of applying the regional BMP Manual. This scenario proves to

APWA BMP manual provides a method for siting, designing, and maintaining BMPs in the Kansas City region



be the most cost effective scenario for each site. In the larger redevelopments, the capital expenditure and return on investment for LID Scenario 1 is comparable to the traditional scenario. The BMP Manual, applied to redevelopment sites, provides substantial benefit to water quality as well as helping the City to meet NPDES Phase II requirements for compliance. Mid-America Regional Council (MARC) and the Kansas City Metro Chapter of the APWA have developed a comprehensive method for siting, designing, and maintaining BMPs in the Kansas City region, the *Manual of Best Management Practices for Stormwater Quality*. This document was created to be used in conjunction with the APWA Division V stormwater design criteria, already adopted by the City Municipal Code. The BMP Manual, developed and refined over an 8-year period by municipal stormwater engineers, planners, and consultants, provides a step-by-step process for determining the BMPs required for successful stormwater runoff water quality management. Use of the BMP Manual is growing as communities implement post-construction runoff control programs as part of their NPDES Phase II requirements. Major area communities that have adopted the BMP Manual include Fairway, Leawood, Lenexa, Overland Park, Prairie Village, and Johnson County, Kansas, and Kansas City, Missouri.

The City of Mission should focus on immediately adopting the BMP Manual to achieve the significant water quality benefits demonstrated in this study. The BMP Manual may be adopted in entirety into the Municipal Code as follows in Section 500, Article X Stormwater Management Criteria:

Section 500.210: APWA Manual for Best Management Practices for Stormwater Quality – Adoption

There is hereby incorporated by reference for the purpose of implementing and regulating stormwater management criteria for development in the City of Mission, Kansas, those certain criteria and specifications known as the 2008 or most current Mid-America Regional Council and American Public Works Association Manual of Best Management Practices for Stormwater Quality, hereinafter referred to as the Manual of Best Management Practices for Stormwater Quality. No fewer than three (3) copies of the Manual of Best Management Practices for Stormwater Quality shall be marked or stamped in the matter provided by K.S.A. Sections 12-3009—12-0312, and to which shall be attached a copy of this Section and shall by filed with the City Clerk to be open to inspection and available to the public at all reasonable hours.

Additionally, to prioritize BMP improvements through the City, it is recommended that the City formally adopt the recommendations developed in the 2007 Rock Creek Watershed Feasibility Study into City planning guidance documents.

Adoption of the BMP Manual would formally require developers in the City of Mission to maintain existing quality of runoff from after development or redevelopment of sites. Using the BMP Manual as a framework, the City may develop amendments to require more stringent water quality standards as needed. The BMP Manual ranks the relative water quality impact of a development or redevelopment project through the LS calculation based on the change in site cover or imperviousness, respectively. Meeting the LS is intended to maintain a site's predevelopment water quality impact after development. Utilizing the LS method as a foundation, the City may improve water quality further by requiring that developments exceed the required Level of Service by a factor of 0.5 or 1.0 further reducing runoff and the associated contamination from more frequent storms.

Many communities have determined that significant issues associated with adoption of the BMP Manual include defining submittal requirements for permitting and long-term operation and maintenance. Johnson County's "Resolution Adopting Post-Construction Stormwater Quality Treatment Regulations" provides model language that can be used to define permitting, submittal, easement, maintenance, and enforcement procedures. If the BMP Manual is adopted, the City may adopt the Johnson County resolution to further amend Section 500 Article X of the Municipal Code.

The BMP Manual provides a strong foundation for improved stormwater quality management. **A higher standard for water quality of site runoff, as presented in the LID Scenario 2, is achieved using strategies specific to the site such as increased open space, increased depth of aggregate under porous pavement, and larger rain gardens.** Implementation of the standards used to define LID Scenario 2 would require detailed pre and post-development hydrologic evaluation at each site. **The increased cost and water quality benefit associated with LID Scenario 2 did not justify implementation of a standard requirement to maintain pre-development hydrology**; however, after adopting the BMP Manual, the City should consider the following amendments to have greater impact on water quality.

Parking and Loading Regulations

Surface parking is the dominant impervious cover type on non-residential developments and is a significant portion of residential site imperviousness. Reducing parking requirements and providing flexibility are key LID approaches that allow developers to minimize imperviousness and the resulting runoff and pollution. Additionally, reducing parking spaces provides green space and area for stormwater management practices. The existing City Municipal Code sets parking ratios and caps parking at 150 percent of the minimum requirements in Section 425 and the City FBC allows for parking structures in the West Gateway area. To amend these existing standards, **the City should reduce the parking maximum and require mitigation (such as pervious pavement or native landscaping) for excess parking.** The City of Fairway addresses

Figure 25. Impervious Parking in Mission, KS

maximum parking and mitigation measures in Section 14-3-3.102 of its Municipal Code, presented below:

Section 14-3-3.102, C. Maximum Parking

No use shall provide more than ten (10%) percent more than the maximum required parking without providing two or more of the following mitigating design features:

1. The surface shall be porous and shall allow all stormwater to be infiltrated below the surface, subject to the approval by the City. Any porous surface used shall demonstrate that it has at least the same or better performance standard as the required standard parking surface and does not present any maintenance issues.

2. The site shall be required to provide additional area, equal to or greater than the area of parking in excess of the maximum, as public or common open space. This additional open space shall be subject to the design and location requirements and shall be in addition to the minimum open space requirements for the site.

3. Landscape material requirements for the site shall be increased by ten (10%) percent above the minimum amount required by this Division and shall be allocated to provide enhanced buffering of all on-site parking; or

4. Internal landscape islands for the on-site parking shall be increased by five (5%) percent above the minimum percentage requirements of this Division.

To further minimize surface parking, **the City should allow shared parking arrangements in which two or more nonresidential uses with different peak parking periods (hours of operation) use the same off-street parking spaces to meet their off-street parking requirements.** Kansas City, Missouri considers shared parking based on results of an alternative parking study on a site specific basis in the City Municipal Code Section 80-420. Additionally, **the City of Mission may consider other approaches to reduce impervious surface parking such as credits for off-site parking, requiring use of porous pavement, allowing narrower street widths, nearby mass transit, and bicycle facilities.**

Landscaping

The pervious landscape can be amended to improve infiltration and help maintain the predevelopment runoff volume. Native landscaping is an integral component of LID. Native plants are well-adapted to the local climate and ecosystem, meaning they require fewer resources. Native plants generally require little fertilizer or pesticides, little supplemental watering after establishment, and these selections provide valuable habitat. The BMP Manual provides an extensive section on landscaping that existing Municipal Code may be amended to use as reference.

Figure 26. Bioswale in Kansas City, MO

The existing City Municipal Code specifies landscaping requirements in Chapter 415, Article III. This section dictates the minimum number of trees, shrubs, and plantings as well as the submittal requirements for proposed development. The existing code allows native grasses and dictates weed and nuisance vegetation management in Section 220, Chapter 2. Specific plant palettes are not provided in the Municipal Code or design guidelines for the Johnson Drive Corridor. To amend these existing standards, **the City should adopt a plant materials palette that includes a variety of attractive, low-maintenance native vegetation that would allow developers to use native landscaping areas as BMPs, while promoting attractive landscape designs.** Within this ordinance, the BMP Manual may be referenced as an accepted guidance for planting selections. Additionally, codes regarding weeds or necessitating irrigation of landscape areas should provide exceptions for low-maintenance native vegetation after the initial establishment period and encourage the use of borders to clearly define native vegetation plantings in the landscape.

Open Space Preservation

Open space and conservation development are an important means of reducing overall site imperviousness, site disturbance, and runoff, as well as construction and long-term operations and maintenance costs. These provisions allow development to be more densely clustered on part of a site in exchange for providing permanent open space on the remainder of the site,

while maintaining or modestly increasing the overall net density of the area. Provisions can include reduced minimum lot sizes and dimensions, smaller internal setbacks, zero lot lines and shared driveways. Open space may be preserved for active and passive recreation or natural resource preservation.

The City should consider open space in planning and should prioritize preservation of existing open spaces such as the Roe Avenue Multi-Family Development site or Mohawk Park. Outside of the FBC overlay districts, the City may consider adopting an ordinance that defines the components of conservation and open space requirements that are applicable to redevelopment such as building density and shared impervious spaces. Kansas City, Missouri's Development Code (Ordinance 080770) allows for open space and conservation development as-of-right in all residential zoning districts and provides an integrated framework to guide developments. Alternately, the City could use the USGBC LEED criteria to define open space preservation in development.

Stream Preservation and Buffers

In the City Municipal Code, Article X Section 500.190, the City adopts APWA 5600 and subsequently the minimum stream setback provisions defined therein. The City Engineer has the authority to expand the minimum buffers as needed and to require that native vegetation be preserved.

C. EMERGING STORMWATER CODES AND ORDINANCES

Across the nation, existing LID practices and emerging design criteria provide additional resources for the City of Mission to consider allowing and encouraging in future updates to ordinances and the municipal code. The following practices include decentralized detention, regulation of impervious areas, and rainwater harvesting. These methods could be permissible on a site specific basis or addressed in revisions to the City Municipal Code.

Successful integration of best management practices results in decentralized storage, treatment, and infiltration of stormwater. Many cities allow drainage to vegetated centers of cul-de-sacs, depressed roadway medians and swales to collect runoff. Similarly, encouraging drainage to depressed landscaped areas in parking lots reduces runoff volumes by providing detention and infiltration. To control increases in impervious area, the city of Philadelphia, Pennsylvania limits residents with impervious area percentage maximums. The regulation requires any new impervious area to be developed with porous pavements. Rainwater capture, another strategy to reduce runoff, is promoted by the city of Sparks, Nevada. This reuse approach simultaneously reduces the amount of potable water used for irrigation and reduces the amount of runoff from each site. Increasingly, roof water is harvested for use in buildings and site irrigation.

The concentration of development in an urban or business district may be considered directly in conflict with LID principles of preserving open space.

Many cities, including Kansas City, Missouri, require all municipal buildings to be LEED certified. Some cities, including Washington D.C. and Boston, Massachusetts, even require private developments to obtain LEED certification. LEED certification does not guarantee that applicants pursue open space, stormwater, or water efficient landscaping credits but reinforces the City's stormwater management policies.

The BMP Manual incorporates several strategies that are designed for urban settings, including pervious pavement, subsurface filters and settling devices, and other relatively compact solutions such as bioretention cells and rain gardens.

The Sustainable Sites Initiative (SSI) is developing a sustainable site development rating system for projects that do not include built structures. This collective effort between the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center, the American Botanic Garden, and numerous national and local partners will be published in late 2009 and pilot projects established in 2010. The City could promote or adopt the SSI rating system when it becomes available and host demonstration sites.

D. EXISTING AND PROPOSED CODES: POTENTIAL CONFLICTS

The existing Municipal Code presents some limitations to implementation of LID practices but no apparent conflicts. There are, however, potential differences between components of Mission's FBC and some LID principles. LID principles can be summarized as follows: preserve open space, preserve natural topography, and preserve predevelopment hydrology. The FBC that defines the overlay districts of West Gateway and Johnson Drive dictates clustered, dense development and specific location and orientation of buildings with respect to streets and sidewalks. Preservation of open space is

the highest priority of an LID development. In the City of Mission or any developed community, open space is of premium value and density is strongly encouraged to create walkable communities. The concentration of development in an urban or business district may be considered directly in conflict with LID principles of preserving open space. High intensity cities, however, lessen development expansion pressures and adhere to the overarching principle of clustering development to preserve open spaces.

Developing with topography and natural drainage is a key LID principle which, on a site- specific basis, may conflict with the City's FBC. Additionally, the literature review found that reducing site grading can provide a great potential savings of construction costs. The City may choose to consider variances on a site-specific level to allow buildings to conform to the existing topography rather than to be strictly parallel with the street. Preserving predevelopment hydrology may be redefined in the case of redevelopment. The BMP Manual incorporates several strategies that are designed for urban settings, including pervious pavement, subsurface filters and settling devices, and other relatively compact solutions such as bioretention cells and rain gardens. The BMP Manual also promotes native vegetation to reduce runoff. Dispersed BMPs to capture and filter or infiltrate runoff at the source are preferred to large detention practices.

In contrast to the potential conflicts between FBC and LID, there are several correlations. FBCs, by nature, do not typically express minimum parking standards in their guidelines. The purpose of FBCs is to create a walkable environment, so parking minimums are often omitted (although parking maximums may be included). Likewise, traditional zoning regulations require most cities to base their minimum parking standards on the uses of each building. FBCs are not usually so limiting as to pronounce single uses for buildings and therefore, traditional parking standards cannot apply in the same way. The FBC in Mission designateswhere parking is permitted and the minimum parking setbacks as dictated by the Regulating Plan. Additionally, for Mid-Rise and High-Rise building types, outdoor common space is generally provided in the form of front yards, plazas, and courtyards. Stormwater BMPs and other LID approaches can be used in these locations. Rooftop gardens are permitted to provide additional outdoor common space for these denser building types and grants the opportunity for green roof applications. Chapter 5 of the FBC states that, "green roofs are strongly encouraged and may be used in lieu of any other roofing material with appropriate review of technical drawings" and for High-Rise and

Parking Structure building types, "green roofs (over principal or secondary roofs) are encouraged and assist in the creation of a sustainable future for Mission". The City's FBC calls for two-way streets such as Martway and 61st Street to be less urban with more green space at the curb line, offering opportunities for native landscaping and BMPs.

In conclusion, existing codes in the City of Mission do not significantly conflict with low impact development. **To increase the application of LID practices in the City of Mission and accomplish the water quality benefits outlined in this study, the most significant step is to adopt the American Public Works Association (APWA) Manual for Best Management Practices for Stormwater Quality. To further improve water quality runoff the City should consider reducing parking maximum requirements, preserving open space, and being informed of emerging trends and technologies.**

6 CONCLUDING RECOMMENDATIONS

The life cycle costs and water quality benefits of the low impact development (LID) scenarios are compared with traditional development scenarios to help evaluate the cost-effectiveness of LID approaches and to inform future policies and design criteria. The net present value (NPV) of traditional and LID scenario costs are approximately equal based on the 50 year period of analysis. Site development costs are a fraction of total development costs. The resulting return on investment (ROI) of traditional and LID scenarios are comparable and therefore, the study indicates that an incentive for LID development is not necessary. The water quality benefits of LID scenarios are significant when compared to traditional scenarios of development.

Completion of this study generates additional questions to further discussion and analysis. The results of this study may have been strengthened by additional design detail, less consistency between traditional and LID scenario layouts, and an optimization of BMP configurations. Aside from evaluation of other common development scenarios for the City, additional regional study opportunities are presented below:

(1) Alternative Futures Analysis of Traditional and LID approaches to New Development

(2) Analysis of the broad scale cost effectiveness of LID site design. For example, a study that presents and compares the treatment cost for each percent reduction of total suspended solids discharged from an LID site, a rural stream buffer, or from a wastewater treatment facility with tertiary treatment

(3) Analysis to optimize arrangement of LID developments at a watershed scale, targeting investment to maximize water quality benefit

(4) Market study to evaluate sale revenues of LID developments in the Kansas City region

(5) Analysis of the cost benefit that LID developments impart on municipalities and their stormwater infrastructure

(6) Survey of leading practitioners across the country including researchers and developers who study and apply LID in new and redevelopment

To actualize the potential benefits of LID development scenarios, existing codes and ordinances should be amended and adopted as recommended. Existing codes in the City of Mission do not significantly conflict with LID concepts. **To increase the application of LID practices in the City of Mission and accomplish the water quality benefits outlined in this study, the most significant step is to adopt the American Public Works Association (APWA) *Manual for Best Management Practices for Stormwater Quality*.** The City may use this study as a foundation to move forward and implement substantial changes to the Municipal Code in order to not only allow but require improved stormwater and environmental management strategies.

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APPENDICES

A. Background and Assumptions

B. Site Development

A BACKGROUND AND ASSUMPTIONS

ECONOMIC ANALYSIS

1. Life Cycle Cost Analysis

The life cycle cost analysis is based upon the approach in the referenced 2005 WERF study. This cost method identifies capital costs as well as expected yearly operation and maintenance costs anticipated for the life cycle of the project. The capital cost and future maintenance costs are then converted into a present worth value. This allows different alternatives to be quantitatively compared on a cost basis that accounts for both upfront capital expenditures as well as anticipated yearly expenses.

Table A-1. Common Life Cycle Cost Template

Capital Expenditures	
Base Costs	Unit
MOBILIZATION	
	Lump Sum (LS)
SITE PREP	
Clearing & Grubbing	Acre (AC)
Grading	LS
Additional Grading (BMPs)	CY
Total	

STORMWATER CONVEYANCE AND STORAGE	
15" Pipe	Linear Foot (LF)
18" Pipe	LF
24" Pipe	LF
30" Pipe	LF
36" Pipe	LF
4" Perforated Drain Tile, PVC	LF
Storm Structures (inlets, flumes, junctions, etc.)	Each (EA)
Storage Structure	LS
Total	
LANDSCAPING	
Shade Trees	EA
Ornamental Trees	EA
Evergreen Trees	EA
Shrubs/Perennials	Square Yard (SY)
Rain Garden Plants	SY
Traditional Turf (Sod)	SY
Irrigation	SY
Total	
ACCESS	
Asphalt Surface Course (2")	Ton
Asphalt Base Course (7")	Ton
Aggregate (6")	Cubic Yard (CY)
Pervious Concrete Parking Stalls (6")	SY
¾" Stone Drainage Layer Beneath Pervious Pavement	SY
Adjacent Parking (cost adjusted according to depth)	
Curb and Gutter (18")	LF
Concrete Sidewalks (4")	Square Foot (SF)
Traffic Control	LS
Signage, Public Education Materials, etc.	LS
Total	
CONTINGENCY	
Total Base Cost	
Associated Capital Costs	
Construction Documents (15%)	
Total Associated Capital Costs	
Total Site Capital Cost	
Frequent Maintenance Expenditures	
Tree Maintenance	
Shrub/Perennial Maintenance	
Turf Maintenance	

Irrigation System Maintenance and Irrigation	
Rain Garden Maintenance (Trash and Sediment Removal)	
Concrete Maintenance (Vacuuming)	
Storm Structures Inspection and Maintenance	
Corrective and Infrequent Maintenance Expenditures	
Seal Coat Pavement	
Crack Sealing	
Replacement (Mill & Overlay) for Asphalt	
Patch and Repair Concrete	

To estimate and compare the life cycle cost for the traditional and LID scenarios, a common cost template was prepared, presented above in Table A-1. The life cycle analysis uses this template and applies a conservative discount rate of 5% and an inflation rate of 3% to determine the present worth value over an anticipated design life of 50 years. The capital, regular maintenance, and corrective maintenance costs are based on current and inflated market values, as applicable. The capital costs were derived from local construction bid unit values and adjusted to 2009 values based on inflation and increased material costs. Local landscape businesses were contacted to determine general site maintenance costs and maintenance frequency for traditional and LID practices. This information was used to estimate the yearly maintenance expenses for each traditional and LID scenario. For the purpose of this study, the cost of the building, land, and building utilities were excluded from the life cycle cost assessment. These costs are assumed to be consistent between traditional and LID developments and are therefore not relevant to the life cycle cost comparison. Additionally, the salvage value at the end of the 50-year design life is assumed to be equal among scenarios and therefore, excluded from the analysis.

2. Return on Investment Analysis

Developers evaluate the potential of an investment opportunity by developing a pro forma and calculating an ROI. This study applies the same ROI approach to evaluate the investment in LID techniques as compared with traditional types of development. It is expressed as a ratio in which the benefit (or return) of the investment is divided by the cost of the investment. An ROI within a targeted range indicates that the investment should be

undertaken. For hotels, offices, and apartments, a target ROI, synonymous with internal rate of return (IRR), is between 9 and 12 percent (Korpacz, 2009). Other stakeholders, including municipalities, evaluate proposed development with consideration to potential tax revenues and impacts on city infrastructure and services.

LID has the potential to benefit all stakeholder groups through lower costs and improved environmental assets. Implementing nontraditional, decentralized methods for handling stormwater can reduce regional expenditures for storm water and planning while protecting the environment. LID areas benefit from improved water quality, increased groundwater recharge, improved air quality, enhanced aesthetics, increased open space, and carbon sequestration.

In order to estimate and compare the anticipated ROI for the traditional and LID scenarios, a regionally specific financial forecast model was prepared. The model incorporates capital costs for stormwater management and assumes other development factors are similar between traditional and LID scenarios. The model includes an operating pro forma with anticipated expenses and revenues to estimate ROI for the private development. Additionally, the model estimates tax revenues that the City would likely realize from the development. The ROI model includes the following components, and is based on a number of assumptions as presented in Appendix G.

- Redevelopment project costs, including site improvements and unit costs for the proposed buildings based on the proposed uses.
- Retail sales estimates based on typical earnings per square foot for the proposed buildings.
- Anticipated annual sales taxes based on the proposed building square footages and uses.
- An annual cash flow estimate that includes lease and sales revenues, management expenses, and debt service; and the projected sale value.
- Stormwater operations and maintenance costs.

- Optional input of public subsidies and incentives.

Current property values and demolition costs of the existing site were not accounted for as they will be identical for both scenarios. Building and site development capital costs, expenses, and revenues are included in the model to compare the potential costs, benefits, and ROI for the traditional and LID scenarios. Site features not related to stormwater management are consistent for both scenarios. Site development capital costs and maintenance estimates are extracted from the life cycle cost model for each development scenario to allow the two development options to be directly compared. The model estimates the sale value at typical timeframes specific to each development. Additional data sources and assumptions are provided in Appendix G.

B. STORMWATER QUANTITY AND QUALITY

1. Regional Design Criteria: APWA 5600 and BMP Manual

Locally adopted APWA Section 5600 specifies that storm drainage systems shall be capable of conveying the peak discharge generated by the 100-year storm event. If the system capacity does not meet this requirement, overflow systems must be developed to provide adequate conveyance capacity. In the case of Mission where the secondary drainage collection system is aging, undersized, and degraded, APWA dictates that peak discharges for the 1-year, 10-year, and 100-year storm events shall be limited to predevelopment peak flows for these respective storms. This development standard is required regardless of whether LID or traditional stormwater management practices are used.

The adopted APWA criteria, if applied correctly, have great impact on controlling peak flows.

Existing City standards, however, do not necessarily have a significant impact on water quality. The regional Manual of Best Management Practices for Stormwater Quality provides an existing complementary document to APWA 5600 that addresses water quality in site development. Using the

BMP Manual, the first LID scenario of each site integrates BMPs to meet the necessary Level of Service (LS) and manage runoff from the regional water quality storm (1.37-inch/24-hour rainfall). The LS requirement is based on the change in runoff as measured by the change in curve number from the existing site condition to the post-development condition. The LS provided by the proposed design is determined by applying the Value Rating (VR) associated with each BMP to its associated drainage area (APWA BMP Manual, 2008).

2. LID Site Design Criteria

Hydrologic analysis of LID site design is typically based on storms with 2- and 10-year return periods. These storms are selected with the goal of maintaining predevelopment hydrologic conditions for the site: peak flows and volume of runoff. The 2-year storm event is selected to evaluate and mitigate potential sedimentation and erosion issues within the channels. The larger 10-year storm event is used to evaluate conveyance design and to ensure that flooding concerns are properly addressed by the proposed stormwater controls. The focus of LID is to maintain the integrity of the natural system while still allowing development to progress. By comparing the hydrologic response from traditional and LID scenarios using various design storms (i.e., water quality events and flood events), potential benefits and drawbacks from each methodology can be identified. At each site, the existing conditions are compared to proposed site designs to determine the storage and infiltration requirements for both traditional and LID scenarios.

3. LEED Site Design Criteria

The development community is increasingly influenced by the LEED rating system, developed by the U.S. Green Building Council (USGBC). The LEED system, accounted for in LID Scenario 1 at each site, considers stormwater management for the 1- and 2-year design storms, using two credits related to site sustainability.

Credit 6.1

- Option 1
  Existing impervious area is less than or equal to 50%.
  In this case, the design should prevent the post-development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity for the 1- and 2-year, 24-hour design storms.

- Option 2
  Existing impervious area is greater than 50%.
  In this case, the design should result in a 25% decrease in the volume of stormwater runoff from the 2-year, 24-hour event.

Credit 6.2

- BMPs are designed to capture and treat 90% of the average annual rainfall for the site as defined by LEED (0.75 inches for City of Mission, Kansas).

- Stormwater BMPs must meet 80% removal of TSS and be designed in accordance with state or local program performance standards.

- Both of the LEED credits are achieved at each site when the BMP manual and adopted APWA 5600 standards are applied.

C. MODEL SELECTION

1. P8 Model Review

The P8 model simulates the generation and transport of stormwater runoff pollutants in urban watersheds. The model simulates runoff events with continuous simulation of water and mass balance calculations on a drainage system. P8 simulates runoff water quality in watersheds or on specific sites with a variety of control devices: detention ponds, infiltration basins, swales, and buffer strips. Runoff quality and particle settling velocity data is based on both the EPA's Nationwide Urban Runoff Program data as well as data obtained from a Wisconsin watershed study. This model is ideally suited for evaluating proposed developments and determining compliance with stormwater treatment objectives.

2. SLAMM Model Review

The Source Loading and Management Model (SLAMM) is a continuous sequential event based model that is designed to simulate rainfall runoff in an urban landscape. It includes a variety of land use scenarios: residential, institutional, commercial, industrial, open space, and freeways. SLAMM calculates the pollutant loading generated by the runoff associated with normal rainfall events. Best management practices and control devices may be incorporated into the model to determine their effective removal of these pollutants. This model is ideal for identifying pollutant sources and performing BMP evaluation at the watershed scale.

3. XP-SWMM Model Review

XP-SWMM is a stormwater and wastewater management tool. The one-dimensional mass balance flow and pollutant routing framework simulates overland water quantity and quality produced by storms in urban watersheds. The runoff algorithm is based on the concept of surface storage balance: runoff from specific rainfall events is simulated with the nonlinear reservoir approach and a lumped storage scheme is applied for subsurface modeling. For impervious areas, a linear formulation is used to compute

increases in particle accumulation over time. For pervious areas, SWMM uses a modified Universal Soil Loss Equation to determine sediment load. The concentration of pollutants is associated with calculated sediment loading as pollutants are assumed to be attached to the sediment fraction.

4. Discussion

The P8 model was selected for the water quality modeling component of this analysis. This model is specifically designed for site analysis compared to SLAMM, which is better suited to watershed level modeling. Additionally, the P8 model is calibrated to Midwestern watersheds, providing an initial calibration that is better aligned for the City's conditions. The P8 model measures water quality changes associated with settling of suspended solids, dissolved solids, and associated contaminants. Contaminants can be completely removed from the system through infiltration. Furthermore, the model includes a particle removal scale factor that may be adjusted to represent effects of vegetation on particle removal rates. Plants can increase particle removal rates under a given hydraulic regime through biological mechanisms. While Black & Veatch has developed an extensive XP-SWMM model of the secondary stormwater drainage infrastructure in the City, this model is not a public domain product and therefore, would not be readily available to the City for evaluation of future sites. Assumptions for selected sites and associated scenarios are provided in the following chapter.

B SITE DEVELOPMENT

The life cycle costs and water quality benefits of the LID scenarios are compared with traditional development scenarios to evaluate the cost-effectiveness of LID approaches and allow the City to evaluate policies and design criteria. Several locations in the City of Mission were considered for this analysis: a single residential site, a proposed condominium development situated on green space at Shawnee Mission Parkway and Roe Avenue, a future downtown park and marketplace, the existing County offices at Lamar Avenue and Johnson Drive, and a proposed multi-use commercial site redevelopment at 61st Street and Metcalf Avenue. Three of these sites were selected. The selected locations include a single residential lot, a proposed condominium development situated on green space at Shawnee Mission Parkway and Roe Avenue, and a proposed multi-use commercial site redevelopment at 61st Street and Metcalf Avenue. Each selected site characterizes a redevelopment or retrofit opportunity in the City of Mission. The selected sites represent varying levels of potential development in dense and residential zones, allowing the life cycle cost and water quality information obtained at these sites to be extrapolated to other locations throughout the City.

Private developers previously submitted plans for two of the selected sites: the proposed multi-use commercial site redevelopment at 61st Street and Broadmoor and the proposed condominium development situated on green space at Shawnee Mission Parkway and Roe Avenue. The traditional sites presented are based on these proposed plans and supporting documentation provided by the City. The original plan documents for both sites were adjusted to ensure accordance with the City's development codes and form-based codes for the Johnson Drive corridor.

The LID scenarios were developed by identifying site design strategies that could meet the stormwater management requirements set forth in the BMP Manual, LID standards, LEED, and APWA 5600 stormwater design criteria. Grading plans were not provided with the original development plans. Future drainage patterns were assumed to generally follow existing conditions at both sites and the placement of contributing drainage areas for each BMP were evaluated accordingly.

A. Site 1: Metcalf Avenue Mixed-Use Development

The Metcalf Avenue Mixed-Use Development site (see Figure B-1) represents 6.2 acres, situated in the West Gateway overlay district in Mission. The conceptual site plan is 75% impervious and includes a proposed hotel, office, commercial, retail and limited housing opportunities. The traditional scenario uses underground detention to control stormwater runoff peak discharge. Application of the BMP Manual and APWA 5600 to develop LID Scenario 1 resulted in a site design that also satisfied the peak discharge and total runoff volume requirements of Scenario 2, as shown in Table B-2. Under the LID scenario, a combination of porous pavement, rain gardens, and underground detention is used to meet quantity and quality criteria. The original plan submitted by a private developer was slightly modified to conform to form-based codes (FBCs) applicable along Johnson Drive. The FBC for the West Gateway Study Area has been adopted to create a pedestrian-friendly environment and to promote redevelopment and revitalization. Updates to the original site plan included reduced building setbacks, changing building orientations to front the streets, adding retail to

the ground floor of the proposed parking structure, and adding on-street parking. Table B-1 presents the proposed buildings, uses, square footage, and required parking spaces. These characteristics were constant for both traditional and LID scenarios. The development plan presents the site layout and orientation.

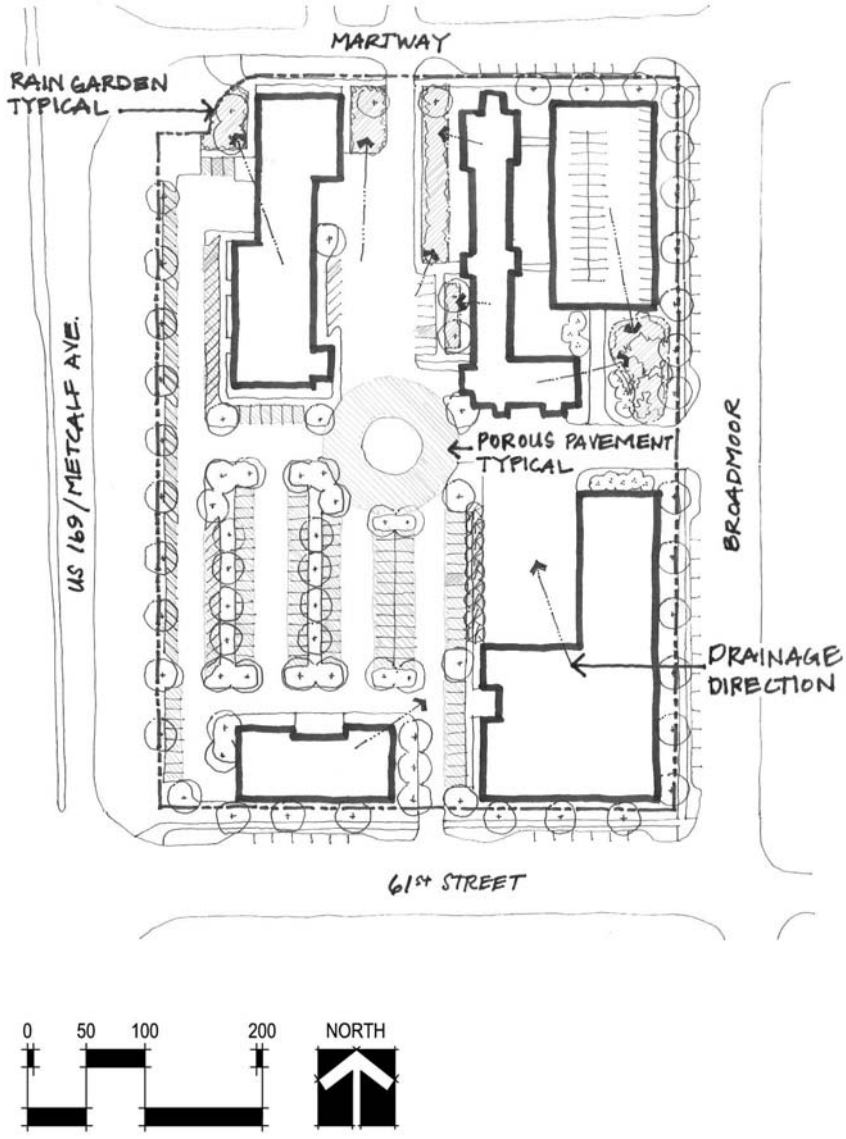


Figure B-1. Metcalf Avenue Mixed-Use Development Site Layout

Table B-1. Metcalf Avenue Mixed-Use Development Summary

Building	Use	Square Feet	Required Parking
Building A			
	Bank	5,200	18 spaces
	Office	20,000	70 spaces
	Retail	9,750	35 spaces
Building B			
	Restaurant	5,698	50 spaces
	Restaurant	4,050	25 spaces
Building C			
	Retail	30,400	107 spaces
	Condominiums	30,000	66 spaces
Building D			
	Hotel	89,454	131 spaces
Parking Structure			
	General Retail	9,965	35 spaces
Parking			
		Surface:	242
		West Garage:	100
		Hotel Garage:	192
		Provided	534
		Total Required Spaces	537

Note: This summary reflects the minimum required number of spaces; the original development proposal included additional parking.

To maintain the required peak volume and discharge requirements associated with each design criterion, several different storage volumes were considered. The retention time necessary for water quality treatment in BMPs resulted in larger cumulative storage volumes for LID solutions. The rain gardens are not associated with an underdrain system and the porous paving systems are designed to infiltrate runoff from the water quality storm and retain additional storage for at least 12 hours. A traditional underground storage is designed to reduce the peak discharge from the site and this scenario results in a limited residence time. The residence time of each system is directly related to the level of stormwater treatment: each particle is associated with a settling rate. Table B-2 presents storage volumes required in each scenario to control the governing peak volume and discharge rate. Application of the BMP Manual and APWA 5600 to develop LID Scenario 1 resulted in a site design that also satisfied the peak discharge and total runoff volume requirements of Scenario 2, and therefore, Scenario 2 is not presented.

Table B-2. Metcalf Avenue Mixed-Use Development: Required Storage and Hydrology

Scenario	Infiltration Storage	Underground Storage Volume	Runoff Volume				Peak Discharge			
			WQ Event	2-year	10-year	100-year	WQ Event	2-year	10-year	100-year
	acre-ft	*acre-ft*	*acre-ft*	*acre-ft*	*acre-ft*	*acre-ft*	*cfs*	*cfs*	*cfs*	*cfs*
Existing Conditions	None	None	0.24	1.19	2.01	3.26	4	22	36	56
Baseline Traditional	None	0.50	0.37	1.41	2.25	3.51	3	21	34	53
LID Scenario 1	0.35	0.30	0.04	1.10	1.94	3.21	0	22	36	56

Note: Both traditional and LID developments have same general site characteristics to define hydrology.

1. Life Cycle Cost of Metcalf Avenue Mixed-Use Development Scenarios

To evaluate the life cycle cost of the Metcalf Avenue Mixed-Use Development site scenarios, assumptions related to the cost template were developed. Mobilization is based on approximately 10% of the base cost and adjusted to be the same for each scenario. The base cost includes materials associated with stormwater conveyance infrastructure, landscaping and access. Grading, a major component of site preparation, is approximated as 10% of the base costs and adjusted to be the same for each scenario because individual grading plans were not developed. The cost of each underground storage system, necessary to meet discharge volume and rate requirements, is based on a materials and delivery quote from a local manufacturer with a 50% increase to account for installation expenditures. The pipe lengths and sizes are based on a conceptual layout of the stormwater drainage network. Unit costs for all landscaping components and maintenance were established by a local contractor. Traditional site costs include an asphalt section comprised of a 7-inch base with a 2-inch wearing course. This is supported by a 6-inch aggregate base. The curb and gutter is 18-inch and the sidewalk is 4-inch thick. The LID scenario costs include traditional access as well as porous pavement with varying depths of aggregate to provide sufficient storage. Costs for porous pavement were provided by local contractors. Traffic control is based on 5% of base costs and signage is based on 3% of the base costs then adjusted to be consistent for all scenarios. Contingency is a straight 15% of base costs. The cost of construction documents, estimated at 15% of the subtotal cost, is added to the subtotal, resulting in total capital costs.

2. Traditional Site Design and Water Quality Modeling at Metcalf Avenue Mixed-Use Development

To meet existing City of Mission's stormwater criteria, the site design incorporated an underground detention basin with minimum capacity of 0.5 acre-feet which is required to maintain peak discharges from the 6.2 acre site during the 1-, 10-, and 100-year storm events. Existing conditions and traditional site design were modeled in HEC-HMS to accurately predict peak discharges. Existing site conditions were

characterized with an area weighted curve number of 87 and a lag time of five minutes.

Traditional site development assumptions included an area weighted curve number of 96 and a lag time of five minutes. To simulate water quality changes between runoff and discharge to the storm sewer, drainage from several distinct events and a year long simulation was routed to a representative storage device regulated by a 3-foot diameter outflow orifice in the P8 model. It was assumed that 75% of the total site area was impervious and directly connected to the underground vault system through curb and area inlets. This area is associated with a depression storage variable of 0.014 inches, based on its relatively steep slope. Additionally, it was assumed that impervious pavement areas were not regularly vacuum swept. The remaining pervious area was characterized with a curve number of 74, representative of turf grass in good condition. Highlighted water quality parameters include sediment particles, nutrients, and heavy metals. A particle removal factor was scaled to 0.5 to represent the absence of vegetation in the underground storage vault.

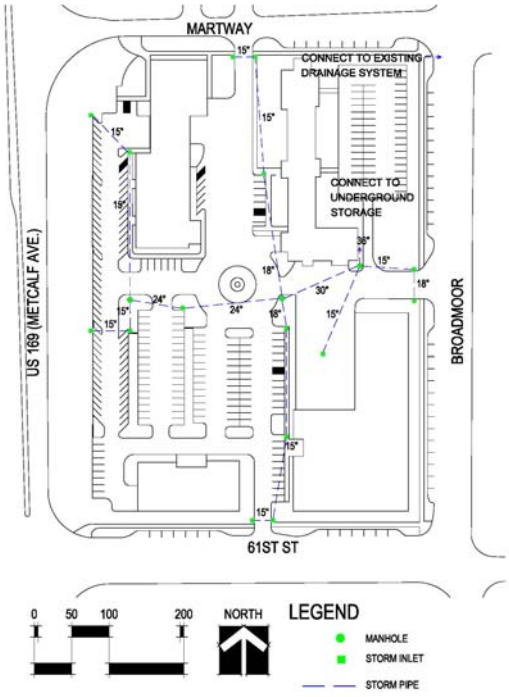


Figure B-2. Metcalf Avenue Mixed-Use Traditional Layout

3. LID Site Design and Water Quality Modeling at Metcalf Avenue Mixed-Use Development

To simulate a LID approach to the Metcalf Avenue Mixed-Use Development, several principles were applied. The traditional arrangement of buildings was maintained because structures were aligned with consideration to existing topography and the City's Form Based Code. Preliminary site

designs were modified as the stormwater management system and associated BMP options were evaluated and refined.

A Level of Service (LS) analysis was completed to develop a configuration of BMPs in accordance with the regional BMP Manual. The LS procedure for previously developed sites bases the LS on the percentage of new impervious surfaces added to the site. For the proposed design, 36% of the site area is additional impervious area. It was estimated that the proposed improvements to the Metcalf Avenue Mixed-Use Development site would require a LS of 5.3. The project areas were determined using the property boundaries and survey information from the original development plans. The proposed Metcalf Avenue Mixed-Use Development site was modified to maximize the amount of vegetative cover in and around the buildings, while maintaining necessary walkways.

Scenario 1 – Meeting the BMP Level of Service and APWA 5600

Structural BMPs that could be easily integrated into the proposed site layouts without major modifications were evaluated. Drainage structures were oriented to limit distance of travel within porous pavement to 100 feet and assuming no changes in the existing topography. The length of curb and gutter throughout the site was reduced by 35% from the traditional scenario. Parking stalls with pervious pavement over a gravel storage bed were applied for stormwater detention and treatment. Proposed landscaped areas adjacent to buildings were designed as rain gardens to collect

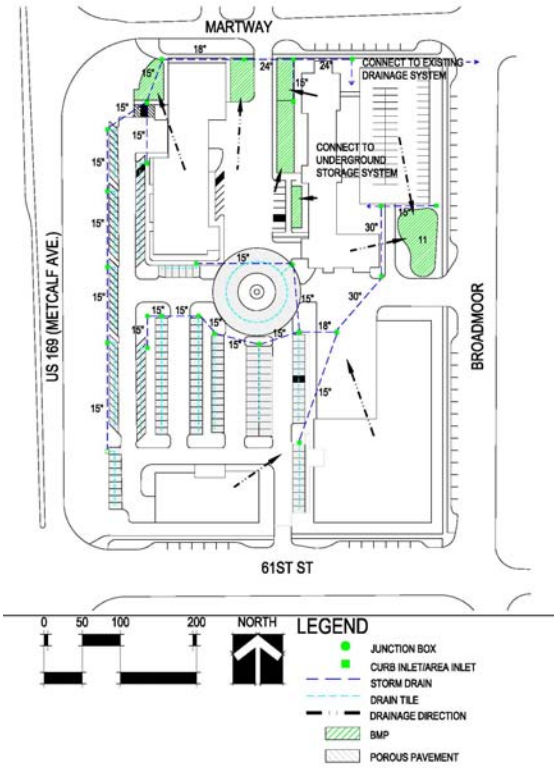


Figure B-3. Metcalf Avenue Mixed- Use LID Layout

and infiltrate runoff from the building roof areas. It is estimated that 6 rain gardens and about 0.75 acres of pervious paving draining 2 acres of total parking area would provide a weighted VR of about 5.3, meeting the LS of 5.3 for the Metcalf Avenue Mixed-Use Development.

The proposed LID site was divided into three grouped catchments, each routing flow to a different device, overflowing to a vault or infiltrating to an aquifer, and finally discharging to the secondary collection system. To meet the required level of service, a combined storage volume of 0.35 acre-feet is necessary. The primary catchment is the accumulation of all subareas draining to rain gardens on the proposed site. The pervious fraction of this 2 acre drainage area is associated with a CN of 74. Eighty percent of the catchment is impervious and it was assumed that half of this was semi-annually vacuum swept. This catchment is directly routed to an infiltration device that represents the cumulative rain gardens. The cumulative rain garden area is 0.25 acres, associated with a ponding storage volume of 0.19 acre-ft. The particle removal scale factor has been increased to 1.5 in order to represent the sediment and nutrient removal capacity of the plants. The secondary catchment is the accumulation of all subareas draining to porous pavement on the proposed site. This 1.75-acre area is 100% impervious and it was assumed that all of this was semi-annually vacuum swept. This catchment is directly routed to an infiltration device that represents the cumulative porous pavement. The cumulative porous pavement area is 0.77 acres, associated with an available storage volume of 0.20 acre-ft in the gravel subgrade (38% void volume).

Both devices representing rain gardens and porous pavements allow discharge by two means: infiltration and overflow. The rate of infiltration is controlled in the model with the infiltration rate of the soil (k=0.02 in/hr). Overflow is directed toward an underground vault that manages peak discharges to meet City and regional stormwater management criteria. The third catchment is directly connected to the underground vault with storage capacity of 0.3 acre-ft. The vault outfall is controlled with two orifices of diameters of 5-foot and 1-foot (invert set at elevation 1002 ft). The vault is

associated with a particle removal scale factor of 0.5 to represent the lack of vegetation.

Scenario 2 – Meeting traditional LID requirements and APWA 5600

Application of the BMP Manual and APWA 5600 to develop LID Scenario 1 resulted in a site design that also satisfied the peak discharge and total runoff volume requirements of Scenario 2, and therefore, Scenario 2 is not presented.

B. SITE 2. ROE AVENUE MULTI-FAMILY DEVELOPMENT

The residential Roe Avenue Multi-Family Development plan (see Figure B-2) is located on approximately one acre of undeveloped land near Shawnee Mission Parkway and Roe Avenue. The traditional site development proposed a water feature, large condominium, underground parking, and traditional landscaping. The modified LID scenarios utilized the water feature as a detention and treatment device and incorporated native vegetation and pervious paving. The Roe Avenue Multi-Family Development plan was slightly modified to meet City setback regulations. The modified plans serve as the traditional design for purposes of comparison. These development plan characteristics, presented in Table B-3, are constant for both traditional and LID scenarios. The development plan presents the site layout and orientation.

Table B-3. Roe Avenue Multi-Family Development Summary

Building	Use	Square Feet	Required Parking
3-Story Building			
	26 Condominiums	45,540	52 spaces
Parking			
		Surface:	8
		Garage:	44
		Provided	52
		Total Required Spaces	52

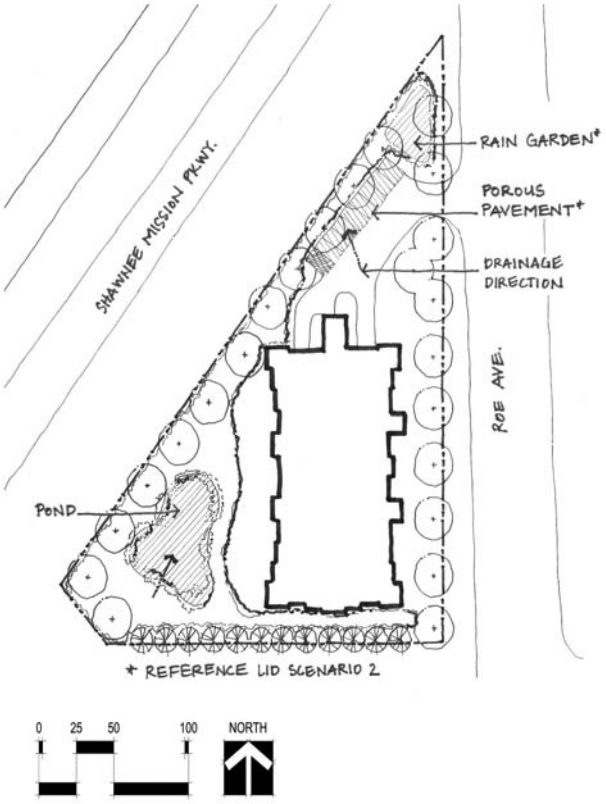


Figure B-4. Roe Avenue Multi-Family Development Site Layout

Table B-4. Roe Avenue Multi-Family Development: Required Storage and Hydrology

Scenario	Infiltration Storage	Underground Storage Volume	Runoff Volume				Peak Discharge			
			WQ Event	2-year	10-year	100-year	WQ Event	2-year	10-year	100-year
	acre-ft	*acre-ft*	*acre-ft*	*acre-ft*	*acre-ft*	*acre-ft*	*cfs*	*cfs*	*cfs*	*cfs*
Existing Conditions	None	None	0.02	0.17	0.32	0.54	2	19	34	56
Baseline Traditional	None	0.20	0.03	0.18	0.33	0.55	2	19	33	55
LID Scenario 1	None	0.20	0.03	0.18	0.33	0.55	2	19	33	55
LID Scenario 2	0.08	0.20	0.02	0.17	0.32	0.55	2	17	33	54

Note: LID scenario results in a weighted CN reduction of 0.5 compared to traditional scenario.

To maintain the required peak volume and discharge requirements associated with each design criteria, several different storage volumes were considered. The LID scenario hydrology was defined by slightly different parameters than the traditional scenario but the slight reduction in curve number to represent a native and shrub-based landscape was not significant.

1. Life Cycle Cost of Roe Avenue Multi-Family Development Scenarios

The Roe Avenue Multi-Family Development site capital and maintenance costs were developed with similar assumptions described for the previous site. The cost template, however, included a detention basin in place of the underground storage system. The cost for the detention basin is based on the Costs of Urban Stormwater Control (USEPA, 2002) and adjusted to 2009 values.

2. Traditional Site Design and Water Quality Modeling at Roe Avenue Multi-Family Development

The traditional layout is based on a conceptual plan that included upscale condominiums, underground parking, and a water feature. To meet existing City stormwater criteria, the water feature was sized to include appropriate detention volume in order to maintain peak discharges from the 1.2-acre site during the 1-, 10-, and 100-year storm events. Existing conditions and the proposed site designs were modeled in HEC-HMS to accurately predict peak discharges. Existing site conditions were characterized with an area weighted curve number of 76 and a lag time of ten minutes. Traditional site development assumptions included an area weighted curve number of 84 and a lag time of seven minutes.

The existing site drainage includes a 36-inch corrugated metal pipe (CMP) that discharges into an open concrete trapezoidal channel that drains to an area inlet at the northern edge of the site. The proposed design routes this existing CMP to a water feature that provides detention and aesthetic value. Discharge from the water feature is routed through new underground pipe and accumulates with other site drainage at a junction before entering the

existing area inlet location. To maintain adequate storage capacity, the water feature will require 0.20 acre-feet of detention storage that discharges to the underground piped collection system. The traditional site design assumes that all impervious area runoff is directly connected to this underground conveyance system.

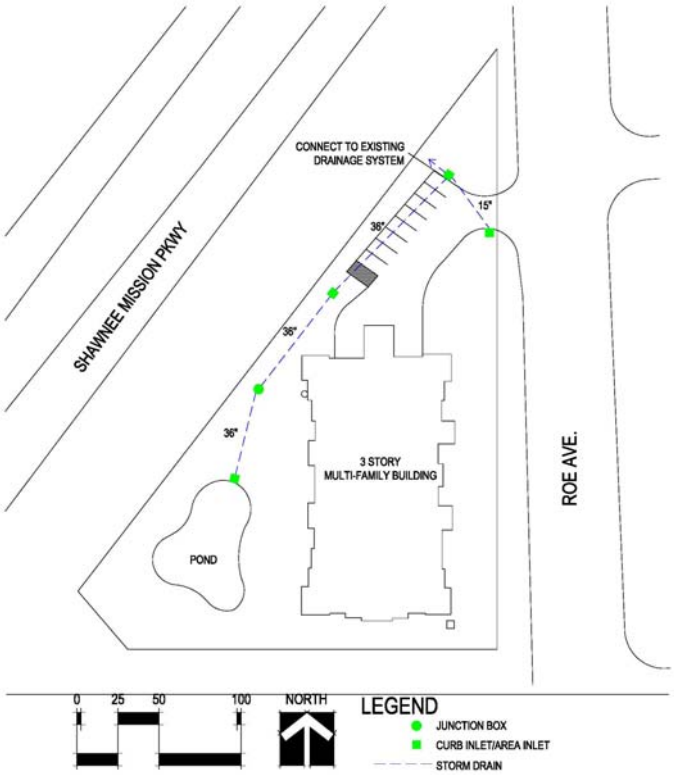


Figure B-5. Roe Avenue Multi-Family Development Traditional Layout

To simulate water quality changes between runoff and discharge to the storm sewer leaving the site, drainage from several distinct events was routed to a "pond" device regulated by an outflow orifice in the P8 model. The 6-acre upstream drainage area, of which 33% is impervious, was routed to the storage device and discharged to a junction box. It was assumed that 43% of the proposed redevelopment site area was impervious and directly connected to the same underground drainage system. This area is associated with a depression storage variable of 0.02 inches, based on its average slope. The remaining pervious area was characterized with a curve number of 74. Highlighted water quality parameters included sediment particles, nutrients, and heavy metals.

3. LID Site Design and Water Quality Modeling at Roe Avenue Multi-Family Development

The revised LID scenario for the Roe Avenue Multi-Family Development incorporated LID approaches, integrating BMP solutions that function with

the existing topography. A combination of the proposed water feature, native vegetation areas, porous pavement, and a large rain garden was used to develop the LID scenarios.

Scenario 1 – Meeting the BMP Level of Service and APWA 5600

To meet the BMP LS required at the site, a combination of native vegetation and a pond "credit" was applied. Drainage structures were oriented to limit distance of travel within porous pavement to 100 feet and assuming no changes in the existing topography. The length of curb and gutter throughout the site was reduced by 35% from the traditional scenario. The LS for undeveloped sites is based on the pre- and post-development curve number (CN) resulting from the combination of site soils and vegetative cover. The pond is credited with treating runoff equivalent to the 1.2-acre site and detaining the associated water quality volume of 0.02 acre-ft for 40 hours. The 6-acre upstream drainage area is 33% impervious area and the on-site catchment, representing

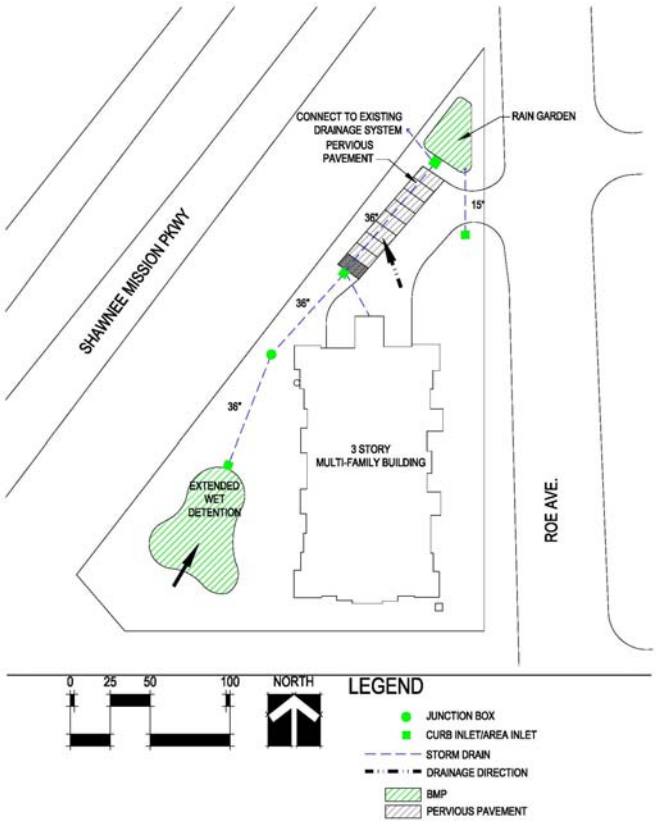


Figure B-7. Roe Avenue Multi-Family Development LID Layout

0.31 acres, is 91% impervious, mostly associated with the building. These catchments are directly routed to the water feature.

Scenario 2 – Meeting traditional LID requirements and APWA 5600

An additional 0.08 acre-ft of storage is required to meet traditional LID requirements when the proposed and existing sites are compared. There is sufficient storage volume in the pond to control the peak discharge. To address the excess runoff volume, a rain garden and additional depth in porous pavement were incorporated in the second LID scenario.

A second on-site catchment of 0.6 acres is directly routed to an infiltration device that represents the porous pavement. The cumulative porous pavement area is 0.05 acres, associated with a storage volume of 0.08 acre-feet in the gravel subgrade (38% void volume). The porous pavement device allows discharge by two means: infiltration and overflow. The rate of infiltration is governed by the clay layer assumed to be underneath the gravel sub-grade (k=0.02 in/hr). Overflow is directed to the secondary drainage system. The remaining 0.26 acres are routed directly into the secondary drainage system as well.

C. SITE 3. RESIDENTIAL

The majority of the City of Mission is developed as residential property. A typical residential site was selected to determine the cost impacts and water quality benefits of one commonly applied low impact development practice: a rain garden. The existing conditions of the site were assumed to reflect traditional development patterns. The initial retrofit option (LID Scenario 1) evaluated was the addition of a rain garden to treat approximately half of the site's runoff from a one-inch rainfall. On a typical Mission residential site, which is approximately 35% impervious, the first scenario presents a 175 square foot rain garden to treat one inch of rainfall that runs off of half of a typical 1400 square foot roof. The second, more comprehensive, retrofit was developed to enhance existing drainage patterns, infiltration, and incorporate a larger rain garden of 425 square feet with the capacity to treat runoff from the entire site. Assumptions associated with the cost template are consistent

with the other development sites, except that the cost of excavation is relatively more expensive for a small site.

Existing conditions of the residential site were used to evaluate existing water quality characteristics of runoff. All impervious areas on the residential site are assumed to be indirectly connected and there is no water quality treatment on the existing site. To model the water quality characteristics of site runoff from the LID retrofit scenarios, all drainage from the 0.39 acre site is directly routed to an infiltration device that represents the rain garden. The rain garden area is 175 square feet in Scenario 1 and 475 square feet in Scenario 2. The particle removal scale factor has been increased to 1.5 in order to represent the sediment and nutrient removal capacity of the plants. The rain garden device allows discharge by two means: infiltration and overflow.

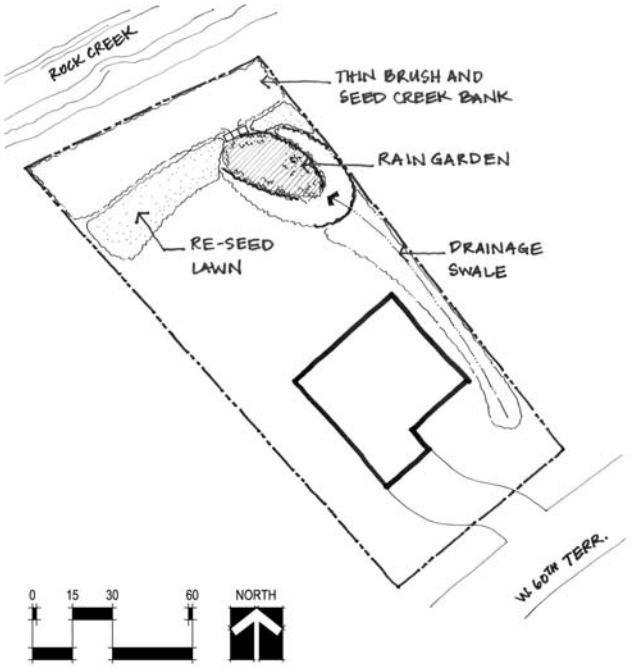


Figure B-8. Residential LID Retrofit

C Regional and National Resource Summary

LOCAL STUDIES

Overland Park Site BMP Cost Analysis.

Olsson Associates. 2007.

The purpose of this study was to investigate construction cost impacts for implementing stormwater BMPs under the proposed Stormwater Treatment Standards for the City of Overland Park, Kansas. There were 9 study sites evaluated for this analysis:

- Actual costs for 3 constructed sites in Lenexa, KS.
- Cost impact for 6 traditional sites in Overland Park, KS.
- The analysis compared BMP construction costs to typical construction and total development costs (soft costs and land value were excluded).
- Typical BMP maintenance costs.
- Local vs. national cost comparison.
- Land area used for BMPs.

Results of the local and national cost comparison indicated a slightly higher implementation cost of LID at the local level; maintenance costs were found

to vary widely; and some BMPs were found to be more applicable in certain types of development.

REGIONAL STUDIES

Green Infrastructure Best Management Practices: A Hypothetical Development for the City of Lincoln, Nebraska.

Olsson Associates. ASFPM Conference Paper (no date).

This paper reported the results of a case study on the implementation of green infrastructure best management practices and Low-Impact Development within the City of Lincoln, Nebraska.

- The study used a hypothetical redesign of a conventional subdivision for conceptual land use layouts and cost comparisons.
- The key to implementing LID locally is to adapt practices to local conditions (soils, climate, etc.).
- The challenge is to evaluate requirements for incorporating LID into existing design criteria.

The results of the study showed that costs are comparable with the added incentive of increased values for lots in general and increased lot values for pond sites; LID techniques are effective in reducing infrastructure costs and improving water quality; and that detention structures and other controls are still required in conjunction with LID to control stormwater runoff from larger storms.

NATIONAL STUDIES

Low-Impact Development Strategies and Tools for Local Governments: Building a Business Case.

LMI Government Consulting. 2005.

The purpose of this study was to provide municipal managers with a life-cycle cost (LCC) analysis method for evaluating LID. The study provides the framework for assessing which design alternatives (LID or traditional) fulfill

performance requirements while having the lowest LCC. The study recognized that LID designs provide:

- Up front savings due to less pipe and underground infrastructure.
- Lower Operations and Maintenance (O&M) costs resulting in lower LCC.
- Affordability should be defined as a measure of the overall LCC of a project with benefits properly recognized.

Performance and Whole Life Costs of Best Management Practices and Sustainable Urban Drainage Systems.

Water Environment Research Foundation (WERF). 2005.

The purpose of this report was to document performance and whole life costs of BMPs and sustainable urban drainage systems. The researchers completed an extensive survey of BMPs in the United States with site visits to seven cities. Whole life costing identifies future costs and refers them back to present day costs using standardized accounting techniques. A whole life cost model was developed. The benefits of whole life costing include:

- Identifies preferred designs.
- Improves design procedures and guidance on approach and effectiveness of maintenance.
- Documents maintenance costs.
- Hydraulic modeling demonstrates benefits of BMPs in comparison to conventional drainage systems.
- Provides guidance on selection, design, and maintenance.

Conclusions:

- The present whole life cost (WLC) comprises capital costs, post-construction rehabilitation costs (if appropriate), regular and maintenance costs, and sediment management costs. All costs are discounted to present day.
- Model uses three levels of maintenance costs to reflect varying aesthetic/amenity performance needs at various sites.
- Maintenance can have a greater influence on WLC than construction cost, especially for ponds.

- If there is uncertainty of cost components, the model should be run for a range of appropriate values.

The Economics of Low-Impact Development: A Literature Review.

ECONorthwest. 2007.

This paper contained a literature review of costs and benefits associated with LID. The objectives of the paper were to review methods used for measuring costs and benefits; summarize literature that identifies and measures costs and/or benefits; and to organize and present this information. The effectiveness of stormwater controls and ecosystem services was outside the scope of this paper. Findings include:

- Existing economic research is preliminary or limited in scope.
- Cost and benefits can be site specific.
- Most studies focus on costs of including LID in new construction.
- Few studies consider economic outcomes of including LID in urban redevelopment projects.

Life cycle cost analysis may require more data than is currently available. The comparisons in the report excluded measurements of economic benefits and ignored differences in effectiveness. A cost-benefit analysis is the most comprehensive in that it considers the full range of costs and benefits of alternative management options. The next best alternative is to identify the range of costs and benefits, quantify what can be measured and qualitatively describe the remaining elements.

Brown and Schueler (1997) concluded that BMP construction costs increase with the volume of stormwater the BMP stores. Site conditions can greatly influence construction costs. Comparing construction costs does not provide information on the relationship between cost and effectiveness.

Brewer and Fisher (2004) looked at four development sites and concluded that LID controls in residential cost less; in schools and commercial

developments, the cost for LID controls was greater, but greater stormwater volumes were controlled which in return reduces municipal expenditures.

Doran and Cannon (2006) studied the relationship between construction costs and effectiveness. Effectiveness was measured by improvements in water quality. Conventional controls resulted in a cost of $1,700 for each one percent reduction in sediment and phosphorus while LID resulted in a cost of $645 for each one percent reduction in sediment and phosphorus loading. Looking at life cycle costs provides a more complete picture of economic consequences.

Vesely (2005) noted that life cycle costs for LID were 4-8% higher than traditional development. However, when the value of recycled stormwater was included, the cost of LID was only 0-6% higher than traditional development dependent upon the discount rate and the number of future years in the analysis.

Braden and Johnson (2004) evaluated the economic benefits onsite stormwater management could have on downstream properties and found that property values for floodplain properties increased 0-5% due to a reduction in flooding.

Literature reports estimate that benefits of improved water quality could reach 15% of market value for properties bordering water bodies. Floodplain properties generally have a 2-5% increase in value when there is on-site management of stormwater.

Devinney et al (2005) provided the first approximation of a benefit-cost analysis. They found that the density of existing development limits the extent to which LID and BMPs can be retrofitted. As density increases, so does size and costs of developing regional wetlands.

Developers may be willing to adopt LID practices because they can help reduce construction costs, increase sales, and boost profits. There are certain risks associated with adopting LID practices, however, such as lost construction time due to the need to acquire variances.

Greatest challenges to implementation of LID are lack of public awareness of the principles, site specific construction costs, and building codes. Municipalities may be able to overcome these challenges through public awareness, updating codes, and providing incentives for developers (e.g., density bonuses, reduction in development related fees).

Future research needs include quantifying costs and benefits of stormwater management including operations and maintenance, more detailed costs for LID, economic studies that control effectiveness of techniques, economic outcomes of including LID in urban redevelopment, and retrospective studies of installed practices.

Reducing Stormwater Costs Through Low Impact Development (LID) Strategies and Practices.

EPA. 2007.

This report summarizes 17 case studies of developments with LID practices to compare costs of LID practices with those of conventional developments. Conclusion is that in most cases, LID practices are shown to be environmentally and fiscally beneficial. Significant cost savings were realized due to reduction in site grading and preparation. Total capital cost savings are site dependent and ranged widely between 15 to 80% with LID practices.

More study is needed regarding benefits (environmental and economic) of LID. This study did not monetize nor factor in bottom line for projects. Benefits included aesthetics, expanded recreation, increased property values, marketing potential and number of units sold, and faster sales. There is a

need to research monetization of cost reductions achieved through improved environmental performance and/or reductions in life cycle costs.

The study states that it is generally difficult to evaluate LID costs from practice to practice and that it is also difficult to calculate economic benefits based on effectiveness in reducing runoff volume and rates or treating pollutants.

Environmental benefits only applied general costs for water quality improvement/reduced treatment sites based on a study in Atlanta of trees and stormwater by the Trust for Public Land. The study found a direct relationship between forest cover in a watershed and water supply treatment costs. Research found a 20% reduction in costs for every 10% increase in forest cover up to 60%. Land values and quality of life benefits were also reported without cost figures.

Cost considerations should include project materials (e.g., soils and plants) and site preparation, amount of land required and differences in maintenance requirements. A 1999 EPA report estimated maintenance costs for retention basins and constructed wetlands to be 3-6% of construction costs.

The following table, "Summary of Cost Comparisons between Conventional and LID Approaches", provides an analysis of development costs for conventional and LID. The percent difference listed in the table is the cost savings relative to conventional development costs. This value ranged from -96 to 80%, with an average of 30%. The negative value for Kensington Estates in Washington state appears to be due to the increased costs for items like Grasscrete and the rainwater collection systems designed for the site.

Table C-1. Summary of Cost Comparisons Between Conventional and LID Approaches

Table 2. Summary of Cost Comparisons Between Conventional and LID Approaches[a]

Project	Conventional Development Cost	LID Cost	Cost Difference[b]	Percent Difference[b]
2nd Avenue SEA Street	$868,803	$651,548	$217,255	25%
Auburn Hills	$2,360,385	$1,598,989	$761,396	32%
Bellingham City Hall	$27,600	$5,600	$22,000	80%
Bellingham Bloedel Donovan Park	$52,800	$12,800	$40,000	76%
Gap Creek	$4,620,600	$3,942,100	$678,500	15%
Garden Valley	$324,400	$260,700	$63,700	20%
Kensington Estates	$765,700	$1,502,900	–$737,200	-96%
Laurel Springs	$1,654,021	$1,149,552	$504,469	30%
Mill Creek[c]	$12,510	$9,099	$3,411	27%
Prairie Glen	$1,004,848	$599,536	$405,312	40%
Somerset	$2,456,843	$1,671,461	$785,382	32%
Tellabs Corporate Campus	$3,162,160	$2,700,650	$461,510	15%

[a] The Central Park Commercial Redesigns, Crown Street, Poplar Street Apartments, Prairie Crossing, Portland Downspout Disconnection, and Toronto Green Roofs study results do not lend themselves to display in the format of this table.
[b] Negative values denote increased cost for the LID design over conventional development costs.
[c] Mill Creek costs are reported on a per-lot basis.

The report concludes that capital cost savings range from 15-80% with the use of LID and that much more research is needed on the benefits as mentioned above.

Changing Cost Perceptions: An Analysis of Conservation Development.

Conservation Research Institute. 2005.

This study compares stormwater management costs of conservation with conventional development through a literature review, analysis of built-site case studies, and cost analysis of hypothetical conventional and conservation design.

The significant theme is that by combining multiple tools such as cluster development with native landscaping, bio-swales, and other practices, greater cost savings can be achieved from resulting opportunities to downsize infrastructure. There is an average 36% savings for conservation over conventional development.

The built-site analysis compared specific aspects of development costs to find where the savings are derived. The largest savings were from site

preparation, stormwater management, site paving, and sidewalks. The two conservation designs with the most direct and significant cost savings are clustered site design and naturalized stormwater management.

Template cost analysis showed the following:

- Moderate density residential – 15% overall cost savings.
- Rural residential – cost savings are slightly less than moderate density.
- Estate residential – 40% savings.
- Commercial/industrial – nearly equal.
- A majority of the templates are cost competitive or more economical.
- Largest savings are in stormwater infrastructure.

The study draws the conclusion that conservation development is cost competitive and can actually save developers significant expenses in many cases. By clustering development and reducing site disturbance, construction costs will be reduced. Favorable cost comparisons are just one reason to consider conservation development. Ecological and social reasons should also be considered. Finally, conservation design is not an all or nothing approach. It is a mix of conservation tools and stormwater BMP approaches that can be considered for every budget.

Further research is needed to collect and analyze operations and maintenance costs, using life cycle cost analysis for comparison of conventional and conservation developments. There is also a need to consider approaches that evaluate both cost and effectiveness. Analysis of development in higher density context is needed where tools like pervious pavement and green roofs are perceived to be more cost competitive. Furthermore, to provide guidance for planning, more economic benefit studies should be conducted to provide information on economic values of conservation development.

Alternative Approaches to Stormwater Quality Control.

J.S. Devinney, et.al. USC Center for Sustainable Cities and the Los Angeles Regional Water Quality Control Board. 2005.

This report was prepared to counter an earlier report that based cost estimates for stormwater compliance on capturing most or all flows and subjecting them to advanced treatment at peak runoff rates. It provides far less expensive approaches to achieving compliance. The report looked at runoff controls for varying degrees of development including low density, high density, and extremely high density areas within the Los Angeles Region. A conceptual plan and cost estimates were developed for the region. A primary assumption used in plan development is that it is always cheaper to do source control than clean polluted waters, so efforts should begin with preventing the release of polluted runoff. Estimated costs revealed the following:

- Costs for compliance were predicted to be between $2.8 billion (using non-structural solutions for the whole region) to $7.4 billion (if regional treatment or infiltrations are needed throughout the region). Some regional systems will likely be needed.

- Structural BMPs total costs (regional wetlands and infiltration systems):
    - Low density - $420 million ($420,000/mi2 of drainage area)
    - High density - $3.7 billion ($3.7 million//mi2 of drainage area)
    - Extremely high density – more sophisticated treatment BMPs - $1.7 billion ($33 million//mi2 of drainage area)
    - Total new facilities cost estimate $5.8 billion
- Second method for estimating structural BMP costs utilized costs per acre-foot of retention capacity (presumes runoff from ¾ -inch storm) with runoff coefficients of 0.4, 0.6, and 1.0 respectively. Costs are $53,000, $98,000, and $470,000 per acre-foot respectively. Overall facilities cost is $4 billion.
- Total benefits for non-structural control program $5.6 billion.
- Implementation of non-structural and regional control measures throughout the region would have benefits worth $18 billion.
- Benefits exceed costs including: improved neighborhood health and livability due to decreased pollutant releases; and restoration of hydrologic cycle that will replenish ground water, reduce flood risks, and provide green space for recreation and wildlife habitat.

D

Metcalf Avenue Mixed-Use Development Economic Analysis

APPENDIX D-1

APPENDIX D-2

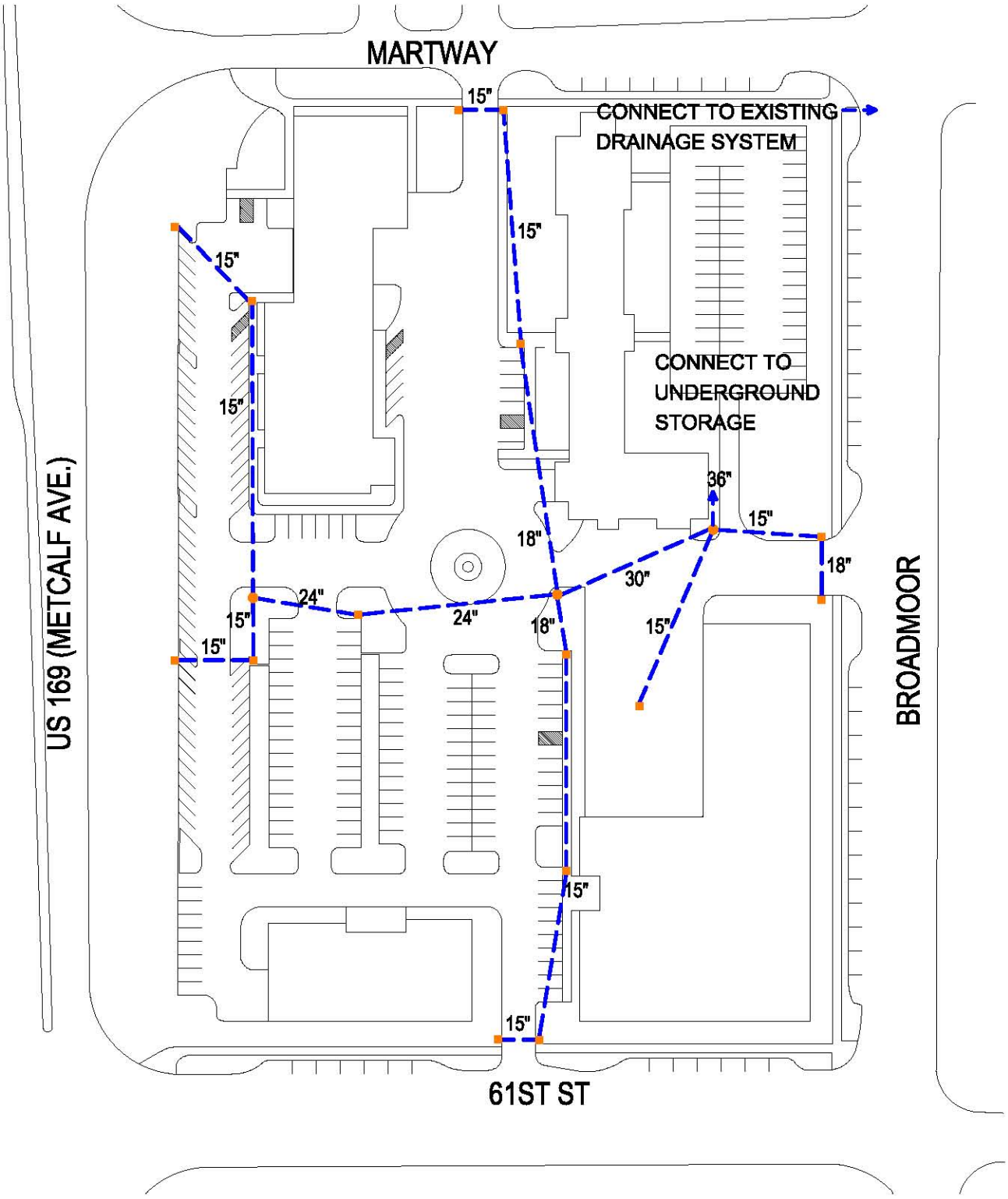
TRADITIONAL SCENARIO

Site Layout

Life Cycle Cost

Return on Investment

APPENDIX D-4



METCALF AVENUE
MIXED-USE DEVELOPMENT
TRADITIONAL SCENERIO

0 50 100 200 NORTH

LEGEND

- MANHOLE
- STORM INLET
- STORM PIPE

APPENDIX D-5

Metcalf Avenue Mixed-Use Development

Traditional Scenario

CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 300,000	1	$ 300,000
SITE PREP				
Clearing & Grubbing	AC	$ 5,800	6.2	$ 35,960
Grading	LS	$ 270,000	1	$ 270,000
BMP Grading (Additional)	CY	$ 7	0	$ -
Total				$ 305,960
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54	813	$ 43,902
18" Pipe	LF	$ 57	200	$ 11,400
24" Pipe	LF	$ 59	193	$ 11,387
30" Pipe	LF	$ 79	100	$ 7,900
36" Pipe	LF	$ 85	50	$ 4,250
4" Perforated Drain Tile, PVC	LF	$ 9.75	0	$ -
Storm Structures (inlets etc.)	EA	$ 5,250	18	$ 94,500
Storage Structure	LS	$ 159,300	1	$ 159,300
Total				$ 332,639
LANDSCAPING				
Shade Trees	EA	$ 400.00	71	$ 28,400
Ornamental Trees	EA	$ 350.00	17	$ 5,950
Evergreen Trees	EA	$ 350.00	9	$ 3,150
Shrubs/Perennials	SY	$ 65.00	2662	$ 173,030
Raingarden plants	SY	$ 24.00	0	$ -
Traditional turf (Sod)	SY	$ 7.00	4840	$ 33,880
Irrigation	SY	$ 18.00	7502	$ 135,036
Total				$ 379,446
ACCESS				
Asphalt Surface Course (2")	Ton	$ 68.00	1699	$ 115,502
Asphalt Base Course (7")	Ton	$ 64.00	5945	$ 380,478
Aggregate (6")	CY	$ 16.00	2462	$ 39,387
Pervious Concrete Parking Stalls (6")	SY	$ -	0	$ -
3/4" Stone Drainage Layer Beneath Pervious Pavement and Adjacent Parking (18")	SY	$ 25.20	0	$ -
Curb and Gutter (18")	LF	$ 12.00	5000	$ 60,000
Concrete Sidewalks (4")	SF	$ 4.00	22000	$ 88,000
Traffic Control	LS	$ 130,000	1	$ 130,000
Signage, Public Education Materials, etc.	LS	$ 90,000	1	$ 90,000
Total				$ 903,367
CONTINGENCY				$ 333,212
Total Base Cost				**$ 2,554,624**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	1	$ 383,194	LS	$ 383,194
Total Associated Capital Costs				**$ 383,194**
Total Site Capital Cost				**$ 2,937,818**

Metcalf Avenue Mixed-Use Development

Traditional Scenario

Maintenance Costs

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Hour ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Storm Structures Inspection, Reporting & Information Management	36.00						250
Tree maintenance	6.00						561
Concrete Maintenance	6.00						0
Shrub/Perennial maintenance	2.00						878
Raingarden maintenance	2.00						0
Turf maintenance	1.00						988
Irrigation system maintenance	12.00						6,936

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Unit ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Coat Seal Pavement	48.00	1	1		1.000	3,939	3,939
Crack Sealing	18.00	1	1		1.000	700	700
Replacement (Mill & Overlay)	186.00	1	1		1.000	132,685	132,685
Patch and repair pervious concrete	480.00	1	1		1.000	0	0

Metcalf Avenue Mixed-Use Development

Traditional Scenario

Cost Summary

CAPITAL COSTS	Total Costs
Total Facility Base Cost	$ 2,554,624
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	$ 383,194
Capital Costs	**$ 2,937,818**

REGULAR MAINTENANCE ACTIVITIES	Years between Events	Cost per Event	Total Cost per Year
Storm Structures Inspection, Reporting & Information Management	3.00	$250	$83
Tree maintenance	0.50	$561	$1,123
Shrub/Perennial maintenance	0.17	$878	$5,270
Turf maintenance	0.08	$988	$11,856
Irrigation system maintenance	1.00	$6,936	$6,936
Totals, Regular Maintenance Activities			**$25,268**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Years between Events	Cost per Event	Total Cost per Year
Coat Seal Pavement	4	$3,939	$985
Crack Sealing	2	$700	$467
Replacement (Mill & Overlay)	16	$132,685	$8,560
Patch and repair pervious concrete	0	$0	$0
Totals, Corrective & Infrequent Maintenance Activities			**$10,012**

Metcalf Avenue Mixed-Use Development

Traditional Scenario

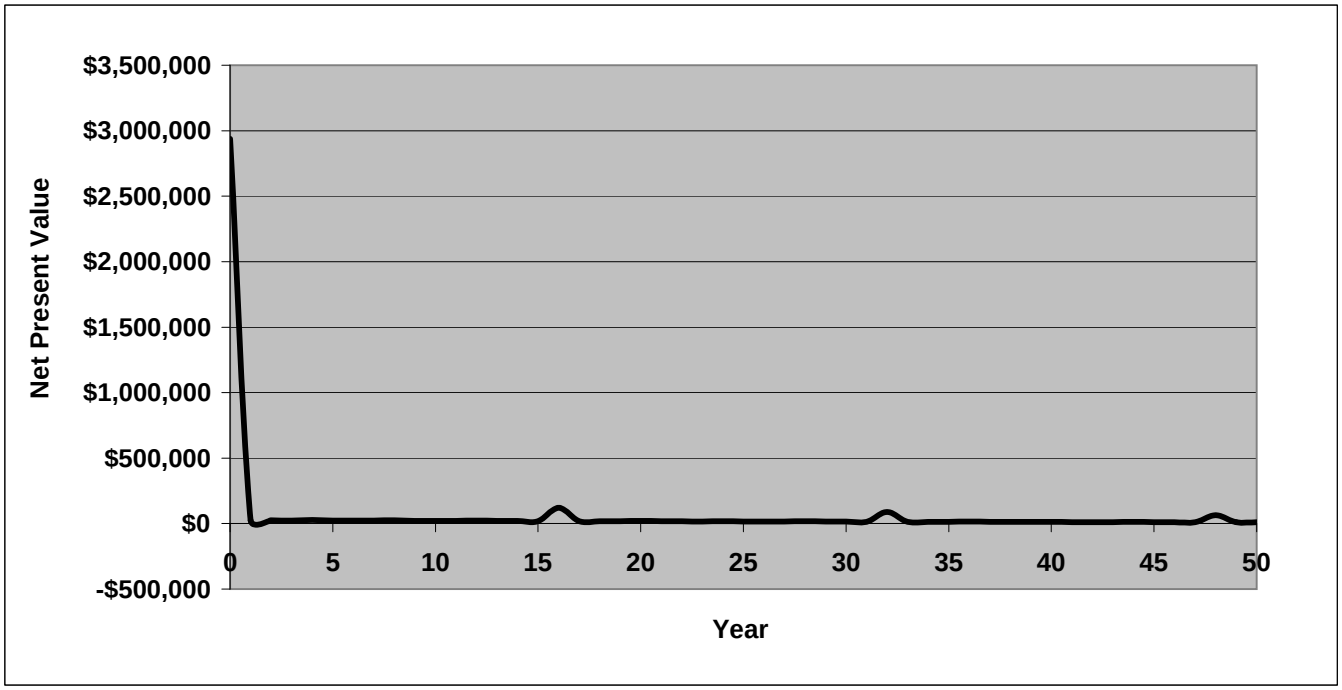
Life Cycle Costs - based on 50 year Design Life

Year	Discount Factor (%)	Capital & Assoc. Costs	Regular Maint. Costs	Corrective Maint.	Inflation (%)	Total Costs	Present Value of Costs	Cumulative Costs	
								Cash	Present Value
Cash Sum ($)	5.00				3.00	**$ 7,128,284**	**$ 4,004,326**		
0	1.000	**$ 2,937,818**			1.000	$ 2,937,818	$ 2,937,818	$ 2,937,818	$ 2,937,818
1	0.952	$ -	**$ 25,268**	$ -	1.030	$ 26,026	$ 24,787	$ 2,963,844	$ 2,962,605
2	0.907	$ -	**$ 25,268**	$ 700	1.061	$ 27,550	$ 24,988	$ 2,991,394	$ 2,987,593
3	0.864	$ -	**$ 25,268**	$ -	1.093	$ 27,611	$ 23,852	$ 3,019,005	$ 3,011,445
4	0.823	$ -	**$ 25,268**	$ 4,639	1.126	$ 33,661	$ 27,693	$ 3,052,666	$ 3,039,137
5	0.784	$ -	**$ 25,268**	$ -	1.159	$ 29,293	$ 22,952	$ 3,081,958	$ 3,062,089
6	0.746	$ -	**$ 25,268**	$ 700	1.194	$ 31,007	$ 23,138	$ 3,112,966	$ 3,085,227
7	0.711	$ -	**$ 25,268**	$ -	1.230	$ 31,077	$ 22,086	$ 3,144,042	$ 3,107,313
8	0.677	$ -	**$ 25,268**	$ 4,639	1.267	$ 37,886	$ 25,642	$ 3,181,928	$ 3,132,955
9	0.645	$ -	**$ 25,268**	$ -	1.305	$ 32,969	$ 21,252	$ 3,214,897	$ 3,154,208
10	0.614	$ -	**$ 25,268**	$ 700	1.344	$ 34,899	$ 21,425	$ 3,249,796	$ 3,175,633
11	0.585	$ -	**$ 25,268**	$ -	1.384	$ 34,977	$ 20,450	$ 3,284,773	$ 3,196,083
12	0.557	$ -	**$ 25,268**	$ 4,639	1.426	$ 42,640	$ 23,744	$ 3,327,414	$ 3,219,827
13	0.530	$ -	**$ 25,268**	$ -	1.469	$ 37,107	$ 19,679	$ 3,364,521	$ 3,239,505
14	0.505	$ -	**$ 25,268**	$ 700	1.513	$ 39,279	$ 19,839	$ 3,403,800	$ 3,259,344
15	0.481	$ -	**$ 25,268**	$ -	1.558	$ 39,367	$ 18,936	$ 3,443,167	$ 3,278,280
16	0.458	$ -	**$ 25,268**	$ 137,324	1.605	$ 260,913	$ 119,527	$ 3,704,080	$ 3,397,807
17	0.436	$ -	**$ 25,268**	$ -	1.653	$ 41,764	$ 18,222	$ 3,745,844	$ 3,416,029
18	0.416	$ -	**$ 25,268**	$ 700	1.702	$ 44,209	$ 18,370	$ 3,790,054	$ 3,434,399
19	0.396	$ -	**$ 25,268**	$ -	1.754	$ 44,308	$ 17,534	$ 3,834,361	$ 3,451,933
20	0.377	$ -	**$ 25,268**	$ 4,639	1.806	$ 54,016	$ 20,358	$ 3,888,377	$ 3,472,291
21	0.359	$ -	**$ 25,268**	$ -	1.860	$ 47,006	$ 16,873	$ 3,935,383	$ 3,489,164
22	0.342	$ -	**$ 25,268**	$ 700	1.916	$ 49,758	$ 17,010	$ 3,985,141	$ 3,506,173
23	0.326	$ -	**$ 25,268**	$ -	1.974	$ 49,869	$ 16,236	$ 4,035,010	$ 3,522,409
24	0.310	$ -	**$ 25,268**	$ 4,639	2.033	$ 60,795	$ 18,851	$ 4,095,805	$ 3,541,260
25	0.295	$ -	**$ 25,268**	$ -	2.094	$ 52,906	$ 15,623	$ 4,148,711	$ 3,556,883
26	0.281	$ -	**$ 25,268**	$ 700	2.157	$ 56,003	$ 15,750	$ 4,204,714	$ 3,572,633
27	0.268	$ -	**$ 25,268**	$ -	2.221	$ 56,128	$ 15,034	$ 4,260,842	$ 3,587,667
28	0.255	$ -	**$ 25,268**	$ 4,639	2.288	$ 68,425	$ 17,455	$ 4,329,267	$ 3,605,122
29	0.243	$ -	**$ 25,268**	$ -	2.357	$ 59,546	$ 14,467	$ 4,388,813	$ 3,619,588
30	0.231	$ -	**$ 25,268**	$ 700	2.427	$ 63,032	$ 14,584	$ 4,451,845	$ 3,634,173
31	0.220	$ -	**$ 25,268**	$ -	2.500	$ 63,172	$ 13,921	$ 4,515,018	$ 3,648,093
32	0.210	$ -	**$ 25,268**	$ 137,324	2.575	$ 418,688	$ 87,869	$ 4,933,706	$ 3,735,962
33	0.200	$ -	**$ 25,268**	$ -	2.652	$ 67,020	$ 13,395	$ 5,000,726	$ 3,749,357
34	0.190	$ -	**$ 25,268**	$ 700	2.732	$ 70,943	$ 13,504	$ 5,071,668	$ 3,762,861
35	0.181	$ -	**$ 25,268**	$ -	2.814	$ 71,101	$ 12,890	$ 5,142,769	$ 3,775,751
36	0.173	$ -	**$ 25,268**	$ 4,639	2.898	$ 86,679	$ 14,966	$ 5,229,449	$ 3,790,717
37	0.164	$ -	**$ 25,268**	$ -	2.985	$ 75,431	$ 12,404	$ 5,304,880	$ 3,803,121
38	0.157	$ -	**$ 25,268**	$ 700	3.075	$ 79,847	$ 12,504	$ 5,384,727	$ 3,815,625
39	0.149	$ -	**$ 25,268**	$ -	3.167	$ 80,025	$ 11,936	$ 5,464,752	$ 3,827,561
40	0.142	$ -	**$ 25,268**	$ 4,639	3.262	$ 97,558	$ 13,858	$ 5,562,310	$ 3,841,418
41	0.135	$ -	**$ 25,268**	$ -	3.360	$ 84,899	$ 11,485	$ 5,647,208	$ 3,852,904
42	0.129	$ -	**$ 25,268**	$ 700	3.461	$ 89,868	$ 11,579	$ 5,737,076	$ 3,864,482
43	0.123	$ -	**$ 25,268**	$ -	3.565	$ 90,069	$ 11,052	$ 5,827,145	$ 3,875,534
44	0.117	$ -	**$ 25,268**	$ 4,639	3.671	$ 109,803	$ 12,832	$ 5,936,948	$ 3,888,366
45	0.111	$ -	**$ 25,268**	$ -	3.782	$ 95,554	$ 10,635	$ 6,032,502	$ 3,899,001
46	0.106	$ -	**$ 25,268**	$ 700	3.895	$ 101,147	$ 10,721	$ 6,133,649	$ 3,909,722
47	0.101	$ -	**$ 25,268**	$ -	4.012	$ 101,373	$ 10,234	$ 6,235,023	$ 3,919,955
48	0.096	$ -	**$ 25,268**	$ 137,324	4.132	$ 671,872	$ 64,595	$ 6,906,895	$ 3,984,551
49	0.092	$ -	**$ 25,268**	$ -	4.256	$ 107,547	$ 9,847	$ 7,014,441	$ 3,994,398
50	0.087	$ 1	**$ 25,268**	700.00	4.384	$ 113,842	$ 9,927	$ 7,128,284	$ 4,004,326

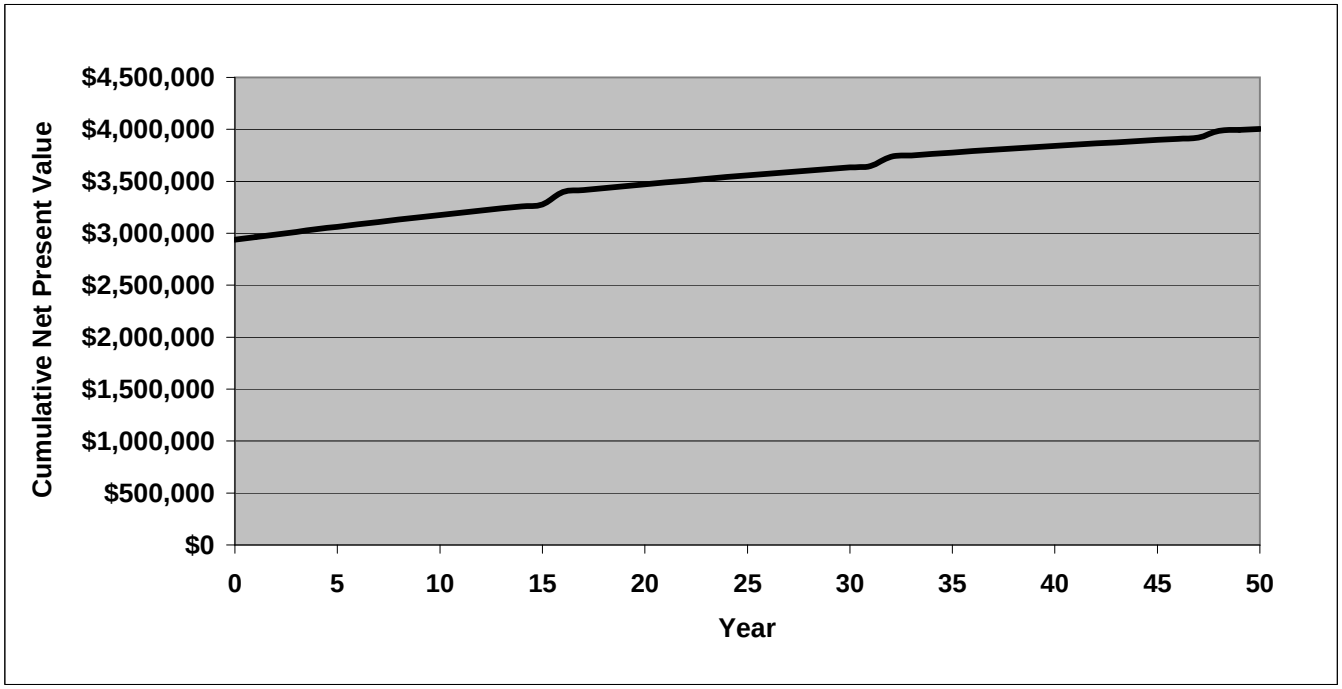
Metcalf Avenue Mixed-Use Development

Traditional Scenario

Net Present Value over time



NPV - Cumulative



Metcalf Avenue Mixed-Use Development

Traditional Scenario

27-Aug-09

ASSUMPTION NOTES:

Tax rates reflect 2008 rates provided by Johnson County Kansas Treasurer
Construction costs are based on RS Means and development in Kansas City Missouri
Rents are based on market reports for First Quarter 2009
Source of wage information is Bureau of Labor Statistics
Assume all surface parking and costs of parking are included in site preparation

Traditional Scenario

27-Aug-09

	TOTAL
Acquisition & Demolition	
Acquisition	$ -
Demolition/Clearance	$ -
Relocation - Existing Buildings	$ -
Soft Costs & Mis	$ -
Total Acquisition & Demolition	$ -

Site Improvements	
On-Site	
Mobilization	$ 300,000
Site Prep	$ 305,960
Stormwater Conveyance and Storage	$ 332,639
Landscaping	$ 379,446
Access	$ 903,367
Contingency	$ 333,212
Construction Documents	$ 383,194
Total Site Improvements	$ 2,937,818

Building Costs	
Parking Structure	$ 6,840,000
Hard Costs	$ 24,541,130
Hard Costs Contingency	$ 2,454,113
Soft Costs	$ 2,726,792
Soft Costs-Incentive	
Total Building Costs	$ 36,562,035

Grand Total	$ 39,499,853

Redevelopment Project Costs

	Bldg SF	Stories	SF	Units
Hotel	89,454	1	$ 140.00	120
Housing	30,000	1	$ 150.00	33
Office	20,000	1	$ 130.00	
Bank	5,200	1	$ 140.00	
Restaurant	9,748	1	$ 144.00	
Retail	50,115	1	$ 110.00	
Total Bldg SF	204,517			

Site SF	-

Parking		# Spaces	PS Cost
Spaces	534		
Type	Surface	242	3,000
Type	Structured Above	192	20,000
Type	Structured Below	100	30,000

Traditional Scenario

27-Aug-09

Economic Impact by Tax Type - 10 Years

27-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
Total	$ -	$ 8,614,853	$ -	$ -	$ -	$ 8,614,853	$ 7,427,984	$ -	$ 7,427,984		$ 1,385,025	$ 705,548
PV	$0	$6,363,808	$0	$0	$0	$6,363,808	$5,712,833	$0	$5,712,833		$1,023,120	$542,634

Discount Rate	*5.00%*

Traditional Scenario

27-Aug-09

Economic Impact by Tax Type - 30 Years

27-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
11	-	1,112,475	$ -	-	-	$ 1,112,475	$ 784,262	$ -	$ 784,262		$ 178,855	$ 74,493
12	-	1,134,725	$ -	-	-	$ 1,134,725	$ 792,105	$ -	$ 792,105		$ 182,432	$ 75,238
13	-	1,157,419	$ -	-	-	$ 1,157,419	$ 800,026	$ -	$ 800,026		$ 186,080	$ 75,991
14	-	1,180,568	$ -	-	-	$ 1,180,568	$ 808,026	$ -	$ 808,026		$ 189,802	$ 76,750
15	-	1,204,179	$ -	-	-	$ 1,204,179	$ 816,106	$ -	$ 816,106		$ 193,598	$ 77,518
16	-	1,228,263	$ -	-	-	$ 1,228,263	$ 824,267	$ -	$ 824,267		$ 197,470	$ 78,293
17	-	1,252,828	$ -	-	-	$ 1,252,828	$ 832,510	$ -	$ 832,510		$ 201,419	$ 79,076
18	-	1,277,885	$ -	-	-	$ 1,277,885	$ 840,835	$ -	$ 840,835		$ 205,448	$ 79,867
19	-	1,303,442	$ -	-	-	$ 1,303,442	$ 849,243	$ -	$ 849,243		$ 209,557	$ 80,666
20	-	1,329,511	$ -	-	-	$ 1,329,511	$ 857,736	$ -	$ 857,736		$ 213,748	$ 81,472
21	-	1,356,101	$ -	-	-	$ 1,356,101	$ 866,313	$ -	$ 866,313		$ 218,023	$ 82,287
22	-	1,383,223	$ -	-	-	$ 1,383,223	$ 874,976	$ -	$ 874,976		$ 222,383	$ 83,110
23	-	1,410,888	$ -	-	-	$ 1,410,888	$ 883,726	$ -	$ 883,726		$ 226,831	$ 83,941
24	-	1,439,106	$ -	-	-	$ 1,439,106	$ 892,563	$ -	$ 892,563		$ 231,367	$ 84,780
25	-	1,467,888	$ -	-	-	$ 1,467,888	$ 901,489	$ -	$ 901,489		$ 235,995	$ 85,628
26	-	1,497,245	$ -	-	-	$ 1,497,245	$ 910,504	$ -	$ 910,504		$ 240,715	$ 86,484
27	-	1,527,190	$ -	-	-	$ 1,527,190	$ 919,609	$ -	$ 919,609		$ 245,529	$ 87,349
28	-	1,557,734	$ -	-	-	$ 1,557,734	$ 928,805	$ -	$ 928,805		$ 250,440	$ 88,223
29	-	1,588,889	$ -	-	-	$ 1,588,889	$ 938,093	$ -	$ 938,093		$ 255,448	$ 89,105
30	-	1,620,667	$ -	-	-	$ 1,620,667	$ 947,474	$ -	$ 947,474		$ 260,557	$ 89,996
Total	$ -	$ 35,645,079	$ -	$ -	$ -	$ 35,645,079	$ 24,696,651	$ -	$ 24,696,651		$ 5,730,720	$ 2,345,815
PV	$0	$16,379,741	$0	$0	$0	$16,379,741	$12,214,145	$0	$12,214,145		$2,633,399	$1,160,162

Discount Rate	*5.00%*

Traditional Scenario

27-Aug-09

Economic Impact by Tax Type - 50 Years

27-Aug-09

	EATS (Economic Activity Taxes) Under Redevelopment							Property Tax			Share To City of Mission	
Year	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
11	-	1,112,475	$ -	-	-	$ 1,112,475	$ 784,262	$ -	$ 784,262		$ 178,855	$ 74,493
12	-	1,134,725	$ -	-	-	$ 1,134,725	$ 792,105	$ -	$ 792,105		$ 182,432	$ 75,238
13	-	1,157,419	$ -	-	-	$ 1,157,419	$ 800,026	$ -	$ 800,026		$ 186,080	$ 75,991
14	-	1,180,568	$ -	-	-	$ 1,180,568	$ 808,026	$ -	$ 808,026		$ 189,802	$ 76,750
15	-	1,204,179	$ -	-	-	$ 1,204,179	$ 816,106	$ -	$ 816,106		$ 193,598	$ 77,518
16	-	1,228,263	$ -	-	-	$ 1,228,263	$ 824,267	$ -	$ 824,267		$ 197,470	$ 78,293
17	-	1,252,828	$ -	-	-	$ 1,252,828	$ 832,510	$ -	$ 832,510		$ 201,419	$ 79,076
18	-	1,277,885	$ -	-	-	$ 1,277,885	$ 840,835	$ -	$ 840,835		$ 205,448	$ 79,867
19	-	1,303,442	$ -	-	-	$ 1,303,442	$ 849,243	$ -	$ 849,243		$ 209,557	$ 80,666
20	-	1,329,511	$ -	-	-	$ 1,329,511	$ 857,736	$ -	$ 857,736		$ 213,748	$ 81,472
21	-	1,356,101	$ -	-	-	$ 1,356,101	$ 866,313	$ -	$ 866,313		$ 218,023	$ 82,287
22	-	1,383,223	$ -	-	-	$ 1,383,223	$ 874,976	$ -	$ 874,976		$ 222,383	$ 83,110
23	-	1,410,888	$ -	-	-	$ 1,410,888	$ 883,726	$ -	$ 883,726		$ 226,831	$ 83,941
24	-	1,439,106	$ -	-	-	$ 1,439,106	$ 892,563	$ -	$ 892,563		$ 231,367	$ 84,780
25	-	1,467,888	$ -	-	-	$ 1,467,888	$ 901,489	$ -	$ 901,489		$ 235,995	$ 85,628
26	-	1,497,245	$ -	-	-	$ 1,497,245	$ 910,504	$ -	$ 910,504		$ 240,715	$ 86,484
27	-	1,527,190	$ -	-	-	$ 1,527,190	$ 919,609	$ -	$ 919,609		$ 245,529	$ 87,349
28	-	1,557,734	$ -	-	-	$ 1,557,734	$ 928,805	$ -	$ 928,805		$ 250,440	$ 88,223
29	-	1,588,889	$ -	-	-	$ 1,588,889	$ 938,093	$ -	$ 938,093		$ 255,448	$ 89,105
30	-	1,620,667	$ -	-	-	$ 1,620,667	$ 947,474	$ -	$ 947,474		$ 260,557	$ 89,996
31	-	1,653,080	$ -	-	-	$ 1,653,080	$ 956,949	$ -	$ 956,949		$ 265,768	$ 90,896
32	-	1,686,142	$ -	-	-	$ 1,686,142	$ 966,518	$ -	$ 966,518		$ 271,084	$ 91,805
33	-	1,719,864	$ -	-	-	$ 1,719,864	$ 976,183	$ -	$ 976,183		$ 276,506	$ 92,723
34	-	1,754,262	$ -	-	-	$ 1,754,262	$ 985,945	$ -	$ 985,945		$ 282,036	$ 93,650
35	-	1,789,347	$ -	-	-	$ 1,789,347	$ 995,805	$ -	$ 995,805		$ 287,676	$ 94,587
36	-	1,825,134	$ -	-	-	$ 1,825,134	$ 1,005,763	$ -	$ 1,005,763		$ 293,430	$ 95,533
37	-	1,861,636	$ -	-	-	$ 1,861,636	$ 1,015,820	$ -	$ 1,015,820		$ 299,298	$ 96,488
38	-	1,898,869	$ -	-	-	$ 1,898,869	$ 1,025,978	$ -	$ 1,025,978		$ 305,284	$ 97,453
39	-	1,936,847	$ -	-	-	$ 1,936,847	$ 1,036,238	$ -	$ 1,036,238		$ 311,390	$ 98,427
40	-	1,975,584	$ -	-	-	$ 1,975,584	$ 1,046,601	$ -	$ 1,046,601		$ 317,618	$ 99,412
41	-	2,015,095	$ -	-	-	$ 2,015,095	$ 1,057,067	$ -	$ 1,057,067		$ 323,970	$ 100,406
42	-	2,055,397	$ -	-	-	$ 2,055,397	$ 1,067,637	$ -	$ 1,067,637		$ 330,450	$ 101,410
43	-	2,096,505	$ -	-	-	$ 2,096,505	$ 1,078,314	$ -	$ 1,078,314		$ 337,059	$ 102,424
44	-	2,138,435	$ -	-	-	$ 2,138,435	$ 1,089,097	$ -	$ 1,089,097		$ 343,800	$ 103,448
45	-	2,181,204	$ -	-	-	$ 2,181,204	$ 1,099,988	$ -	$ 1,099,988		$ 350,676	$ 104,483
46	-	2,224,828	$ -	-	-	$ 2,224,828	$ 1,110,988	$ -	$ 1,110,988		$ 357,689	$ 105,527
47	-	2,269,324	$ -	-	-	$ 2,269,324	$ 1,122,098	$ -	$ 1,122,098		$ 364,843	$ 106,583
48	-	2,314,711	$ -	-	-	$ 2,314,711	$ 1,133,318	$ -	$ 1,133,318		$ 372,140	$ 107,648
49	-	2,361,005	$ -	-	-	$ 2,361,005	$ 1,144,652	$ -	$ 1,144,652		$ 379,583	$ 108,725
50	-	2,408,225	$ -	-	-	$ 2,408,225	$ 1,156,098	$ -	$ 1,156,098		$ 387,174	$ 109,812
Total	$ -	$ 75,810,573	$ -	$ -	$ -	$ 75,810,573	$ 45,767,706	$ -	$ 45,767,706		$ 12,188,195	$ 4,347,253
PV	$0	$21,989,043	$0	$0	$0	$21,989,043	$15,203,947	$0	$15,203,947		$3,535,216	$1,444,149

Discount Rate	*5.00%*

Traditional Scenario — Operating Pro Forma

27-Aug-09 | 27-Aug-09

Revenue Information					Expense Info			Debt Info	
Type	Retail	Residential	Office		Retail: Rate/% per SF	Residential: Total expense per unit	Office: Rate/% per SF	Total RPC	$ 39,499,853
SF	55,315	30,000	20,000	Taxes	$ 3.60	$ 2,495.00	$ 3.60	Equity share	25%
Rate per SF/yr	$ 14.71	$ 156,000	$ 18.18	Insurance	$ 0.20	$ 0.20	$ 0.20	Equity amount	$ 9,874,963
Increase yr	5	0	5	CAM	$ 0.50	$ -	$ 0.50	Loan amount	$ 29,624,890
Increase rate	7.5%	0.0%	7.5%	Mgmt	7.60%	0.00%	7.60%	Loan term-yr	30
VC losses	5%	0%	5%	Accntg/Misc	$ 0.10	$ 0.10	$ 0.10	Interest rate	6.50%
Dwelling Units		33		Reserves	$ 0.15	$ -	$ 0.15	Monthly payment	$ (187,249.46)
Hotel Rooms	120			Annual increase	3.00%	3.00%	3.00%		
				Annual Increase in Tax Value	1%	1%	1%		

Sales Info	
Sales Cost	5.0%
Cap Rate	9.5%
Sale End of	
	$ 36,905,667

Incentive Info	
Available to Developer	
% Needed	0%
Balance	$ -

Years

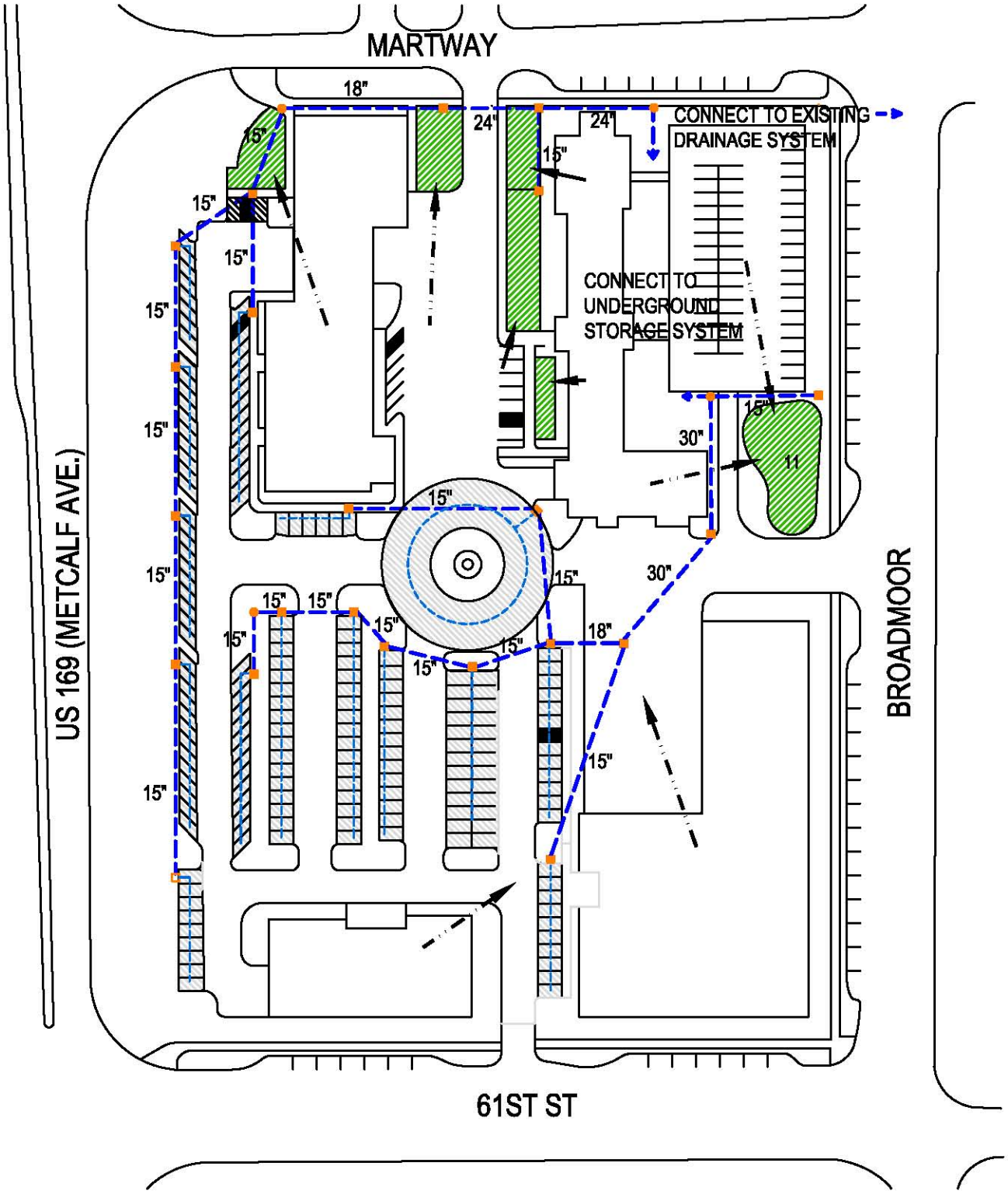
	Construction	1	2	3	4	5	6	7	8	9	10	Sale
Revenue												
Retail/Office		$ 1,177,284	$ 1,177,284	$ 1,177,284	$ 1,177,284	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,360,498
Retail/Office VC Losses		$ (58,864)	$ (58,864)	$ (58,864)	$ (58,864)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (68,025)
Revenue Hotel		$ 2,298,114	$ 2,784,600	$ 3,111,108	$ 3,183,835	$ 3,264,643	$ 3,346,421	$ 3,429,815	$ 3,515,794	$ 3,603,714	$ 3,693,572	$ 3,767,444
Sale of Condo (8units/year)		$ 1,248,000	$ 1,248,000	$ 1,248,000	$ 1,248,000	$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total		$ 4,664,533	$ 5,151,019	$ 5,477,527	$ 5,550,255	$ 4,636,944	$ 4,548,722	$ 4,632,116	$ 4,718,095	$ 4,806,014	$ 4,895,873	$ 5,059,917
T/I/CAM Reimbursement		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gross Collected Revenue		$ 4,664,533	$ 5,151,019	$ 5,477,527	$ 5,550,255	$ 4,636,944	$ 4,548,722	$ 4,632,116	$ 4,718,095	$ 4,806,014	$ 4,895,873	$ 5,059,917
Expenses												
Maintenance (Present Value from Life Cycle Model)		$ 24,787	$ 24,988	$ 23,852	$ 27,693	$ 22,952	$ 23,138	$ 22,086	$ 25,642	$ 21,252	$ 21,425	$ 20,450
Hotel Expenses		$ 124,000	$ 126,480	$ 129,010	$ 131,590	$ 134,222	$ 136,906	$ 139,644	$ 142,437	$ 145,286	$ 148,191	$ 152,637
Hotel Deprc & Amtz		$ 495,441	$ 597,441	$ 527,441	$ 477,441	$ 441,841	$ 416,741	$ 416,841	$ 372,141	$ 327,541	$ 327,541	$ 337,367
Real Estate Taxes (commercial, hotel and unsold condos)		$ 690,022	$ 677,162	$ 664,373	$ 651,655	$ 656,475	$ 663,040	$ 669,670	$ 676,367	$ 683,131	$ 689,962	$ 696,862
Insurance		$ 19,608	$ 18,606	$ 17,617	$ 16,642	$ 16,954	$ 17,462	$ 17,986	$ 18,526	$ 19,081	$ 19,654	$ 20,243
Common Area Maintenance		$ 37,658	$ 38,787	$ 39,951	$ 41,149	$ 42,384	$ 43,655	$ 44,965	$ 46,314	$ 47,703	$ 49,134	$ 50,609
Management		$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 98,228
Accntg & Misc		$ 9,804	$ 9,303	$ 8,808	$ 8,321	$ 8,477	$ 8,731	$ 8,993	$ 9,263	$ 9,541	$ 9,827	$ 10,122
Retail/Office Replacement reserves		$ 11,297	$ 11,636	$ 11,985	$ 12,345	$ 12,715	$ 13,097	$ 13,490	$ 13,894	$ 14,311	$ 14,740	$ 15,183
Hotel Fixed Asset Replacement Fund		$ 68,943	$ 83,538	$ 124,444	$ 127,353	$ 130,586	$ 133,850	$ 137,197	$ 140,627	$ 144,142	$ 147,746	$ 152,178
Total Expenses		$ 1,566,560	$ 1,672,941	$ 1,632,480	$ 1,579,189	$ 1,557,980	$ 1,547,995	$ 1,562,246	$ 1,536,586	$ 1,503,363	$ 1,519,595	$ 1,553,879
Debt Service		$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ (2,246,993)	$ 25,114,834
Coverage ratio		138%	155%	171%	177%	137%	134%	137%	142%	147%	150%	
Cash from sale of property												$ 9,945,550
NOI after Debt Service		$ 850,980	$ 1,231,085	$ 1,598,054	$ 1,724,073	$ 831,971	$ 753,733	$ 822,876	$ 934,516	$ 1,055,658	$ 1,129,284	$ 9,945,550
Public Incentive/ reimbursement		-										
Cash Flow	$ (9,874,963)	$ 850,980	$ 1,231,085	$ 1,598,054	$ 1,724,073	$ 831,971	$ 753,733	$ 822,876	$ 934,516	$ 1,055,658	$ 1,129,284	$ 9,945,550
Without Assistance	$ (9,874,963)	$ 850,980	$ 1,231,085	$ 1,598,054	$ 1,724,073	$ 831,971	$ 753,733	$ 822,876	$ 934,516	$ 1,055,658	$ 1,129,284	$ 9,945,550
Return on Equity		8.62%	12.47%	16.18%	17.46%	8.43%	7.63%	8.33%	9.46%	10.69%	11.44%	100.71%
Return on Investment (ROI) 10 year	10.76%											

LID SCENARIO 1

Site Layout

Life Cycle Cost – LID Scenario 1

Return on Investment – LID Scenario 1



METCALF AVENUE
MIXED-USE DEVELOPMENT
LID SCENARIOS

0 50 100 200 NORTH

LEGEND

- JUNCTION BOX
- CURB INLET/AREA INLET
- STORM DRAIN
- DRAIN TILE
- DRAINAGE DIRECTION
- BMP
- POROUS PAVEMENT

APPENDIX D-19

Metcalf Avenue Mixed-Use Development
LID Scenario 1
CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 300,000	1	$ 300,000
SITE PREP				
Clearing & Grubbing	AC	$ 5,800	6.2	$ 35,960
Excavation/Grading	LS	$ 270,000	1	$ 270,000
BMP Grading (Additional)	CY	$ 7	1014	$ 7,100
Total				$ 313,060
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54	1275	$ 68,850
18" Pipe	LF	$ 57	150	$ 8,550
24" Pipe	LF	$ 59	120	$ 7,080
30" Pipe	LF	$ 85	225	$ 19,125
36" Pipe	LF	$ 85	0	$ -
4" Perforated Drain Tile, PVC	LF	$ 9.75	1650	$ 16,088
Storm Structures (inlets etc.)	EA	$ 5,250	26	$ 136,500
Storage Structure	LS	$ 111,510	1	$ 111,510
Total				$ 367,703
LANDSCAPING				
Shade Trees	EA	$ 400.00	71	$ 28,400
Ornamental Trees	EA	$ 350.00	17	$ 5,950
Evergreen Trees	EA	$ 350.00	9	$ 3,150
Shrubs/Perennials	SY	$ 65.00	2904	$ 188,760.00
Raingarden plants	SY	$ 24.00	823	$ 19,747.20
Traditional turf (Sod)	SY	$ 7.00	3582	$ 25,071.20
Irrigation	SY	$ 18.00	3582	$ 64,468.80
Total				$ 335,547
ACCESS				
Asphalt Surface Course (2")	Ton	$ 68.00	1270	$ 86,359
Asphalt Base Course (7")	Ton	$ 64.00	4445	$ 284,476
Aggregate (6") Beneath Traditional Parking	CY	$ 16.00	1841	$ 29,449
Pervious Concrete Parking Stalls (6")	SY	$ 40.00	3727	$ 149,072
3/4" Stone Drainage Layer Beneath Pervious Stalls (15")	SY	$ 21.60	3727	$ 80,499
Curb and Gutter (18")	LF	$ 12.00	3250	$ 39,000
Concrete Sidewalks (4")	SF	$ 4.00	22000	$ 88,000
Traffic Control	LS	$ 130,000	1	$ 130,000
Signage, Public Education Materials, etc.	LS	$ 90,000	1	$ 90,000
Total				$ 976,854
CONTINGENCY				$ 343,975
Total Base Cost				**$ 2,637,138**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	1	$ 395,571	LS	$ 395,571
Total Associated Capital Costs				**$ 395,571**
Total Site Capital Cost				**$ 3,032,709**

Metcalf Avenue Mixed-Use Development

LID Scenario 1

Maintenance Costs

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Hour ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Storm Structures Inspection, Reporting & Information Management	20.00						250
Concrete Maintenance	6.00	3	1	120	0	0	360
Tree maintenance	6.00						561
Shrub/Perennial maintenance	2.00						958
Raingarden maintenance	2.00						271
Turf maintenance	1.00						731
Irrigation maintenance	12.00						3,312

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Unit ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Coat Seal Pavement	48.00	1	1		1.000	843	843
Crack Sealing	18.00	1	1		1.000	700	700
Replacement (Mill & Overlay)	186.00	1	1		1.000	99,125	99,125
Remove and Replace Concrete Surface	480.00	1	1		1.000	261,360	261,360

Metcalf Avenue Mixed-Use Development

LID Scenario 1

CAPITAL COSTS	Total Costs	
Total Facility Base Cost	$	2,637,138
Total Associated Capital Costs (e.g., Engineering, Land, etc.)	$	395,571
Capital Costs	**$**	**3,032,709**

REGULAR MAINTENANCE ACTIVITIES	Years between Events	Cost per Event	Total Cost per Year
Storm Structures Inspection, Reporting & Information Management	1.67	$250	$150
Concrete Maintenance	0.50	$360	$720
Tree maintenance	0.50	$561	$1,123
Shrub/Perennial maintenance	0.17	$958	$5,749
Raingarden maintenance	0.17	$271	$1,629
Turf maintenance	0.08	$731	$8,773
Irrigation maintenance	1.00	$3,312	$3,312
Totals, Regular Maintenance Activities			**$21,456**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Years between Events	Cost per Event	Total Cost per Year
Coat Seal Pavement	4	$843	$211
Crack Sealing	2	$700	$467
Replacement (Mill & Overlay)	16	$99,125	$6,395
Remove and Replace Concrete Surface	40	$261,360	$6,534
Totals, Corrective & Infrequent Maintenance Activities			**$13,607**

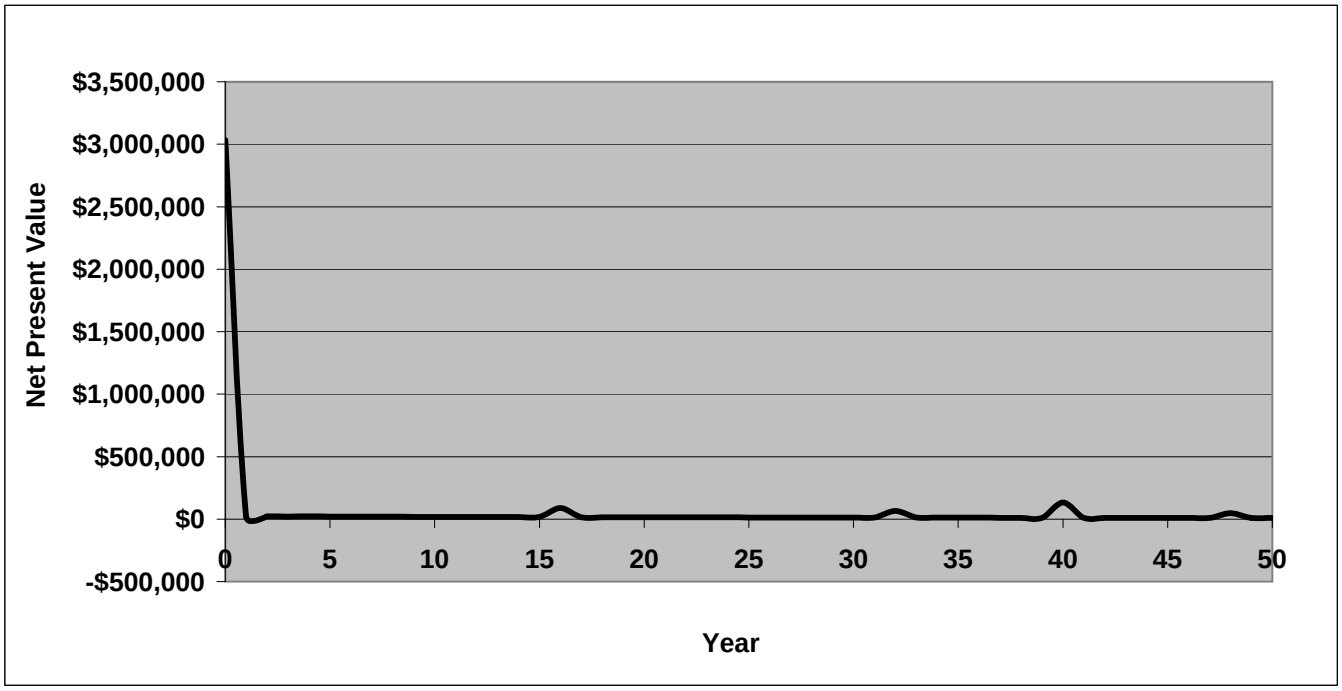
Metcalf Avenue Mixed-Use Development

LID Scenario 1

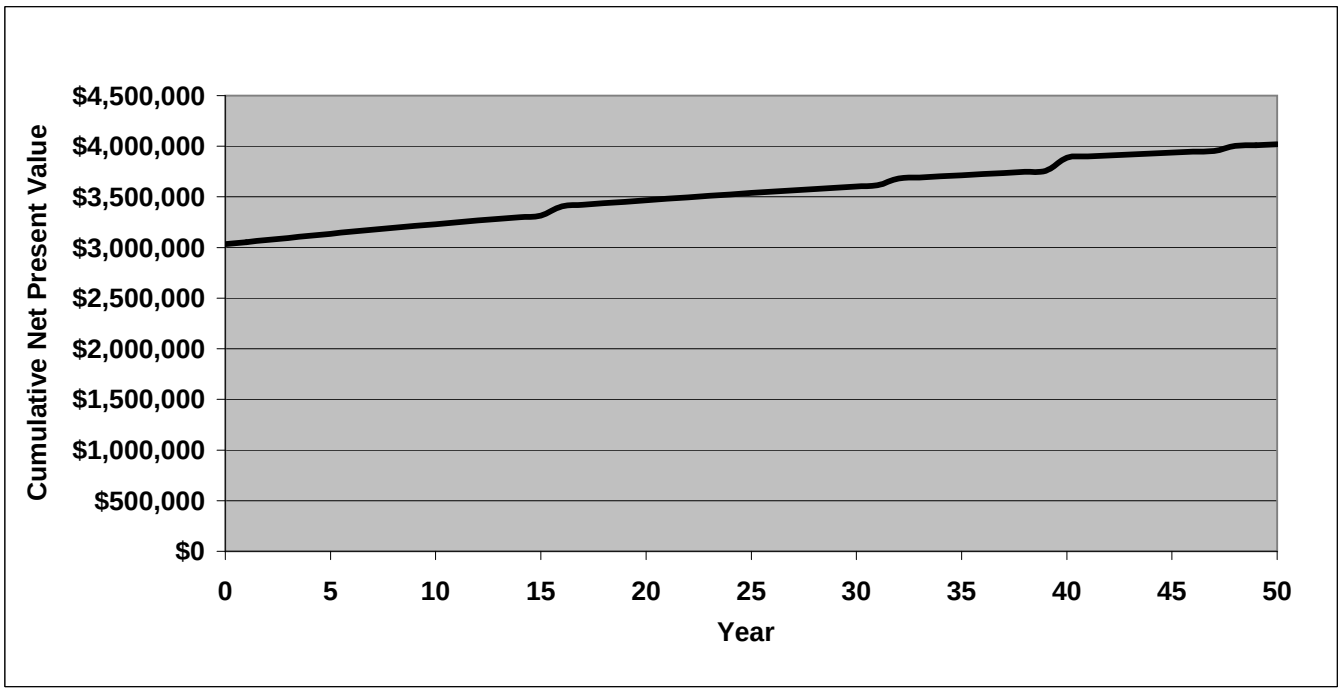
Year	Discount Factor (%)	Capital & Assoc. Costs	Regular Maint. Costs	Corrective Maint.	Inflation (%)	Total Costs	Present Value of Costs	Cumulative Costs	
								Cash	Present Value
Cash Sum ($)	5.00				3.00	**$ 7,266,875**	**$ 4,019,557**		
0	1.000	**$ 3,032,709**			1.000	$ 3,032,709	$ 3,032,709	$ 3,032,709	$ 3,032,709
1	0.952	$ -	**$ 21,456**	$ -	1.030	$ 22,099	$ 21,047	$ 3,054,808	$ 3,053,755
2	0.907	$ -	**$ 21,456**	$ 700	1.061	$ 23,505	$ 21,320	$ 3,078,313	$ 3,075,075
3	0.864	$ -	**$ 21,456**	$ -	1.093	$ 23,445	$ 20,253	$ 3,101,758	$ 3,095,328
4	0.823	$ -	**$ 21,456**	$ 1,543	1.126	$ 25,885	$ 21,296	$ 3,127,643	$ 3,116,624
5	0.784	$ -	**$ 21,456**	$ -	1.159	$ 24,873	$ 19,489	$ 3,152,516	$ 3,136,112
6	0.746	$ -	**$ 21,456**	$ 700	1.194	$ 26,455	$ 19,741	$ 3,178,971	$ 3,155,853
7	0.711	$ -	**$ 21,456**	$ -	1.230	$ 26,388	$ 18,753	$ 3,205,358	$ 3,174,606
8	0.677	$ -	**$ 21,456**	$ 1,543	1.267	$ 29,134	$ 19,719	$ 3,234,492	$ 3,194,325
9	0.645	$ -	**$ 21,456**	$ -	1.305	$ 27,995	$ 18,046	$ 3,262,487	$ 3,212,371
10	0.614	$ -	**$ 21,456**	$ 700	1.344	$ 29,775	$ 18,279	$ 3,292,262	$ 3,230,650
11	0.585	$ -	**$ 21,456**	$ -	1.384	$ 29,700	$ 17,365	$ 3,321,962	$ 3,248,015
12	0.557	$ -	**$ 21,456**	$ 1,543	1.426	$ 32,790	$ 18,259	$ 3,354,752	$ 3,266,274
13	0.530	$ -	**$ 21,456**	$ -	1.469	$ 31,508	$ 16,709	$ 3,386,260	$ 3,282,984
14	0.505	$ -	**$ 21,456**	$ 700	1.513	$ 33,512	$ 16,926	$ 3,419,773	$ 3,299,910
15	0.481	$ -	**$ 21,456**	$ -	1.558	$ 33,427	$ 16,079	$ 3,453,200	$ 3,315,989
16	0.458	$ -	**$ 21,456**	$ 100,668	1.605	$ 195,972	$ 89,777	$ 3,649,172	$ 3,405,766
17	0.436	$ -	**$ 21,456**	$ -	1.653	$ 35,463	$ 15,472	$ 3,684,635	$ 3,421,238
18	0.416	$ -	**$ 21,456**	$ 700	1.702	$ 37,718	$ 15,673	$ 3,722,353	$ 3,436,911
19	0.396	$ -	**$ 21,456**	$ -	1.754	$ 37,622	$ 14,888	$ 3,759,976	$ 3,451,799
20	0.377	$ -	**$ 21,456**	$ 1,543	1.806	$ 41,538	$ 15,655	$ 3,801,514	$ 3,467,455
21	0.359	$ -	**$ 21,456**	$ -	1.860	$ 39,914	$ 14,327	$ 3,841,428	$ 3,481,781
22	0.342	$ -	**$ 21,456**	$ 700	1.916	$ 42,452	$ 14,512	$ 3,883,880	$ 3,496,294
23	0.326	$ -	**$ 21,456**	$ -	1.974	$ 42,344	$ 13,786	$ 3,926,224	$ 3,510,080
24	0.310	$ -	**$ 21,456**	$ 1,543	2.033	$ 46,751	$ 14,496	$ 3,972,976	$ 3,524,576
25	0.295	$ -	**$ 21,456**	$ -	2.094	$ 44,923	$ 13,266	$ 4,017,899	$ 3,537,842
26	0.281	$ -	**$ 21,456**	$ 700	2.157	$ 47,781	$ 13,438	$ 4,065,680	$ 3,551,280
27	0.268	$ -	**$ 21,456**	$ -	2.221	$ 47,659	$ 12,765	$ 4,113,339	$ 3,564,045
28	0.255	$ -	**$ 21,456**	$ 1,543	2.288	$ 52,619	$ 13,423	$ 4,165,958	$ 3,577,468
29	0.243	$ -	**$ 21,456**	$ -	2.357	$ 50,561	$ 12,284	$ 4,216,519	$ 3,589,752
30	0.231	$ -	**$ 21,456**	$ 700	2.427	$ 53,777	$ 12,443	$ 4,270,297	$ 3,602,194
31	0.220	$ -	**$ 21,456**	$ -	2.500	$ 53,641	$ 11,820	$ 4,323,937	$ 3,614,015
32	0.210	$ -	**$ 21,456**	$ 100,668	2.575	$ 314,478	$ 65,998	$ 4,638,416	$ 3,680,013
33	0.200	$ -	**$ 21,456**	$ -	2.652	$ 56,907	$ 11,374	$ 4,695,323	$ 3,691,387
34	0.190	$ -	**$ 21,456**	$ 700	2.732	$ 60,527	$ 11,522	$ 4,755,850	$ 3,702,909
35	0.181	$ -	**$ 21,456**	$ -	2.814	$ 60,373	$ 10,945	$ 4,816,223	$ 3,713,854
36	0.173	$ -	**$ 21,456**	$ 1,543	2.898	$ 66,656	$ 11,509	$ 4,882,879	$ 3,725,363
37	0.164	$ -	**$ 21,456**	$ -	2.985	$ 64,050	$ 10,532	$ 4,946,929	$ 3,735,895
38	0.157	$ -	**$ 21,456**	$ 700	3.075	$ 68,124	$ 10,669	$ 5,015,053	$ 3,746,563
39	0.149	$ -	**$ 21,456**	$ -	3.167	$ 67,950	$ 10,135	$ 5,083,003	$ 3,756,698
40	0.142	$ -	**$ 21,456**	$ 262,903	3.262	$ 927,588	$ 131,760	$ 6,010,592	$ 3,888,458
41	0.135	$ -	**$ 21,456**	$ -	3.360	$ 72,089	$ 9,752	$ 6,082,680	$ 3,898,210
42	0.129	$ -	**$ 21,456**	$ 700	3.461	$ 76,674	$ 9,879	$ 6,159,354	$ 3,908,089
43	0.123	$ -	**$ 21,456**	$ -	3.565	$ 76,479	$ 9,384	$ 6,235,833	$ 3,917,473
44	0.117	$ -	**$ 21,456**	$ 1,543	3.671	$ 84,438	$ 9,868	$ 6,320,271	$ 3,927,341
45	0.111	$ -	**$ 21,456**	$ -	3.782	$ 81,136	$ 9,030	$ 6,401,407	$ 3,936,371
46	0.106	$ -	**$ 21,456**	$ 700	3.895	$ 86,297	$ 9,147	$ 6,487,704	$ 3,945,518
47	0.101	$ -	**$ 21,456**	$ -	4.012	$ 86,078	$ 8,689	$ 6,573,782	$ 3,954,207
48	0.096	$ -	**$ 21,456**	$ 100,668	4.132	$ 504,645	$ 48,518	$ 7,078,427	$ 4,002,725
49	0.092	$ -	**$ 21,456**	$ -	4.256	$ 91,320	$ 8,362	$ 7,169,747	$ 4,011,087
50	0.087	$ 1	**$ 21,456**	$ 700	4.384	$ 97,128	$ 8,470	$ 7,266,875	$ 4,019,557

Metcalf Avenue Mixed-Use Development

LID Scenario 1



NPV - Cumulative



Metcalf Avenue Mixed-Use Development

LID Scenario 1

27-Aug-09

ASSUMPTION NOTES:

Tax rates reflect 2008 rates provided by Johnson County Kansas Treasurer
Construction costs are based on RS Means and development in Kansas City Missouri
Rents are based on market reports for First Quarter 2009
Source of wage information is Bureau of Labor Statistics
Assume all surface parking and costs of parking are included in site preparation

LID Scenario 1

27-Aug-09

	TOTAL
Acquisition & Demolition	
Acquisition	$ -
Demolition/Clearance	$ -
Relocation - Existing Buildings	$ -
Soft Costs & Mis	$ -
Total Acquisition & Demolition	$ -

Site Improvements	
On-Site	
Mobilization	$ 300,000
Site Prep	$ 313,060
Stormwater Conveyance and Storage	$ 367,703
Landscaping	$ 335,547
Access	$ 976,854
Contingency	$ 343,975
Construction Documents	$ 395,571
Total Site Improvements	$ 3,032,710

Building Costs	
Parking Structure	$ 6,840,000
Hard Costs	$ 24,541,130
Hard Costs Contingency	$ 2,454,113
Soft Costs	$ 2,726,792
Soft Costs-Incentive	
Total Building Costs	$ 36,562,035

Grand Total	$ 39,594,745

Redevelopment Project Costs

	Bldg SF	Stories	SF	Units
Hotel	89,454	1	$ 140.00	120
Housing	30,000	1	$ 150.00	33
Office	20,000	1	$ 130.00	
Bank	5,200	1	$ 140.00	
Restaurant	9,748	1	$ 144.00	
Retail	50,115	1	$ 110.00	
Total Bldg SF	204,517			

Site SF	-

Parking		# Spaces	PS Cost
Spaces	534		
Type	Surface	242	3,000
Type	Structured Above	192	20,000
Type	Structured Below	100	30,000

LID Scenario 1

27-Aug-09

Economic Impact by Tax Type - 10 Years

27-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
Total	$ -	$ 8,614,853	$ -	$ -	$ -	$ 8,614,853	$ 7,427,984	$ -	$ 7,427,984		$ 1,385,025	$ 705,548
PV	$0	$6,363,808	$0	$0	$0	$6,363,808	$5,712,833	$0	$5,712,833		$1,023,120	$542,634

Discount Rate	*5.00%*

LID Scenario 1

27-Aug-09

Economic Impact by Tax Type - 30 Years

27-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
11	-	1,112,475	$ -	-	-	$ 1,112,475	$ 784,262	$ -	$ 784,262		$ 178,855	$ 74,493
12	-	1,134,725	$ -	-	-	$ 1,134,725	$ 792,105	$ -	$ 792,105		$ 182,432	$ 75,238
13	-	1,157,419	$ -	-	-	$ 1,157,419	$ 800,026	$ -	$ 800,026		$ 186,080	$ 75,991
14	-	1,180,568	$ -	-	-	$ 1,180,568	$ 808,026	$ -	$ 808,026		$ 189,802	$ 76,750
15	-	1,204,179	$ -	-	-	$ 1,204,179	$ 816,106	$ -	$ 816,106		$ 193,598	$ 77,518
16	-	1,228,263	$ -	-	-	$ 1,228,263	$ 824,267	$ -	$ 824,267		$ 197,470	$ 78,293
17	-	1,252,828	$ -	-	-	$ 1,252,828	$ 832,510	$ -	$ 832,510		$ 201,419	$ 79,076
18	-	1,277,885	$ -	-	-	$ 1,277,885	$ 840,835	$ -	$ 840,835		$ 205,448	$ 79,867
19	-	1,303,442	$ -	-	-	$ 1,303,442	$ 849,243	$ -	$ 849,243		$ 209,557	$ 80,666
20	-	1,329,511	$ -	-	-	$ 1,329,511	$ 857,736	$ -	$ 857,736		$ 213,748	$ 81,472
21	-	1,356,101	$ -	-	-	$ 1,356,101	$ 866,313	$ -	$ 866,313		$ 218,023	$ 82,287
22	-	1,383,223	$ -	-	-	$ 1,383,223	$ 874,976	$ -	$ 874,976		$ 222,383	$ 83,110
23	-	1,410,888	$ -	-	-	$ 1,410,888	$ 883,726	$ -	$ 883,726		$ 226,831	$ 83,941
24	-	1,439,106	$ -	-	-	$ 1,439,106	$ 892,563	$ -	$ 892,563		$ 231,367	$ 84,780
25	-	1,467,888	$ -	-	-	$ 1,467,888	$ 901,489	$ -	$ 901,489		$ 235,995	$ 85,628
26	-	1,497,245	$ -	-	-	$ 1,497,245	$ 910,504	$ -	$ 910,504		$ 240,715	$ 86,484
27	-	1,527,190	$ -	-	-	$ 1,527,190	$ 919,609	$ -	$ 919,609		$ 245,529	$ 87,349
28	-	1,557,734	$ -	-	-	$ 1,557,734	$ 928,805	$ -	$ 928,805		$ 250,440	$ 88,223
29	-	1,588,889	$ -	-	-	$ 1,588,889	$ 938,093	$ -	$ 938,093		$ 255,448	$ 89,105
30	-	1,620,667	$ -	-	-	$ 1,620,667	$ 947,474	$ -	$ 947,474		$ 260,557	$ 89,996
Total	$ -	$ 35,645,079	$ -	$ -	$ -	$ 35,645,079	$ 24,696,651	$ -	$ 24,696,651		$ 5,730,720	$ 2,345,815
PV	$0	$16,379,741	$0	$0	$0	$16,379,741	$12,214,145	$0	$12,214,145		$2,633,399	$1,160,162

Discount Rate	*5.00%*

LID Scenario 1

27-Aug-09

Economic Impact by Tax Type - 50 Years

27-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment							Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 709,982	$ -	$ 709,982		$ -	$ 67,438
2	-	465,435	$ -	-	-	$ 465,435	$ 717,082	$ -	$ 717,082		$ 74,829	$ 68,112
3	-	949,487	$ -	-	-	$ 949,487	$ 724,253	$ -	$ 724,253		$ 152,651	$ 68,793
4	-	968,477	$ -	-	-	$ 968,477	$ 731,495	$ -	$ 731,495		$ 155,704	$ 69,481
5	-	987,846	$ -	-	-	$ 987,846	$ 738,810	$ -	$ 738,810		$ 158,818	$ 70,176
6	-	1,007,603	$ -	-	-	$ 1,007,603	$ 746,198	$ -	$ 746,198		$ 161,994	$ 70,878
7	-	1,027,755	$ -	-	-	$ 1,027,755	$ 753,660	$ -	$ 753,660		$ 165,234	$ 71,587
8	-	1,048,310	$ -	-	-	$ 1,048,310	$ 761,197	$ -	$ 761,197		$ 168,539	$ 72,302
9	-	1,069,277	$ -	-	-	$ 1,069,277	$ 768,809	$ -	$ 768,809		$ 171,909	$ 73,025
10	-	1,090,662	$ -	-	-	$ 1,090,662	$ 776,497	$ -	$ 776,497		$ 175,348	$ 73,756
11	-	1,112,475	$ -	-	-	$ 1,112,475	$ 784,262	$ -	$ 784,262		$ 178,855	$ 74,493
12	-	1,134,725	$ -	-	-	$ 1,134,725	$ 792,105	$ -	$ 792,105		$ 182,432	$ 75,238
13	-	1,157,419	$ -	-	-	$ 1,157,419	$ 800,026	$ -	$ 800,026		$ 186,080	$ 75,991
14	-	1,180,568	$ -	-	-	$ 1,180,568	$ 808,026	$ -	$ 808,026		$ 189,802	$ 76,750
15	-	1,204,179	$ -	-	-	$ 1,204,179	$ 816,106	$ -	$ 816,106		$ 193,598	$ 77,518
16	-	1,228,263	$ -	-	-	$ 1,228,263	$ 824,267	$ -	$ 824,267		$ 197,470	$ 78,293
17	-	1,252,828	$ -	-	-	$ 1,252,828	$ 832,510	$ -	$ 832,510		$ 201,419	$ 79,076
18	-	1,277,885	$ -	-	-	$ 1,277,885	$ 840,835	$ -	$ 840,835		$ 205,448	$ 79,867
19	-	1,303,442	$ -	-	-	$ 1,303,442	$ 849,243	$ -	$ 849,243		$ 209,557	$ 80,666
20	-	1,329,511	$ -	-	-	$ 1,329,511	$ 857,736	$ -	$ 857,736		$ 213,748	$ 81,472
21	-	1,356,101	$ -	-	-	$ 1,356,101	$ 866,313	$ -	$ 866,313		$ 218,023	$ 82,287
22	-	1,383,223	$ -	-	-	$ 1,383,223	$ 874,976	$ -	$ 874,976		$ 222,383	$ 83,110
23	-	1,410,888	$ -	-	-	$ 1,410,888	$ 883,726	$ -	$ 883,726		$ 226,831	$ 83,941
24	-	1,439,106	$ -	-	-	$ 1,439,106	$ 892,563	$ -	$ 892,563		$ 231,367	$ 84,780
25	-	1,467,888	$ -	-	-	$ 1,467,888	$ 901,489	$ -	$ 901,489		$ 235,995	$ 85,628
26	-	1,497,245	$ -	-	-	$ 1,497,245	$ 910,504	$ -	$ 910,504		$ 240,715	$ 86,484
27	-	1,527,190	$ -	-	-	$ 1,527,190	$ 919,609	$ -	$ 919,609		$ 245,529	$ 87,349
28	-	1,557,734	$ -	-	-	$ 1,557,734	$ 928,805	$ -	$ 928,805		$ 250,440	$ 88,223
29	-	1,588,889	$ -	-	-	$ 1,588,889	$ 938,093	$ -	$ 938,093		$ 255,448	$ 89,105
30	-	1,620,667	$ -	-	-	$ 1,620,667	$ 947,474	$ -	$ 947,474		$ 260,557	$ 89,996
31	-	1,653,080	$ -	-	-	$ 1,653,080	$ 956,949	$ -	$ 956,949		$ 265,768	$ 90,896
32	-	1,686,142	$ -	-	-	$ 1,686,142	$ 966,518	$ -	$ 966,518		$ 271,084	$ 91,805
33	-	1,719,864	$ -	-	-	$ 1,719,864	$ 976,183	$ -	$ 976,183		$ 276,506	$ 92,723
34	-	1,754,262	$ -	-	-	$ 1,754,262	$ 985,945	$ -	$ 985,945		$ 282,036	$ 93,650
35	-	1,789,347	$ -	-	-	$ 1,789,347	$ 995,805	$ -	$ 995,805		$ 287,676	$ 94,587
36	-	1,825,134	$ -	-	-	$ 1,825,134	$ 1,005,763	$ -	$ 1,005,763		$ 293,430	$ 95,533
37	-	1,861,636	$ -	-	-	$ 1,861,636	$ 1,015,820	$ -	$ 1,015,820		$ 299,298	$ 96,488
38	-	1,898,869	$ -	-	-	$ 1,898,869	$ 1,025,978	$ -	$ 1,025,978		$ 305,284	$ 97,453
39	-	1,936,847	$ -	-	-	$ 1,936,847	$ 1,036,238	$ -	$ 1,036,238		$ 311,390	$ 98,427
40	-	1,975,584	$ -	-	-	$ 1,975,584	$ 1,046,601	$ -	$ 1,046,601		$ 317,618	$ 99,412
41	-	2,015,095	$ -	-	-	$ 2,015,095	$ 1,057,067	$ -	$ 1,057,067		$ 323,970	$ 100,406
42	-	2,055,397	$ -	-	-	$ 2,055,397	$ 1,067,637	$ -	$ 1,067,637		$ 330,450	$ 101,410
43	-	2,096,505	$ -	-	-	$ 2,096,505	$ 1,078,314	$ -	$ 1,078,314		$ 337,059	$ 102,424
44	-	2,138,435	$ -	-	-	$ 2,138,435	$ 1,089,097	$ -	$ 1,089,097		$ 343,800	$ 103,448
45	-	2,181,204	$ -	-	-	$ 2,181,204	$ 1,099,988	$ -	$ 1,099,988		$ 350,676	$ 104,483
46	-	2,224,828	$ -	-	-	$ 2,224,828	$ 1,110,988	$ -	$ 1,110,988		$ 357,689	$ 105,527
47	-	2,269,324	$ -	-	-	$ 2,269,324	$ 1,122,098	$ -	$ 1,122,098		$ 364,843	$ 106,583
48	-	2,314,711	$ -	-	-	$ 2,314,711	$ 1,133,318	$ -	$ 1,133,318		$ 372,140	$ 107,648
49	-	2,361,005	$ -	-	-	$ 2,361,005	$ 1,144,652	$ -	$ 1,144,652		$ 379,583	$ 108,725
50	-	2,408,225	$ -	-	-	$ 2,408,225	$ 1,156,098	$ -	$ 1,156,098		$ 387,174	$ 109,812
Total	$ -	$ 75,810,573	$ -	$ -	$ -	$ 75,810,573	$ 45,767,706	$ -	$ 45,767,706		$ 12,188,195	$ 4,347,253
PV	$0	$21,989,043	$0	$0	$0	$21,989,043	$15,203,947	$0	$15,203,947		$3,535,216	$1,444,149

Discount Rate	*5.00%*

LID Scenario 1 — Operating Pro Forma

27-Aug-09 (left) 27-Aug-09 (right)

Revenue Information					Expense Info				Debt Info	
Type	Retail	Residential	Office		Retail: per SF	Rate/%	Residential: Total expense per unit	Office: Rate/% per SF	Total RPC	$ 39,594,745
SF	55,315	30,000	20,000	Taxes	$ 3.60		$ 2,495.00	$ 3.60	Equity share	25%
Rate per SF/yr	$ 14.71	$ 156,000	$ 18.18	Insurance	$ 0.20		$ 0.20	$ 0.20	Equity amount	$ 9,898,686
Increase yr	5	0	5	CAM	$ 0.50		$ -	$ 0.50	Loan amount	$ 29,696,059
Increase rate	7.5%	0.0%	7.5%	Mgmt		7.60%	0.00%	7.60%	Loan term-yr	30
VC losses	5%	0%	5%	Accntg/Misc	$ 0.10		$ 0.10	$ 0.10	Interest rate	6.50%
Dwelling Units		33		Reserves	$ 0.15		$ -	$ 0.15	Monthly payment	$ (187,699.29)
Hotel Rooms	120			Annual increase	3.00%		3.00%	3.00%		
				Annual Increase in Tax Value	1%		1%	1%		

Sales Info	
Sales Cost	5.0%
Cap Rate	9.5%
Sale End of	
	$ 36,938,148

Incentive Info	
Available to Developer	
% Needed	0%
Balance	$ -

	Construction	Years 1	2	3	4	5	6	7	8	9	10	Sale
Revenue												
Retail/Office		$ 1,177,284	$ 1,177,284	$ 1,177,284	$ 1,177,284	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,265,580	$ 1,360,498
Retail/Office VC Losses		$ (58,864)	$ (58,864)	$ (58,864)	$ (58,864)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (63,279)	$ (68,025)
Revenue Hotel		$ 2,298,114	$ 2,784,600	$ 3,111,108	$ 3,183,835	$ 3,264,643	$ 3,346,421	$ 3,429,815	$ 3,515,794	$ 3,603,714	$ 3,693,572	$ 3,767,444
Sale of Condo (8units/year)		$ 1,248,000	$ 1,248,000	$ 1,248,000	$ 1,248,000	$ 170,000	$ -	$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total		$ 4,664,533	$ 5,151,019	$ 5,477,527	$ 5,550,255	$ 4,636,944	$ 4,548,722	$ 4,632,116	$ 4,718,095	$ 4,806,014	$ 4,895,873	$ 5,059,917
T/I/CAM Reimbursement		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gross Collected Revenue		$ 4,664,533	$ 5,151,019	$ 5,477,527	$ 5,550,255	$ 4,636,944	$ 4,548,722	$ 4,632,116	$ 4,718,095	$ 4,806,014	$ 4,895,873	$ 5,059,917
Expenses												
Maintenance (Present Value from Life Cycle Model)		$ 21,047	$ 21,320	$ 20,253	$ 21,296	$ 19,489	$ 19,741	$ 18,753	$ 19,719	$ 18,046	$ 18,279	$ 17,365
Hotel Expenses		$ 124,000	$ 126,480	$ 129,010	$ 131,590	$ 134,222	$ 136,906	$ 139,644	$ 142,437	$ 145,286	$ 148,191	$ 152,637
Hotel Deprc & Amtz		$ 495,441	$ 597,441	$ 527,441	$ 477,441	$ 441,841	$ 416,741	$ 416,841	$ 372,141	$ 327,541	$ 327,541	$ 337,367
Real Estate Taxes (commercial, hotel and unsold condos)		$ 690,022	$ 677,162	$ 664,373	$ 651,655	$ 656,475	$ 663,040	$ 669,670	$ 676,367	$ 683,131	$ 689,962	$ 696,862
Insurance		$ 19,608	$ 18,606	$ 17,617	$ 16,642	$ 16,954	$ 17,462	$ 17,986	$ 18,526	$ 19,081	$ 19,654	$ 20,243
Common Area Maintenance		$ 37,658	$ 38,787	$ 39,951	$ 41,149	$ 42,384	$ 43,655	$ 44,965	$ 46,314	$ 47,703	$ 49,134	$ 50,609
Management		$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 91,375	$ 98,228
Accntg & Misc		$ 9,804	$ 9,303	$ 8,808	$ 8,321	$ 8,477	$ 8,731	$ 8,993	$ 9,263	$ 9,541	$ 9,827	$ 10,122
Retail/Office Replacement reserves		$ 11,297	$ 11,636	$ 11,985	$ 12,345	$ 12,715	$ 13,097	$ 13,490	$ 13,894	$ 14,311	$ 14,740	$ 15,183
Hotel Fixed Asset Replacement Fund		$ 68,943	$ 83,538	$ 124,444	$ 127,353	$ 130,586	$ 133,850	$ 137,197	$ 140,627	$ 144,142	$ 147,746	$ 152,178
Total Expenses		$ 1,562,820	$ 1,669,272	$ 1,628,882	$ 1,572,791	$ 1,554,517	$ 1,544,598	$ 1,558,914	$ 1,530,662	$ 1,500,157	$ 1,516,450	$ 1,550,793
Debt Service		$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ (2,252,391)	$ 25,175,168
Coverage ratio		138%	155%	171%	177%	137%	133%	136%	142%	147%	150%	
Cash from sale of property												$ 9,916,072
NOI after Debt Service		$ 849,322	$ 1,229,355	$ 1,596,254	$ 1,725,072	$ 830,036	$ 751,732	$ 820,810	$ 935,041	$ 1,053,466	$ 1,127,032	$ 9,916,072
Public Incentive/ reimbursement		-										
Cash Flow	$ (9,898,686)	$ 849,322	$ 1,229,355	$ 1,596,254	$ 1,725,072	$ 830,036	$ 751,732	$ 820,810	$ 935,041	$ 1,053,466	$ 1,127,032	$ 9,916,072
Without Assistance	$ (9,898,686)	$ 849,322	$ 1,229,355	$ 1,596,254	$ 1,725,072	$ 830,036	$ 751,732	$ 820,810	$ 935,041	$ 1,053,466	$ 1,127,032	$ 9,916,072
Return on Equity		8.58%	12.42%	16.13%	17.43%	8.39%	7.59%	8.29%	9.45%	10.64%	11.39%	100.18%
Return on Investment (ROI)												
10 year	10.69%											

E

Roe Avenue Multi-Family Development Economic Analysis

APPENDIX E-2

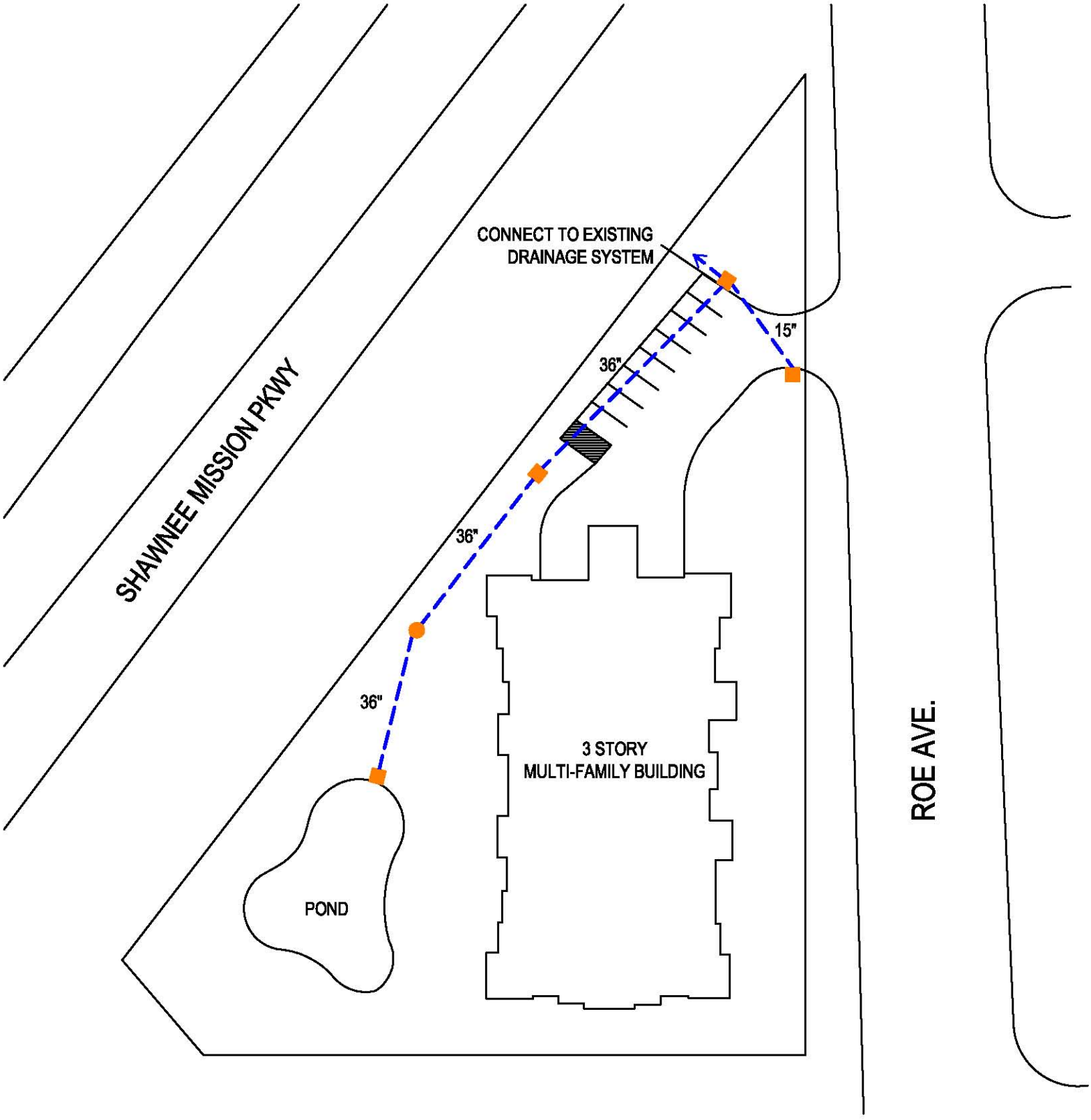
TRADITIONAL SCENARIO

Site Layout

Life Cycle Cost

Return on Investment

APPENDIX E-4



ROE AVENUE
MULTI-FAMILY DEVELOPMENT
TRADITIONAL SCENARIO

0 25 50 100 NORTH

LEGEND

JUNCTION BOX

CURB INLET/AREA INLET

STORM DRAIN

APPENDIX E-5

Roe Avenue Multi-Family Development
Traditional Scenario

CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 35,000	1	$ 35,000
SITE PREP				
Clearing & Grubbing	AC	$ 5,800	1	$ 5,800
Grading	LS	$ 52,000	1	$ 52,000
Additional Grading (BMPs)	CY	$ 7	0	$ -
Total				$ 57,800
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54.00	40	$ 2,160
36" Pipe	LF	$ 85.00	250	$ 21,250
Storm Structures	EA	$ 5,250	4	$ 21,000
Water Feature (Detention Basin)	EA	$ 7,000	1	$ 7,000
Junction Connection to Existing	EA	$ 3,000	0	$ -
Flared Pipe Outfall structure	EA	$ 2,060	1	$ 2,060
Water Feature Outfall structure	EA	$ 8,000	1	$ 8,000
Total				$ 61,470
LANDSCAPING				
Shade Trees	EA	$ 400.00	23	$ 9,200
Evergreen Trees	EA	$ 350.00	12	$ 4,200
Shrubs/Perennials	SY	$ 65.00	1017	$ 66,105
Traditional turf (Sod)	SY	$ 7.00	2082	$ 14,574
Aquatic Plants (Water Feature)	SY	$ 24.00	24	$ 582
Rain Garden Plants	SY	$ 24.00	0	$ -
Irrigation	SY	$ 18.00	3099	$ 55,782
Total				$ 150,443
ACCESS				
Asphalt Wearing Course (2")	Ton	$ 68.00	64	$ 4,344
Asphalt Base Course (7")	Ton	$ 64.00	224	$ 14,311
Aggregate (6")	CY	$ 16.00	93	$ 1,481
Pervious Concrete Parking Stalls (6")	SY	$ 40.00	0	$ -
3/4" Stone Drainage Layer Beneath Pervious Stalls (15")	SY	$ 32.40	0	$ -
Curb and Gutter	LF	$ 12.00	500	$ 6,000
Traffic Control	LS	$ 16,000	1	$ 16,000
Signage, Public Education Materials, etc.	LS	$ 12,000	1	$ 12,000
Total				$ 54,137
CONTINGENCY				$ 53,828
Total Base Cost				**$ 412,678**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	1	$ 61,902	LS	$ 61,902
Total Associated Capital Costs				**$ 61,902**
Total Site Capital Cost				**$ 474,579**

Roe Avenue Multi-Family Development

Traditional Scenario

Maintenance Costs

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Hour ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Storm Structures Inspection, Reporting & Information Management	36.00						35
Tree maintenance	6.00						78
Shrub/Perennial maintenance	2.00						1,597
Turf maintenance	1.00						425
Rain Garden Maintenance	2.00						0
Pond maintenance	6.00						85
Irrigation system maintenance	12.00						2,864
CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Unit ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Coat Seal Pavement	48.00						300
Crack Sealing	18.00						200
Replacement (Mill & Overlay)	186						5,085
Remove and Replace Concrete Surface	480						0

Roe Avenue Multi-Family Development

Traditional Scenario

Cost Summary

CAPITAL COSTS	Total Costs
Total Facility Base Cost	$ 412,678
Total Associated Capital Costs (Engineering)	$ 61,902
Capital Costs	**$ 474,579**

REGULAR MAINTENANCE ACTIVITIES	Years between Events	Cost per Event	Total Cost per Year
Storm Structures Inspection, Reporting & Information Management	3.00	$35	$12
Tree maintenance	0.50	$78	$155
Shrub/Perennial maintenance	0.17	$1,597	$9,583
Turf maintenance	0.08	$425	$5,098
Rain Garden Maintenance	0.17	$0	$0
Pond maintenance	0.50	$85	$170
Irrigation system maintenance	1.00	$2,864	$2,864
Totals, Regular Maintenance Activities			**$17,882**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Years between Events	Cost per Event	Total Cost per Year
Coat Seal Pavement	4	$300	$75
Crack Sealing	2	$200	$133
Replacement (Mill & Overlay)	16	$5,085	$328
Remove and Replace Concrete Surface	40	$0	$0
Totals, Corrective & Infrequent Maintenance Activities			**$536**

Roe Avenue Multi-Family Development

Traditional Scenario

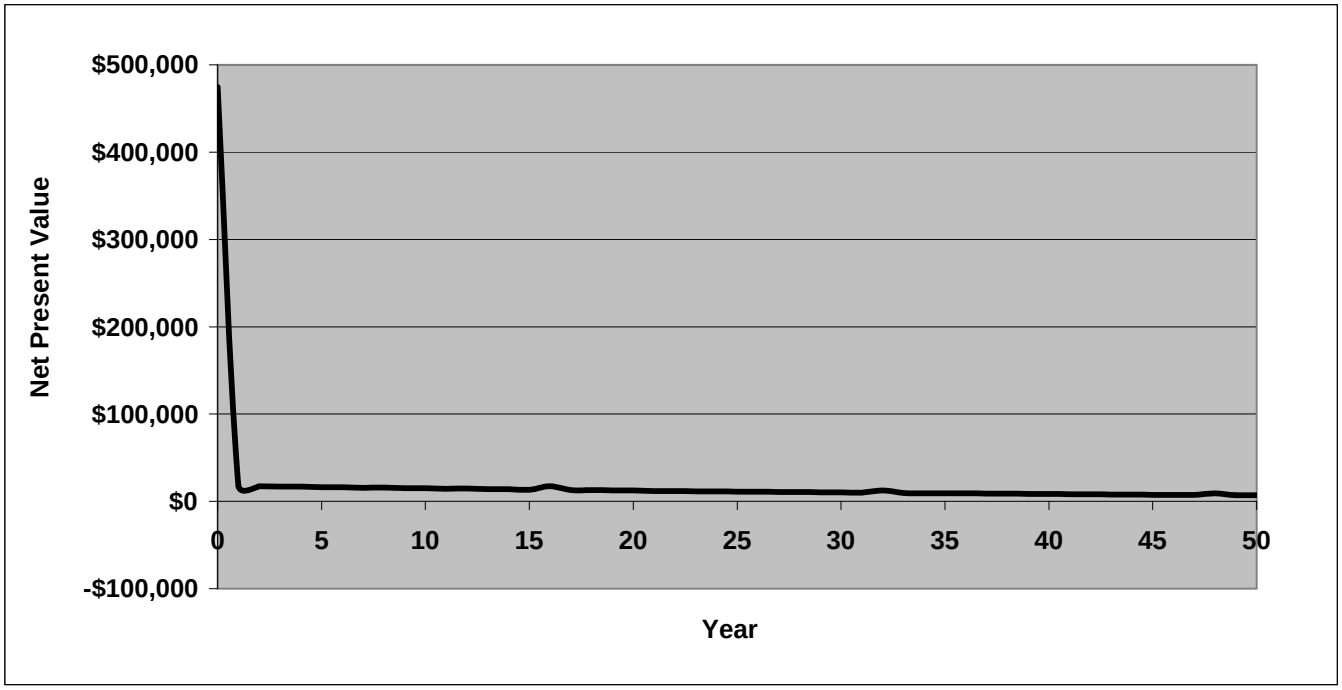
Life Cycle Costs - based on 50 year Design Life

Year	Discount Factor (%)	Capital & Assoc. Costs	Regular Maint. Costs	Corrective Maint.	Inflation (%)	Total Costs	Present Value of Costs	Cumulative Costs	
								Cash	Present Value
Cash Sum ($)	5.00				3.00	**$ 2,614,609**	**$ 1,057,359**		
0	1.000	**$ 474,579**			1.000	$ 474,579	$ 474,579	$ 474,579	$ 474,579
1	0.952	$ -	**$ 17,882**	$ -	1.030	$ 18,418	$ 17,541	$ 492,998	$ 492,121
2	0.907	$ -	**$ 17,882**	$ 200	1.061	$ 19,183	$ 17,400	$ 512,181	$ 509,520
3	0.864	$ -	**$ 17,882**	$ -	1.093	$ 19,540	$ 16,880	$ 531,721	$ 526,400
4	0.823	$ -	**$ 17,882**	$ 500	1.126	$ 20,689	$ 17,021	$ 552,410	$ 543,421
5	0.784	$ -	**$ 17,882**	$ -	1.159	$ 20,730	$ 16,243	$ 573,140	$ 559,663
6	0.746	$ -	**$ 17,882**	$ 200	1.194	$ 21,591	$ 16,111	$ 594,731	$ 575,775
7	0.711	$ -	**$ 17,882**	$ -	1.230	$ 21,993	$ 15,630	$ 616,724	$ 591,405
8	0.677	$ -	**$ 17,882**	$ 500	1.267	$ 23,286	$ 15,761	$ 640,010	$ 607,165
9	0.645	$ -	**$ 17,882**	$ -	1.305	$ 23,332	$ 15,040	$ 663,341	$ 622,205
10	0.614	$ -	**$ 17,882**	$ 200	1.344	$ 24,301	$ 14,919	$ 687,642	$ 637,124
11	0.585	$ -	**$ 17,882**	$ -	1.384	$ 24,753	$ 14,472	$ 712,395	$ 651,596
12	0.557	$ -	**$ 17,882**	$ 500	1.426	$ 26,208	$ 14,594	$ 738,603	$ 666,190
13	0.530	$ -	**$ 17,882**	$ -	1.469	$ 26,260	$ 13,926	$ 764,864	$ 680,117
14	0.505	$ -	**$ 17,882**	$ 200	1.513	$ 27,351	$ 13,814	$ 792,214	$ 693,930
15	0.481	$ -	**$ 17,882**	$ -	1.558	$ 27,860	$ 13,401	$ 820,074	$ 707,331
16	0.458	$ -	**$ 17,882**	$ 5,585	1.605	$ 37,658	$ 17,252	$ 857,732	$ 724,583
17	0.436	$ -	**$ 17,882**	$ -	1.653	$ 29,556	$ 12,895	$ 887,288	$ 737,478
18	0.416	$ -	**$ 17,882**	$ 200	1.702	$ 30,783	$ 12,791	$ 918,072	$ 750,269
19	0.396	$ -	**$ 17,882**	$ -	1.754	$ 31,356	$ 12,409	$ 949,428	$ 762,678
20	0.377	$ -	**$ 17,882**	$ 500	1.806	$ 33,200	$ 12,513	$ 982,628	$ 775,191
21	0.359	$ -	**$ 17,882**	$ -	1.860	$ 33,266	$ 11,941	$ 1,015,894	$ 787,131
22	0.342	$ -	**$ 17,882**	$ 200	1.916	$ 34,647	$ 11,844	$ 1,050,541	$ 798,975
23	0.326	$ -	**$ 17,882**	$ -	1.974	$ 35,292	$ 11,490	$ 1,085,832	$ 810,465
24	0.310	$ -	**$ 17,882**	$ 500	2.033	$ 37,367	$ 11,586	$ 1,123,199	$ 822,052
25	0.295	$ -	**$ 17,882**	$ -	2.094	$ 37,441	$ 11,056	$ 1,160,640	$ 833,108
26	0.281	$ -	**$ 17,882**	$ 200	2.157	$ 38,995	$ 10,967	$ 1,199,635	$ 844,075
27	0.268	$ -	**$ 17,882**	$ -	2.221	$ 39,721	$ 10,639	$ 1,239,357	$ 854,714
28	0.255	$ -	**$ 17,882**	$ 500	2.288	$ 42,057	$ 10,728	$ 1,281,413	$ 865,443
29	0.243	$ -	**$ 17,882**	$ -	2.357	$ 42,140	$ 10,238	$ 1,323,553	$ 875,681
30	0.231	$ -	**$ 17,882**	$ 200	2.427	$ 43,890	$ 10,155	$ 1,367,443	$ 885,836
31	0.220	$ -	**$ 17,882**	$ -	2.500	$ 44,706	$ 9,851	$ 1,412,150	$ 895,687
32	0.210	$ -	**$ 17,882**	$ 5,585	2.575	$ 60,430	$ 12,682	$ 1,472,580	$ 908,369
33	0.200	$ -	**$ 17,882**	$ -	2.652	$ 47,429	$ 9,480	$ 1,520,009	$ 917,849
34	0.190	$ -	**$ 17,882**	$ 200	2.732	$ 49,398	$ 9,403	$ 1,569,407	$ 927,252
35	0.181	$ -	**$ 17,882**	$ -	2.814	$ 50,318	$ 9,122	$ 1,619,725	$ 936,374
36	0.173	$ -	**$ 17,882**	$ 500	2.898	$ 53,276	$ 9,199	$ 1,673,001	$ 945,573
37	0.164	$ -	**$ 17,882**	$ -	2.985	$ 53,382	$ 8,778	$ 1,726,383	$ 954,351
38	0.157	$ -	**$ 17,882**	$ 200	3.075	$ 55,598	$ 8,707	$ 1,781,981	$ 963,058
39	0.149	$ -	**$ 17,882**	$ -	3.167	$ 56,633	$ 8,447	$ 1,838,614	$ 971,504
40	0.142	$ -	**$ 17,882**	$ 500	3.262	$ 59,963	$ 8,517	$ 1,898,576	$ 980,022
41	0.135	$ -	**$ 17,882**	$ -	3.360	$ 60,082	$ 8,128	$ 1,958,658	$ 988,150
42	0.129	$ -	**$ 17,882**	$ 200	3.461	$ 62,576	$ 8,062	$ 2,021,234	$ 996,212
43	0.123	$ -	**$ 17,882**	$ -	3.565	$ 63,741	$ 7,821	$ 2,084,975	$ 1,004,033
44	0.117	$ -	**$ 17,882**	$ 500	3.671	$ 67,489	$ 7,887	$ 2,152,464	$ 1,011,920
45	0.111	$ -	**$ 17,882**	$ -	3.782	$ 67,623	$ 7,526	$ 2,220,086	$ 1,019,446
46	0.106	$ -	**$ 17,882**	$ 200	3.895	$ 70,430	$ 7,465	$ 2,290,517	$ 1,026,912
47	0.101	$ -	**$ 17,882**	$ -	4.012	$ 71,741	$ 7,242	$ 2,362,257	$ 1,034,154
48	0.096	$ -	**$ 17,882**	$ 5,585	4.132	$ 96,972	$ 9,323	$ 2,459,230	$ 1,043,477
49	0.092	$ -	**$ 17,882**	$ -	4.256	$ 76,110	$ 6,969	$ 2,535,339	$ 1,050,446
50	0.087	$ 1	**$ 17,882**	$ 200	4.384	$ 79,270	$ 6,913	$ 2,614,609	$ 1,057,359

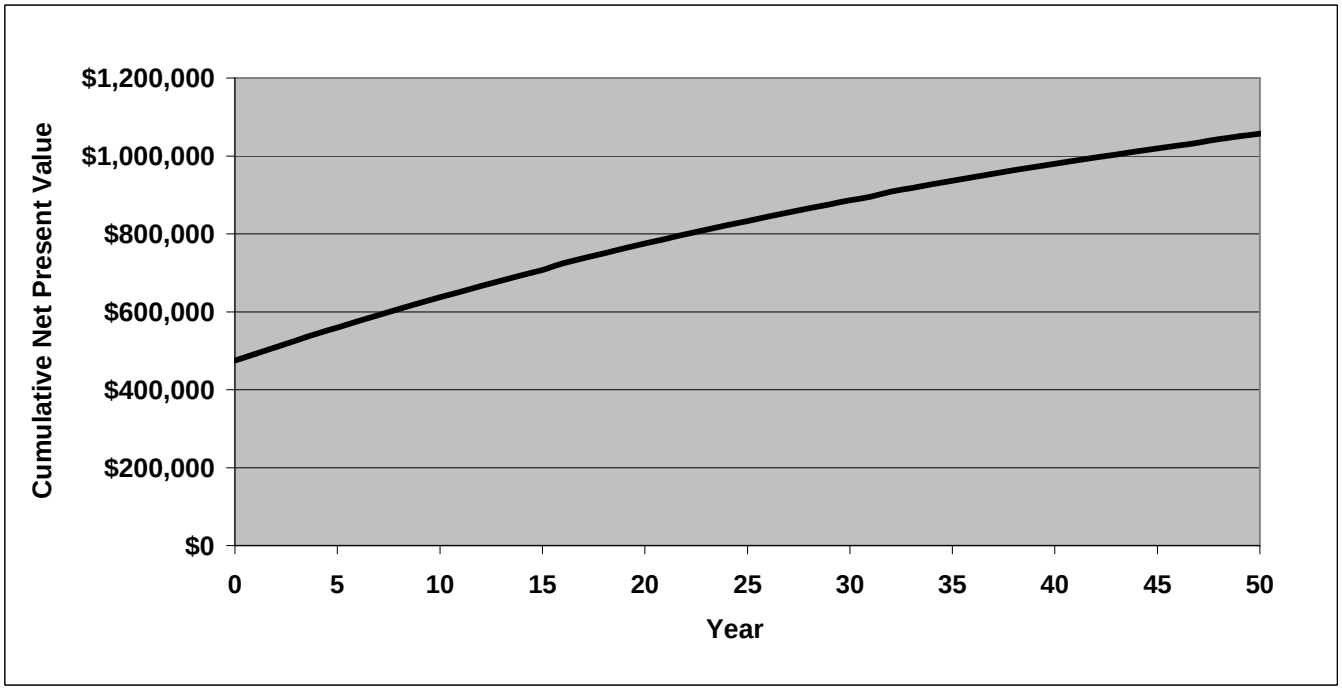
Roe Avenue Multi-Family Development

Traditional Scenario

Net Present Value over time



NPV - Cumulative



Roe Avenue Multi-Family Development

Traditional Scenario

14-Aug-09

ASSUMPTION NOTES:

Tax rates are consistent with 2008 rates provided by Johnson County Kansas Treasurer
Construction costs are based on RS Means and development in Kansas City Missouri
Rents are based on market reports for First Quarter 2009
Source of wage information is Bureau of Labor Statistics
Assume all surface parking and costs of parking are included in site preparation
Proposal is for 26 luxury condo units, 44 below ground structured parking spaces, and 8 surface parking space

Traditional Scenario

14-Aug-09

	TOTAL
Acquisition & Demolition	
Acquisition	$ -
Demolition/Clearance	$ -
Relocation - Existing Buildings	$ -
Soft Costs & Mis	$ -
Total Acquisition & Demolition	$ -

Site Improvements	
On-site	
Mobilization	$ 35,000
Site Prep	$ 57,800
Stormwater Conveyance and Storage	$ 61,470
Landscaping	$ 150,443
Access	$ 54,137
Contingency	$ 53,828
Construction Documents	$ 61,902
Total Site Improvements	$ 474,580

Building Costs	
Parking Structure	$ 1,320,000
Hard Costs	$ 6,147,900
Hard Costs Contingency	$ 614,790
Soft Costs	$ 683,100
Soft Costs-Incentive	
Total Building Costs	$ 8,765,790

Grand Total	$ 9,240,370

Redevelopment Project Costs

	Bldg SF	Stories	SF	Units
Hotel	-	1	$ 140.00	
Housing	45,540	1	$ 150.00	26
Office	-	1	$ 130.00	
Bank	-	1	$ 140.00	
Restaurant	-	1	$ 144.00	
Retail	-	1	$ 110.00	
Total Bldg SF	45,540			

Site SF	-

Parking		# Spaces	Cost
Spaces	44		
Type	Structured Above	0	20,000
Type	Structured Below	44	30,000

Traditional Scenario

14-Aug-09

Economic Impact by Tax Type - 10 Years

14-Aug-09

Year		EATS (Economic Activity Taxes) Under Redevelopment					Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,740,869	$ -	$ 1,740,869	$ -	$ 165,357
PV	$0	$0	$0	$0	$0	$0	$1,338,896	$0	$1,338,896	$0	$127,175

Discount Rate	*5.00%*

Traditional Scenario

Economic Impact by Tax Type - 30 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396		$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060		$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740		$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438		$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152		$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884		$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633		$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399		$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183		$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985		$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805		$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643		$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499		$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374		$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268		$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180		$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112		$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063		$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034		$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024		$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035		$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065		$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116		$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187		$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279		$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391		$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525		$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681		$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857		$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056		$ -	$ 21,092
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,788,063	$ -	$ 5,788,063		$ -	$ 549,780
PV	$0	$0	$0	$0	$0	$0	$2,862,584	$0	$2,862,584		$0	$271,903

Discount Rate	5.00%

Traditional Scenario

Economic Impact by Tax Type - 50 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805	$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643	$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499	$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374	$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268	$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180	$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112	$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063	$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034	$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024	$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035	$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065	$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116	$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187	$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279	$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391	$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525	$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681	$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857	$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056	$ -	$ 21,092
31	-	-	$ -	-	-	$ -	$ 224,277	$ -	$ 224,277	$ -	$ 21,303
32	-	-	$ -	-	-	$ -	$ 226,519	$ -	$ 226,519	$ -	$ 21,516
33	-	-	$ -	-	-	$ -	$ 228,784	$ -	$ 228,784	$ -	$ 21,731
34	-	-	$ -	-	-	$ -	$ 231,072	$ -	$ 231,072	$ -	$ 21,948
35	-	-	$ -	-	-	$ -	$ 233,383	$ -	$ 233,383	$ -	$ 22,168
36	-	-	$ -	-	-	$ -	$ 235,717	$ -	$ 235,717	$ -	$ 22,390
37	-	-	$ -	-	-	$ -	$ 238,074	$ -	$ 238,074	$ -	$ 22,614
38	-	-	$ -	-	-	$ -	$ 240,455	$ -	$ 240,455	$ -	$ 22,840
39	-	-	$ -	-	-	$ -	$ 242,859	$ -	$ 242,859	$ -	$ 23,068
40	-	-	$ -	-	-	$ -	$ 245,288	$ -	$ 245,288	$ -	$ 23,299
41	-	-	$ -	-	-	$ -	$ 247,741	$ -	$ 247,741	$ -	$ 23,532
42	-	-	$ -	-	-	$ -	$ 250,218	$ -	$ 250,218	$ -	$ 23,767
43	-	-	$ -	-	-	$ -	$ 252,720	$ -	$ 252,720	$ -	$ 24,005
44	-	-	$ -	-	-	$ -	$ 255,248	$ -	$ 255,248	$ -	$ 24,245
45	-	-	$ -	-	-	$ -	$ 257,800	$ -	$ 257,800	$ -	$ 24,487
46	-	-	$ -	-	-	$ -	$ 260,378	$ -	$ 260,378	$ -	$ 24,732
47	-	-	$ -	-	-	$ -	$ 262,982	$ -	$ 262,982	$ -	$ 24,979
48	-	-	$ -	-	-	$ -	$ 265,612	$ -	$ 265,612	$ -	$ 25,229
49	-	-	$ -	-	-	$ -	$ 268,268	$ -	$ 268,268	$ -	$ 25,481
50	-	-	$ -	-	-	$ -	$ 270,950	$ -	$ 270,950	$ -	$ 25,736
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,726,409	$ -	$ 10,726,409	$ -	$ 1,018,850
PV	$0	$0	$0	$0	$0	$0	$3,563,293	$0	$3,563,293	$0	$338,460

Discount Rate	*5.00%*

Traditional Scenario — Operating Pro Forma

14-Aug-09 (14-Aug-09)

Revenue Information			
Type	Retail	Residential	Office
SF	-	45,540	-
Rate per SF/yr	$ 14.71	$ 400,000	$ 18.18
Increase yr	5	0	5
Increase rate	7.5%	0.0%	7.5%
VC losses	5%	0%	5%
Dwelling Units		26	
Hotel Rooms	0		

Expense Info			
	Retail: Rate/% per SF	Residential: Total expense per unit	Office: Rate/% per SF
Taxes	$ 3.60	$ 6,400	$ 3.60
Insurance	$ 0.20	$ 0.20	$ 0.20
CAM	$ 0.50	$ 0.10	$ 0.50
Mgmt	7.60%	0.00%	7.60%
Accntg/Misc	$ 0.10	$ 0.10	$ 0.10
Reserves	$ 0.15	$ -	$ 0.15
Annual increase	3.00%	3.00%	3.00%
Annual Increase in Tax Value	1%	1%	1%

Debt Info	
Total RPC	$ 9,240,370
Equity share	25%
Equity amount	$ 2,310,093
Loan amount	$ 6,930,278
Loan term-yr	5
Interest rate	6.50%
Monthly payment	$ (135,598.84)

Sales Info	
Sales Cost	5.0%
Cap Rate	9.5%
Sale End of	
	$ -

Incentive Info	
Available to Developer	
% Needed	0%
Balance	$ -

Years

	Construction	1	2	3	4	Sale						
Revenue												
Retail/Office		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office VC Losses		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sale of Condo (8 units/year)		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000		$ -	$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
T/I/CAM Reimbursement		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gross Collected Revenue		$ 3,204,554	$ 3,204,691	$ 3,204,831	$ 804,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Expenses												
Maintenance (Present Value from Life Cycle Assessment)		$ 17,541	$ 17,400	$ 16,880	$ 17,021							
Real Estate Taxes (unsold condos)		$ 115,197	$ 65,662	$ 16,144	$ 5,042	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insurance		$ 6,900	$ 4,692	$ 2,484	$ 276	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Common Area Maintenance		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Management		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accntg & Misc		$ 3,450	$ 2,346	$ 1,242	$ 138	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office Replacement reserves		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenses		$ 147,643	$ 94,791	$ 41,581	$ 27,453	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Service		$ (2,185,925)	$ (2,185,925)	$ (2,185,925)	$ (591,961)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Coverage ratio		140%	142%	145%	131%							
Cash from sale of property		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000							$ -
NOI after Debt Service		$ 4,070,986	$ 4,123,975	$ 4,177,325	$ 985,562	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Public Incentive/ reimbursement		-										
Cash Flow	$ (2,310,093)	$ 870,986	$ 923,975	$ 977,325	$ 185,562	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Without Assistance	$ (2,310,093)	$ 870,986	$ 923,975	$ 977,325	$ 185,562	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Return on Equity		37.70%	40.00%	42.31%	8.03%							
Return on Investment (ROI) 5 year	12.42%											

LID SCENARIOS 1 AND 2

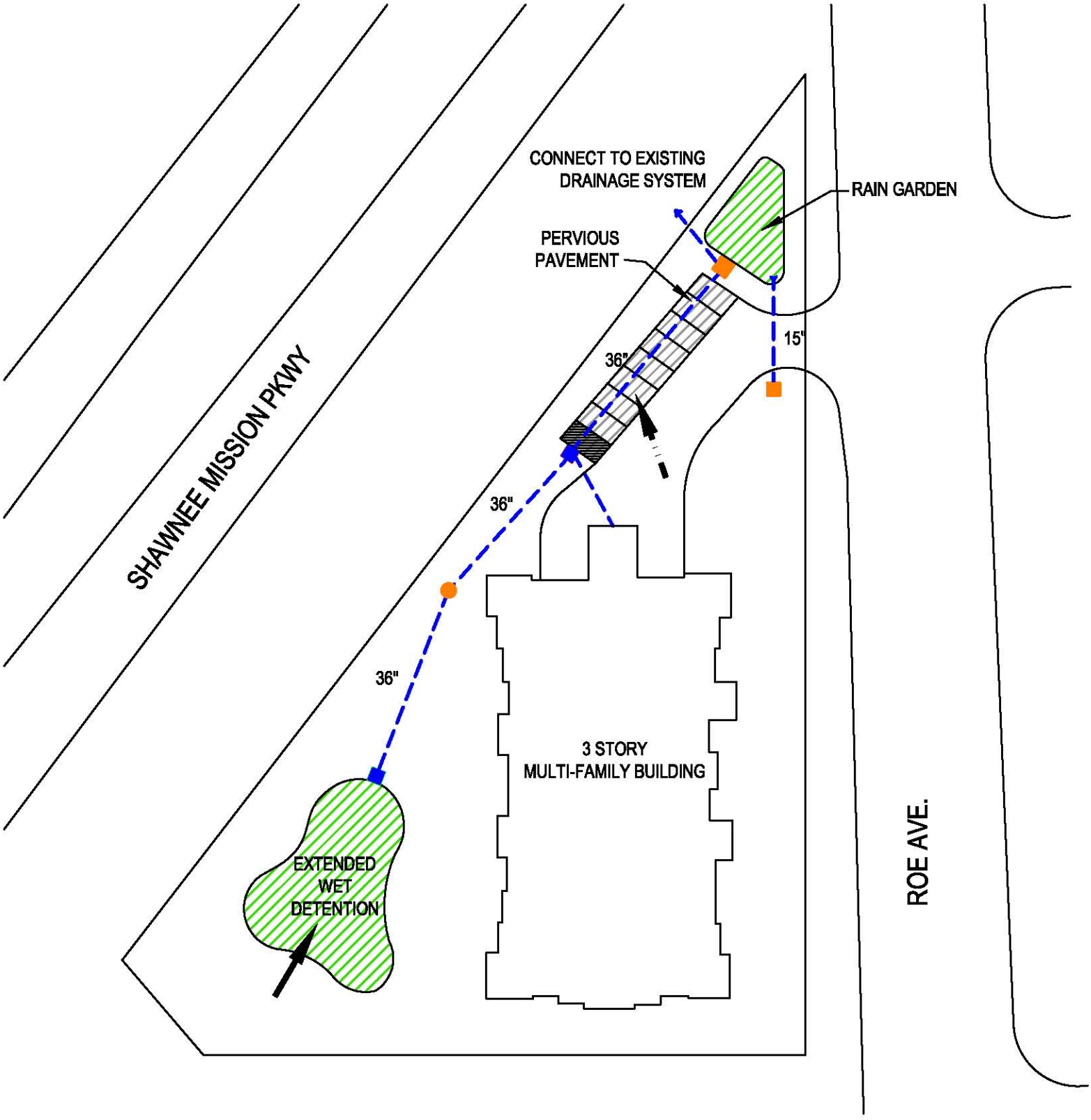
Site Layout

Life Cycle Cost – LID Scenario 1

Return on Investment – LID Scenario 1

Life Cycle Cost – LID Scenario 2

Return on Investment – LID Scenario 2



ROE AVENUE
MULTI-FAMILY DEVELOPMENT
LID SCENARIOS

0 25 50 100

NORTH

LEGEND

- JUNCTION BOX
- CURB INLET/AREA INLET
- STORM DRAIN
- DRAINAGE DIRECTION
- BMP
- PERVIOUS PAVEMENT

APPENDIX E-19

Roe Avenue Multi-Family Development

LID Scenario 1

CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 35,000	1	$ 35,000
SITE PREP				
Clearing & Grubbing	AC	$ 5,800	1	$ 5,800
Grading	LS	$ 52,000.00	1	$ 52,000
Additional Grading (BMPs)	CY	$ 7	0	$ -
Total				$ 57,800
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54.00	40	$ 2,160
36" Pipe	LF	$ 85.00	250	$ 21,250
Storm Structures	EA	$ 5,250	4	$ 21,000
Water Feature (Detention Basin)	EA	$ 7,000	1	$ 7,000
Junction Connection to Existing	EA	$ 3,000	0	$ -
Flared Pipe Outfall structure	EA	$ 2,060	1	$ 2,060
Water Feature Outfall structure	EA	$ 8,000	1	$ 8,000
Total				$ 61,470
LANDSCAPING				
Shade Trees	EA	$ 400.00	23	$ 9,200
Evergreen Trees	EA	$ 350.00	12	$ 4,200
Shrubs/Perennials	SY	$ 65.00	1017	$ 66,105
Traditional turf (Sod)	SY	$ 7.00	2082	$ 14,574
Aquatic plants (Water Feature)	SY	$ 24.00	24	$ 582
Rain Garden Plants	SY	$ 24.00	0	$ -
Irrigation	SY	$ 18.00	2082	$ 37,476
Total				$ 132,137
ACCESS				
Asphalt Wearing Course (2")	Ton	$ 68.00	64	$ 4,344
Asphalt Base Course (7")	Ton	$ 64.00	224	$ 14,311
Aggregate (6")	CY	$ 16.00	93	$ 1,481
Pervious Concrete Parking Stalls (6")	SY	$ 40.00	0	$ -
3/4" Stone Drainage Layer Beneath Pervious Stalls (15")	SY	$ 32.40	0	$ -
Curb and Gutter	LF	$ 12.00	500	$ 6,000
Traffic Control	LS	$ 16,000	1	$ 16,000
Signage, Public Education Materials, etc.	LS	$ 12,000	1	$ 12,000
Total				$ 54,137
CONTINGENCY				$ 51,082
Total Base Cost				**$ 391,626**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	1	$ 58,744	LS	$ 58,744
Total Associated Capital Costs				**$ 58,744**
Total Site Capital Cost				**$ 450,369**

Roe Avenue Multi-Family Development
LID Scenario 1

Maintenance Costs

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Hour ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Storm Structures Inspection, Reporting & Information Management	20.00						**$ 35**
Tree maintenance	6.00						**$ 78**
Shrub/Perennial maintenance	2.00						**$ 1,597**
Turf maintenance	1.00						**$ 425**
Rain Garden Maintenance	2.00						**$ -**
Pond maintenance	6.00						**$ 85**
Irrigation system maintenance	12.00						**$ 1,924**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Unit ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Coat Seal Pavement	48.00	1	1	40	1.000	300	**$ 300**
Crack Sealing	18.00	1	1	41	1.000	200	**$ 200**
Replacement (Mill & Overlay)	186	1	1	1	1	1	**$ 1,664**
Remove and Replace Concrete Surface	480	1	1	1	1	1	**$ -**

Roe Avenue Multi-Family Development

LID Scenario 1

Cost Summary

CAPITAL COSTS	Total Costs	
Total Facility Base Cost	$	391,626
Total Associated Capital Costs (Engineering)	$	58,744
Capital Costs	**$**	**450,369**

REGULAR MAINTENANCE ACTIVITIES	Years between Events	Cost per Event	Total Cost per Year
Storm Structures Inspection, Reporting & Information Management	1.67	$35	$21
Tree maintenance	0.50	$78	$155
Shrub/Perennial maintenance	0.17	$1,597	$9,583
Turf maintenance	0.08	$425	$5,098
Rain Garden Maintenance	0.17	$0	$0
Pond maintenance	0.50	$85	$170
Irrigation system maintenance	1.00	$1,924	$1,924
Totals, Regular Maintenance Activities			**$16,952**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Years between Events	Cost per Event	Total Cost per Year
Coat Seal Pavement	4	$300	$75
Crack Sealing	2	$200	$133
Replacement (Mill & Overlay)	16	$1,664	$107
Totals, Corrective & Infrequent Maintenance Activities			**$316**

Roe Avenue Multi-Family Development

LID Scenario 1

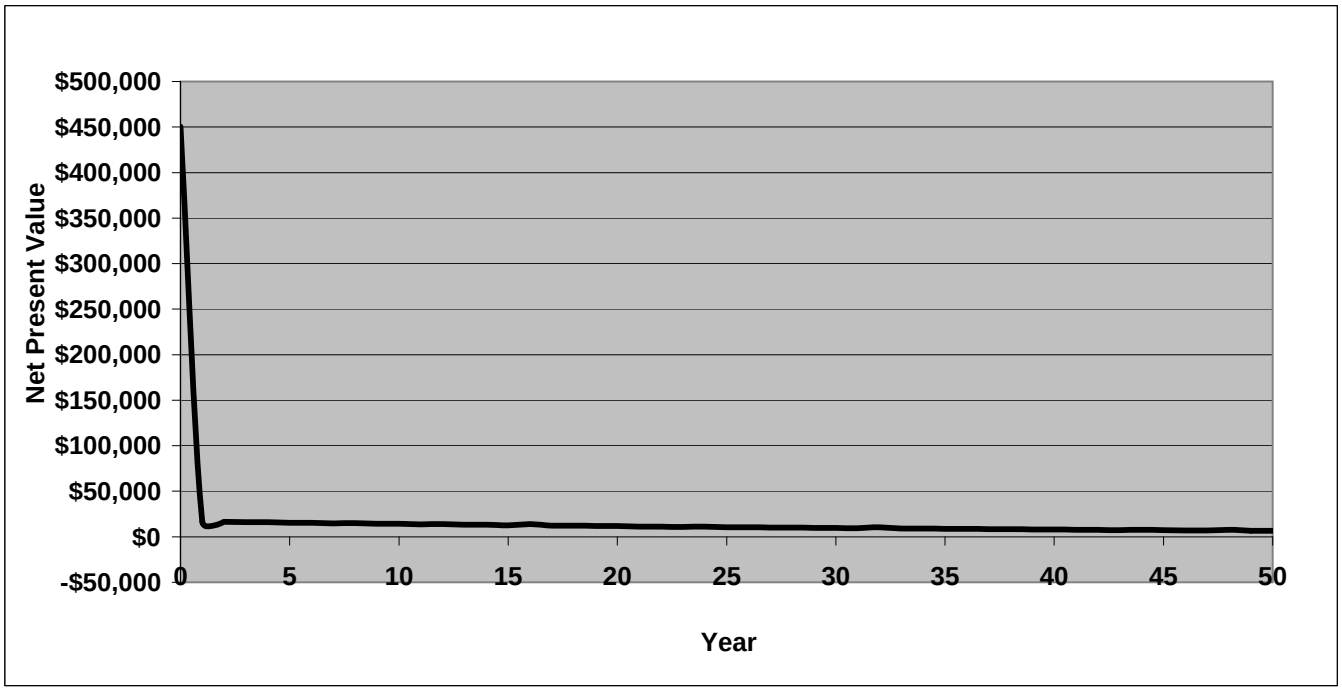
Life Cycle Costs - based on 50 year Design Life

Year	Discount Factor (%)	Capital & Assoc. Costs	Regular Maint. Costs	Corrective Maint.	Inflation (%)	Total Costs	Present Value of Costs	Cumulative Costs	
								Cash	Present Value
Cash Sum ($)	5.00				3.00	**$ 2,453,862**	**$ 997,827**		
0	1.000	**$ 450,369**			1.000	$ 450,369	$ 450,369	$ 450,369	$ 450,369
1	0.952	$ -	**$ 16,952**	$ -	1.030	$ 17,460	$ 16,629	$ 467,830	$ 466,998
2	0.907	$ -	**$ 16,952**	$ 200	1.061	$ 18,196	$ 16,504	$ 486,026	$ 483,503
3	0.864	$ -	**$ 16,952**	$ -	1.093	$ 18,523	$ 16,001	$ 504,549	$ 499,504
4	0.823	$ -	**$ 16,952**	$ 500	1.126	$ 19,642	$ 16,159	$ 524,191	$ 515,663
5	0.784	$ -	**$ 16,952**	$ -	1.159	$ 19,652	$ 15,397	$ 543,843	$ 531,061
6	0.746	$ -	**$ 16,952**	$ 200	1.194	$ 20,480	$ 15,282	$ 564,323	$ 546,343
7	0.711	$ -	**$ 16,952**	$ -	1.230	$ 20,848	$ 14,817	$ 585,171	$ 561,160
8	0.677	$ -	**$ 16,952**	$ 500	1.267	$ 22,107	$ 14,963	$ 607,278	$ 576,123
9	0.645	$ -	**$ 16,952**	$ -	1.305	$ 22,118	$ 14,257	$ 629,396	$ 590,380
10	0.614	$ -	**$ 16,952**	$ 200	1.344	$ 23,050	$ 14,151	$ 652,446	$ 604,531
11	0.585	$ -	**$ 16,952**	$ -	1.384	$ 23,465	$ 13,719	$ 675,911	$ 618,251
12	0.557	$ -	**$ 16,952**	$ 500	1.426	$ 24,882	$ 13,855	$ 700,793	$ 632,106
13	0.530	$ -	**$ 16,952**	$ -	1.469	$ 24,894	$ 13,202	$ 725,687	$ 645,307
14	0.505	$ -	**$ 16,952**	$ 200	1.513	$ 25,943	$ 13,103	$ 751,630	$ 658,411
15	0.481	$ -	**$ 16,952**	$ -	1.558	$ 26,410	$ 12,704	$ 778,040	$ 671,114
16	0.458	$ -	**$ 16,952**	$ 2,164	1.605	$ 30,674	$ 14,052	$ 808,715	$ 685,167
17	0.436	$ -	**$ 16,952**	$ -	1.653	$ 28,018	$ 12,224	$ 836,733	$ 697,391
18	0.416	$ -	**$ 16,952**	$ 200	1.702	$ 29,199	$ 12,133	$ 865,932	$ 709,524
19	0.396	$ -	**$ 16,952**	$ -	1.754	$ 29,725	$ 11,763	$ 895,657	$ 721,287
20	0.377	$ -	**$ 16,952**	$ 500	1.806	$ 31,520	$ 11,879	$ 927,177	$ 733,166
21	0.359	$ -	**$ 16,952**	$ -	1.860	$ 31,535	$ 11,319	$ 958,712	$ 744,485
22	0.342	$ -	**$ 16,952**	$ 200	1.916	$ 32,864	$ 11,235	$ 991,576	$ 755,720
23	0.326	$ -	**$ 16,952**	$ -	1.974	$ 33,455	$ 10,892	$ 1,025,031	$ 766,612
24	0.310	$ -	**$ 16,952**	$ 500	2.033	$ 35,475	$ 11,000	$ 1,060,507	$ 777,612
25	0.295	$ -	**$ 16,952**	$ -	2.094	$ 35,493	$ 10,481	$ 1,096,000	$ 788,093
26	0.281	$ -	**$ 16,952**	$ 200	2.157	$ 36,989	$ 10,403	$ 1,132,989	$ 798,496
27	0.268	$ -	**$ 16,952**	$ -	2.221	$ 37,654	$ 10,086	$ 1,170,643	$ 808,582
28	0.255	$ -	**$ 16,952**	$ 500	2.288	$ 39,928	$ 10,185	$ 1,210,571	$ 818,767
29	0.243	$ -	**$ 16,952**	$ -	2.357	$ 39,948	$ 9,705	$ 1,250,519	$ 828,472
30	0.231	$ -	**$ 16,952**	$ 200	2.427	$ 41,631	$ 9,633	$ 1,292,150	$ 838,105
31	0.220	$ -	**$ 16,952**	$ -	2.500	$ 42,380	$ 9,339	$ 1,334,530	$ 847,444
32	0.210	$ -	**$ 16,952**	$ 2,164	2.575	$ 49,223	$ 10,330	$ 1,383,753	$ 857,774
33	0.200	$ -	**$ 16,952**	$ -	2.652	$ 44,961	$ 8,987	$ 1,428,715	$ 866,760
34	0.190	$ -	**$ 16,952**	$ 200	2.732	$ 46,857	$ 8,919	$ 1,475,571	$ 875,680
35	0.181	$ -	**$ 16,952**	$ -	2.814	$ 47,699	$ 8,647	$ 1,523,271	$ 884,327
36	0.173	$ -	**$ 16,952**	$ 500	2.898	$ 50,580	$ 8,733	$ 1,573,850	$ 893,060
37	0.164	$ -	**$ 16,952**	$ -	2.985	$ 50,604	$ 8,321	$ 1,624,455	$ 901,381
38	0.157	$ -	**$ 16,952**	$ 200	3.075	$ 52,737	$ 8,259	$ 1,677,192	$ 909,640
39	0.149	$ -	**$ 16,952**	$ -	3.167	$ 53,686	$ 8,007	$ 1,730,878	$ 917,647
40	0.142	$ -	**$ 16,952**	$ 500	3.262	$ 56,928	$ 8,086	$ 1,787,806	$ 925,734
41	0.135	$ -	**$ 16,952**	$ -	3.360	$ 56,956	$ 7,705	$ 1,844,762	$ 933,439
42	0.129	$ -	**$ 16,952**	$ 200	3.461	$ 59,356	$ 7,647	$ 1,904,118	$ 941,086
43	0.123	$ -	**$ 16,952**	$ -	3.565	$ 60,424	$ 7,414	$ 1,964,542	$ 948,501
44	0.117	$ -	**$ 16,952**	$ 500	3.671	$ 64,073	$ 7,488	$ 2,028,615	$ 955,988
45	0.111	$ -	**$ 16,952**	$ -	3.782	$ 64,104	$ 7,135	$ 2,092,719	$ 963,123
46	0.106	$ -	**$ 16,952**	$ 200	3.895	$ 66,806	$ 7,081	$ 2,159,525	$ 970,204
47	0.101	$ -	**$ 16,952**	$ -	4.012	$ 68,008	$ 6,865	$ 2,227,533	$ 977,069
48	0.096	$ -	**$ 16,952**	$ 2,164	4.132	$ 78,989	$ 7,594	$ 2,306,522	$ 984,664
49	0.092	$ -	**$ 16,952**	$ -	4.256	$ 72,150	$ 6,606	$ 2,378,671	$ 991,270
50	0.087	$ 1	**$ 16,952**	$ 200	4.384	$ 75,191	$ 6,557	$ 2,453,862	$ 997,827

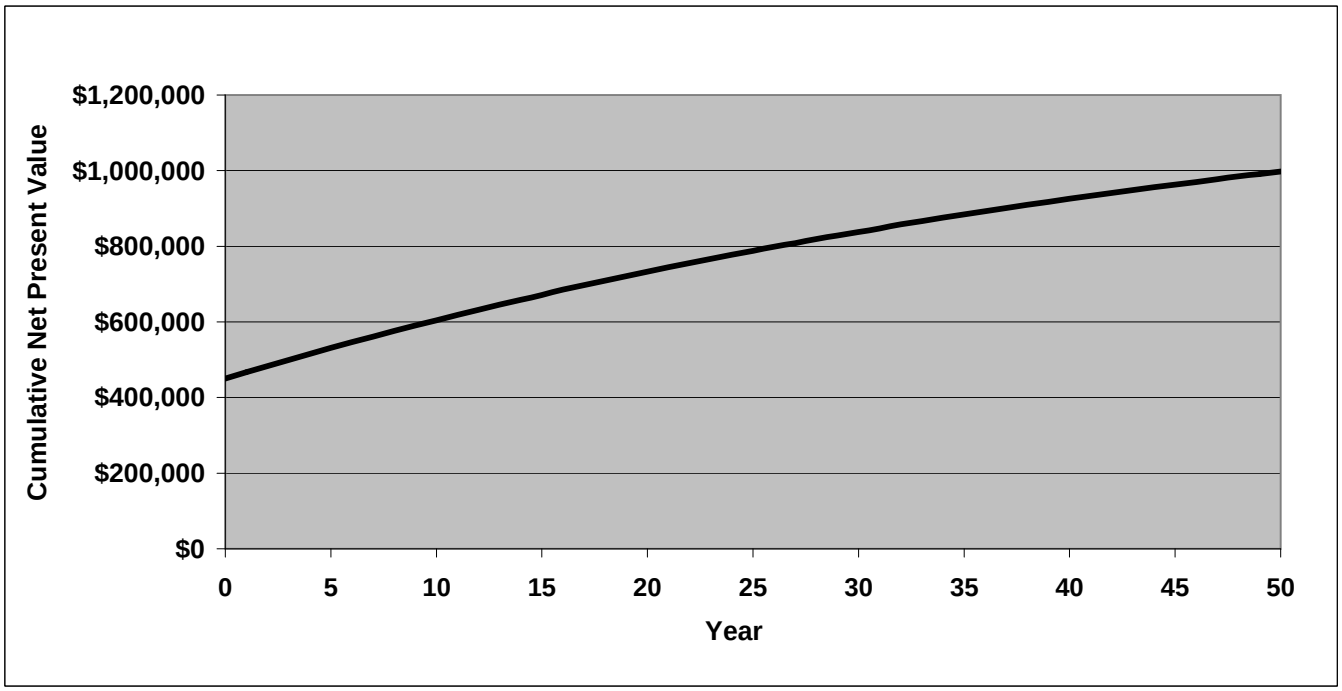
Roe Avenue Multi-Family Development

LID Scenario 1

Net Present Value over time



NPV - Cumulative



Roe Avenue Multi-Family Development

LID Scenario 1

14-Aug-09

ASSUMPTION NOTES:

Tax rates are consistent with 2008 rates provided by Johnson County Kansas Treasurer
Construction costs are based on RS Means and development in Kansas City Missouri
Rents are based on market reports for First Quarter 2009
Source of wage information is Bureau of Labor Statistics
Assume all surface parking and costs of parking are included in site preparation
Proposal is for 26 luxury condo units, 44 below ground structured parking spaces, and 8 surface parking space

LID Scenario 1

14-Aug-09

	TOTAL
Acquisition & Demolition	
Acquisition	$ -
Demolition/Clearance	$ -
Relocation - Existing Buildings	$ -
Soft Costs & Mis	$ -
Total Acquisition & Demolition	$ -

Site Improvements	
On-site	
Mobilization	$ 35,000
Site Prep	$ 57,800
Stormwater Conveyance and Storage	$ 61,470
Landscaping	$ 132,137
Access	$ 54,137
Contingency	$ 51,082
Construction Documents	$ 58,744
Total Site Improvements	$ 450,370

Building Costs	
Parking Structure	$ 1,320,000
Hard Costs	$ 6,147,900
Hard Costs Contingency	$ 614,790
Soft Costs	$ 683,100
Soft Costs-Incentive	
Total Building Costs	$ 8,765,790

Grand Total	$ 9,216,160

Redevelopment Project Costs

	Bldg SF	Stories	SF	Units
Hotel	-	1	$ 140.00	
Housing	45,540	1	$ 150.00	26
Office	-	1	$ 130.00	
Bank	-	1	$ 140.00	
Restaurant	-	1	$ 144.00	
Retail	-	1	$ 110.00	
Total Bldg SF	45,540			

Site SF	-

Parking		# Spaces	Cost
Spaces	44		
Type	Structured Above	0	20,000
Type	Structured Below	44	30,000

LID Scenario 1

14-Aug-09

Economic Impact by Tax Type - 10 Years

14-Aug-09

Year		EATS (Economic Activity Taxes) Under Redevelopment					Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,740,869	$ -	$ 1,740,869	$ -	$ 165,357
PV	$0	$0	$0	$0	$0	$0	$1,338,896	$0	$1,338,896	$0	$127,175

Discount Rate	*5.00%*

LID Scenario 1

Economic Impact by Tax Type - 30 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396		$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060		$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740		$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438		$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152		$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884		$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633		$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399		$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183		$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985		$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805		$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643		$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499		$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374		$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268		$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180		$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112		$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063		$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034		$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024		$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035		$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065		$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116		$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187		$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279		$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391		$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525		$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681		$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857		$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056		$ -	$ 21,092
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,788,063	$ -	$ 5,788,063		$ -	$ 549,780
PV	$0	$0	$0	$0	$0	$0	$2,862,584	$0	$2,862,584		$0	$271,903

Discount Rate	5.00%

LID Scenario 1

Economic Impact by Tax Type - 50 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805	$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643	$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499	$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374	$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268	$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180	$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112	$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063	$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034	$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024	$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035	$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065	$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116	$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187	$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279	$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391	$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525	$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681	$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857	$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056	$ -	$ 21,092
31	-	-	$ -	-	-	$ -	$ 224,277	$ -	$ 224,277	$ -	$ 21,303
32	-	-	$ -	-	-	$ -	$ 226,519	$ -	$ 226,519	$ -	$ 21,516
33	-	-	$ -	-	-	$ -	$ 228,784	$ -	$ 228,784	$ -	$ 21,731
34	-	-	$ -	-	-	$ -	$ 231,072	$ -	$ 231,072	$ -	$ 21,948
35	-	-	$ -	-	-	$ -	$ 233,383	$ -	$ 233,383	$ -	$ 22,168
36	-	-	$ -	-	-	$ -	$ 235,717	$ -	$ 235,717	$ -	$ 22,390
37	-	-	$ -	-	-	$ -	$ 238,074	$ -	$ 238,074	$ -	$ 22,614
38	-	-	$ -	-	-	$ -	$ 240,455	$ -	$ 240,455	$ -	$ 22,840
39	-	-	$ -	-	-	$ -	$ 242,859	$ -	$ 242,859	$ -	$ 23,068
40	-	-	$ -	-	-	$ -	$ 245,288	$ -	$ 245,288	$ -	$ 23,299
41	-	-	$ -	-	-	$ -	$ 247,741	$ -	$ 247,741	$ -	$ 23,532
42	-	-	$ -	-	-	$ -	$ 250,218	$ -	$ 250,218	$ -	$ 23,767
43	-	-	$ -	-	-	$ -	$ 252,720	$ -	$ 252,720	$ -	$ 24,005
44	-	-	$ -	-	-	$ -	$ 255,248	$ -	$ 255,248	$ -	$ 24,245
45	-	-	$ -	-	-	$ -	$ 257,800	$ -	$ 257,800	$ -	$ 24,487
46	-	-	$ -	-	-	$ -	$ 260,378	$ -	$ 260,378	$ -	$ 24,732
47	-	-	$ -	-	-	$ -	$ 262,982	$ -	$ 262,982	$ -	$ 24,979
48	-	-	$ -	-	-	$ -	$ 265,612	$ -	$ 265,612	$ -	$ 25,229
49	-	-	$ -	-	-	$ -	$ 268,268	$ -	$ 268,268	$ -	$ 25,481
50	-	-	$ -	-	-	$ -	$ 270,950	$ -	$ 270,950	$ -	$ 25,736
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,726,409	$ -	$ 10,726,409	$ -	$ 1,018,850
PV	$0	$0	$0	$0	$0	$0	$3,563,293	$0	$3,563,293	$0	$338,460

Discount Rate	*5.00%*

LID Scenario 1 — Operating Pro Forma

14-Aug-09 (14-Aug-09)

Revenue Information				Expense Info				Debt Info	
Type	Retail	Residential	Office		Retail: Rate/% per SF	Residential: Total expense per unit	Office: Rate/% per SF	Total RPC	$ 9,216,160
SF	-	45,540	-	Taxes	$ 3.60	$ 6,400	$ 3.60	Equity share	25%
Rate per SF/yr	$ 14.71	$ 400,000	$ 18.18	Insurance	$ 0.20	$ 0.20	$ 0.20	Equity amount	$ 2,304,040
Increase yr	5	0	5	CAM	$ 0.50	$ 0.10	$ 0.50	Loan amount	$ 6,912,120
Increase rate	7.5%	0.0%	7.5%	Mgmt	7.60%	0.00%	7.60%	Loan term-yr	5
VC losses	5%	0%	5%	Accntg/Misc	$ 0.10	$ 0.10	$ 0.10	Interest rate	6.50%
Dwelling Units		26		Reserves	$ 0.15	$ -	$ 0.15	Monthly payment	$ (135,243.56)
Hotel Rooms	0			Annual increase	3.00%	3.00%	3.00%		
				Annual Increase in Tax Value	1%	1%	1%		

Sales Info	
Sales Cost	5.0%
Cap Rate	9.5%
Sale End of	
	$ -

Incentive Info	
Available to Developer	
% Needed	0%
Balance	$ -

	Construction	Years 1	2	3	4	Sale					
Revenue											
Retail/Office		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office VC Losses		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sale of Condo (8 units/year)		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000		$ -	$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
T/I/CAM Reimbursement		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gross Collected Revenue		$ 3,204,554	$ 3,204,691	$ 3,204,831	$ 804,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Expenses											
Maintenance (Present Value from Life Cycle Assessment)		$ 16,629	$ 16,504	$ 16,001	$ 16,159							
Real Estate Taxes (unsold condos)		$ 115,197	$ 65,662	$ 16,144	$ 5,042	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Insurance		$ 6,900	$ 4,692	$ 2,484	$ 276	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Common Area Maintenance		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Management		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accntg & Misc		$ 3,450	$ 2,346	$ 1,242	$ 138	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office Replacement reserves		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenses		$ 146,730	$ 93,895	$ 40,703	$ 26,592	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Service		$ (2,180,198)	$ (2,180,198)	$ (2,180,198)	$ (590,410)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Coverage ratio		140%	143%	145%	132%							
Cash from sale of property		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000							$ -
NOI after Debt Service		$ 4,077,626	$ 4,130,597	$ 4,183,931	$ 987,974	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Public Incentive/ reimbursement		-										
Cash Flow	$ (2,304,040)	$ 877,626	$ 930,597	$ 983,931	$ 187,974	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Without Assistance	$ (2,304,040)	$ 877,626	$ 930,597	$ 983,931	$ 187,974	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Return on Equity		38.09%	40.39%	42.70%	8.16%							
Return on Investment (ROI) 5 year	12.97%											

Roe Avenue Multi-Family Development
LID Scenario 2

CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 35,000	1	$ 35,000
SITE PREP				
Clearing & Grubbing	AC	$ 5,800	1	$ 5,800
Grading	LS	$ 52,000	1	$ 52,000
Additional Grading (BMPs)	CY	$ 7	273	$ 1,911
Total				$ 59,711
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54.00	40	$ 2,160
36" Pipe	LF	$ 85.00	270	$ 22,950
Storm Structures	EA	$ 5,250	4	$ 21,000
Water Feature (Detention Basin)	EA	$ 7,000	1	$ 7,000
Junction Connection to Existing	EA	$ 3,000	1	$ 3,000
Flared Pipe Outfall structure	EA	$ 2,060	0	$ -
Water Feature Outfall structure	EA	$ 8,000	1	$ 8,000
Total				$ 64,110
LANDSCAPING				
Shade Trees	EA	$ 400.00	23	$ 9,200
Evergreen Trees	EA	$ 350.00	12	$ 4,200
Shrubs/Perennials	SY	$ 65.00	1210	$ 78,650.00
Traditional turf (Sod)	SY	$ 7.00	1888	$ 13,216.00
Aquatic plants (Water Feature)	SY	$ 24.00	24	$ 582.00
Rain Garden Plants	SY	$ 24.00	101	$ 2,426.67
Irrigation	SY	$ 18.00	1888	$ 33,984.00
Total				$ 142,259
ACCESS				
Asphalt Wearing Course (2")	Ton	$ 68.00	64	$ 4,344
Asphalt Base Course (7")	Ton	$ 64.00	224	$ 14,311
Aggregate (6")	CY	$ 16.00	0	$ -
Pervious Concrete Parking Stalls (6")	SY	$ 40.00	145	$ 5,800
3/4" Stone Drainage Layer Beneath both Porous and Traditional Parking (24")	SY	$ 32.40	556	$ 18,000
Curb and Gutter	LF	$ 12.00	500	$ 6,000
Traffic Control	LS	$ 16,000	1	$ 16,000
Signage, Public Education Materials, etc.	LS	$ 12,000	1	$ 12,000
Total				$ 76,456
CONTINGENCY				$ 56,630
Total Base Cost				**$ 434,165**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	1	$ 65,125	LS	$ 65,125
Total Associated Capital Costs				**$ 65,125**
Total Site Capital Cost				**$ 499,290**

Roe Avenue Multi-Family Development
LID Scenario 2

Maintenance Costs

ROUTINE MAINTENANCE ACTIVITIES (Frequent, scheduled events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Hour ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Storm Structures Inspection, Reporting & Information Management	20.00						$ 35
Tree maintenance	6.00						$ 78
Shrub/Perennial maintenance	2.00						$ 1,597
Turf maintenance	1.00						$ 385
Rain Garden Maintenance	2.00						$ 218
Pond maintenance	6.00						$ 85
Irrigation system maintenance	12.00						$ 1,745

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or > 3 yrs. betw. events)							
Cost Item	**Frequency (months betw. maint. events)**	**Hours per Event**	**Average Labor Crew Size**	**Avg. (Pro-Rated) Labor Rate/Hr. ($)**	**Machinery Cost/Unit ($)**	**Materials & Incidentals Cost/Event ($)**	**Total cost per visit ($)**
	User	**User**	**User**	**User**	**User**	**User**	**User**
Coat Seal Pavement	48.00	1	1	1	1	1	$ 300
Crack Sealing	18.00	1	1	1	1	1	$ 200
Replacement (Mill & Overlay)	300	1	1	1	1	1	$ 4,846
Remove and Replace Concrete Surface	360	480	600	1	1	1	$ 13,068

Roe Avenue Multi-Family Development
LID Scenario 2

Cost Summary

CAPITAL COSTS	Total Costs
Total Facility Base Cost	$ 434,165
Total Associated Capital Costs (Engineering)	$ 65,125
Capital Costs	**$ 499,290**

REGULAR MAINTENANCE ACTIVITIES	Years between Events	Cost per Event	Total Cost per Year
Storm Structures Inspection, Reporting & Information Management	1.67	$35	$21
Tree maintenance	0.50	$78	$155
Shrub/Perennial maintenance	0.17	$1,597	$9,584
Turf maintenance	0.08	$385	$4,624
Rain Garden Maintenance	0.17	$218	$1,308
Pond maintenance	0.50	$85	$170
Irrigation system maintenance	1.00	$1,745	$1,745
Totals, Regular Maintenance Activities			**$17,607**

CORRECTIVE AND INFREQUENT MAINTENANCE ACTIVITIES (Unplanned and/or >3yrs. betw. events)	Years between Events	Cost per Event	Total Cost per Year
Coat Seal Pavement	4	$300	$75
Crack Sealing	2	$200	$133
Replacement (Mill & Overlay)	25	$4,846	$194
Remove and Replace Concrete Surface	30	$13,068	$436
Totals, Corrective & Infrequent Maintenance Activities			**$838**

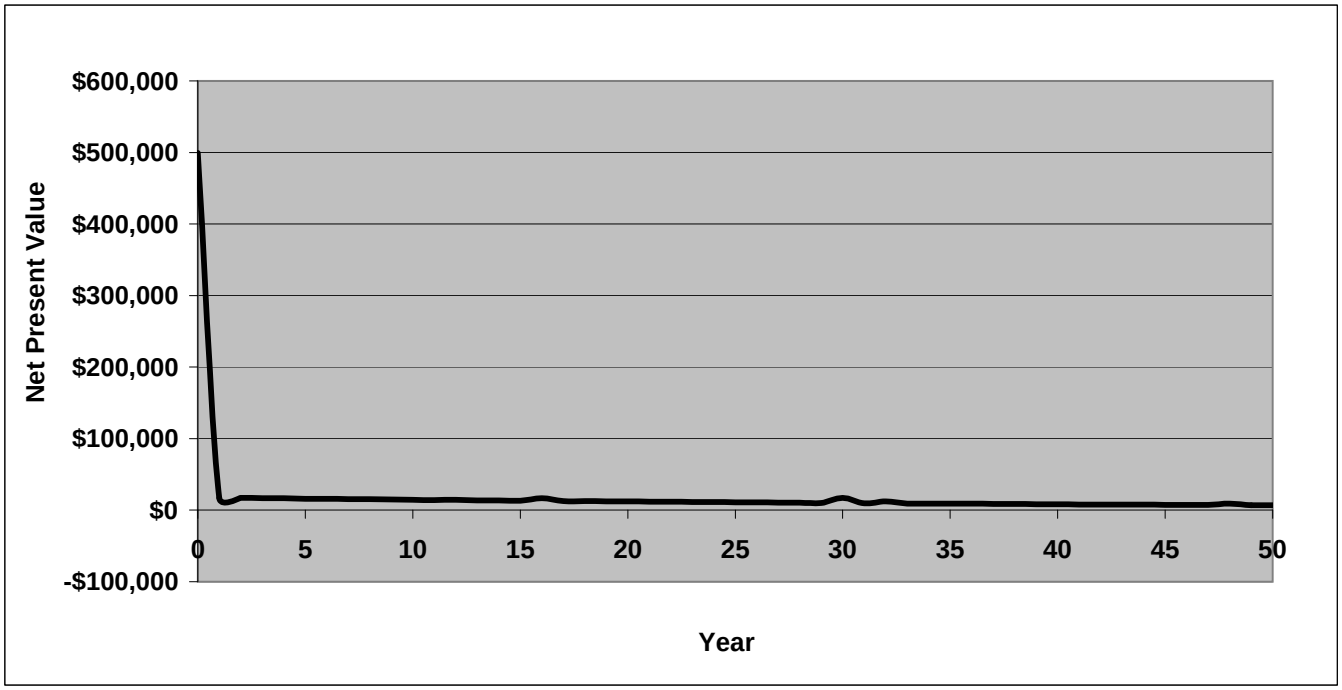
Roe Avenue Multi-Family Development
LID Scenario 2

Life Cycle Costs - based on 50 year Design Life

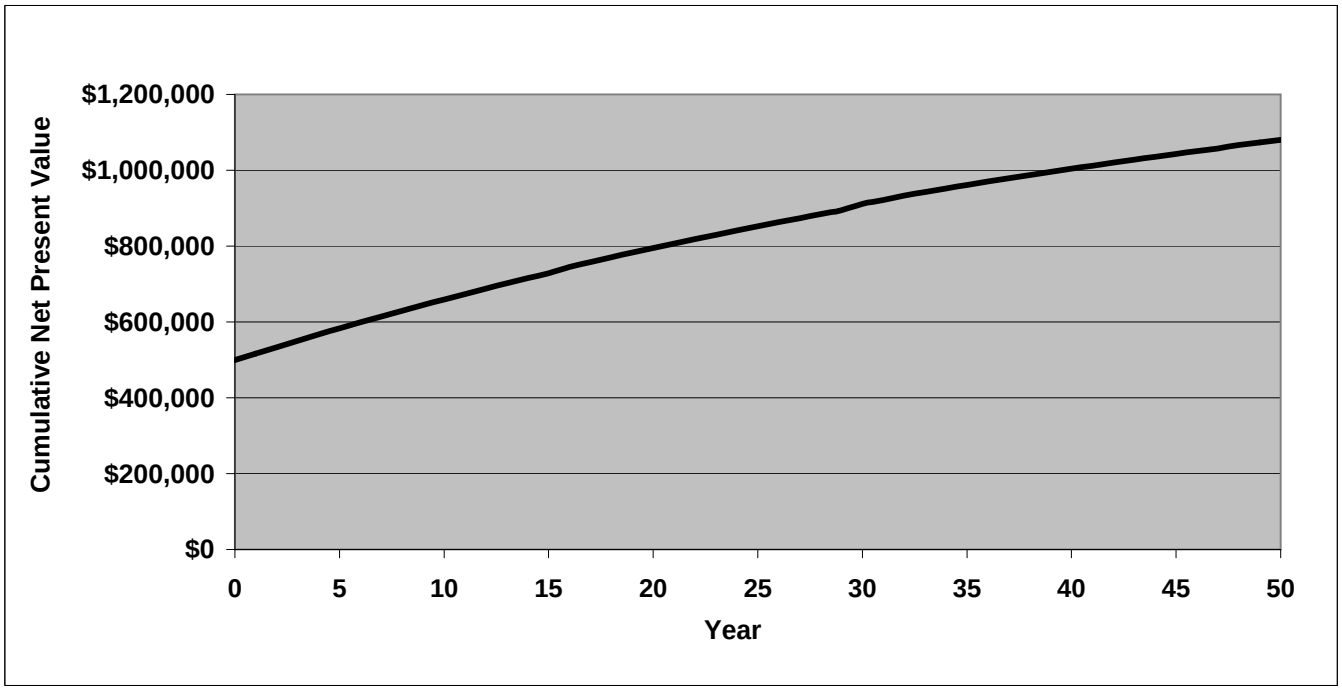
Year	Discount Factor (%)	Capital & Assoc. Costs	Regular Maint. Costs	Corrective Maint.	Inflation (%)	Total Costs	Present Value of Costs	Cumulative Costs	
								Cash	Present Value
Cash Sum ($)	5				3	$ 2,637,050	$ 1,080,246		
0	1.000	$ 499,290			1.000	$ 499,290	$ 499,290	$ 499,290	$ 499,290
1	0.952	$ -	$ 17,607	$ -	1.030	$ 18,135	$ 17,271	$ 517,425	$ 516,561
2	0.907	$ -	$ 17,607	$ 200	1.061	$ 18,891	$ 17,135	$ 536,316	$ 533,696
3	0.864	$ -	$ 17,607	$ -	1.093	$ 19,239	$ 16,620	$ 555,555	$ 550,315
4	0.823	$ -	$ 17,607	$ 500	1.126	$ 20,379	$ 16,766	$ 575,934	$ 567,081
5	0.784	$ -	$ 17,607	$ -	1.159	$ 20,411	$ 15,992	$ 596,345	$ 583,074
6	0.746	$ -	$ 17,607	$ 200	1.194	$ 21,262	$ 15,866	$ 617,607	$ 598,940
7	0.711	$ -	$ 17,607	$ -	1.230	$ 21,654	$ 15,389	$ 639,261	$ 614,329
8	0.677	$ -	$ 17,607	$ 500	1.267	$ 22,937	$ 15,525	$ 662,198	$ 629,853
9	0.645	$ -	$ 17,607	$ -	1.305	$ 22,973	$ 14,808	$ 685,170	$ 644,662
10	0.614	$ -	$ 17,607	$ 200	1.344	$ 23,931	$ 14,691	$ 709,101	$ 659,353
11	0.585	$ -	$ 17,607	$ -	1.384	$ 24,372	$ 14,250	$ 733,472	$ 673,603
12	0.557	$ -	$ 17,607	$ 500	1.426	$ 25,816	$ 14,375	$ 759,288	$ 687,978
13	0.530	$ -	$ 17,607	$ -	1.469	$ 25,856	$ 13,712	$ 785,144	$ 701,690
14	0.505	$ -	$ 17,607	$ 200	1.513	$ 26,934	$ 13,604	$ 812,078	$ 715,293
15	0.481	$ -	$ 17,607	$ -	1.558	$ 27,430	$ 13,195	$ 839,509	$ 728,488
16	0.458	$ -	$ 17,607	$ 5,346	1.605	$ 36,832	$ 16,873	$ 876,340	$ 745,361
17	0.436	$ -	$ 17,607	$ -	1.653	$ 29,101	$ 12,697	$ 905,441	$ 758,057
18	0.416	$ -	$ 17,607	$ 200	1.702	$ 30,315	$ 12,596	$ 935,756	$ 770,654
19	0.396	$ -	$ 17,607	$ -	1.754	$ 30,873	$ 12,218	$ 966,629	$ 782,871
20	0.377	$ -	$ 17,607	$ 500	1.806	$ 32,703	$ 12,325	$ 999,331	$ 795,197
21	0.359	$ -	$ 17,607	$ -	1.860	$ 32,753	$ 11,757	$ 1,032,085	$ 806,953
22	0.342	$ -	$ 17,607	$ 200	1.916	$ 34,119	$ 11,664	$ 1,066,204	$ 818,617
23	0.326	$ -	$ 17,607	$ -	1.974	$ 34,748	$ 11,313	$ 1,100,952	$ 829,930
24	0.310	$ -	$ 17,607	$ 500	2.033	$ 36,807	$ 11,413	$ 1,137,759	$ 841,342
25	0.295	$ -	$ 17,607	$ -	2.094	$ 36,864	$ 10,886	$ 1,174,624	$ 852,229
26	0.281	$ -	$ 17,607	$ 200	2.157	$ 38,402	$ 10,800	$ 1,213,025	$ 863,029
27	0.268	$ -	$ 17,607	$ -	2.221	$ 39,109	$ 10,475	$ 1,252,134	$ 873,504
28	0.255	$ -	$ 17,607	$ 500	2.288	$ 41,427	$ 10,568	$ 1,293,561	$ 884,072
29	0.243	$ -	$ 17,607	$ -	2.357	$ 41,491	$ 10,080	$ 1,335,052	$ 894,152
30	0.231	$ -	$ 17,607	$ 13,268	2.427	$ 74,941	$ 17,340	$ 1,409,993	$ 911,491
31	0.220	$ -	$ 17,607	$ -	2.500	$ 44,018	$ 9,700	$ 1,454,011	$ 921,191
32	0.210	$ -	$ 17,607	$ 5,346	2.575	$ 59,104	$ 12,404	$ 1,513,115	$ 933,595
33	0.200	$ -	$ 17,607	$ -	2.652	$ 46,699	$ 9,334	$ 1,559,813	$ 942,929
34	0.190	$ -	$ 17,607	$ 200	2.732	$ 48,646	$ 9,260	$ 1,608,459	$ 952,189
35	0.181	$ -	$ 17,607	$ -	2.814	$ 49,543	$ 8,982	$ 1,658,002	$ 961,170
36	0.173	$ -	$ 17,607	$ 500	2.898	$ 52,478	$ 9,061	$ 1,710,480	$ 970,231
37	0.164	$ -	$ 17,607	$ -	2.985	$ 52,560	$ 8,643	$ 1,763,039	$ 978,874
38	0.157	$ -	$ 17,607	$ 200	3.075	$ 54,751	$ 8,574	$ 1,817,791	$ 987,448
39	0.149	$ -	$ 17,607	$ -	3.167	$ 55,761	$ 8,317	$ 1,873,551	$ 995,765
40	0.142	$ -	$ 17,607	$ 500	3.262	$ 59,064	$ 8,390	$ 1,932,616	$ 1,004,155
41	0.135	$ -	$ 17,607	$ -	3.360	$ 59,156	$ 8,003	$ 1,991,772	$ 1,012,157
42	0.129	$ -	$ 17,607	$ 200	3.461	$ 61,623	$ 7,940	$ 2,053,395	$ 1,020,097
43	0.123	$ -	$ 17,607	$ -	3.565	$ 62,759	$ 7,701	$ 2,116,154	$ 1,027,798
44	0.117	$ -	$ 17,607	$ 500	3.671	$ 66,477	$ 7,769	$ 2,182,632	$ 1,035,566
45	0.111	$ -	$ 17,607	$ -	3.782	$ 66,581	$ 7,410	$ 2,249,213	$ 1,042,977
46	0.106	$ -	$ 17,607	$ 200	3.895	$ 69,357	$ 7,352	$ 2,318,570	$ 1,050,328
47	0.101	$ -	$ 17,607	$ -	4.012	$ 70,636	$ 7,131	$ 2,389,206	$ 1,057,459
48	0.096	$ -	$ 17,607	$ 5,346	4.132	$ 94,845	$ 9,119	$ 2,484,050	$ 1,066,577
49	0.092	$ -	$ 17,607	$ -	4.256	$ 74,938	$ 6,862	$ 2,558,988	$ 1,073,439
50	0.087	$ 1	$ 17,607	$ 200	4.384	$ 78,062	$ 6,807	$ 2,637,050	$ 1,080,246

Roe Avenue Multi-Family Development
LID Scenario 2

Net Present Value over time



NPV - Cumulative



Roe Avenue Multi-Family Development

LID Scenario 2

14-Aug-09

ASSUMPTION NOTES:

Tax rates are consistent with 2008 rates provided by Johnson County Kansas Treasurer
Construction costs are based on RS Means and development in Kansas City Missouri
Rents are based on market reports for First Quarter 2009
Source of wage information is Bureau of Labor Statistics
Assume all surface parking and costs of parking are included in site preparation
Proposal is for 26 luxury condo units, 44 below ground structured parking spaces, and 8 surface parking space

LID Scenario 2

14-Aug-09

	TOTAL
Acquisition & Demolition	
Acquisition	$ -
Demolition/Clearance	$ -
Relocation - Existing Buildings	$ -
Soft Costs & Mis	$ -
Total Acquisition & Demolition	$ -

Site Improvements	
On-site	
Mobilization	$ 35,000
Site Prep	$ 59,711
Stormwater Conveyance and Storage	$ 64,110
Landscaping	$ 142,259
Access	$ 76,456
Contingency	$ 56,630
Construction Documents	$ 65,125
Total Site Improvements	$ 499,291

Building Costs	
Parking Structure	$ 1,320,000
Hard Costs	$ 6,147,900
Hard Costs Contingency	$ 614,790
Soft Costs	$ 683,100
Soft Costs-Incentive	
Total Building Costs	$ 8,765,790

Grand Total	$ 9,265,081

Redevelopment Project Costs

	Bldg SF	Stories	SF	Units
Hotel	-	1	$ 140.00	
Housing	45,540	1	$ 150.00	26
Office	-	1	$ 130.00	
Bank	-	1	$ 140.00	
Restaurant	-	1	$ 144.00	
Retail	-	1	$ 110.00	
Total Bldg SF	45,540			

Site SF	-

Parking		# Spaces	Cost
Spaces	44		
Type	Structured Above	0	20,000
Type	Structured Below	44	30,000

LID Scenario 2

14-Aug-09

Economic Impact by Tax Type - 10 Years

14-Aug-09

Year		EATS (Economic Activity Taxes) Under Redevelopment					Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,740,869	$ -	$ 1,740,869	$ -	$ 165,357
PV	$0	$0	$0	$0	$0	$0	$1,338,896	$0	$1,338,896	$0	$127,175

Discount Rate	*5.00%*

LID Scenario 2

Economic Impact by Tax Type - 30 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax				Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes		Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I		J	K
						A+B+C+D+E			G-H		B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396		$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060		$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740		$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438		$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152		$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884		$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633		$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399		$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183		$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985		$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805		$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643		$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499		$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374		$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268		$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180		$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112		$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063		$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034		$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024		$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035		$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065		$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116		$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187		$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279		$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391		$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525		$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681		$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857		$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056		$ -	$ 21,092
Total	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,788,063**	**$ -**	**$ 5,788,063**		**$ -**	**$ 549,780**
PV	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,862,584**	**$0**	**$2,862,584**		**$0**	**$271,903**

Discount Rate	5.00%

LID Scenario 2

Economic Impact by Tax Type - 50 Years

14-Aug-09

Year	EATS (Economic Activity Taxes) Under Redevelopment						Property Tax			Share To City of Mission	
	Food & Beverage	Sales	Corp Earn	Indiv Earn	Utilities	TOTAL	New Taxes on Development	Existing Taxes	Real Property Taxes	Sales Tax	Real Property Taxes
	A	B	C	D	E	F	G	H	I	J	K
						A+B+C+D+E			G-H	B*16.08%	I*9.5%
1		$ -		$ -		$ -	$ 166,396	$ -	$ 166,396	$ -	$ 15,805
2	-	-	$ -	-	-	$ -	$ 168,060	$ -	$ 168,060	$ -	$ 15,963
3	-	-	$ -	-	-	$ -	$ 169,740	$ -	$ 169,740	$ -	$ 16,123
4	-	-	$ -	-	-	$ -	$ 171,438	$ -	$ 171,438	$ -	$ 16,284
5	-	-	$ -	-	-	$ -	$ 173,152	$ -	$ 173,152	$ -	$ 16,447
6	-	-	$ -	-	-	$ -	$ 174,884	$ -	$ 174,884	$ -	$ 16,611
7	-	-	$ -	-	-	$ -	$ 176,633	$ -	$ 176,633	$ -	$ 16,777
8	-	-	$ -	-	-	$ -	$ 178,399	$ -	$ 178,399	$ -	$ 16,945
9	-	-	$ -	-	-	$ -	$ 180,183	$ -	$ 180,183	$ -	$ 17,115
10	-	-	$ -	-	-	$ -	$ 181,985	$ -	$ 181,985	$ -	$ 17,286
11	-	-	$ -	-	-	$ -	$ 183,805	$ -	$ 183,805	$ -	$ 17,459
12	-	-	$ -	-	-	$ -	$ 185,643	$ -	$ 185,643	$ -	$ 17,633
13	-	-	$ -	-	-	$ -	$ 187,499	$ -	$ 187,499	$ -	$ 17,810
14	-	-	$ -	-	-	$ -	$ 189,374	$ -	$ 189,374	$ -	$ 17,988
15	-	-	$ -	-	-	$ -	$ 191,268	$ -	$ 191,268	$ -	$ 18,168
16	-	-	$ -	-	-	$ -	$ 193,180	$ -	$ 193,180	$ -	$ 18,349
17	-	-	$ -	-	-	$ -	$ 195,112	$ -	$ 195,112	$ -	$ 18,533
18	-	-	$ -	-	-	$ -	$ 197,063	$ -	$ 197,063	$ -	$ 18,718
19	-	-	$ -	-	-	$ -	$ 199,034	$ -	$ 199,034	$ -	$ 18,905
20	-	-	$ -	-	-	$ -	$ 201,024	$ -	$ 201,024	$ -	$ 19,094
21	-	-	$ -	-	-	$ -	$ 203,035	$ -	$ 203,035	$ -	$ 19,285
22	-	-	$ -	-	-	$ -	$ 205,065	$ -	$ 205,065	$ -	$ 19,478
23	-	-	$ -	-	-	$ -	$ 207,116	$ -	$ 207,116	$ -	$ 19,673
24	-	-	$ -	-	-	$ -	$ 209,187	$ -	$ 209,187	$ -	$ 19,870
25	-	-	$ -	-	-	$ -	$ 211,279	$ -	$ 211,279	$ -	$ 20,068
26	-	-	$ -	-	-	$ -	$ 213,391	$ -	$ 213,391	$ -	$ 20,269
27	-	-	$ -	-	-	$ -	$ 215,525	$ -	$ 215,525	$ -	$ 20,472
28	-	-	$ -	-	-	$ -	$ 217,681	$ -	$ 217,681	$ -	$ 20,676
29	-	-	$ -	-	-	$ -	$ 219,857	$ -	$ 219,857	$ -	$ 20,883
30	-	-	$ -	-	-	$ -	$ 222,056	$ -	$ 222,056	$ -	$ 21,092
31	-	-	$ -	-	-	$ -	$ 224,277	$ -	$ 224,277	$ -	$ 21,303
32	-	-	$ -	-	-	$ -	$ 226,519	$ -	$ 226,519	$ -	$ 21,516
33	-	-	$ -	-	-	$ -	$ 228,784	$ -	$ 228,784	$ -	$ 21,731
34	-	-	$ -	-	-	$ -	$ 231,072	$ -	$ 231,072	$ -	$ 21,948
35	-	-	$ -	-	-	$ -	$ 233,383	$ -	$ 233,383	$ -	$ 22,168
36	-	-	$ -	-	-	$ -	$ 235,717	$ -	$ 235,717	$ -	$ 22,390
37	-	-	$ -	-	-	$ -	$ 238,074	$ -	$ 238,074	$ -	$ 22,614
38	-	-	$ -	-	-	$ -	$ 240,455	$ -	$ 240,455	$ -	$ 22,840
39	-	-	$ -	-	-	$ -	$ 242,859	$ -	$ 242,859	$ -	$ 23,068
40	-	-	$ -	-	-	$ -	$ 245,288	$ -	$ 245,288	$ -	$ 23,299
41	-	-	$ -	-	-	$ -	$ 247,741	$ -	$ 247,741	$ -	$ 23,532
42	-	-	$ -	-	-	$ -	$ 250,218	$ -	$ 250,218	$ -	$ 23,767
43	-	-	$ -	-	-	$ -	$ 252,720	$ -	$ 252,720	$ -	$ 24,005
44	-	-	$ -	-	-	$ -	$ 255,248	$ -	$ 255,248	$ -	$ 24,245
45	-	-	$ -	-	-	$ -	$ 257,800	$ -	$ 257,800	$ -	$ 24,487
46	-	-	$ -	-	-	$ -	$ 260,378	$ -	$ 260,378	$ -	$ 24,732
47	-	-	$ -	-	-	$ -	$ 262,982	$ -	$ 262,982	$ -	$ 24,979
48	-	-	$ -	-	-	$ -	$ 265,612	$ -	$ 265,612	$ -	$ 25,229
49	-	-	$ -	-	-	$ -	$ 268,268	$ -	$ 268,268	$ -	$ 25,481
50	-	-	$ -	-	-	$ -	$ 270,950	$ -	$ 270,950	$ -	$ 25,736
Total	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,726,409	$ -	$ 10,726,409	$ -	$ 1,018,850
PV	$0	$0	$0	$0	$0	$0	$3,563,293	$0	$3,563,293	$0	$338,460

Discount Rate	*5.00%*

LID Scenario 2 — Operating Pro Forma

14-Aug-09 (14-Aug-09)

Revenue Information				Expense Info				Debt Info	
Type	Retail	Residential	Office		Retail: Rate/% per SF	Residential: Total expense per unit	Office: Rate/% per SF	Total RPC	$ 9,265,081
SF	-	45,540	-	Taxes	$ 3.60	$ 6,400	$ 3.60	Equity share	25%
Rate per SF/yr	$ 14.71	$ 400,000	$ 18.18	Insurance	$ 0.20	$ 0.20	$ 0.20	Equity amount	$ 2,316,270
Increase yr	5	0	5	CAM	$ 0.50	$ 0.10	$ 0.50	Loan amount	$ 6,948,811
Increase rate	7.5%	0.0%	7.5%	Mgmt	7.60%	0.00%	7.60%	Loan term-yr	5
VC losses	5%	0%	5%	Accntg/Misc	$ 0.10	$ 0.10	$ 0.10	Interest rate	6.50%
Dwelling Units		26		Reserves	$ 0.15	$ -	$ 0.15	Monthly payment	$ (135,961.46)
Hotel Rooms	0			Annual increase	3.00%	3.00%	3.00%		
				Annual Increase in Tax Value	1%	1%	1%		

Sales Info	
Sales Cost	5.0%
Cap Rate	9.5%
Sale End of	
	$ -

Incentive Info	
Available to Developer	
% Needed	0%
Balance	$ -

	Construction	Years 1	2	3	4	Sale					
Revenue											
Retail/Office		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office VC Losses		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sale of Condo (8 units/year)		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000		$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ -
T/I/CAM Reimbursement		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -
Gross Collected Revenue		$ 3,204,554	$ 3,204,691	$ 3,204,831	$ 804,976	$ -	$ -	$ -	$ -	$ -	$ -
Expenses											
Maintenance (Present Value from Life Cycle Assessment)		$ 17,271	$ 17,135	$ 16,620	$ 16,766						
Real Estate Taxes (unsold condos)		$ 115,197	$ 65,662	$ 16,144	$ 5,042	$ -	$ -	$ -	$ -	$ -	$ -
Insurance		$ 6,900	$ 4,692	$ 2,484	$ 276	$ -	$ -	$ -	$ -	$ -	$ -
Common Area Maintenance		$ 4,554	$ 4,691	$ 4,831	$ 4,976	$ -	$ -	$ -	$ -	$ -	$ -
Management		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accntg & Misc		$ 3,450	$ 2,346	$ 1,242	$ 138	$ -	$ -	$ -	$ -	$ -	$ -
Retail/Office Replacement reserves		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenses		$ 147,372	$ 94,526	$ 41,321	$ 27,198	$ -	$ -	$ -	$ -	$ -	$ -
Debt Service		$ (2,191,771)	$ (2,191,771)	$ (2,191,771)	$ (593,544)	$ -	$ -	$ -	$ -	$ -	$ -
Coverage ratio		139%	142%	144%	131%						
Cash from sale of property		$ 3,200,000	$ 3,200,000	$ 3,200,000	$ 800,000						$ -
NOI after Debt Service		$ 4,065,411	$ 4,118,394	$ 4,171,739	$ 984,234	$ -	$ -	$ -	$ -	$ -	$ -
Public Incentive/ reimbursement		-									
Cash Flow	$ (2,316,270)	$ 865,411	$ 918,394	$ 971,739	$ 184,234	$ -	$ -	$ -	$ -	$ -	$ -
Without Assistance	$ (2,316,270)	$ 865,411	$ 918,394	$ 971,739	$ 184,234	$ -	$ -	$ -	$ -	$ -	$ -
Return on Equity		37.36%	39.65%	41.95%	7.95%						
Return on Investment (ROI) 5 year	11.94%										

Residential Site Economic Analysis

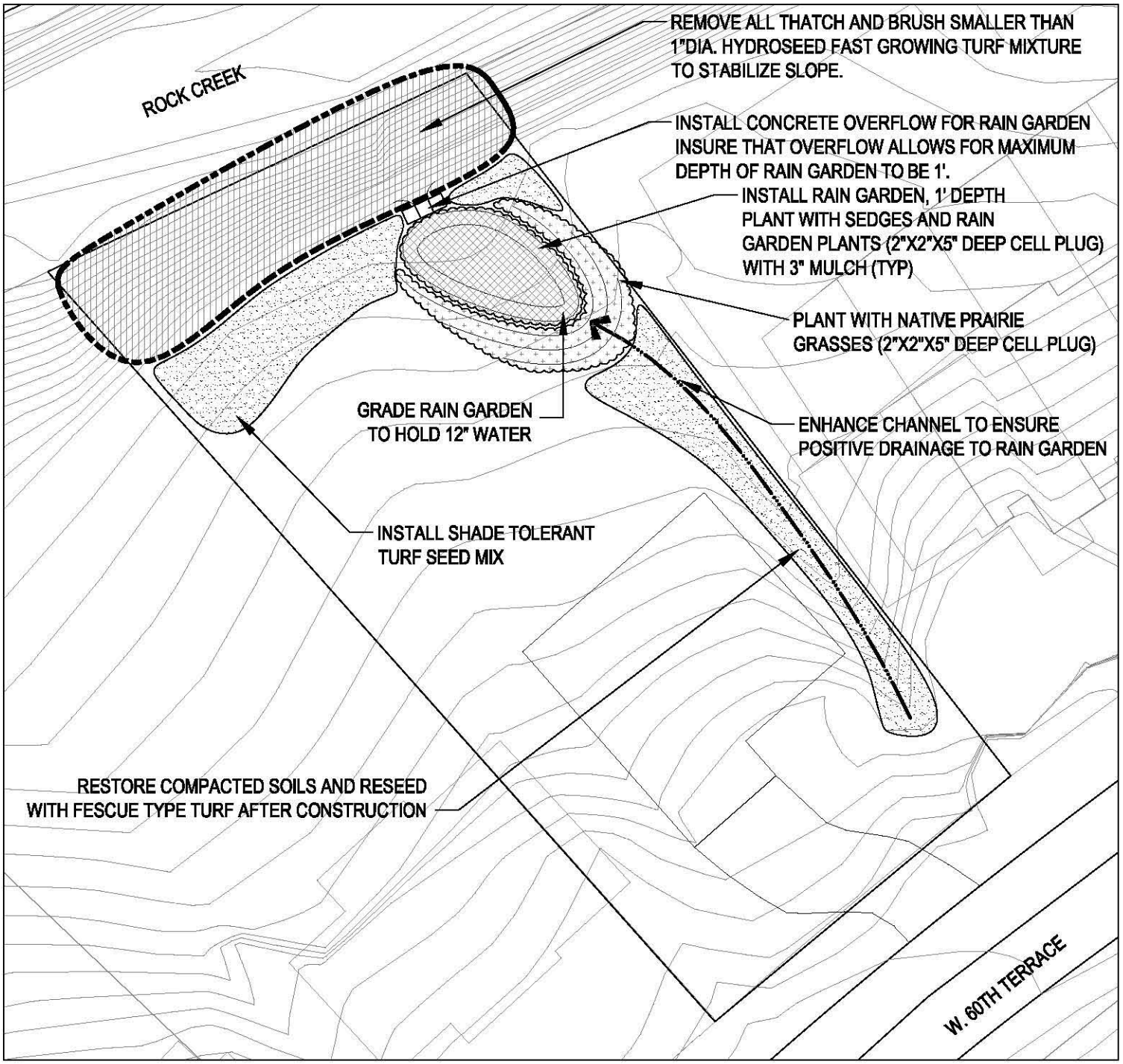
APPENDIX F-2

LID RETROFITS

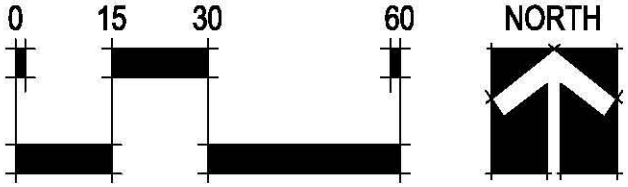
LID Retrofit Site Layout

LID Scenario 1 – Capital Cost

LID Scenario 2 – Capital Cost



RESIDENTIAL SITE LID RETROFIT



APPENDIX F-4

Residential
LID Scenario 1
CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 300,000		$ -
SITE PREP				
Clearing & Grubbing	AC	$ 5,800		$ -
Grading	LS			$ -
BMP Grading*	CY	$ 12	19	$ 233
Total				$ 233
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54		$ -
18" Pipe	LF	$ 57		$ -
24" Pipe	LF	$ 59		$ -
30" Pipe	LF	$ 85		$ -
4" Perforated Drain Tile, PVC	LF	$ 9.75		$ -
Storm Structures (inlets etc.)	EA	$ 5,250		$ -
Overflow Structure	EA	$ 850	0	$ -
Storage Structure	LS	$ 111,510		$ -
Total				$ -
LANDSCAPING				
Shade Trees	EA	$ 400.00		$ -
Ornamental Trees	EA	$ 350.00		$ -
Evergreen Trees	EA	$ 350.00		$ -
Shrubs/Perennials	SY	$ 65.00		$ -
Raingarden plants	SY	$ 27.00	19	$ 525.00
Traditional turf (Sod) Edges for Rain Gardens	SY	$ 7.00		$ -
Hydroseeding	SY	$ 7.00	19	$ 130.67
Irrigation	SY	$ 18.00		$ -
Total				$ 656
ACCESS				
Asphalt Surface Course (2")	Ton	$ 68.00		$ -
Asphalt Base Course (7")	Ton	$ 64.00		$ -
Aggregate (6") Beneath Traditional Parking	CY	$ 16.00		$ -
Pervious Concrete Parking Stalls (6")	SY	$ -		$ -
3/4" Stone Drainage Layer Beneath Pervious Pavement and Adjacent Parking (18")	SY	$ -		$ -
Curb and Gutter (18")	LF	$ 12.00		$ -
Concrete Sidewalks (4")	SF	$ 4.00		$ -
Traffic Control	LS	$ 130,000		$ -
Signage, Public Education Materials, etc.	LS	$ 90,000		$ -
Total				$ -
CONTINGENCY				$ 133
Total Base Cost				**$ 1,022**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	0	$ 153	LS	
Total Associated Capital Costs				**$ -**
Total Site Capital Cost				**$ 1,022**

APPENDIX F-6

Residential
LID Scenario 2
CAPITAL COSTS

Base Costs	Unit	Unit Cost	Quantity	Cost
MOBILIZATION	LS	$ 300,000		$ -
SITE PREP				
Clearing & Grubbing	AC	$ 5,800		$ -
Grading	LS			$ -
BMP Grading*	CY	$ 12	64	$ 768
Total				$ 768
STORMWATER CONVEYANCE AND STORAGE				
15" Pipe	LF	$ 54		$ -
18" Pipe	LF	$ 57		$ -
24" Pipe	LF	$ 59		$ -
30" Pipe	LF	$ 85		$ -
4" Perforated Drain Tile, PVC	LF	$ 9.75		$ -
Storm Structures (inlets etc.)	EA	$ 5,250		$ -
Overflow Structure	EA	$ 850	1	$ 850
Storage Structure	LS	$ 111,510		$ -
Total				$ 850
LANDSCAPING				
Shade Trees	EA	$ 400.00		$ -
Ornamental Trees	EA	$ 350.00		$ -
Evergreen Trees	EA	$ 350.00		$ -
Shrubs/Perennials	SY	$ 65.00		$ -
Raingarden plants	SY	$ 27.00	61	$ 1,644.00
Traditional turf (Sod) Edges for Rain Gardens	SY	$ 7.00		$ -
Hydroseeding	SY	$ 7.00	56	$ 388.89
Irrigation	SY	$ 18.00		$ -
Total				$ 2,033
ACCESS				
Asphalt Surface Course (2")	Ton	$ 68.00		$ -
Asphalt Base Course (7")	Ton	$ 64.00		$ -
Aggregate (6") Beneath Traditional Parking	CY	$ 16.00		$ -
Pervious Concrete Parking Stalls (6")	SY	$ -		$ -
3/4" Stone Drainage Layer Beneath Pervious Pavement and Adjacent Parking (18")	SY	$ -		$ -
Curb and Gutter (18")	LF	$ 12.00		$ -
Concrete Sidewalks (4")	SF	$ 4.00		$ -
Traffic Control	LS	$ 130,000		$ -
Signage, Public Education Materials, etc.	LS	$ 90,000		$ -
Total				$ -
CONTINGENCY				$ 548
Total Base Cost				**$ 4,199**
Associated Capital Costs	**Unit**	**Unit Cost**	**Quantity**	**Cost**
Construction Documents (15%)	0	$ 630	LS	$ 630
Total Associated Capital Costs				**$ 630**
Total Site Capital Cost				**$ 4,829**

G Return on Investment Detailed Assumptions And References

1. BUILDING CONSTRUCTION COSTS:

- Building construction cost by type of use by square foot: RSMeans Quick Cost Estimator; Reed Construction Data, "RSMeans' Dollars-per-Square-Foot Construction Costs: Office Buildings and Public Structures", April 09, 2009 (Accessed online at: http://www.reedconstructiondata.com/news/2009/04/rsmeans-dollars-per-square-foot-construction-costs-office-buildings-and-pub/?nid=4267

2. TAX VALUE:

- Tax assessment value as percent of market value: Johnson County Treasurer
- Tax mill levy rates by taxing district: Johnson County Clerk

3. LEASE RATES:

- Colliers Turley Martin Tucker Commercial Real Estate Services Kansas City 2008 Year End Market Report (Date: January, 2009) (accessed on line at: http://www.colliers.com/Content/Repositories/Base/Markets/KansasCity/E

nglish/Market_Report/PDFs/CTMT2009CommercialRealEstateReportweb.pdf)

- Lane4 Property Group 2009 Kansas City Retail Report (No Date: not given) (accessed on line at: http://www.colliers.com/Content/Repositories/Base/Markets/KansasCity/English/Market_Report/PDFs/CTMT2009CommercialRealEstateReportweb.pdf)
- Block & Company Inc Realtors Website May, 2009 (accessed on line at http://www.blockandco.com/)

4. VACANCY RATES:

- Colliers Turley Martin Tucker Commercial Real Estate Services Kansas City 2008 Year End Market Report (Date: January, 2009) (accessed on line at: http://www.colliers.com/Content/Repositories/Base/Markets/KansasCity/English/Market_Report/PDFs/CTMT2009CommercialRealEstateReportweb.pdf)
- Lane4 Property Group 2009 Kansas City Retail Report (Date: not given) (accessed on line at: http://www.colliers.com/Content/Repositories/Base/Markets/KansasCity/English/Market_Report/PDFs/CTMT2009CommercialRealEstateReportweb.pdf)

5. DEBT SERVICE/INTEREST RATE:

- RealtyRate.com (accessed on line at http://www.realtyrates.com)

6. CAPITALIZATION RATES:

- RealtyRate.com (accessed on line at http://www.realtyrates.com)
- Springsted Inc, 2005 for the Kansas City, Missouri TIF Commission review of the Brush Creek Redevelopment Plan
- Review of analyses of TIF Plans approved by the Kansas City Missouri TIF Commission

7. TAXES / INSURANCE / CAM / MANAGEMENT / ACCOUNTING / MISCELLANEOUS FEES:

- Discussions with developers of Blue Parkway Town Center, Kansas City, Missouri
- Block & Company, Inc. Realtors Website May, 2009 for property retail property at 6425 Nieman Road in Shawnee, Kansas (accessed on line at: http://www.blockandco.com/retailCommercialRealEstateListings.aspx?propertyID=10552)
- Johnson County Treasurer's Office - website and telephone call
- City of Mission, Administration and Finance Services - website and telephone call
- Kansas Department of Revenue - website
- Johnson County Kansas Records & Tax Administration – website

Other inputs such as discount rates, tax rate growth rates, maintenance reserves, and lease rate increases are based on standard assumptions and PBA's professional judgment.

Traditional Scenario

Revenue Generator

14-Aug-09

Office

Building size	Year begins	Hard Costs
204,517		$ 26,995,243

Food & Beverage	per SF	F&B	Tax Rate	Inflation	Every	Initial
	$ 200	$ 1,949,600	0.00%	2.00%	1	$ -
Sales-Construction	Sales%	Const Sales	Tax Rate			Initial
	45%	$ -	0.000%			
Sales-Operation	Per SF	Sales	Tax Rate	Inflation	Every	Initial
	$ 200	$ 11,972,600	7.775%	2.00%	1	
Corporate	Per SF	Corp Earnings	Tax Rate	Inflation	Every	Initial
			0.00%	2.00%	1	
Individual Earnings-Construction	Construction Cost %	Construction Payroll	Tax Rate			Initial
	45%	$ -	0.00%			
Individual Earnings-Operations TOTAL	Emps/1000SF	Employees				
		230				
	Avg Salary	Total Payroll	Tax Rate	Inflation	Every	Initial
		$ 6,350,555	0.00%	2.00%	1	
Utilties TOTAL	Per SF	Utility costs	Tax Rate	Inflation	Every	Initial
		$ 157,195	0.00%	2.00%	1	
Real Property COMMERCIAL	Market%	Market value				
	100.00%	$ 26,995,243				
	Asd%	AsdValue	TIF Rate (improver	Inflation	Every	Initial
	25.00%	$ 6,748,811	13.9127%	1.00%	1	
Personal Property	Market%	Market value				
	Asd%	AsdValue	Tax Rate	Inflation	Every	Initial
	0.00%					$ -

Source:
Bureau of Labor Statistics, May 2008 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, Kansas City, MO-KS

Current Parcel Information	
Current Parcel Information	City Property Tax Records
Demolition Costs/sf commercial	
Acreage	
Assessed Value	
Assessed Value- Exempt Properties - Vacant Ground - Land	
Assessed Value - Exempt Properties - Building	Average SF Cost of Buildings in Surrounding Area
Roll Backs	
Residential	12%
Commercial	25%
Demolition Costs/house	

Redevelopment Project Costs		
Acquisition		Average SF Cost of Properties in Surrounding Area
Relocation		per s.f.
Parking		
Hotel		spaces/hotel room
Residential		spaces/dwelling unit
Office		spaces/1000 sf
Recreation		spaces/SF
Restaurant		spaces/SF
Retail		spaces/SF
Cost of Parking/space		
Surface	$ 4,000	
Structured	$ 20,000	
Landscaping/sf	$ 2.65	
Site Prep/sf	$ 3.12	
Off site improvements/sf	6.85	
Building Costs/sf		
Hotel	$ 140.00	
Residential	$ 150.00	
Office	$ 130.00	
Recreation		
Restaurant	$ 144.00	
Retail	$ 110.00	
Hard Costs	90%	
Soft Costs	10%	
Hard Cost contingency	10%	of Hard Costs
Cost of TIF Plan Preparation		
Inflation rate as applied to increase costs per year	2%	

Revenue Generators	
F&B	$ 200.00 per sf
Sales during construction	45% of hard costs
Sales during operation	$ 200.00 per sf
Corporate earnings	
Individual earnings	
Employees/1000 sf	
Hotel	
Residential	0
Office	4
Recreation	-
Restaurant	2.5
Retail	2.5
Salaries	
Hotel	$ 2,500 per room
Residential	$ -
Office	
Recreation	$ -
Restaurant	
Retail	
Utilities	
Hotel	$ 650.00 per room
Residential	
Office	$ 1.95
Recreation	
Restaurant	$ 2.10
Retail	$ 1.95
Inflation	
Rate	2%
Frequency	1 year
Earnings during construction	45% of hard costs
Discount Rate	5%

H Educational Watershed Model Cost Summary

Municipalities and other government agencies across the United States have utilized a watershed concept as part of educational curriculums to teach about topography, ground and surface water interaction, erosion, land use patterns, non-point source pollution, and general environmental awareness. Educational resources range from mass media ad campaigns to simple brochures to physical models that may be located in schools, libraries, or parks. This memorandum summarizes three options for the City of Mission to consider and provides associated approximate expenditures.

1. WEBSITE DEVELOPMENT

The City currently hosts a website with information for residents, businesses, and visitors. A link to a watershed resource page could be added to provide the history of Rock Creek, current development plans, and information regarding watershed health and community action. This resource page may also link to other cities and programs that relate to watershed health, low impact development, and best management practices to improve water quality. Resources such as the Chicago Green Alley Handbook and 3 Rivers Wet Weather Demonstration in Pittsburg, PA may be linked through the City of Mission website.

2. INFORMATION DISTRIBUTION

Informative handouts or pamphlets can present ideas and resources helping the public understand watershed concepts, low impact development, and stormwater management practices in the City. The pamphlet approach can be useful because it is specific to the area of interest and focused on the points that a city is most concerned about. Pamphlets may be expensive due to printing costs. An example of a watershed educational pamphlet is available through the EPA "After the Storm" program.

3. PHYSICAL MODELS

Physical models are often located in schools, museums, and libraries. These models may be used to present a variety of situations: watershed patterns, predevelopment conditions, future plans, potential sources of contamination, and location of drinking water sources. They may be presented on display or designed for interaction. These types of models may be coupled with a pamphlet, video, or other form of information that summarizes the model. The detail of a physical model is directly related to the cost.

A simplified, generic representation of a watershed may be used interactively to demonstrate flow patterns, non-point source pollution, and the effects of vegetation on water quality. Enviroscape, a company based in Virginia, develops portable physical models for the classroom. This company offers a Watershed model that tracks pollution from point and non-point sources including residential areas, stormwater forests, transportation corridors, recreational areas, agriculture and construction. The model includes a topographical map, storm drainage, clear base, houses, a treatment plant, trees, cows, cars, and a factory. Best management practices such as buffer strips can be added to prevent pollution. The interactive model demonstrates watershed pollution and stormwater runoff when rain falls over the landscape and erodes soil (cocoa), chemicals (colored drink mix powder), and oil through a watershed to a stream. This type of generic model costs approximately $1,000.

A detailed representation of the entire City of Mission or Rock Creek watershed is substantially more expensive. The model of Rock Creek could be utilized to teach the same interactive lessons previously discussed but would include buildings, landmarks, streets, and tributaries unique to the Rock Creek watershed. Enviroscape developed an estimate for a 10 foot by 10 foot custom model, constructed of structural urethane foam with a heavy duty waterproof coating. The model is milled and coated, then painted and sealed. Building, streets, waterways, and landmarks would be integrated into the three-dimensional representation. A custom model with these characteristics would cost approximately $60,000.

A physical model could also be presented in a computer simulation. Digitally, the City of Mission or entire Rock Creek watershed could be modeled to a high level of detail. The graphical representation would be used to run computer models that simulate rainfall events. Short videos could be developed to demonstrate the patterns of water flowing through the watershed, how water transports sediment and nutrients, and the effect of alternative land use patterns. A digital simulation model for the City of Mission would cost approximately $30,000. A computer simulation could be shared with schools or through the City website.

Community education and involvement is a major component of NPDES Phase II communities and improving water quality. Parallel to increasing awareness about stormwater management in the development community, the City of Mission should involve citizens in protecting the Rock Creek watershed.

Residential Rain Garden Incentives Program

Rain gardens are a significant component of low impact development in residential settings and can be easily integrated on existing sites. Any shallow depression that captures and retains rain water to reduce the amount of stormwater running off a property is the basis of a rain garden. Native vegetation and higher rates of infiltration into the soil enhance the role of the basic depression to improve water quality. *The optimal rain garden size for a typical residence in Mission is between 150 and 300 square feet. This typical garden has the capacity to treat runoff from approximately one half of the impervious area on the site and is most cost effective for the typical Mission residence.* Costs associated with the rain garden in LID Scenario 1 can be further reduced by homeowner involvement in construction, an incentives program, and provision of resources by the City, such as planting material and mulch through Public Works.

1. CITY OF MISSION RESOURCES

The City of Mission Public Works has the building blocks in place to provide resources for residential rain garden development. There are great community partners and resources outside the City that can be utilized for expertise and guidance. Program components to develop a successful incentive should include the following:

- Simple Instructions

- Plant and Soil Informational Guides
- Discounted or Free Plant Material
- Community Education and Marketing

The City should develop a webpage within the P3 section of its website with a general introduction to the incentives program, application process, and references to the following program information: 10,000 Rain Gardens (www.rainkc.com) and Grow Native! (www.grownative.org)

2. OTHER PROGRAM COMPONENTS

There are a number of successful rain garden initiative programs around the country to consider in the development of a residential rain gardens incentives program in the City of Mission. The following are a few of the options for consideration:

- Reimbursement of $1.00 or more per square foot with area limits. The average rain garden will likely not exceed 300 square feet and some may be as small as 50 square feet. This incentive based on size will encourage homeowners to develop larger rain gardens.
- Provide 50% of total plant cost up to a pre-determined limit. Homeowners may be wary or unsure of how much the plants will cost. By offering to match their investment, these concerns may be lessened.
- Cultivate and provide rain garden plants from the City nursery – publicize a plant list and sample rain garden designs. A homeowner will submit a list of the plants for their rain garden and the City can provide the same or complimentary plants.
- Provide mulch, potting soil or compost to homeowner. These items will improve the long term maintenance and success of the homeowner's rain garden.
- Offer rain barrels. Homeowners who agree to build a rain garden of a certain size could receive a free rain barrel to help water it during dry periods courtesy of the City.