An Economic Impact Analysis of Eleven Blueprint Projects

– Final Report

Prepared for: The Blueprint Intergovernmental Agency

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Executive Summary

The Blueprint Intergovernmental Agency (BIA) was created by the Leon County Government and the City of Tallahassee, to govern the project management structure for the project planning and construction of the Blueprint 2000 and 2020 projects.[1] The Blueprint program has provided strategic investments in infrastructure that often lead to new growth opportunities. The Blueprint 2020 program, which is also referred as the 2020 Penny Sales Tax Extension Projects, is the second phase of the Blueprint Plan.[2] There are several components of the Blueprint Plan that link together and focus on numerous aspects and benefits to the community. As stated in the report "Blueprint 2000 and Beyond", "A key to solving our local challenges is first to view economic, environmental, and social values as complementary and interdependent. Then we can begin to design long-range solutions that have "synergy" – multiple benefits to our community that become greater than their sum." [3]

In 2017, the BIA commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct an economic impact analysis of eleven Blueprint 2020 projects in order to provide the estimates of the individual and overall economic impacts of those projects in the Leon County area and to decide which infrastructure investment should be undertaken with priority from the economic perspective. The results of this study are applied as one of the five "Blueprint Promise" criteria, "Invest in Economic Development", to scale and evaluate the priority of the remaining eleven Blueprint 2020 projects. Table ES1 shows the titles of BIA eleven projects and their corresponding BIA-defined areas.

Table ES1. Select Blueprint 2020 Intergovernmental Agency (BIA) Projects

Areas	Project
Community Enhancement Districts	Beautification and Improvements to the Fairgrounds
	College Avenue Placemaking
	Market District Placemaking
	Midtown Placemaking
	Monroe-Adams Corridor Placemaking
	Orange Avenue/Meridian Road Placemaking
Connectivity	Florida A&M Entry Points
Quality of Life	Alternative Sewer Solutions Study
	Lake Lafayette and St. Marks Regional Linear Park
	Northeast Park
	Tallahassee-Leon Community Animal Service Center

FSU CEFA initially conducted a literature review of infrastructure investment analyses in order to design and develop the model that would be most suitable for this study. The eleven projects are defined as

[1] http://blueprint2000.org/about-blueprint/history/
[2] http://www.leonpenny.org/
[3] http://blueprint2000.org/DocSearch/download_store/Performance%20Report%20final.pdf

having varied benefits and are characterized in three different areas, “Community Enhancement Districts”, “Connectivity”, and “Quality of Life”. The selected model (to assess the economic impacts) should capture the indicators which determine the economic impacts of each project and equalize the results for equivalent comparisons, for as close as possible to an “apples to apples” approach. The study team developed the Economic Impact Analysis model based on Multi-Attribute Utility (MAU) analysis, which is a well-established decision analysis method that specifically addresses how to compute the overall score, or utility, of each alternative under consideration. The MAU analysis mainly solves for Multiple-Criteria Evaluation (MCE) results where a feasible set of criterion are defined explicitly (by a set of alternatives).

Based on the “Revised Blueprint Promise Criteria and Evaluation Scale”, provided by BIA and the independent research in infrastructure investment, FSU CEFA constructed and estimated four indicators to measure the local economy impacts of each project. The four indicators are: estimated time-adjusted annual cost, estimated annual total (construction related) job creation, estimated annual change in property market value, and annual change in commercial land use (LU) property market value. A set of numerical weights were developed and distributed to each indicator to determine their relative importance in scoring and ranking projects. Table ES2 shows the individual indicator score, overall score and ranking of each project.

When examined from the perspective(s) of the individual indicators, the rankings of the same project are different. Different individual rankings accentuate the different characteristics of projects. For example, the “Florida A&M Entry Points” has the highest score; 0.9213, for the lowest estimated time-adjusted annual cost, while the project of “Northeast Park” has the lowest score; 0.4757, for the highest estimated time-adjusted annual cost. From the aspect of job creation, “Northeast Park” has the highest score; 0.5368, for this project results in the greatest number of construction related jobs created. “Alternative Sewer Solutions Study” is measured as having the lowest job creation score; 0.0140, for its characteristic of being in the area of non-construction. From the aspect of annual change in property values induced by investments,[4] with the average annual growth rate from the year 2011 to 2016, the annual average property value of “College Avenue Placemaking” is expected to increase by the greatest amount with a score of: 1.0000. From the commercial development point of view, the project with the most development potential is “Market District Placemaking” which has the highest individual score 1.0000.

After assigning weights to the four indicators, the overall scores of eleven projects are listed in the sixth column, termed “overall score”. The seventh column displays the corresponding project priority “ranking”. Based on a comprehensive economic impact analysis, “College Avenue Placemaking”, has the highest overall score; 0.5565. The second and third ranked projects are “Florida A&M Entry Points” and “Market District Placemaking”. The spread of the overall scores of eleven projects is relatively large: the difference between the highest value and the lowest value is 0.1769, taking the 31.79% of the highest score.

[4] The rankings were developed based within a one quarter mile radius for property valuation.

Table ES2. The Individual Indicator Score, Overall Score, and Ranking of Projects

Project	Estimated Time-adjusted Annual Cost	Estimated Annual Job Creation, Total	Estimated Annual Change in Property Value	Estimated Annual Change in Commercial Property Value	Overall Score	Ranking
Indicator Weights	**0.335**	**0.335**	**0.220**	**0.110**		
Alternative Sewer Solutions Study	0.8042	0.0140	0.0366	0.8859	0.3796	11
Beautification and Improvements to the Fairgrounds	0.5676	0.4341	0.0000	0.8376	0.4277	10
College Avenue Placemaking	0.7477	0.2567	1.0000	0.0000	0.5565	1
Florida A&M Entry Points	0.9213	0.0840	0.2448	0.8165	0.4805	2
Lake Lafayette and St. Marks Regional Linear Park	0.6974	0.3127	0.0397	0.9349	0.4500	5
Market District Placemaking	0.7419	0.2661	0.1147	1.0000	0.4729	3
Midtown Placemaking	0.5787	0.4341	0.0533	0.8520	0.4447	7
Monroe-Adams Corridor Placemaking	0.8660	0.1354	0.1485	0.8367	0.4601	4
Northeast Park	0.4757	0.5368	0.0367	0.8357	0.4392	8
Orange Avenue/Meridian Road Placemaking	0.8874	0.1167	0.0828	0.8651	0.4498	6
Tallahassee-Leon Community Animal Service Center	0.7477	0.2474	0.0373	0.8357	0.4335	9

Introduction

The Blueprint Intergovernmental Agency (BIA) was created by the Leon County Government and the City of Tallahassee, Florida, to govern the project management structure for the project planning and the construction of the Blueprint 2000 and 2020 projects.

The Blueprint projects aim to provide great strategic investments in infrastructure that often lead to new growth opportunities to benefit communities in the Leon County area. By improving and expanding local roads, reducing traffic congestion, building new sidewalks to local schools, commercial areas and recreational amenities, reducing neighborhood flooding, and expanding green spaces, parks and natural areas, Blueprint projects create and promote jobs. The areas of Blueprint 2020 projects include "Connectivity", "Getaways", "Community Enhancement", "Regional Mobility", and "Quality of Life". Blueprint adheres to its founding principle of holistic planning, an approach where economic, environmental, and social values are complimentary and interdependent. As stated in the report of "Blueprint 2000 and Beyond"…,"A key to solving our local challenges is first to view economic, environmental, and social values as complementary and interdependent. Then we can begin to design long-range solutions that have "synergy" – multiple benefits to our community that become greater than their sum."

In 2017, the BIA commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct an economic impact analysis of eleven blueprint projects in order to provide the estimates of the individual and overall economic impacts in the Leon County area, and to provide project priority "rankings" (from an economic perspective) as a means for the BIA decision-making process. FSU CEFA initially conducted a literature review of the infrastructure investment analysis in order to design and develop the model that would be most suitable for this study. FSU CEFA chose the Multi-Attribute Utility (MAU) analysis as the main economic valuation and modeling tool for this study.

The FSU CEFA study team examined the infrastructure categories by various definitions of benefits. All eleven Blueprint projects are in the regional/local level, as the purpose of this study considers the benefits that accrue from infrastructure investment to the City of Tallahassee and Leon County. The eleven Blueprint projects belong to "Connectivity", "Community Enhancement", and "Quality of Life" areas, which are defined by the Penny Sales Tax.[5] Projects belonging to "Connectivity" link current amenities, neighborhoods, and/or multi-modal nodes through sidewalks, multi-use paths, bike lanes,

[5] http://www.leonpenny.org/

transit, and roadway improvements. Projects belonging to "Community Enhancement" create special urban places which foster a sense of community, and inspire a creative class that builds relationships to solve local problems with local solutions in an inclusive environment. Finally, projects in the "Quality of Life" area promote public recreation and eco-tourism while protecting and preserving the community's environment and natural resources. All eleven projects were categorized as broad social infrastructure. The indicators selected to make equal comparisons are estimated time-adjusted annual cost, estimated annual total job creation, estimated change in average property value, and estimated change in average commercial land use (LU) property value.

The Multi-Attribute Utility (MAU) analysis provided the basic economic methodology framework for this study. The Economic Impact Analysis model helped evaluate the local economic impacts of eleven projects of the Blueprint 2020 program.[6] The development of the weighting factors matrix was the key to identify, score, weight, and evaluate multiple criteria (indicators) representing the economic effects imposed on local economy. All data and information analyzed in this study were summarized in a scoring "Summary Matrix." The matrix shows the original data and data statistics on estimated total cost, estimated time-adjusted annual cost, different types of jobs created, change in average property value, and change in commercial LU average property value. The FSU CEFA study team analyzed and compared the economic effects of eleven projects by using the same measurement criteria.

The report is organized as follows: the "Literature Review" summarizes the studies relating to the theories of infrastructure investment, the selection of model and individual criteria, and the economic impact assessment. The next section, "Methodology", provides the basic steps of model, data preparation, criteria evaluation, and interpreting the model outcomes, or results. The next section "Data Statistics, Economic Evaluation Matrix, and Ranking Results" shows the detail on investment costs, estimated job creations, and project timeframes. The market value and structure information of parcels affected by the projects was derived from both the data collected by the Florida Department of Revenue (FDOR) and the BIA. This section also identifies the rankings of priority projects. The last section provides a discussion of results and conclusions.

[6] Table ES1. Blueprint 2020 Intergovernmental Agency (BIA) Projects

Literature Review

The scope of this study examines the local economic impacts of eleven infrastructure investment projects of Blueprint 2020 program. There're three main topical areas discussed in the literature review.

The Definition and Types, of Infrastructure

The first subject area discussed in the literature is relevant to the definition and types of infrastructure investment.

The United Nations defines infrastructure as "*the system of public works in a country, state or region, including roads, utility lines and public buildings.*"[7] Different from the United Nations' definition, some researchers define and interpret infrastructure based on its various impacts and incidence. For example, in Fourie (2006), the levels of infrastructure are identified as local, national, and transnational. Infrastructure emerges subject to market failures. Public works from infrastructure investment can be divided into broad categories: economic infrastructure and social infrastructure, or into detailed categories, as infrastructure investment is part of the capital accumulation and referred to as capital goods, as opposed to consumption goods. Figure 1 describes how infrastructure is categorized. In the broad category, economic infrastructure promotes economic activity while social infrastructure promotes the quality of life, i.e. the health, education, and culture standards of the population. In the detailed category, infrastructure can be divided into five groups: "Rural", "Urban", "Core", "Social", and "Land-Intensive".[8] It is necessary to identify the level and category of infrastructure before starting economic impact analysis. This is because different levels and types of infrastructure require different economic indicators to measure the impacts of investments.

The eleven projects provided by the Blueprint 2020 program are at the regional or local level, as the purpose of this study only considers the benefits that accrue from infrastructure investment to the city of Tallahassee and Leon County. As described in the project highlights, "Beautification and Improvements to the Fairgrounds", "Lake Lafayette and St. Marks Regional Linear Park", "Northeast Park", and "Tallahassee-Leon Community Animal Service Center" can be identified as in the "Social Infrastructure" category. The five placemaking projects, which focus on community enhancement and the "Florida A&M Entry Points" project, can also be identified as in the "Social Infrastructure" category, as their purposes are to improve the sidewalks, crosswalks, lighting, and other living standards in residential, commercial, and university (educational) areas. The "Alternative Sewer Solution Study" is a project which includes a study to determine alternative methods of domestic wastewater treatment and disposal in the unincorporated areas. It is related to water supply, sanitation, and sewerage, but also concerns public health. In order to measure the economic impacts of eleven projects from equivalent comparisons, the "Alternative Sewer Solution Study" is identified as in the "Social Infrastructure" category as well.

[7] Handbook on Geographic Information Systems and Digital Mapping, Studies in Methods, Series F, No. 79, United Nations Department of Economic and Social Affairs, Statistics Division, New York, 2000, Annex VI - Glossary.
[8] http://nptel.ac.in/

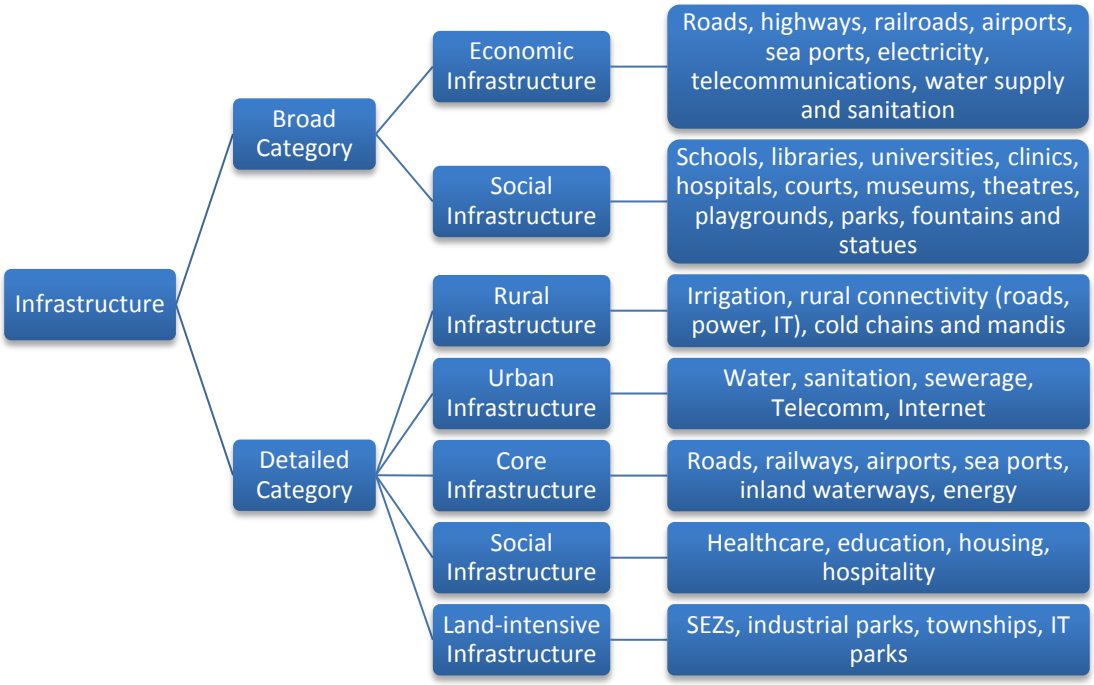

Figure 1. How Infrastructure is Categorized

The Economic Impact Indicators of Infrastructure Development and Analysis Approaches

The second subject area in the literature is related to the economic (impact) indicators of infrastructure investment.

Infrastructure economics examines infrastructure from an economics perspective. Social infrastructure is the interdependent mix of facilities, places, spaces, programs, projects, services and networks that maintain and improve the standard of living and quality of life in a community. The representative literature concerning the economic impact analysis of social infrastructure includes: "Economic Benefits of Walkable and Bike Friendly Communities" (2013),[9] Bivens (2014), Fourie (2006), Fuller (2013), Perrine (2013), "The Economic Impact of Home Building in a Typical Local Area Income, Jobs, and Taxes Generated (2015)",[10] and Schanzenbach, Nunn, and Nantz (2017).

Economic Benefits of Walkable and Bike Friendly Communities (2013) reports the walking and cycling benefits category (economic value only). The improved active transport conditions and the walkable community design can be measured by improved local property values, project employment effects, and changes in household expenditures. Bivens (2014) estimates infrastructure investments' likely impact on overall economic activity, productivity, and the number and types of jobs, depending on how the investments are financed. Bivens indicates that infrastructure investments solve several pressing

[9] Association of Pedestrian and Bicycle Professionals (APBP)
[10] National Association of Home Builders (NAHB)

challenges in the U.S: how to simulate the short-run depressed labor market and how to provide satisfactory living standards growth for the vast majority of people in the long-run. The author also states that based on the building (residential and commercial, or private and publicly-owned) efficiency, the publicly owned buildings are the first place to start an infrastructure investment effort, which provides evidence to support the selection of commercial factors as criterion when ranking multiple projects. Fuller (2013) uses the investment amounts, jobs created directly and indirectly, and expenditures on housing, food, transportation, utilities, fuels and public services, apparels and services, and entertainment as indicators. Perrine (2013) presents that social infrastructure investment can assist economic development by providing opportunities for local ownership, entrepreneurship, employment and for partnerships and increase capacity to attract further investment.

The measurement of criteria in this study shares the features in Fourie (2006), and Schanzenbach, Nunn, and Nantz (2017). Fourie (2006) states two approaches to assessing the economic impacts: the micro-economic benefit cost analysis measured in net present value (NPV) and the theory of clubs. Benefits (or negative costs) are classified as internal and external, direct and indirect, tangible and intangible, expected and unexpected. However, not all returns are measurable. There is a distorted rate of return and difficulty in measuring externalities by benefit-cost analyses. The theory of clubs divides people into two or more groups, enjoying its own public goods but not the other's. This approach is usually pronounced in the field of utilities and infrastructure for pricing and assessing the optimal level. Schanzenbach, Nunn, and Nantz (2017) provide an economic framework for evaluation of infrastructure investments and their methods of funding and finance, which are applied to analyze and assess the gap between insufficient American infrastructure investment and the demand for additional spending to maintain and expand. Problems faced include infrastructure aging, infrastructure benefit and positive externality, which project should be undertaken by the public sector, and how the projects should be financed. A guide to the economics of infrastructure investment is provided – an economic impact analysis remains a very broad concept until the following questions can be answered to make it more specific:

- Why should we invest in infrastructure?
- What projects should be selected?
- Who should decide?
- How should infrastructure investment be paid for?

Table 1 summarizes the structure of the guide to the economics of infrastructure investment in Schanzenbach, Nunn, and Nantz (2017). The study conducted by FSU CEFA responds to the following first two questions by explaining the required specific factors in the guide. In summary, the four economic indicators selected for evaluating the investments in economic development are investment cost (time adjusted), project employment, change in local average property values, and change in local commercial property values.

Table 1. The Structure of the Guide to the Economics of Infrastructure Investment in Schanzenbach, Nunn, and Nantz (2017)

Questions	Factors	Example Factors
Why should we invest in infrastructure?	• Productivity growth has diminished and interest rates have fallen • Infrastructure deficits have become large	▪ The magnitude of the economic returns to successful projects ▪ The share of spending that goes to less productivity projects ▪ Depreciation rate ▪ The share of spending that simply replaces previously planned by government ▪ The Fed. interest on borrowing ▪ The stimulus effects on the economy
What projects should be selected?	• A role of government • Benefits exceed costs	▪ Benefits including housing, transportation, health benefits ▪ Costs including costs to repair and maintain, and time span
Who should decide?	• A given level of government • Insulate decisions from political pressure where possible	▪ Local and/or state government
How should infrastructure investment be paid for?	• Implement user fees • Tax • Government debt • Public-Private Partnerships (PPPs)	

Models in Multiple-Criteria Decision Analysis

The third subject area of the literature is related to multiple-criteria decision analysis.

The model relating to multiple-criteria decision making (MCDM) or multiple-criteria decision analysis (MCDA) is a sub-discipline of operations research that explicitly evaluates multiple conflicting criteria in decision making.[11] It is concerned with structuring and solving decision and planning problems involving multiple criteria. Typically, a unique optimal solution does not exist. It is necessary to use decision-maker's preferences to differentiate between, or among, solutions. MCDM is applied in many fields, such as Mathematics, Behavioral Decision Theory, Economics, and Information Systems. There are two types of problems the MCDM can solve. The first-type problems are multiple-criteria evaluation (MCE) problems which consist of a finite number of alternatives represented by performance in multiple criteria. The second-type problems are of multiple-criteria design in nature, where alternatives are not explicitly known but can be found by solving a mathematical model. The economic impact analysis of eleven Blueprint projects belongs to the first type of problems as all alternatives (projects) are known.

[11] https://en.wikipedia.org/wiki/Multiple-criteria_decision_analysis

There are many methods available with which to conduct MCDM, most of which are implemented by specialized decision-making software.[12] Our analysis relates to the Multi-Attribute Utility (MAU) theory. The MAU analysis literature includes Cassey (2009), Weisbrod and Simmonds (2011), and "The Guidance for Successful Evaluation (2007) from Standardized Technology Evaluation Process (STEP)." Cassey (2009) provides tools of regional economic modeling for economic development decisions. The author describes economic impacts (from policy or shocks) analysis tools, such as Input-Output Analysis, and Computable General Equilibrium (CGE) modeling, which are different from cost-benefit analysis and are not used to optimize. The author also mentions the role of multipliers: Economic Impacts measure how a change in income or employment in one sector flows to all other sectors. Weisbrod and Simmonds (2011) developed a framework by considering the wider economic impacts of transport investment (or other interventions). The authors state that local and state governments need to inform prioritization of investments, for equity consideration in the allocation of funds and in negotiating agreements for sharing of investment costs between different levels of governments. They build a broader set of perspectives and metrics to fully span the wider impacts of transport measures, as well as develop an expanded range of metrics for accessing wider economic impacts, spanning local, intermediate and final outcome metrics in the U.S. The Guidance for Successful Evaluation (2007), from STEP, involves steps for establishing evaluation criteria, scoring the products, computing weights, and computing the overall score for successful technology evaluation.

The FSU CEFA research team follows the steps in the "Guidance for Successful Evaluation (2007) from STEP" by establishing economic evaluation criteria, scoring the projects, and computing criteria (factors) weights, and the overall score for each project. All numerical results are summarized in an assessment matrix.

[12] Appendix A: Table A1. The List of the Multiple-criteria Decision Making (MCDM) Methods

Methodology

The following methodology section describes the economic methodology applied in this study. The Economic Impact Analysis model helps evaluate the local economic impacts of 11 projects provided by the Blueprint 2020 program. The development of weighting factors matrix is the key to identify, score, weight, and evaluate criteria that can represent the economic effects imposed on the local economy.

The dependent variable, Y, represents the local economic impact. It is a continuous variable with value(s) between $[0, 1]$ or a continuous real number that can be translated to a value between $[0, 1]$, following a specific rule. The independent variable, $x_k, k = 1, 2, 3, 4$ represents the four factors that will be identified, scored, weighted, and evaluated. The proposed criteria include: 1) the estimated investment cost (time adjusted), 2) employment effect (job creation), 3) average property value/acre, and; 4) average commercial property value/acre.

Thus, the evaluation function of local economic impact can be expressed as:

$$Y = u(x_1, x_2, x_3, x_4)$$

The Economic Impact Analysis model is most relevant to Multi-Attribute Utility (MAU) analysis: a well-established decision analysis method that specifically addresses how to compute the overall score, or utility, of each project (alternative) under consideration. The MAU analysis mainly solves the multiple-criteria evaluation (MCE) problems with the feasible set of criterion are defined explicitly.

There are four steps required in the MAU analysis process. The process involves:

1. Establishing a set of evaluation criteria, dividing the criteria among a set of categories.

This step requires conducting independent research for each criterion (factor) and requesting guidance on all aspects and objectives from government officials and industry-related experts. The description of measurement for each criterion should be specific. It is necessary to provide a description of how each criterion will be constructed.

2. Determining a scheme for scoring projects compared to the evaluation model.

Step 2 requires constructing scales $u_k(x_k)$ for each criterion, k. This allows both quantitative and qualitative criteria to be measured. FSU CEFA's study team assigned scores based on a standard unit of measure.[13] Based on the requirement of MAU analysis, any scoring function should be normalized so that the scores fall in the range from 0 and 1.

[13] See Appendix B: The Standard Method and the Method of Log-odds Ratio

3. Providing a set of numerical weights to determine the relative importance of the criteria and evaluating categories.

Step 3 assigns weights w_k to each criterion, which specifies relative importance in the overall set of criteria. The weights are non-negative numbers that sum to 1 and their values are dependent on the principles and axioms that the decision maker wishes to follow.

Methods (easy to implement – although time intensive) commonly-used to assigning weights include:

- Weighted ranking
- Reference comparison (10 – 100 criteria)
- Paired comparison, or Balance beam method (100+ criteria)
- Analytic hierarchy process (AHP)
- Trade-off method, or Pricing-out method

Weighted ranking and AHP have been rejected by decision analysts as acceptable methods for computing weights [2, 4, 11, 14]. The Trade-off, or Pricing-out, methods require derived weights for more than ten criteria with related decision-making software. The Reference Comparison and Paired Comparison (Balance Beam) methods are widely accepted methods, and practical in that they can be calculated by hand. They are good choices for 10-100, and for 100+ criteria, respectively.[14]

4. Computing the overall score for each project (weighted sum model).

As the last step, we used the following formula to calculate the overall score for each project and to rank the eleven projects.

$$u(x_1, x_2, x_3, x_4) = \sum_{k=1}^{4} w_k u_k(x_k)$$

[14] Appendix B: Steps to Perform Reference Comparison and Paired Comparison (Balance Beam) Methods

Data Statistics, Economic Evaluation Matrix, and Ranking Results

In this section, FSU CEFA provides the summary matrix with associated results (shown in Appendix D).

The first table in Appendix D is the summary table. The Columns A, B and C list the areas, titles, and highlights of eleven projects. Column D to Column G show the original information of the four indicators of eleven projects. Among them, Column D and E list the estimated total cost and total jobs created for each project. Column F and Column G display the information of changes in average property market value/acre and average commercial LU property market value/acre within a distance of 0.25 mile from each project area respectively. Column H shows the ranking results. Details on individual indicator scores are summarized in tables of this section.

Data and Data Statistics

As illustrated in the literature review and methodology sections, the four indicators selected to establish a set of criteria for Step 1 are: estimated time-adjusted annual cost, total annual job creation, estimated changes in average property market value per acre (1 quarter mile), and in average commercial LU property market value per acre (1 quarter mile).[15]

The data on the estimated total costs of eleven projects are from the project descriptions of the Blueprint 2020 program. Table 2 summarizes the estimated total cost and estimated timelines provided by BIA staff, and estimated time-adjusted cost of the eleven projects.

[15] The average property value growth rates were calculated based on the time series data on properties from the year 2011 to 2016. The research team used property values in 2016 USD to measure changes in property values that will be improved. Details see the “Property Time Series” tab in the summary table.

Table 2. The Estimated Total Cost, Time Span, and Estimated Time-Adjusted Annual Cost of Eleven Projects

Project	Est. Total Cost	Construction Time Span (Month)	Est. Time-adjusted Annual Cost
Alternative Sewer Solutions Study	$2,800,000	9	$3,733,333
Beautification and Improvements to the Fairgrounds	$12,000,000	18	$8,247,420
College Avenue Placemaking	$7,000,000	18	$4,810,995
Florida A&M Entry Points	$1,500,000	12	$1,500,000
Lake Lafayette and St. Marks Regional Linear Park	$15,800,000	36	$5,770,419
Market District Placemaking	$9,400,000	24	$4,921,464
Midtown Placemaking	$22,000,000	36	$8,034,761
Monroe-Adams Corridor Placemaking	$7,000,000	36	$2,556,515
Northeast Park	$10,000,000	12	$10,000,000
Orange Avenue/Meridian Road Placemaking	$4,100,000	24	$2,146,596
Tallahassee-Leon Community Animal Service Center	$7,000,000	18	$4,810,995

The average estimated total cost is $8,963,636, with a standard deviation value of: $5,967,289.[16] The project "Midtown Placemaking" is estimated with the highest investment amount: $22,000,000. The "Florida A&M Entry Points" project requires the least estimated investment amount: $1,500,000. The estimated project timelines are provided by Blueprint staff based on timelines of past and current projects, ranging from 9 months to 36 months. The estimated time-adjusted annual costs are calculated based on the average annual discount factor of the United States from 2010 to 2016,[17] by assuming all projects start at the same time and all estimated total costs are the net present value (NPV) of starting year. Assuming the net investment amount of each year of the same project is identical, the fourth column in Table 2 lists the estimated time-adjusted annual costs. The project, "Northeast Park", is estimated with the highest annual cost. The project with the lowest estimated annual cost is the "Florida A&M Entry Points".

[16] See the "Adjusted Cost" tab in the summary matrix file.
[17] https://fred.stlouisfed.org/series/INTDSRUSM193N
The average annual discount factor (2010 – 2016) is 9.89%.

With the exception of the estimated job creation of "Alternative Sewer Solutions Study",[18] the job creation impacts of other projects are estimated with IMPLAN, based on the estimated total investment cost and the estimated time-adjusted annual cost. The numbers include direct construction jobs, in addition to indirect and induced jobs. Table 3 depicts the estimated number of jobs created, including the direct, indirect, and induced jobs (derived from both estimated total and time-adjusted annual costs).

Table 3. The Direct, Indirect, and Induced Jobs Created Based on the Investment of the Eleven BIA Projects

Projects	Estimated Total Cost Job Creation				Estimated Time-adjusted Annual Cost Job Creation			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Alternative Sewer Solutions Study	-	-	-	3	-	-	-	3
Beautification and Improvements to the Fairgrounds	82	28	23	133	57	20	16	93
College Avenue Placemaking	54	12	14	80	37	8	10	55
Florida A&M Entry Points	12	3	3	18	12	3	3	18
Lake Lafayette and St. Marks Regional Linear Park	122	27	33	182	45	10	12	67
Market District Placemaking	72	16	19	107	38	9	10	57
Midtown Placemaking	170	38	45	253	62	14	17	93
Monroe-Adams Corridor Placemaking	54	12	14	80	20	4	5	29
Northeast Park	77	17	21	115	77	17	21	115
Orange Avenue/Meridian Road Placemaking	32	7	8	47	17	4	4	25
Tallahassee-Leon Community Animal Service Center	48	17	14	79	33	11	9	53

[18] For "Alternative Sewer Solutions Study", BIA experts estimated that there would be approximately 3 to 5 consultants assisting with the project at any given time, but not all full time. A full time equivalent might be 1 to 2 people. The First phase of "Alternative Sewer Solutions Study" would likely be 6 months. Later phases are unknown, but 9 months seems appropriate with about the same workload/consultant use.

The FSU CEFA study team was interested in the total jobs created for the economic impact analysis of individual projects, and used the annual total jobs created for the scoring and equal comparisons of the eleven projects. Figure 2 displays the two values of job creation for eleven projects. Due to the highest estimated total cost, the "Midtown Placemaking" project is expected to generate the most jobs: 253. The numbers of direct, indirect, and induced jobs created are 170, 38, and 45, respectively. While the estimated total cost is distributed evenly to each project year, the "Northeast Park" project had the greatest number of annual jobs created. The annual total number is 115. The project of "Alternative Sewer Solutions Study" creates the least job positions because of its character of non-construction. With the exception of the "Alternative Sewer Solutions Study", the project of "Florida A&M Entry Points" creates the least construction related job positions (totally and annually). As the timeline for the "Florida A&M Entry Points" project is 12 months (1 year), the total and annual job positions created is 18. As can be expected, for each project (when discounting timelines), with the exception of the "Alternative Sewer Solutions Study", projects with higher total costs create more jobs.

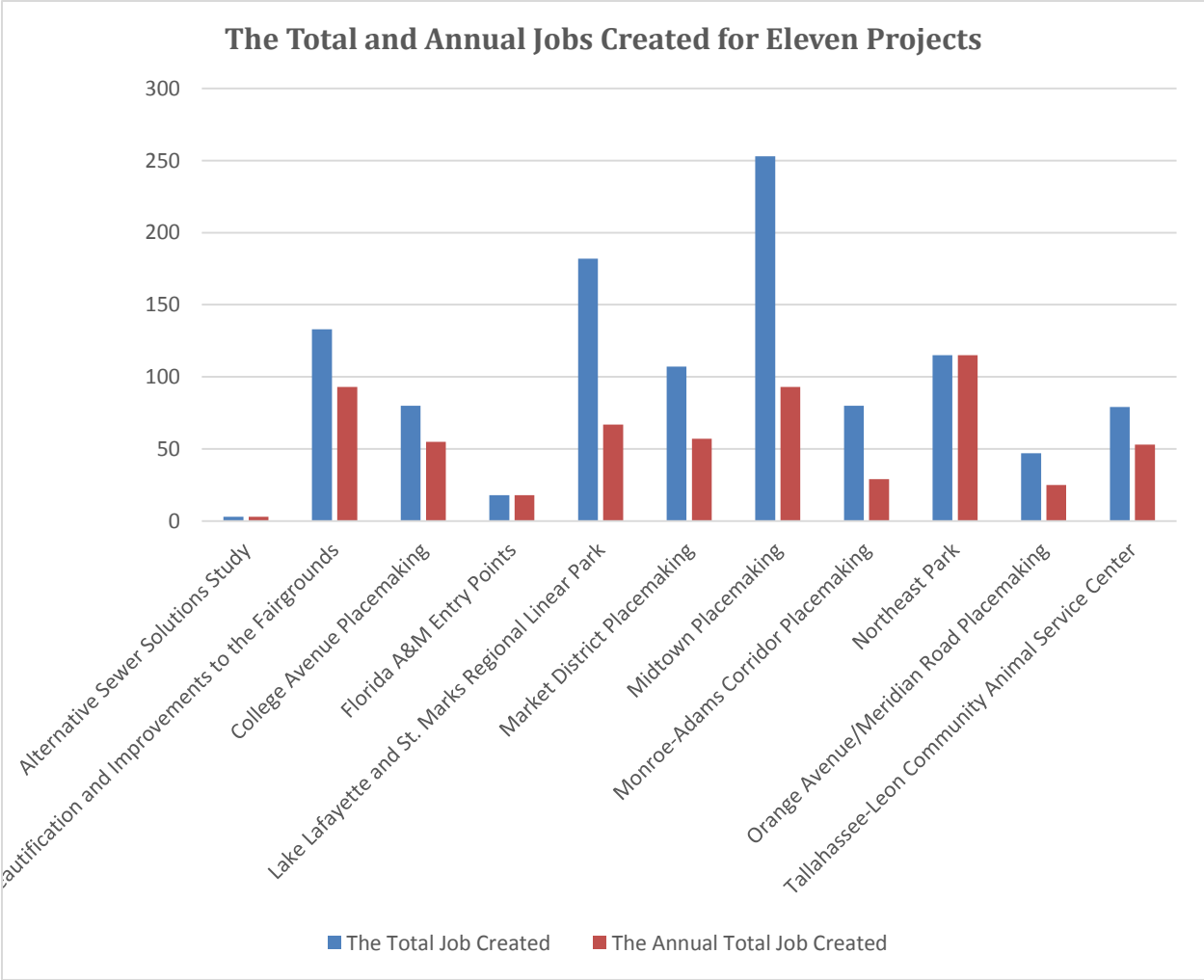

Figure 2. The Total Job Creation and The Annual Total Job Creation for Eleven Projects

The third and fourth factors relate to property values. The FSU CEFA study team used the empirical data on the land use (LU) of Leon County. The empirical data on LU, which was a combined dataset, was both collected from the Florida Department of Revenue (DOR) County Property Appraiser (2016)[19] and provided by the BIA (for years 2011 – 2015). Parcels in Leon County fall in the categories "Residential", "Commercial", "Industrial", "Agricultural", "Institutional", "Governmental", "Miscellaneous", "Centrally Assessed", and "Non-Agricultural Acreage". Table 4 summarizes the estimated changes in average aggregate market value per acre, of intersecting parcels, and within a distance of one quarter mile radius, with the area given by the Blueprint program group. The one quarter mile radius was selected based on the concept "walkshed" suggested by BIA. The "walkshed" is the land area within a defined walking range of a specified location.[20] Due to the limitation of local commercial rent data (due to insufficient observations), FSU CEFA used the changes in commercial LU property value per acre in order to measure commercial rents and reflect commercial development potential. Figure 3 displays the estimated values of these changes, in Columns 2 and 3 in Table 4, respectively.

Table 4. The Changes in Average Aggregate Market Value of Land Use/Commercial Land Use Parcels Intersecting, and within A Distance of a Radius of 0.25 Mile, of the Project Area

Project	Estimated Change in Property Value/Acre (1 Quarter Mile)	Estimated Change in Commercial Property Value/Acre (1 Quarter Mile)
Alternative Sewer Solutions Study	$41	$3,665
Beautification and Improvements to the Fairgrounds	-$4,231	$136
College Avenue Placemaking	$112,584	-$61,044
Florida A&M Entry Points	$24,367	-$1,405
Lake Lafayette and St. Marks Regional Linear Park	$405	-$7,243
Market District Placemaking	$9,165	$11,997
Midtown Placemaking	$1,990	$1,188
Monroe-Adams Corridor Placemaking	$13,112	-$67
Northeast Park	-$53	N.A.
Orange Avenue/Meridian Road Placemaking	$5,437	$2,144
Tallahassee-Leon Community Animal Service Center	$126	N.A.

[19] Data source: http://www.leonpa.org/_dnn/
[20] https://en.wiktionary.org/wiki/walkshed

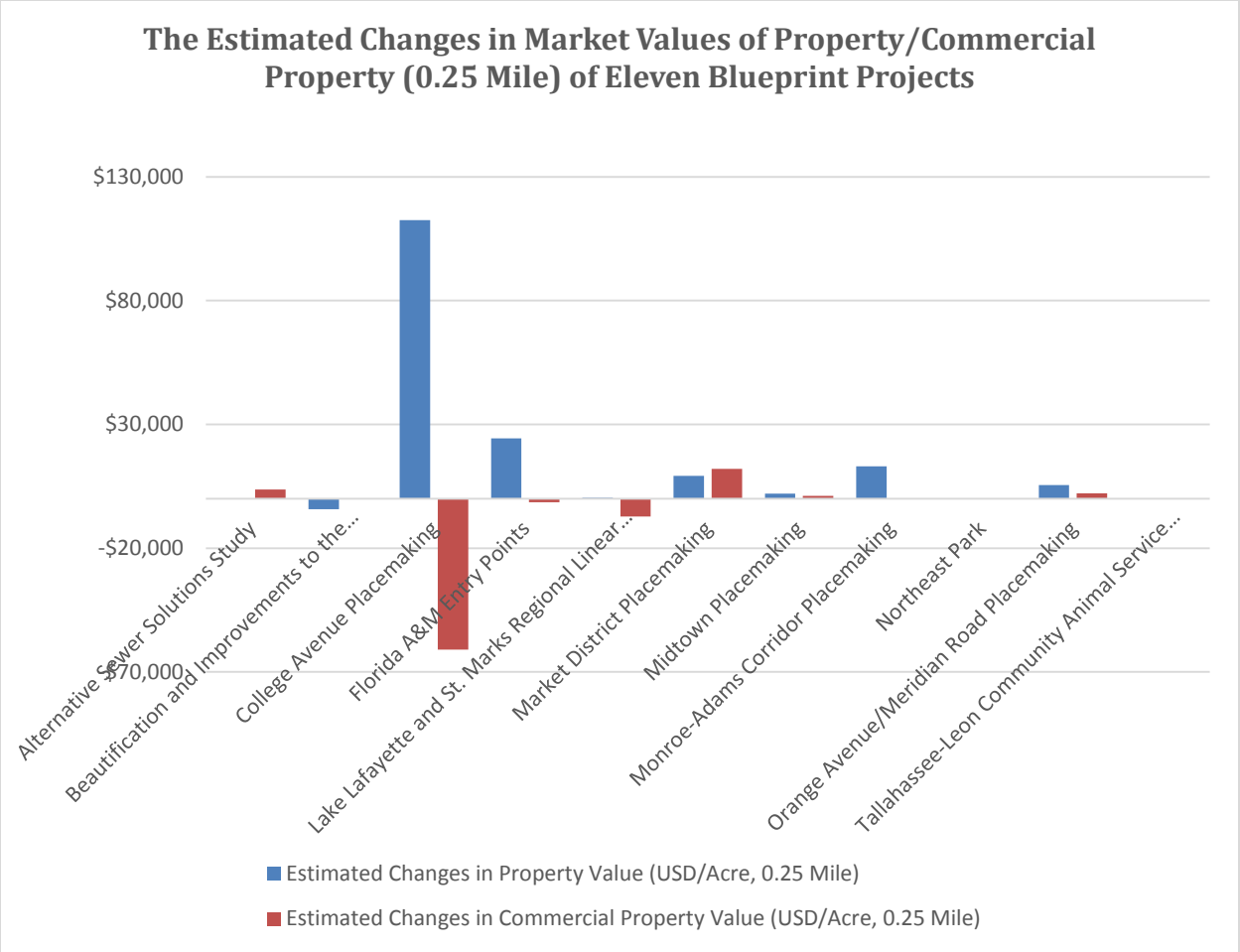

Figure 3. The Estimated Changes in Average Market Values of Property/Commercial Property (within 0.25 Mile) of Eleven Blueprint Projects

Based on the empirical data on the intersecting parcels, and within a distance of one quarter mile radius of the area of each project, the top three projects with high-average estimated improved property market values are: "College Avenue Placemaking", "Florida A&M Entry Points", and "Monroe-Adams Corridor Placemaking". From the aspect of commercial land use, the top three projects are: "Market District Placemaking", "Alternative Sewer Solutions Study", and "Orange Avenue/Meridian Road Placemaking".

A portion of negative values are observed. In Appendix A,[21] the time series data of property values and annual growth rates are listed, showing how the changing values were estimated. In the following

[21] Table A2. The Time Series Market Values of Property/Commercial Property (1 Quarter Mile) of Eleven Blueprint Projects
The top panel lists the average annual property values and average commercial LU property values for the past six years, from 2011 to 2016. The bottom panel lists the corresponding annual growth rates. Some highlights concerning the annual growth rates are discussed

subsection, the data shown above will be normalized as a next step. The normalized scores are used in the weighted sum model for the calculation of final scores and ranking.

The Normalization of Scores

Costs can be defined as a reduction in benefits. The total estimated costs of the eleven projects provided by the Blueprint group were normalized, falling in the range between 0 and 1. The normalized scores of costs then were adjusted by being subtracted by 1. The job creation, changes in average property values and in average commercial property values of "1 quarter mile" are normalized in the regular way. [22] Negative values after normalization are rescaled to the range between 0 and 1.[23] Table 5 summarizes the normalized scores of the four indicators of eleven projects.

Table 5. The Normalized Scores of Four Factors of Eleven Projects

Project	Estimated Time-adjusted Annual Cost	Annual Job Creation, Total	Estimated Changes in Property Value/Acre	Estimated Changes in Commercial Property Value/Acre
Alternative Sewer Solutions Study	0.8042	0.0140	0.0366	0.8859
Beautification and Improvements to the Fairgrounds	0.5676	0.4341	0.0000	0.8376
College Avenue Placemaking	0.7477	0.2567	1.0000	0.0000
Florida A&M Entry Points	0.9213	0.0840	0.2448	0.8165
Lake Lafayette and St. Marks Regional Linear Park	0.6974	0.3127	0.0397	0.9349
Market District Placemaking	0.7419	0.2661	0.1147	1.0000
Midtown Placemaking	0.5787	0.4341	0.0533	0.8520
Monroe-Adams Corridor Placemaking	0.8660	0.1354	0.1485	0.8367
Northeast Park	0.4757	0.5368	0.0367	0.8357
Orange Avenue/Meridian Road Placemaking	0.8874	0.1167	0.0828	0.8651
Tallahassee-Leon Community Animal Service Center	0.7477	0.2474	0.0373	0.8357

The following paragraphs discuss the individual indicator rankings and characteristics of each project.

[22] Normalization method: https://www.mathworks.com/matlabcentral/newsreader/view_thread/330624; https://www.mathworks.com/help/matlab/ref/norm.html
[23] Appendix B

From the aspect of individual indicators, the rankings of eleven projects are different, underscoring the different characteristics of the eleven investment projects. The estimated time-adjusted annual cost scores show the level of financial burden. The higher the score, the less the investment needed. The "Florida A&M Entry Points" has the highest score; 0.9213, while the project, "Northeast Park", needs the most investment on an annual basis, with the lowest score of; 0.4757. Other projects which need low annual investments are "Orange Avenue/Meridian Road Placemaking" and "Monroe-Adams Corridor Placemaking", ranking second and third, respectively. The estimated annual cost is irrelevant to the size of the construction area.[24] From the aspect of stimulating new growth opportunities, the investment[25] for the project "Northeast Park" which has the highest score; 0.5368, will create the greatest number of annual construction jobs. The "Florida A&M Entry Points" has the lowest job creation score: 0.0840.[26]

The fourth column (of Table 5) provides information of the impacted areas of the projects (within distances of one-quarter mile) that have the highest level of changes in average property market value and the most potential for improved property value. The top three ranked projects for the one quarter mile range are: "College Avenue Placemaking", "Florida A&M Entry Points", and "Monroe-Adams Corridor Placemaking."

From the aspect of commercial development, the project which has the highest commercial LU value score in the one quarter mile study range is "Market District Placemaking". Due to the large decreasing in the estimated improved commercial LU of "College Avenue Placemaking"; -$61,044/acre, the score of "College Avenue Placemaking" projects is 0.0000. The commercial development scores of other projects, including projects without commercial LU, are clustering around an average value: 0.8556.

[24] See the flyers of eleven projects for the details of construction/study maps.
[25] Based on the investment data for the construction activity of the project.
[26] The job creation of "Alternative Sewer Solutions Study" is estimated directly by BIA experts. The job type is not construction related.

Computing Weights

Based on the methodology involved with the MAU analysis, FSU CEFA calculated weights by using the Reference Comparison (100 + criteria) Approach. The Paired Comparison, or Balance Beam, Approach (10 - 100 criteria) is discussed in Appendix B. The steps involving the derivation of the overall weights and the weights for each indicator are listed in Table 6. Additional economic guidance from the BIA team relating to the project specifications will assist in the further refinement of the estimation weights.

Table 6. Weights for Evaluation Factors Using the Reference Comparison Method

Reference Comparison	**[3, 9, and 14], accepted and practical to perform by hand, a good choice for 100 + criteria**	1. Choose the evaluation criterion that is important or significant in the set
		2. Assign the most significant criterion a value of 3
		3. Rank the remaining criteria as follows: 'as important as' (3), 'slightly less important' (2), and 'much less important' (1), determined by the Evaluation Team
		4. Normalize so that they sum to 1

Criteria	Grade (3, 2, or 1)	Weight
Est. Time-adjusted Annual Cost	3	.335
Annual Job Creation	3	.335
Est. Changes in Average Property Value	2	.220
Est. Changes in Average Commercial LU Property Value	1	.110

Overall Score and Ranking Results (Reference Comparison Method)

Table7. The Total Scores and Rankings of Eleven Projects

Project	Total Score	Ranking	CCQ Prioritization Score
Alternative Sewer Solutions Study	0.3796	11	5
Beautification and Improvements to the Fairgrounds	0.4277	10	5
College Avenue Placemaking	0.5565	1	20
Florida A&M Entry Points	0.4805	2	20
Lake Lafayette and St. Marks Regional Linear Park	0.4500	5	15
Market District Placemaking	0.4729	3	20
Midtown Placemaking	0.4447	7	10
Monroe-Adams Corridor Placemaking	0.4601	4	15
Northeast Park	0.4392	8	10
Orange Avenue/Meridian Road Placemaking	0.4498	6	15
Tallahassee-Leon Community Animal Service Center	0.4335	9	10

After assigning weights to the four indicators, the overall scores of the eleven projects are listed in the second column of Table 7 for one-quarter mile study distance. The third and fourth columns list the corresponding priority rankings and the CCQ Prioritization Score. Based on the comprehensive economic impact analysis, the project "College Avenue Placemaking" has the highest overall score; 0.5565. The second to fourth projects are "Florida A&M Entry Points", "Market District Placemaking", and "Monroe-Adams Corridor Placemaking". The spread of the overall scores of eleven projects is relatively large: the difference between the highest value and the lowest value is 0.1769, taking the 31.79% of the highest score. Column 4 shows the total points of "Invest in Economic Development" based on the evaluation scale of the: "Revised Blueprint' Promise Criteria and Evaluation Scale", which is also referred as CCQ Prioritization Score. The top-three ranked projects "College Avenue Placemaking", "Florida A&M Entry Points", and "Market District Placemaking" are endowed with the CCQ Score: 20. Projects ranked 4 to 6 are endowed with the score 15. Projects ranked from 7 to 9 have the CCQ Score: 10. And the last-ranked projects, "Beautification and Improvements to the Fairgrounds" and "Alternative Sewer Solutions Study", have the lowest CCQ Score: 5.

Conclusions

In 2017, the BIA commissioned the Florida State University Center for Economic Forecasting and Analysis (FSU CEFA) to conduct an economic impact analysis of eleven Blueprint projects in order to provide estimates of the individual and overall economic impacts of those projects in the Leon County area. In addition, the FSU CEFA study team, based on four economic criteria, identified the priority rankings of the BIA projects. The rankings were provided as one aspect in the scoring criteria used by the BIA, as a means to aid in the infrastructure investment decision-making process. FSU CEFA initially conducted a literature review of the infrastructure investment analysis in order to design and develop the model that would be most suitable for this study. The research team ultimately selected the Multi-Attribute Utility (MAU) analysis as the main economic valuation and modeling tool for the BIA analysis of the proposed eleven projects. The FSU CEFA study team also examined the infrastructure categories by various definitions and categorized the projects into the "broad social infrastructure" category. The indicators selected in order to make equal comparisons among projects were: estimated time-adjusted annual cost, estimated annual total (construction related) job creation, average property value, and average commercial land use (LU) property value. The weighting method was developed based on the Reference Comparison Approach.

From the perspective of individual indicators, the rankings are different for each project. The top ranked projects by individual indicators are: the "Florida A&M Entry Points" for the lowest estimated annual cost, the "Northeast Park" for the greatest number of annual total jobs created, "College Avenue Placemaking" for its most potential in property value improvement and "Market District Placemaking" for its commercial development. After assigning weights to the four indicators, the project of "College Avenue Placemaking" was ranked the highest. The study team found that the other projects that had high rankings based on their economic impacts scores are: "Florida A&M Entry Points", "Market District Placemaking", and "Monroe-Adams Corridor Placemaking".

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Appendix A

Table A1. The List of the Multiple-Criteria Decision Making (MCDM) Methods

Name
▪ Aggregated Indices Randomization Method (AIRM) ▪ Analytic hierarchy process (AHP) ▪ Analytic network process (ANP) ▪ Best worst method (BWM) ▪ Characteristic Objects METhod (COMET) ▪ Choosing By Advantages (CBA) ▪ Data envelopment analysis ▪ Decision EXpert (DEX) ▪ Disaggregation – Aggregation Approaches (UTA*, UTAII, UTADIS) ▪ Rough set (Rough set approach) ▪ Dominance-based rough set approach (DRSA) ▪ ELECTRE (Outranking) ▪ Evaluation Based on Distance from Average Solution (EDAS) ▪ Evidential reasoning approach (ER) ▪ Goal programming (GP) ▪ Grey relational analysis (GRA) ▪ Inner product of vectors (IPV) ▪ Measuring Attractiveness by a categorical Based Evaluation Technique (MACBETH) ▪ Multi-Attribute Global Inference of Quality (MAGIQ) ▪ **Multi-attribute utility theory (MAUT)** ▪ Multi-attribute value theory (MAVT) ▪ New Approach to Appraisal (NATA) ▪ Nonstructural Fuzzy Decision Support System (NSFDSS) ▪ Potentially All Pairwise RanKings of all possible Alternatives (PAPRIKA) ▪ PROMETHEE (Outranking) ▪ Stochastic Multicriteria Acceptability Analysis (SMAA) ▪ Superiority and inferiority ranking method (SIR method) ▪ Technique for the Order of Prioritisation by Similarity to Ideal Solution (TOPSIS) ▪ Value analysis (VA) ▪ Value engineering (VE) ▪ VIKOR method ▪ Fuzzy VIKOR method ▪ Weighted product model (WPM) ▪ Weighted sum model (WSM) ▪ Rembrandt method

Table A2. The Time Series Market Values of Property/Commercial Property (1 Quarter Mile) of Eleven Blueprint Projects

Project	Property Type	2011	2012	2013	2014	2015	2016
Alternative Sewer Solutions Study	Total	$20,842	$19,808	$19,612	$20,131	$20,599	$21,048
	Commercial	$69,723	$75,020	$75,649	$77,246	$81,810	$86,232
Beautification and Improvements to the Fairgrounds	Total	$147,021	$136,023	$130,790	$120,902	$121,357	$123,953
	Commercial	$195,027	$179,393	$173,313	$172,022	$189,724	$195,708
College Avenue Placemaking	Total	$2,948,761	$2,758,981	$2,788,470	$2,942,301	$3,216,529	$3,468,372
	Commercial	$2,340,047	$2,167,303	$2,205,427	$2,252,780	$2,250,209	$2,010,441
Florida A&M Entry Points	Total	$698,218	$664,215	$655,535	$716,983	$762,779	$811,349
	Commercial	$345,069	$328,129	$328,556	$319,622	$324,076	$337,971
Lake Lafayette and St. Marks Regional Linear Park	Total	$21,031	$20,293	$20,305	$22,843	$22,541	$22,969
	Commercial	$37,092	$46,877	$47,262	$208,230	$205,923	$193,187
Market District Placemaking	Total	$331,681	$326,549	$333,535	$351,008	$367,236	$374,817
	Commercial	$692,223	$654,315	$674,573	$699,674	$726,740	$749,870
Midtown Placemaking	Total	$569,372	$542,407	$535,902	$554,578	$573,186	$579,237
	Commercial	$801,237	$770,740	$761,004	$784,337	$803,400	$807,154
Monroe-Adams Corridor Placemaking	Total	$844,084	$817,650	$819,364	$878,412	$875,213	$907,334
	Commercial	$126,914	$122,210	$125,938	$124,643	$124,025	$126,579
Northeast Park	Total	$5,879	$5,626	$5,614	$5,641	$5,641	$5,607
	Commercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Orange Avenue/Meridian Road Placemaking	Total	$408,541	$393,105	$380,616	$408,142	$403,249	$434,895
	Commercial	$280,069	$279,246	$278,772	$274,527	$284,632	$290,594
Tallahassee-Leon Community Animal Service Center	Total	$93,880	$89,532	$88,858	$99,840	$97,965	$94,507
	Commercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Annual Growth Rate						
Project	**Property Type**	**2012**	**2013**	**2014**	**2015**	**2016**
Alternative Sewer Solutions Study	Total	-5.09%	-0.99%	2.62%	2.30%	2.16%
	Commercial	7.32%	0.84%	2.09%	5.74%	5.26%
Beautification and Improvements to the Fairgrounds	Total	-7.78%	-3.92%	-7.86%	0.38%	2.12%
	Commercial	-8.36%	-3.45%	-0.75%	9.79%	3.11%
College Avenue Placemaking	Total	-6.65%	1.06%	5.37%	8.91%	7.54%
	Commercial	-7.67%	1.74%	2.12%	-0.11%	-11.27%
Florida A&M Entry Points	Total	-4.99%	-1.32%	8.96%	6.19%	6.17%
	Commercial	-5.03%	0.13%	-2.76%	1.38%	4.20%
Lake Lafayette and St. Marks Regional Linear Park	Total	-3.57%	0.06%	11.78%	-1.33%	1.88%
	Commercial	23.41%	0.82%	148.29%	-1.11%	-6.38%
Market District Placemaking	Total	-1.56%	2.12%	5.11%	4.52%	2.04%
	Commercial	-5.63%	3.05%	3.65%	3.80%	3.13%
Midtown Placemaking	Total	-4.85%	-1.21%	3.43%	3.30%	1.05%
	Commercial	-3.88%	-1.27%	3.02%	2.40%	0.47%
Monroe-Adams Corridor Placemaking	Total	-3.18%	0.21%	6.96%	-0.36%	3.60%
	Commercial	-3.78%	3.00%	-1.03%	-0.50%	2.04%
Northeast Park	Total	-4.41%	-0.20%	0.47%	0.01%	-0.60%
	Commercial	N.A.	N.A.	N.A.	N.A.	N.A.
Orange Avenue/Meridian Road Placemaking	Total	-3.85%	-3.23%	6.98%	-1.21%	7.56%
	Commercial	-0.29%	-0.17%	-1.53%	3.61%	2.07%
Tallahassee-Leon Community Animal Service Center	Total	-4.74%	-0.76%	11.65%	-1.90%	-3.59%
	Commercial	N.A.	N.A.	N.A.	N.A.	N.A.

Based on the information provided by BIA Geographic Information System (GIS) experts, FSU CEFA study team excluded data on outlier parcels. These parcels are: Lake Lafayette and St. Marks Regional Linear Park Outlier Parcel "1126200090000", Tallahassee-Leon Community Animal Service Center Outlier Parcel "1127208530000", and Northeast Park Outlier Parcel with irregular valuation increases "1401200050000". The 11.65% increase rate of "Tallahassee-Leon Community Animal Service Center" in 2014 is likely due to the Consolidated Dispatch Agency coming on the tax roll. The high fluctuation of annual growth rates of "Lake Lafayette and St. Marks Regional Linear Park", especially the sharp increase in commercial LU properties in 2012 and 2014 (23.41% and 148.29%, respectively), is due to reclassification of the 30 acre parcel. The 30 acre parcel was reclassified as "Vacant Commercial" in 2013 to "Miscellaneous" in 2014. Only data on parcels were used after the reclassification occurred (i.e., from years 2014 – 2016). All acreage information was adjusted for "Air Parcels".[27]

[27] "Air Parcels" are parcels which the Property Appraiser uses a "PARCEL_TYP" field to signify if the acreage is duplicated.

Appendix B

The standard method to normalize the a set of numbers

$$\text{The unit score}_i = \frac{\text{value}_i - \min(\text{value})}{\max(\text{value}) - \min(\text{value})}$$

How to construct $Y \in (0, 1)$ with the Log-odds Ratio Method

The Log-odds Ratio is a discussion in Papke and Wooldridge (1996) for the development of fractional response model:[28]

$$\text{A continuous number} = \log Z = \log \frac{Y}{1-Y} = F(x_1, x_2, x_3, x_4), \qquad Y \in (0, 1)$$

Steps to Perform Paired Comparison (Balance Beam) and Reference Comparison Methods

Weighting Method and Description Proposed for Eliciting Weights [1, 2, 3, 4, 10, and 14]		Steps
Paired Comparison (Balance Beam Method)	[3, 9, and 14], accepted and practical to perform by hand, a good choice for 10 - 100 criteria	1. Determine a basic ordering
		2. Start with the highest ordered one, express the relative importance with the lower ordered ones in terms of >, <, or = (determined by the evaluation team)
		3. Assign the lowest-order a value of 1
		4. Back solve the system

[28] This transformation method does not work for extreme values 0 or 1.

Appendix C

Summary Table of Scores and Rankings, Based on One Mile, and One-Quarter Mile Distances, from the Proposed Project

Projects	Estimated Time-adjusted Annual Costs	Associated Scores (Weights [1, 0, 0, 0])	Annual Job Creation, Total	Associated Scores (Weights [0.5, 0.5, 0, 0])	Change in Property Value/Acre (1 Quarter Mile)	Associated Scores (Weights [0.375, 0.375, 0.25, 0])	Change in Commercial Property Value/Acre (1 Quarter Mile)	Overall Score	Ranking
Indicator Weights for Overall Scores	0.335		0.335		0.220		0.110		
Alternative Sewer Solutions Study	0.8042	0.8042	0.0140	0.4091	0.0366	0.3160	0.8859	0.3796	11
Beautification and Improvements to the Fairgroun	0.5676	0.5676	0.4341	0.5009	0.0000	0.3756	0.8376	0.4277	10
College Avenue Placemaking	0.7477	0.7477	0.2567	0.5022	1.0000	0.6267	0.0000	0.5565	1
Florida A&M Entry Points	0.9213	0.9213	0.0840	0.5027	0.2448	0.4382	0.8165	0.4804	2
Lake Lafayette and St. Marks Regional Linear Park	0.6974	0.6974	0.3127	0.5051	0.0397	0.3887	0.9349	0.4500	5
Market District Placemaking	0.7419	0.7419	0.2661	0.5040	0.1147	0.4067	1.0000	0.4729	3
Midtown Placemaking	0.5787	0.5787	0.4341	0.5064	0.0533	0.3931	0.8520	0.4447	7
Monroe-Adams Corridor Placemaking	0.8660	0.8660	0.1354	0.5007	0.1485	0.4127	0.8367	0.4602	4
Northeast Park	0.4757	0.4757	0.5368	0.5063	0.0367	0.3889	0.8357	0.4392	8
Orange Avenue/Meridian Road Placemaking	0.8874	0.8874	0.1167	0.5021	0.0828	0.3972	0.8651	0.4498	6
Tallahassee-Leon Community Animal Service Cent	0.7477	0.7477	0.2474	0.4976	0.0373	0.3825	0.8357	0.4335	9

Appendix D

Summary Table of the Original Information of Four Economic Indicators of the Eleven BIA Projects

A	B	C	D	E	F	G	H
Areas	**Project**	**Project Highlights**	**The Scoring Mechanism (Criteria and Weight)**				**Ranking (1 quarter mile)**
			Estimated Total Cost 0.335	**Job Creation, Total 0.335**	**Est. Change in Property Value (USD/Acre, 1 quarter mile) 0.22**	**Est. Change in Commercial Property Value (USD/Acre, 1 quarter mile) 0.11**	
Community Enhancement Districts	Beautification and Improvements to the Fairgrounds	**Redevelopment**, reconfiguer existing uses (lighting, sidewalks, relocated building, and parking access)	$12,000,000	134	-$4,231	$136	10
	College Avenue Placemaking	Visual appeal (visitation) **enhancement**, intersection **improvements** (pedestrain safety, pedestrian walkways, and sidewalk links)	$7,000,000	80	$112,584	-$61,044	1
	Market District Placemaking	**Creation** (sidewalks and trails, a central park space, running trail, benches, lighting, parking, and other amenities, safe pedestrain pathways and attractive landscaping)	$9,400,000	107	$9,165	$11,997	3
	Midtown Placemaking	**Creation** (a unique and pedestrain-friendly sense of place), **improvements** (intersection, streetscaping, sidewalks, crosswalks, benches, lighing, landscaping, and signage)	$22,000,000	253	$1,990	$1,188	7
	Monroe-Adams Corridor Placemaking	**Improvements** (sidewalks, lighting, signage, landscaping, undergrand utilities, and intersection crossings)	$7,000,000	80	$13,112	-$67	4
	Orange Avenue/Meridian Road Placemaking	**Revitalization** (commercial area), **improvements** (stormwater facility, intersection, and bus shelter)	$4,100,000	115	$5,437	$2,144	6
Connectivity	Florida A&M Entry Points	**Enhancement** (intersection)	$1,500,000	17	$24,367	-$1,405	2
Quality of Life	Alternative Sewer Solutions Study	**Alternative methods study** of domestic wastewater treatment and disposal in the unincorporated area	$2,800,000	3	$41	$3,665	11
	Lake Lafayette and St. Marks Regional Linear Park	**Improvements** (off-road trails and broadwalk across the lake), **enhancements** (trailheads), **stormwater studies, ecosystem restoration**	$15,800,000	182	$405	-$7,243	5
	Northeast Park	**Improvements** (55 acres active park <baseball and milti-purpose fields, playground, concession/restroom facilities, sidewalks, lighting>, 45 acres passive park <greenways, trails>)	$10,000,000	115	-$53	N.A.	8
	Tallahassee-Leon Community Animal Service Center	**Improvements** (anaimal shelter building)	$7,000,000	78	$126	N.A.	9