SCHILLERPARK

Landscape Architecture_662

Terrain analysis & GIS

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The complexity of ventricle system is similar to the way streets act as veins connecting movement and force to a place where nature meets humanity and we can interact as one.

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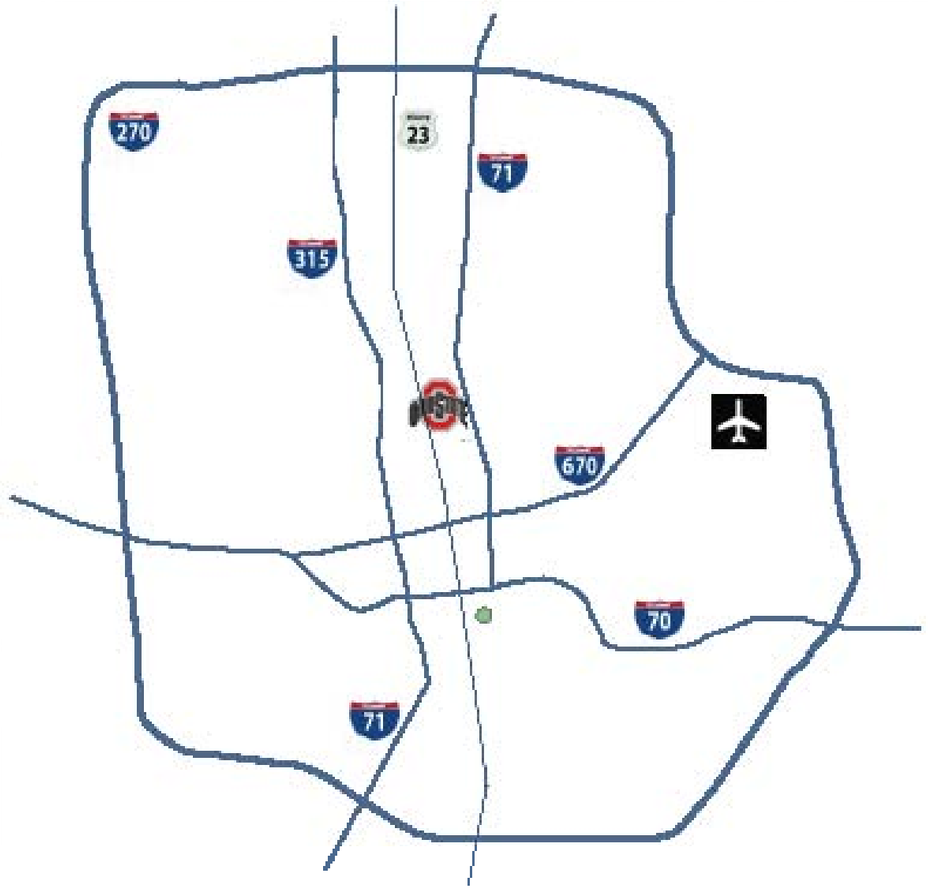
INTRODUCTION:

With a rich history dating back to 1867, Schiller Park has long been a popular destination among multiple generations of people. Years of success and failure raises the question of which direction the park will pursue in the future. Although prediction of the future isn't possible, preparing a planning strategy can be more viable if informed by past and present trends. The main goal of the project is to act as investigative analysts who forecast the future development of Schiller Park. By carefully examining the historical record, changing popu-lous and present condition a five, ten, and twenty year vision for future spending is crafted. Using extensive research to guide decision making, the new plan should respond to present demands while also growing with the community.



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HISTORY: SCHILLER PARK

Originally named Stewart's Grove, the park was built in the early 1800's. It was then purchased by the City of Columbus and was renamed City Park, until finally became known as Schiller Park after Fredrich Schiller, a German poet, philosopher, and historian. During 1891, the Villagers presented the park with a bronze statue of the German poet which had been cast in Germany and transported across the Atlantic. Also, during this time, the fountain was built and the lake was excavated.

Schiller Park is considered the "Village Center" for festivals and neighborhood activities within German Village, South of downtown Columbus. Enclosed by Jaeger Street, City Park, Reinhard, and Deshler Avenue, the park consists of many friendly activities and places of relaxation for the public.

The Huntington Garden Promenade is a model of partnership between public and private enterprises in the spirit of community reinvestment. The promenade is comprised of granite that encircles the Gardens with quotes from Fredrich Schiller himself.

The Umbrella Girl has quite a history as to how she came about within the park. In 1872, Captain J.L. Stelzig, the park's superintendent had the city purchase the statue, Hebe, the goddess of youth located at the South end. Hebe sat in a drinking fountain of youth for the public to gaze at. In the 1920's, her role changed. Her copper umbrella was pieced together with wires to shield her from the plumbed rain which continuously flowed down her umbrella. She had a new location in the center of the shallow pond. In the 1950's, Hebe, vacated the pond, and became known as the "missing umbrella girl". Her disappearance has remained a mystery. Joan Wobst, a Columbus sculptor, offered to sculpt and donate to the German Village Society her version of the of the missing umbrella girl. Her vision was rather of a German girl, rather than the goddess Hebe. Her inspiration was her daughter, Andi. The Umbrella Girl fountain and the Grace Highfield Memorial Garden were dedicated in 1996.

During the 1980's, Schiller Park was in a state of neglect from the city of Columbus and the public. The city's goal was then to revitalize the 23-acre park that would closely resemble the park as if it existed in the late 1800's. Huntington Gardens was taken into effect in 1993. This 7,500 square feet garden and 450 ft brick and stone walkway consisted of tree- lined promenade with three centered perennial beds leading from the park's west entrance to the base of the statue of Fredrich Schiller. Reds and golds dominate the color scheme in honor of Germany's national colors.

Grace Highfield was an important part of the development the historic district. She was an inspiration to all. Her strength and leadership, wisdom and friendships are memorialized at Schiller Park. The Grace Highfield Memorial Garden is island-shaped that consists of boxwoods and 77 varieties of hostas. Landscaped in 1996, the memorial garden and the umbrella girl pay tribute to Grace Highfield, a German Village resident. The garden is maintained through the generosity of a quiet donor.

Today, the park is full of life with the help of Oktoberfest, family reunions, sangerfests, The Ohio State Fair, holiday celebrations, garden tours, festivals, playgrounds, the work of Actor's Theatre, the promenade, a newly renovated recreation center, and the umbrella girl.

Recreation Center

Fountain

The Playground

Actor's Theatre

Huntington Garden Promenade

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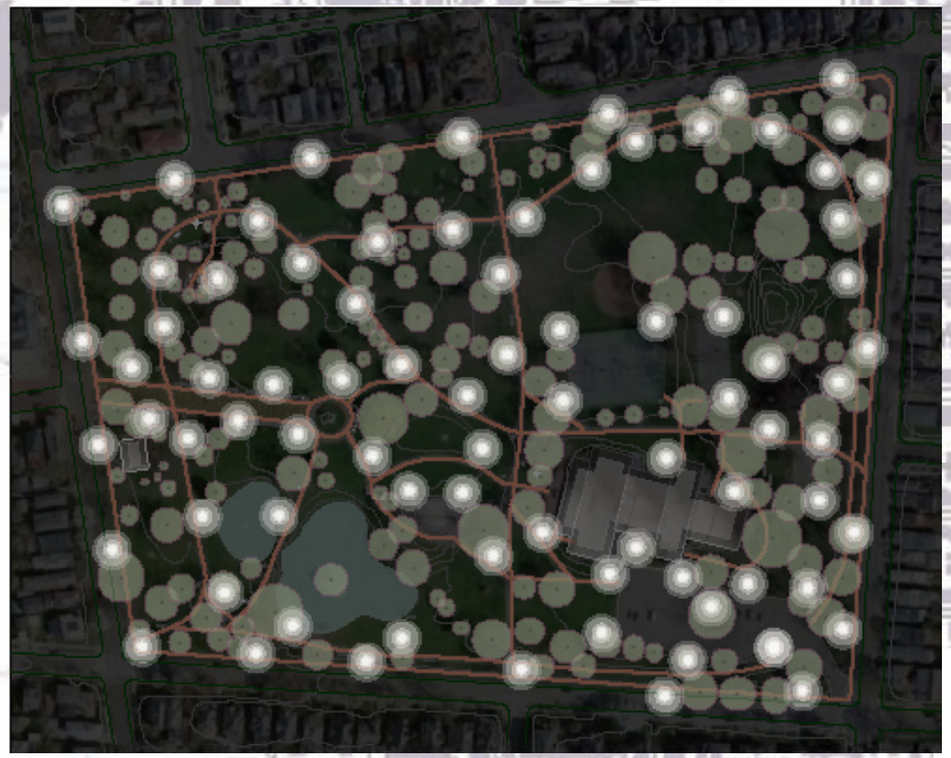
SITE INVENTORY- DAY V NIGHT

CATEGORY	AMOUNT	CONDITION
LIGHT POSTS	88	GOOD
TRASH CANS	36	POOR
PICNIC TABLES	14	FAIR
BENCHES	69	GOOD
LARGE TREES	32	N/A
MEDIUM TREES	76	N/A
SMALL TREES	36	N/A
PATHWAY	2.3 MI	FAIR
BASKETBALL	2	GOOD
SOFTBALL	1	POOR
TENNIS	4	GOOD
PLAYGROUND	2	FAIR
“DOGGY BAG”	3	FAIR
THEATER	1	GOOD
REC CENTER	1	GOOD
PARKING LOT	1	FAIR
BRIDGE	1	GOOD



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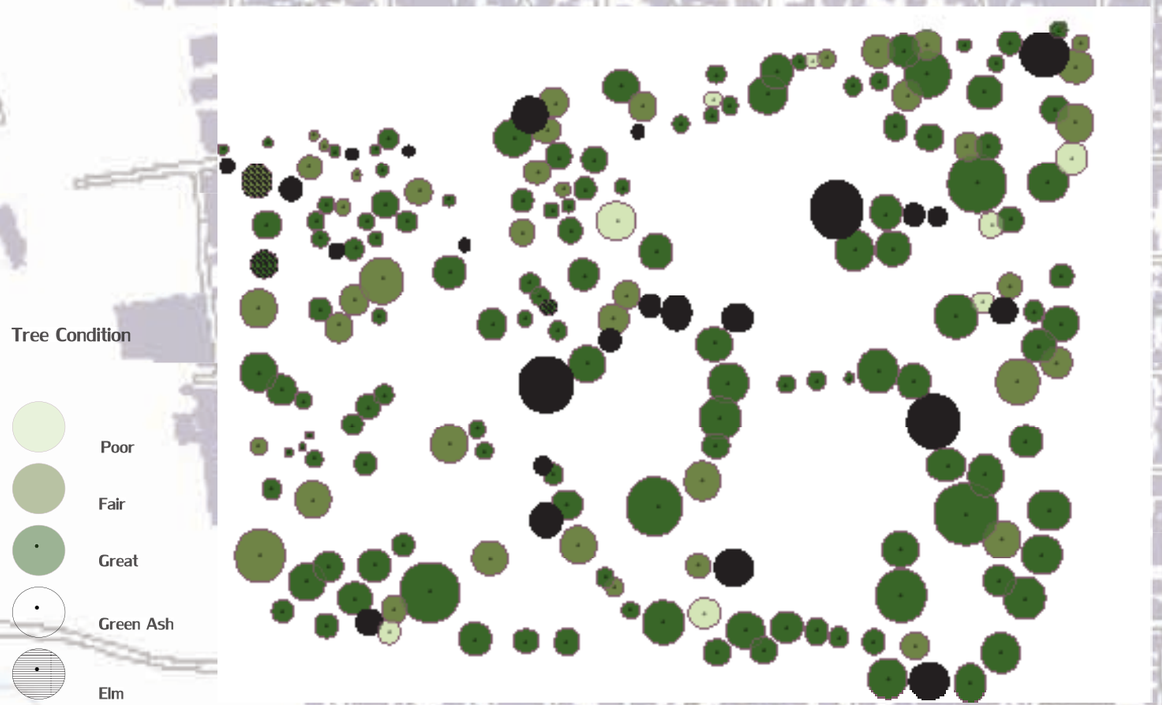
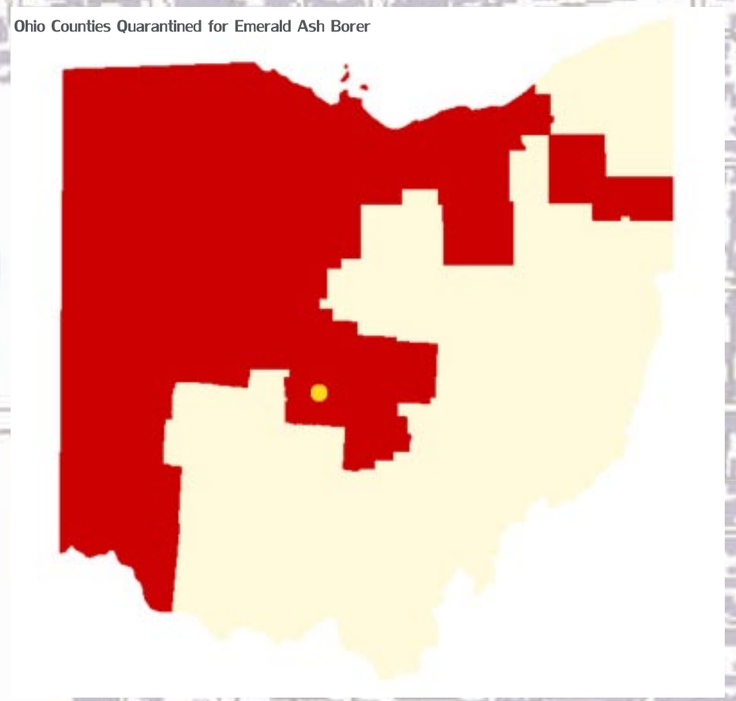
TREE CONDITION_

Objective: We mapped the location, type, canopy size, and health of the trees in Schiller Park. From this we were able to locate the trees that are in poor health, some due old age and others to the wind storm earlier this year, to see what trees need to be cut down. We also looked at the types of trees on the site. The three Green Ash are susceptible to Emerald Ash Borer. The adult beetles nibble on ash foliage but cause little damage. The larvae (the immature stage) feed on the inner bark of ash trees, disrupting the tree's ability to transport water and nutrients (http://www.emeraldashborer.info/). Franklin County is under quarantine for Emerald Ash Borer (http://ashalert.osu.edu). The 24 Elm trees on site are susceptible to Dutch Elm disease. Trees infected by beetles first show wilting, curling and yellowing of leaves on one or more branches in the upper portion of the tree. Large trees may survive and show progressively more symptoms for one or more years. Trees infected through root grafts wilt and die rapidly; this frequently occurs in the spring soon after the trees have leafed out and progresses from the base of the tree upward. The smaller European elm bark beetle feeds in small twigs, usually high in the crown, while the native elm bark beetle bores under the bark of branches 2-4 inches in diameter to feed. (http://www.ag.ndsu.edu/pubs/plantsci/trees/pp324w.htm)

Conclusion: Knowing the types of trees and their condition allows us to know what trees need to be under supervision and what will need to be replaced.





The map represents, in red, the counties that are under quarantine, Franklin county being one of them. The yellow are the counties that are under watch for Emerald Ash Borer.

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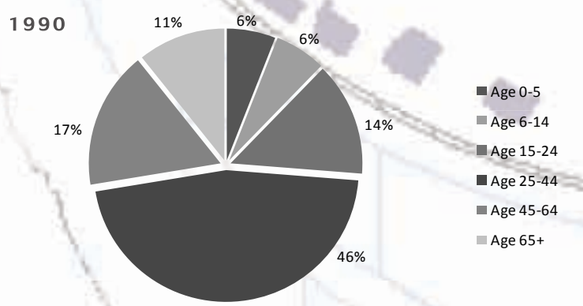
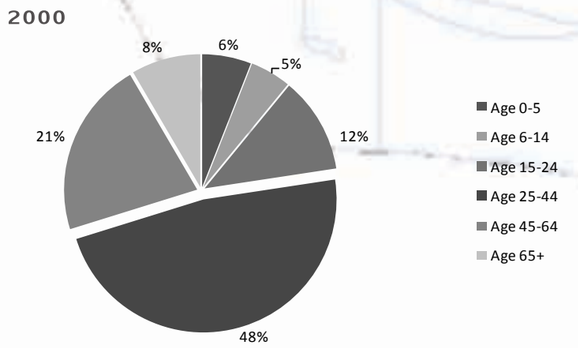
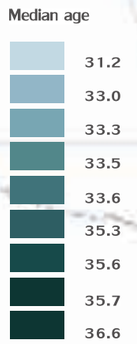
AGE_

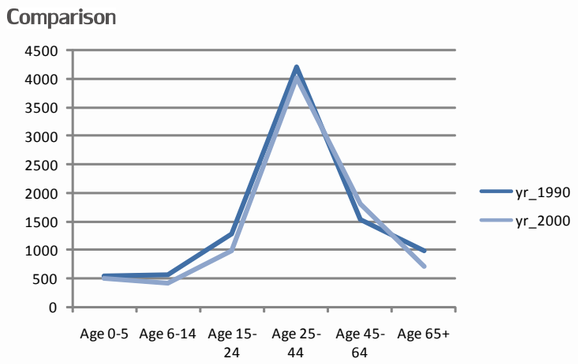
Objective: By looking at the median age by census block group to get an understanding of age, thus allowing us to decipher who uses the park and how we might better fit their needs. The Schiller Park census block has the oldest median age of the nine census blocks we looked at. Looking back and comparing this to the 1990 census, we found that the median age is still highest in Schiller Park meaning that the people living around the park are staying there.

Conclusion: With the median age of 36.6, we see that there is a need to bring in more of the younger crowd so we can now look at activities that might bring the younger people from the surrounding census blocks to Schiller Park.









Method:

Step one_ Open Arch Catalog and create a new shape file within the working folder, making sure to name the shape file appropriately

Step two_ Open Arch GIS and add all necessary attribute layers to the display panel

Step three_ Add the Shape File created in Arch catalog to the layers display panel

Step four_ Open Arc Toolbox and click on analysis - extract feature - clip

Step five_ Export the file as an AI so that it is editable in Adobe Illustrator

Step six_

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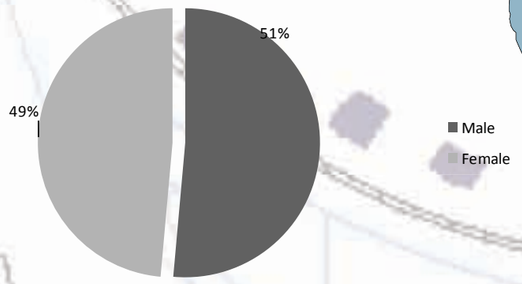
SEX_

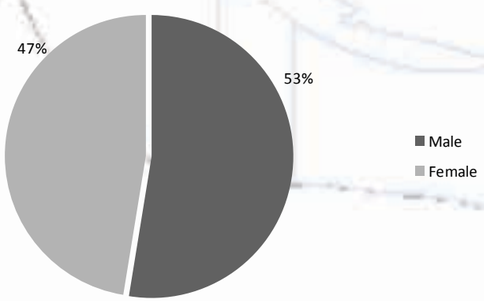
Objective: We first looked at total population and found that Schiller Park was the 2 most populated census block. Sex was broken down by census block to look at how sex relates to age and see if that would allow us to create program. For each census block, the size of the two circles corresponds to the total number of men/women in that census block.

Conclusion: In 1990 51% were male and 49% were female. In 2000 53% were male and 47% were female.

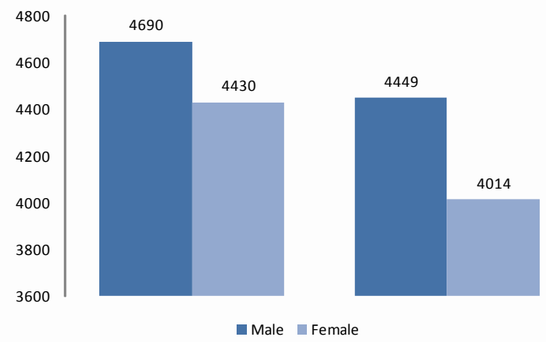
1990

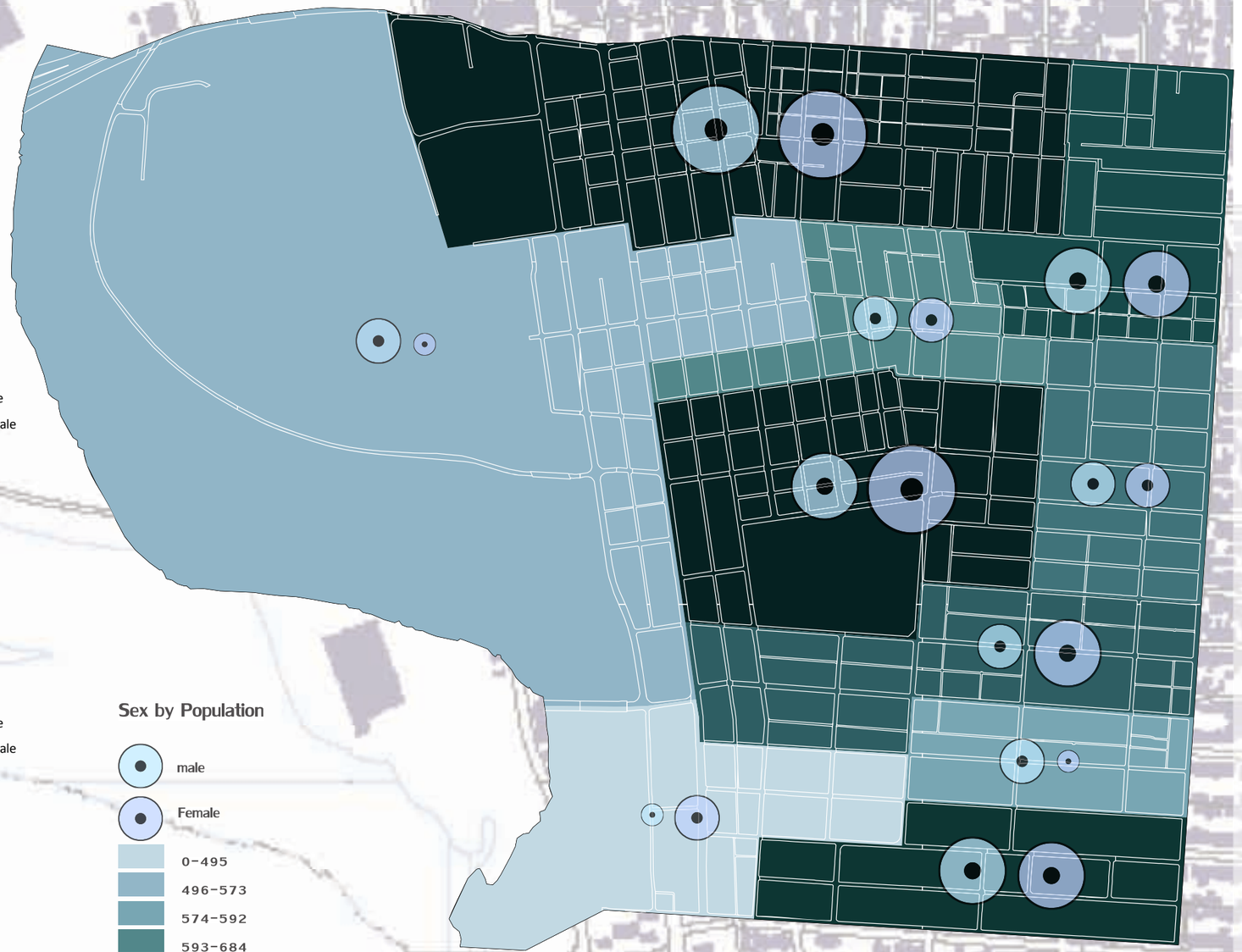


2000



Comparison





Sex by Population

Method:

Step one_ Duplicate the Block Group Attribute Layer from the Median Age Thematic Map – Enter the New Layer and Select Symbology – Quantities – Graduated Colors – Value of Total Population – Select Color Gradient

Step two_ Duplicate Step one Attribute Layer – Select Symbology – Quatities – Graduated Symbols – Value of Total Male Population

Step three_ Duplicate Step two Attribute Layer – Select Symbology – Quatities – Graduated Symbols – Value of Total Fe

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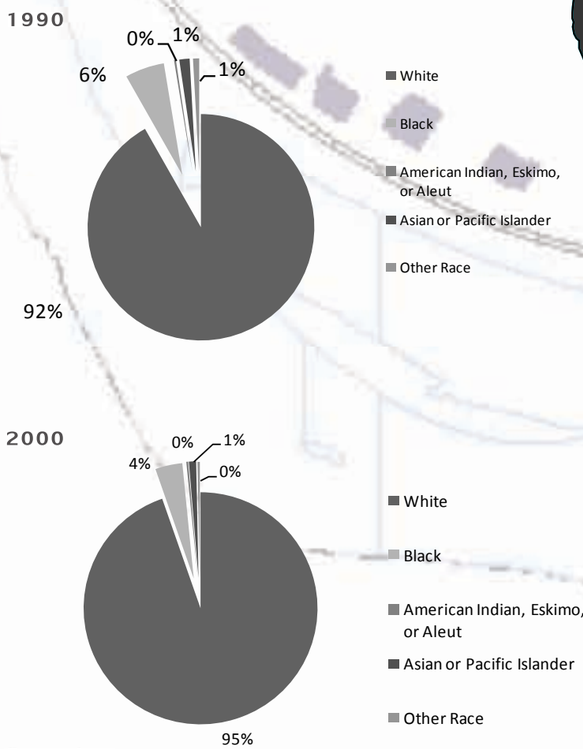
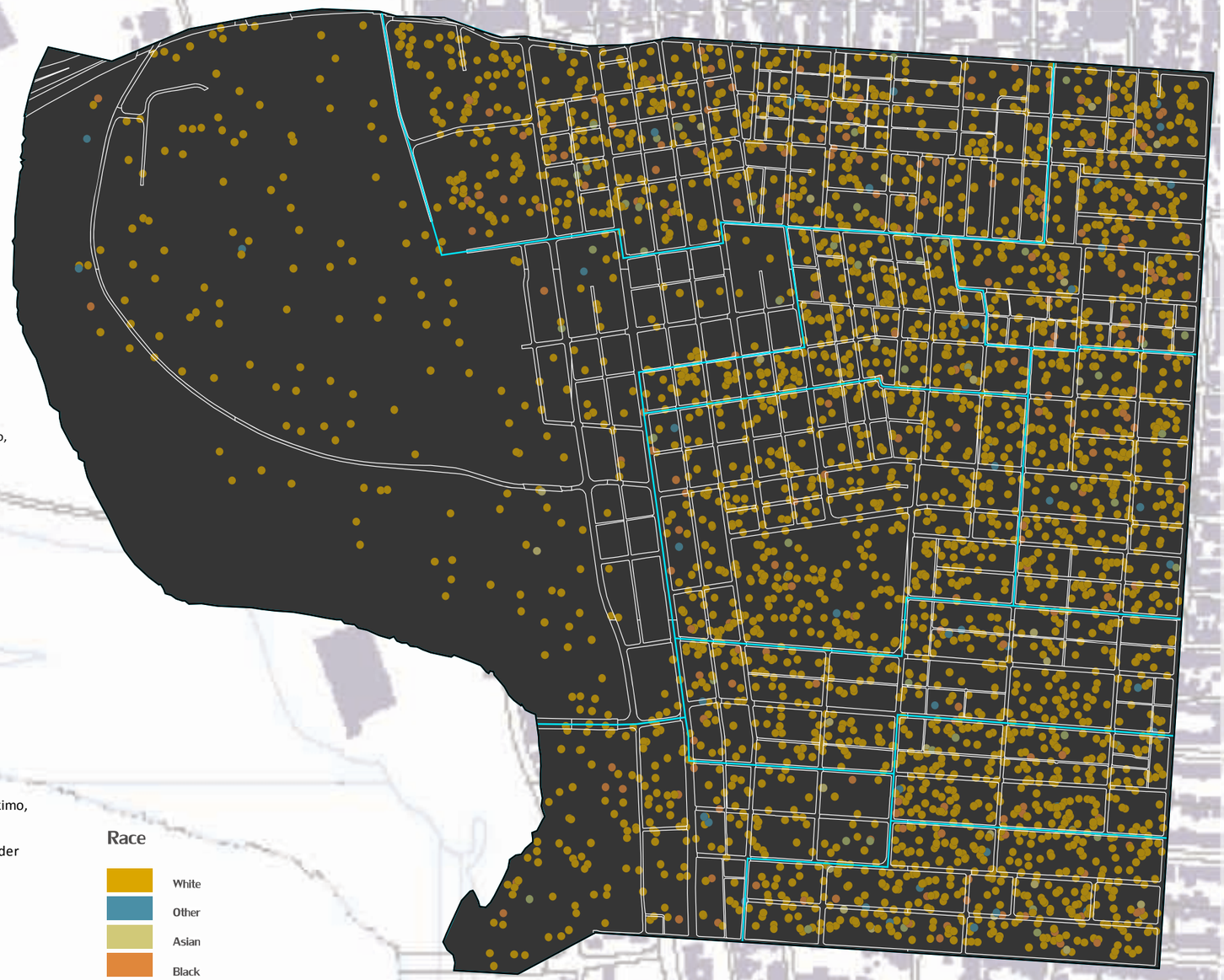
RACE_

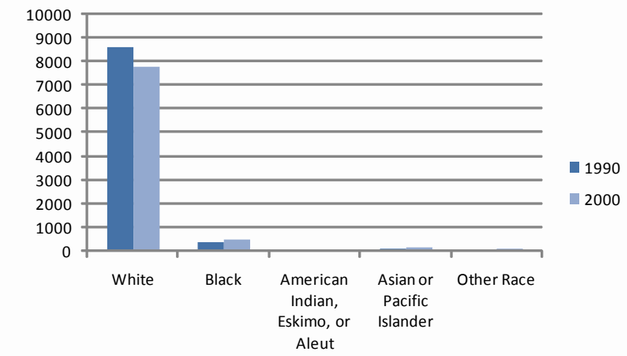
Objective: We looked at what races live around Schiller Park. We found that in 1990 92% were white and 6% were black and then in 2000 95% were white and 4% were black. The other races basically stayed constant. We would like to bring more diversity to the park and community by bring-ing in more minorities.

Conclusion: By reviewing the statistics there is a need to diversify the German village area





Comparison



Method:

Step one_ Duplicate the Block Group Attribute Layer from the Median Age Thematic Map – Enter the New Layer and Select Symbology – Quantities – Dot Density – Add the required Race Fields – Adjust the Gradient, Dot Value, and Dot Size

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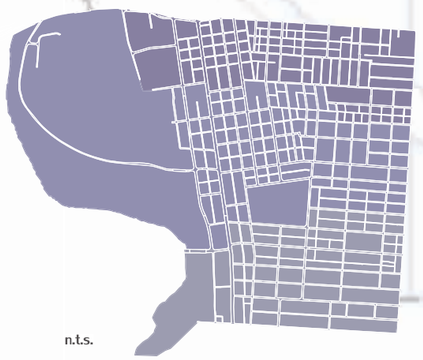
INCOME_

Objective: By examining the median income we are looking to see if people who make more money are more inclined to purchase or rent property closer to public green space. By understanding this we will have a better perceptive their values.

Conclusions: Through the thematic maps we see in 1990 that it was important for people who had a higher median income to live closer to Schiller Park than those with a higher income in the 2000 census. This leads us to believe that the German Village society should address the needs of higher income community member to help get the support and funding through them. Possibly passing a bond that will deal with the up keep of the parks needs.

Income Map_2000



n.t.s.

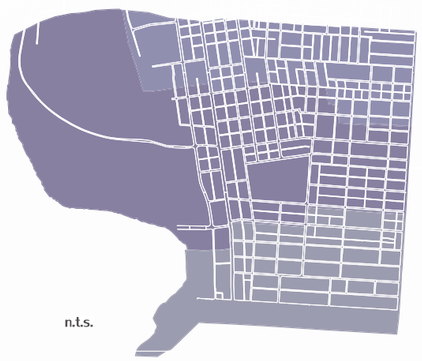
Income by dollar amount

40.682
36,339
28.059

Income by percent increase

65.2
56.8
51.4

Income Map_1990

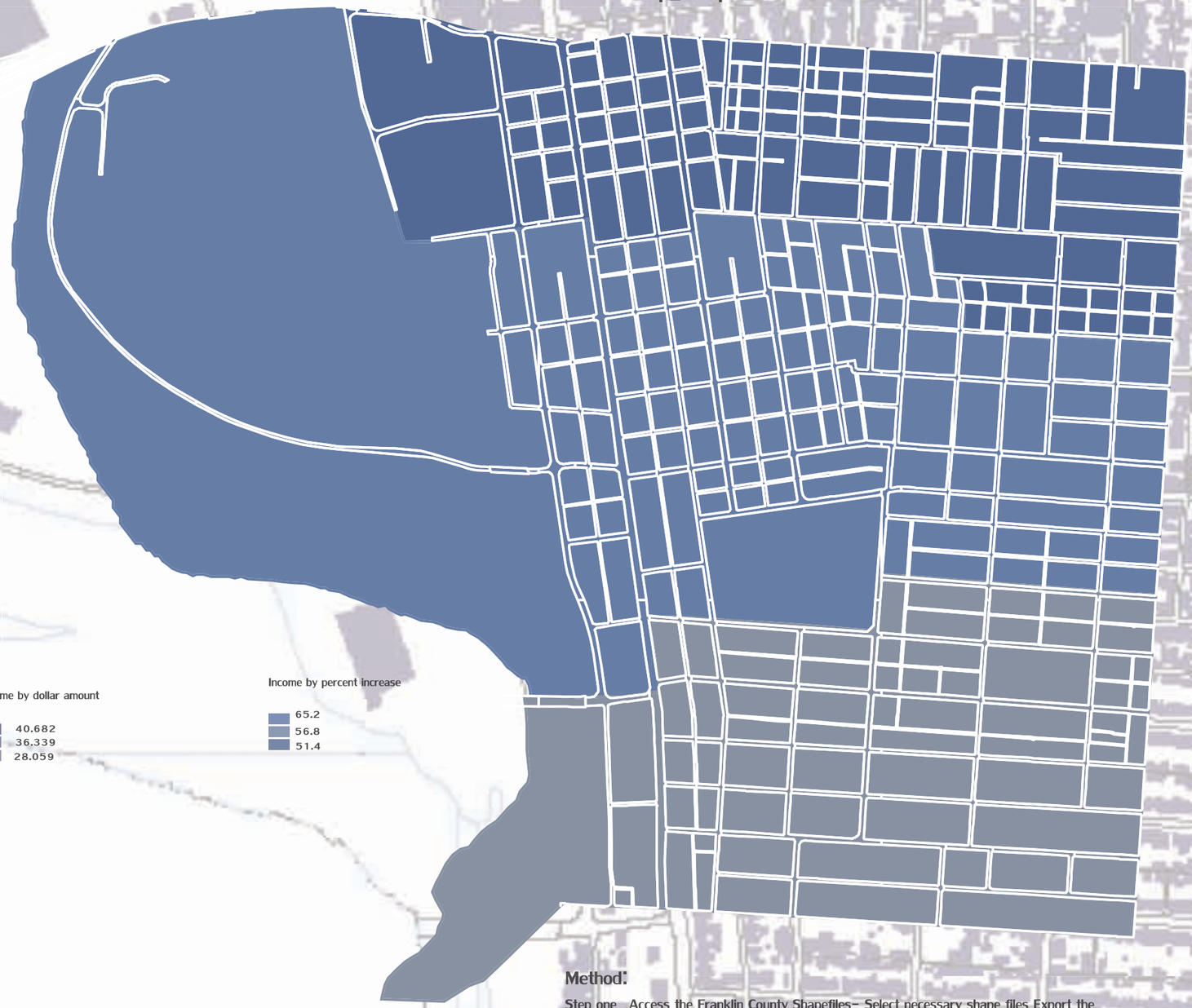


n.t.s.

Income by dollar amount

70.750
62.311
49.400

Income Map_Comparison



Method:

Step one_ Access the Franklin County Shapefiles- Select necessary shape files Export the file as an AI so that it is editable in Adobe Illustrator

Step Two _ Open Illustrator and fill tract based on lowest to highest median income per tract

0 850 1,900 3,800 Feet

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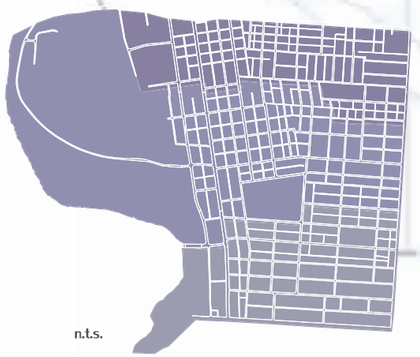
EDUCATION_

Objective: By examining each tract we want to understand whether or not people with Higher education prefer to live near public green space. This map will also give us the ability to cross exam the relationship between education and income.

Conclusions: The Graphs show us that in both the 1990 and 2000 census that the majority of people with a bachelor's degree live in the northern most parcels. By cross examining the median income thematic map with the education map we are able to see that the tract with the highest median income also has the highest number of bachelor's degrees. With this in mind we need to address the fact, and discover what can be done to influence this group to live closer to Schiller Park.

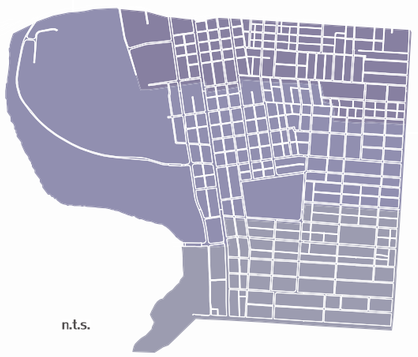
Education Map_1990



Number of Bachlor degrees

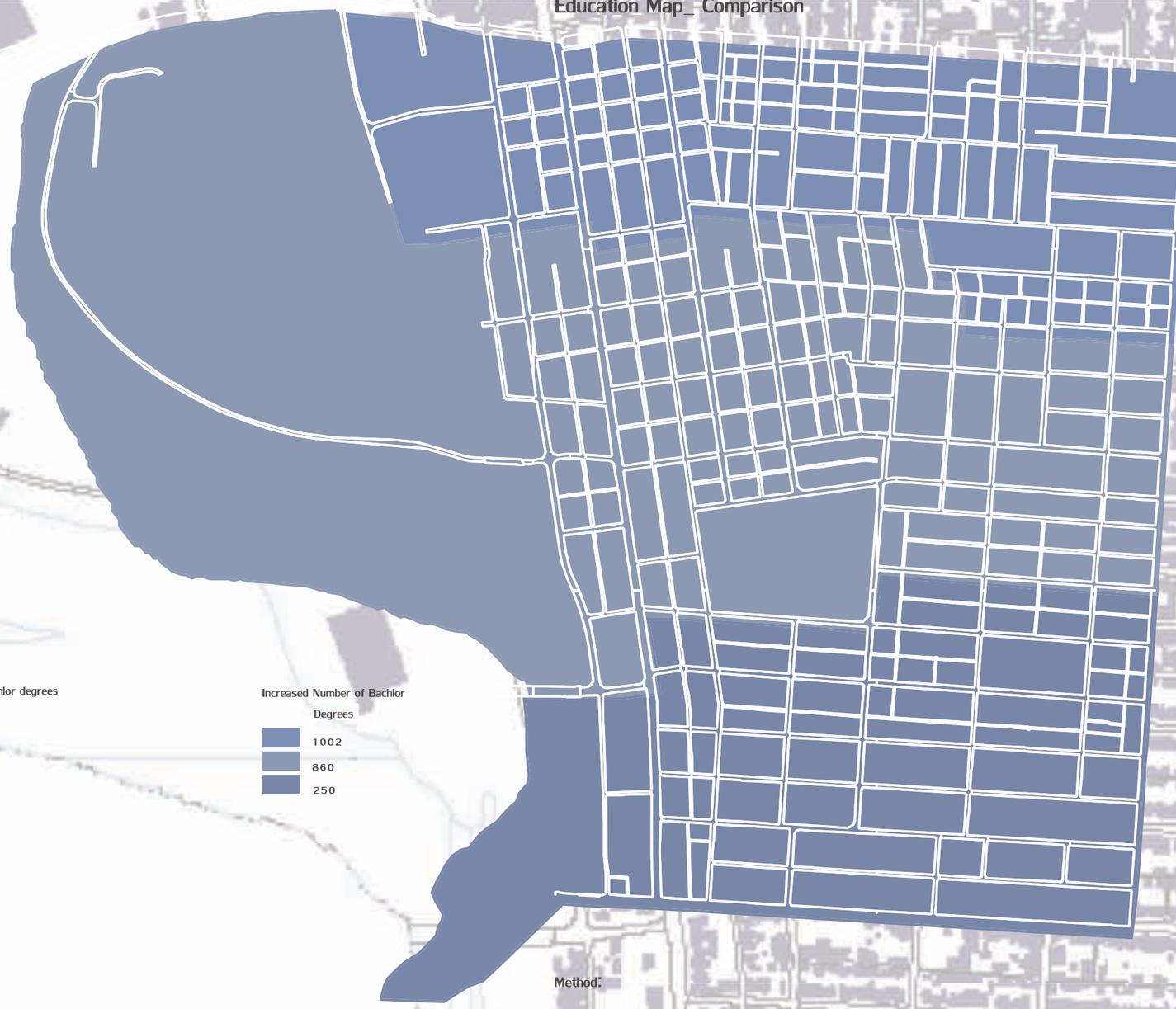
- 702
- 559
- 309

Education Map_2000



- 1704
- 1419
- 559

Education Map_ Comparison



Increased Number of Bachlor Degrees

- 1002
- 860
- 250

Method:

Step One_ Access the Franklin County Shapefiles- Select necessary shape files- Export the file as an AI so that it is editable in Adobe Illustrator

Step Two_ Open Illustrator and fill tract based on fewest bachelor degrees to the tract with the highest number bachelor degrees

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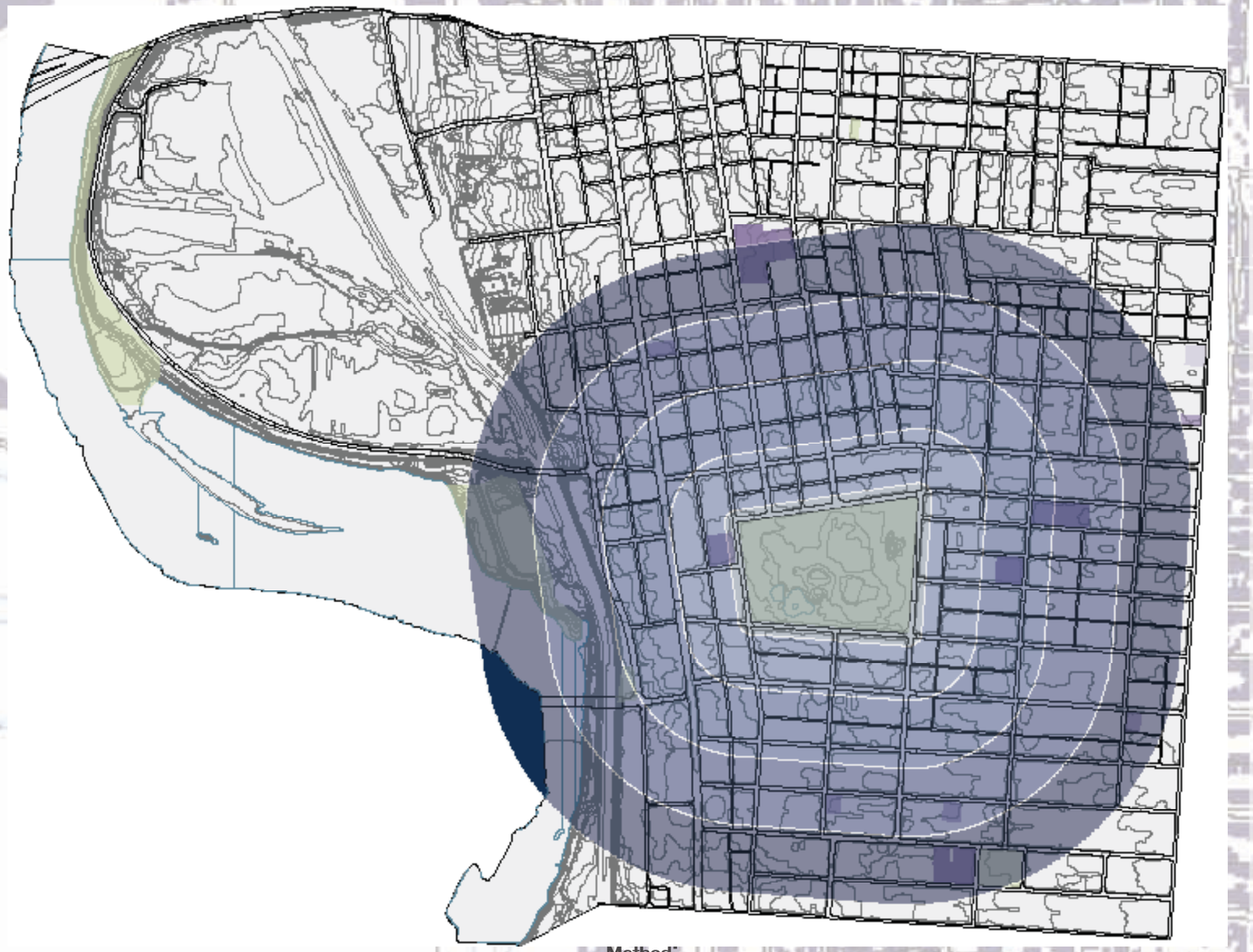
PUBLIC SERVICE THEMATIC MAP_

Objective: By examining the proximity of nearby public services and spaces, a better understanding of the communities' congregation habits and current recreational choices is attained. Within a half mile radius of Schiller are five schools, six churches, and three public parks. Beyond the two-thousand foot ring are two more parks and a public library.

Conclusions: Data collected about school enrollment and race suggested the need for improvement of existing young adult areas (specifically the playground equipment), and the addition of more youth oriented program. Analysis of the total number of active church members, especially those who live locally, implied a definite need for seating, convening spaces, and walking paths. Many of these public facilities were built after the creation of Schiller Park but still developed in close proximity (less than one thousand feet).



Public Services

- Worship
- Schools
- Library
- Parks

Buffer

- 2000'
- 1500'
- 1000'
- 500'
- 100'

Method:

Step One_ Access the Franklin County Shapefiles – Open analysis tools – proximity – multi ring buffer

Step Two_ Export the file as an AI so that it is editable in Adobe Illustrator

0 950 1,900 3,800 Feet

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TABULAR INFORMATION_

Places of Worship	Total	Active
Stowe Baptist Center	85	60
Therman Ave. United Methodist	120	48
Gates Fourth United Methodist	150	70
St. Paul's United Church Of Christ	100	45
Zion Evangelical Lutheran Church	325	325
St. Paul's Lutheran Church	334	334
St.Leo Church	350	350
St. Mary's Church	700	700

n.t.s.

Schools	#of students
St. Paul's Lutheran Church & School	63
Stewart Alternative Elementary	314
Siebert St. Elementary School	316
St. Leo School	373
St. Mary's Grade School	248

n.t.s.

Library

Parsons LIbrary

n.t.s.

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PUBLIC AND PRIVATE GREENS SPACE THEMATIC MAP

Objective: by investigating the public green space and private green space per parcel we will be able to better understand the importance of public green space within the nearby German village community.

Conclusion: By analyzing Private Green space per parcels versus public green space we are able to easily recognize the limited amount of green space per private parcel, the map also enforces the fact that the home takes up the majority of the parcel. With this in mind it is important to recognize the importance of public green space. The thematic map provides evidence that public green space; specifically Schiller Park plays an important and integral part within the community. Not only is Schiller Park a public facility but it is the largest public park in German Village.

Public vs. Private Green

- Public Green Space
- Private Green Space

Frank Fetch Memorial
- -.20 Acres
- -Picnicking - Gardening

Keller
- -.9 Acres
- -Mowed Turf

Moeller
- -1.90 Acres
- -Picnicking – Playground – Walking trail

Schiller Park
- -23.45 Acres
- -Ball Diamonds (Lit)
- -Basketball Court
- -Gazebo
- -Picnicing

Playground

Pond

Recreation Center

Tennis Court (Lit)

Walking Trail

Lower Scioto
- -19.20 Acres
- -Boating - Greenway Trail Access - River/Creek Access -
- -Nature Preserve & Wildlife Area – Picnicking -

n.t.s.

Method:

Step one_ Access the Franklin County Shapefiles - Open Arc Toolbox and click on analysis - extract feature - clip

Step Two symbol selector – options – fill color green

StepThree_ Export the file as an AI so that it is editable in Adobe Illustrator

0 950 1,900 3,800 Feet

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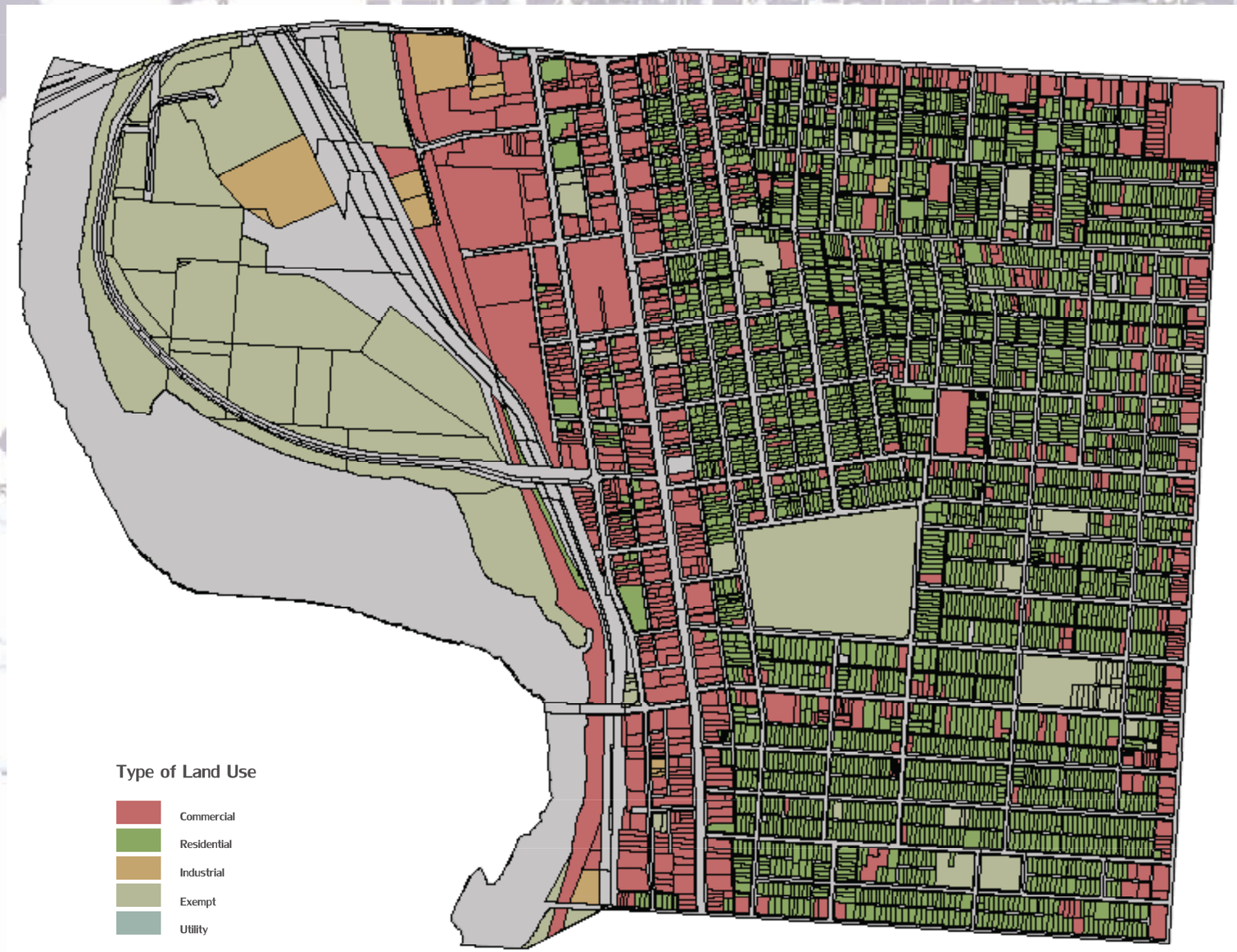
LAND USE THEMATIC MAP_

Objective: By creating this map we want to see the land use and how it is related to Schiller Park. This allows us to see on a larger scale who the park is geared to.

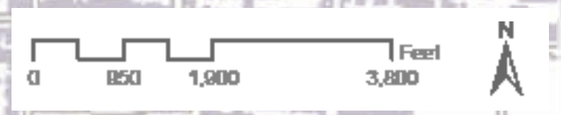
Conclusion: In reviewing the Land use map we see a strong commercial use along High street, and a high residential rate one block east of High St. This make for a great place for people who work or own businesses to live.



Method:

Step one_ Access the Franklin County Shapefiles – Move the Parcel Shapefile to your host folder and upload to the existing map

Step two_ Open the Parcel Attribute Layer – Select Symbology – Categories – Unique Values – Value Field: PCLASS (parcel property class) – Adjust Gradient



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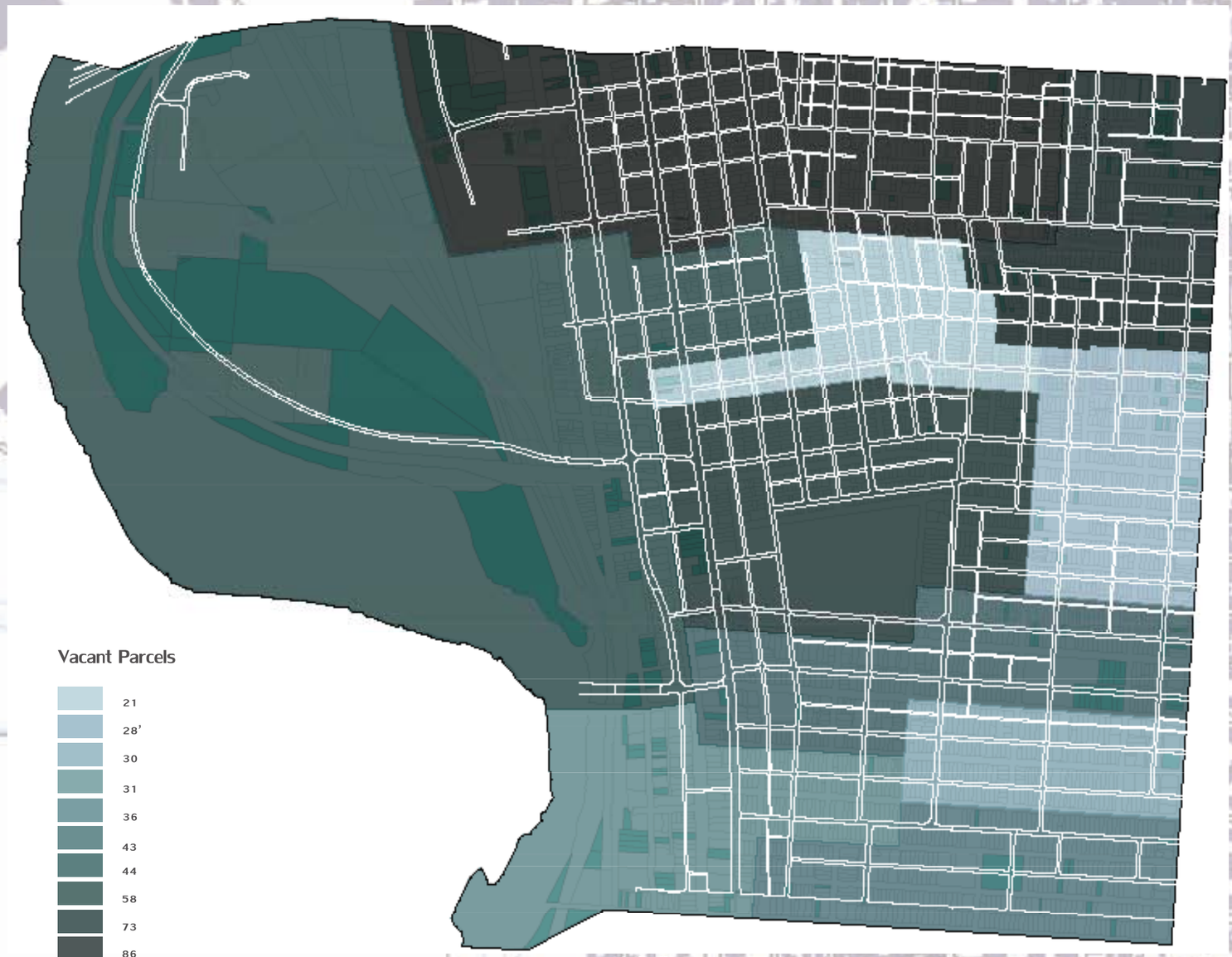
VACANT PARCELS THEMATIC MAP_

Objective: In each census block we looked at the location of vacant parcels with the intention that those vacant parcels could be a possible connection to the park or could be incorporated into the park via a parkway. The graph shows the vacant parcels and which ones have the most vacant parcels. By cross examining this with the Land use we can get a rough idea of what types of buildings may be on the vacant parcels.

Conclusion: Schiller Park census block has vacant parcels near High Street which could be a possible connection to High Street and Whittier Peninsula (The site of the Audubon Nature Center).



Method:

Step one_ Access the Franklin County Shapefiles – Move the Parcel Shapefile to your host folder and upload to the existing map

Step two_ Open the Parcel Attribute Layer – Select Symbology – Categories – Unique Values – Value Field: PROPTYP (property type)

Step three_ Keep field 1 (Vacant Properties) colored and turn the other categories hollow

Step four_ Overlay the Block Group Attribute Layer – Select Symbology – Categories – Unique Values – Housing Units : Vacant – Ad

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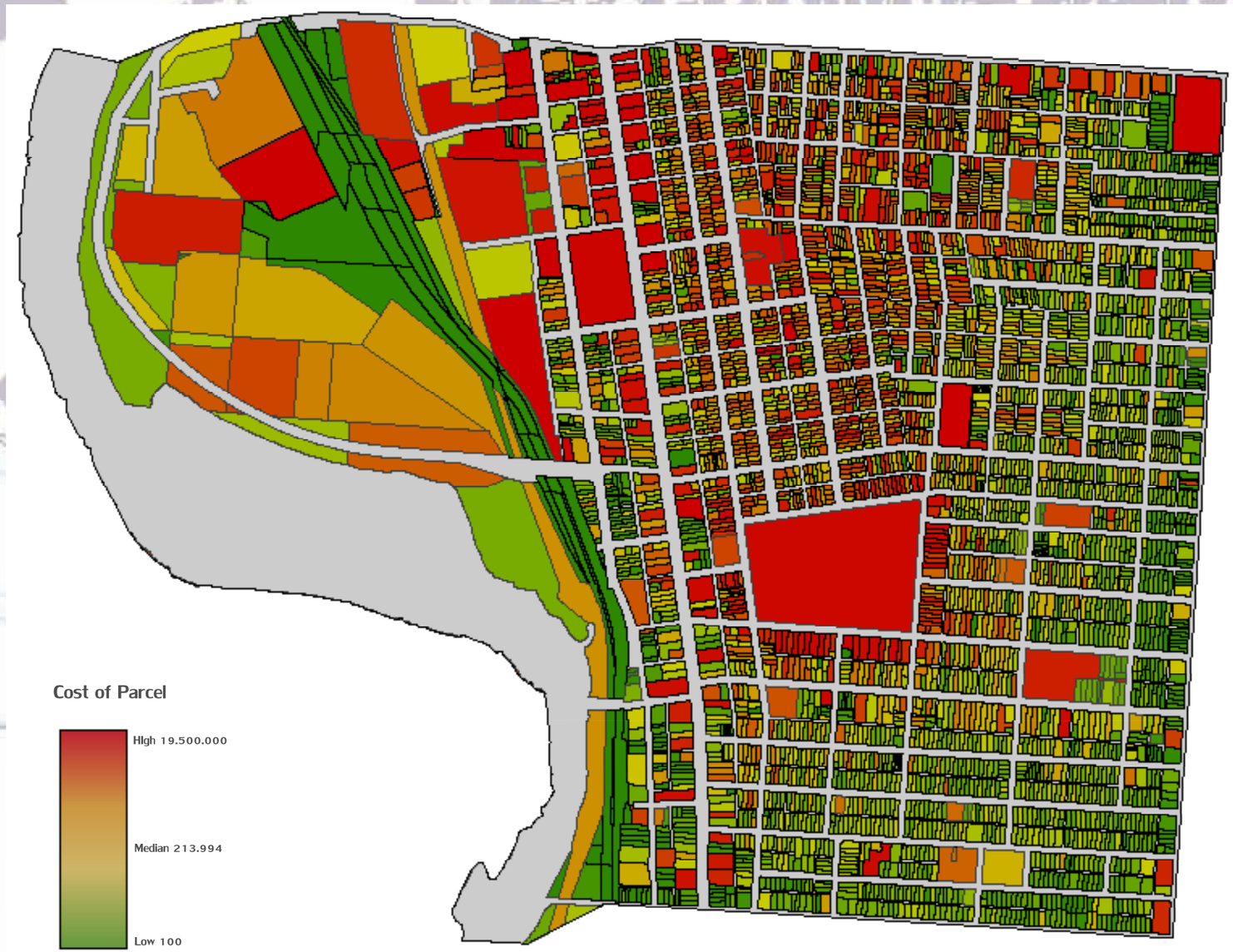
COST PER TOTAL PARCEL_

Objective: We looked at the total appraised value of the parcel with building including both tax exempt and taxable properties. We then looked at parcel price in relation to vacancies to see if the vacant properties would be affordable to purchase and possibly utilize as more park space in the urban fabric.

Conclusion: By understanding the maps we are able to see that the most expensive parcels around Schiller park are to the south end. We are also able to see that many of the vacant properties are very expensive making them unobtainable at this given time.

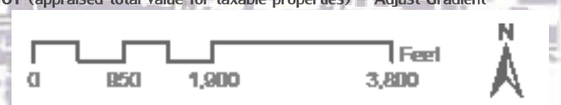


Method:

Step one_ Access the Franklin County Shapefiles – Move the Parcel Shapefile to your host folder and upload to the existing map

Step two_ Open the Parcel Attribute Layer – Select Symbology – Categories – Unique Values – Value Field: AEXMTOT (appraised total value for exempt properties) – Adjust Gradient

Step three_ Duplicate Step two Attribute Layer – Select SymbOlogy – Categories – Unique Values – Value Field: APPRTOT (appraised total value for taxable properties) – Adjust Gradient to match Step two



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FUTURE PLANS_

5 YEARS

- Replace trash cans
- Cut down unhealthy trees
- Plant new native trees
- Install baseball diamond with bleechers
- Paint light posts
- Replace dated picnic tables
- Fence around entire playground
- New pet clean up post
- Winter ice skating rink
- Increase community gardens

10 YEARS

- Replace pavement with permeable pavement
  - Heated surface around the perimeter
- Replace wooden bridge
- Replace playground equipment
  - i.e.Childerens garden
- Pour rubber asphalt around playground
- Cut down unhealthy trees
- Plant new native trees
- Maintain surface areas
- Create an area with wireless internet
- Transform single tennis court into multi use court
  - ie. Basketball, Field Hockey

20 YEARS

- Retrofit the Recreation Center to be more sustainable
  - Green roof
  - Geothermal
- Cut down unhealthy trees
- Plant new native trees
- Maintain Surface Areas
- Whole Park Wireless internet
- Condition tennis courts
- Condition all purpose courts












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APPENDIX_

NO	TYPE	CANOPY	CONDITION
49	silver maple	25	great
66	silver maple	30	fair
80	silver maple	25	great
86	silver maple	20	great
113	silver maple	20	great
5	bald cypress	60	fair
61	basswood	35	fair
69	basswood	35	great
72	basswood	60	fair
11	beech	30	great
15	beech	20	fair
16	beech	25	great
18	beech	25	great
20	beech	25	great
27	beech	25	fair
37	beech	20	great
56	buckeye	30	great
62	buckeye	40	great
74	buckeye	30	great
84	buckeye	45	great
100	buckeye	50	great
114	buckeye	40	poor
130	buckeye	25	great
151	buckeye	25	great
159	buckeye	55	great
161	buckeye	20	fair
163	buckeye	40	great
169	buckeye	45	fair
200	buckeye	30	great
41	catalpa wood	20	great
44	catalpa wood	25	great
54	catalpa wood	20	great
82	catalpa wood	30	fair
109	crab apple	20	great
112	crab apple	30	great
149	crab apple	35	fair
153	crab apple	25	great
166	crab apple	25	fair
172	crab apple	30	fair
175	crab apple	25	great
186	crab apple	30	great
187	crab apple	25	great
37	dogwood	15	great
76	dogwood	20	fair
150	dogwood	25	great
200	dogwood	30	fair
1	elm	30	great
4	elm	25	great
10	elm	45	great
12	elm	25	fair
23	elm	20	fair
30	elm	35	great
52	elm	25	great
68	elm	40	great
78	elm	30	great
85	elm	30	great
88	elm	25	great
89	elm	25	great

NO	TYPE	CANOPY	CONDITION
91	elm	30	fair
97	elm	25	fair
103	elm	20	fair
106	elm	35	great
115	elm	20	great
116	elm	30	great
126	elm	40	great
137	elm	35	great
145	elm	40	great
162	elm	20	great
179	elm	35	fair
185	elm	55	great
28	golden rain tree	10	great
99	golden rain tree	20	great
152	golden rain tree	25	great
199	golden rain tree	20	great
3	green ash	25	fair
20	green ash	20	great
79	green ash	45	great
35	honey locust	25	fair
45	honey locust	30	great
55	honey locust	35	great
67	honey locust	45	great
73	honey locust	25	great
78	honey locust	30	great
82	honey locust	30	great
90	honey locust	25	great
102	honey locust	30	great
117	honey locust	30	great
121	honey locust	20	great
135	honey locust	35	fair
139	honey locust	55	fair
144	honey locust	50	great
163	honey locust	20	great
77	linden	30	great
81	linden	30	great
90	linden	20	great
98	linden	30	great
118	linden	30	great
119	linden	25	great
122	linden	40	great
126	linden	50	great
165	linden	25	great
175	linden	30	great
184	linden	30	great
48	magnolia	25	fair
127	magnolia	20	great
132	magnolia	40	fair
155	magnolia	25	poor
177	magnolia	25	great
188	magnolia	20	great
201	magnolia	20	great
83	pin oak	50	great
94	pin oak	50	great
112	pin oak	25	great
125	pin oak	30	great
154	pin oak	40	great
164	pin oak	50	great

NO	TYPE	CANOPY	CONDITION
9	red maple	15	great
7	red maple	20	fair
8	red oak	50	fair
8	red oak	25	great
10	red oak	20	great
64	red oak	100	fair
140	red oak	100	fair
142	red oak	100	fair
168	red oak	50	great
170	red oak	45	great
171	red oak	100	poor
176	red oak	55	fair
200	red oak	60	great
12	red oak	15	great
31	red oak	10	fair
59	red oak	30	great
71	red oak	15	great
87	red oak	20	fair
96	red oak	25	great
146	red oak	10	fair
155	red oak	20	great
200	red oak	20	fair
46	red cedar	50	fair
30	saw tooth oak	50	fair
101	saw tooth oak	60	great
108	saw tooth oak	60	great
123	saw tooth oak	50	fair
126	saw tooth oak	65	great
138	saw tooth oak	60	great
145	saw tooth oak	60	great
155	saw tooth oak	65	great
17	spruce	15	fair
38	spruce	10	great
39	spruce	20	great
2	sugar maple	25	great
6	sugar maple	10	great
23	sugar maple	60	great
24	sugar maple	15	great
29	sugar maple	10	great
35	sugar maple	10	fair
65	sweetgum	50	great
75	sweetgum	45	great
104	sweetgum	50	great
105	sweetgum	50	great
141	sweetgum	60	great
147	sweetgum	60	fair
151	sweetgum	45	great
152	sweetgum	55	great
166	sweetgum	65	great
198	sweetgum	50	great
199	sweetgum	45	great
105	sycamore	150	poor
107	sycamore	150	fair
111	sycamore	100	fair
120	sycamore	100	great
143	sycamore	55	poor
156	sycamore	55	great

NO	TYPE	CANOPY	CONDITION
100	sycamore	60	great
104	sycamore	60	poor
107	sycamore	65	great
174	sycamore	50	great
183	sycamore	55	poor
192	sycamore	60	great
21	tulip tree	60	great
57	tulip tree	100	poor
63	tulip tree	55	great
128	tulip tree	60	great
190	tulip tree	55	great
197	tulip tree	50	great
40	white_pine	35	great
22	white oak	60	great
42	white oak	60	fair
60	white oak	45	great
66	white oak	50	fair
92	white oak	50	fair
136	white oak	60	great
137	white oak	55	great
191	white oak	50	great
32	white pine	30	great
69	white pine	45	great
133	white pine	35	great
178	white pine	40	great
189	white pine	40	great
196	white pine	55	great
14	willow	20	great
36	redbud	20	great
47	redbud	35	great
53	redbud	20	great
58	redbud	15	great

The Appendix_ shows the attribute window of the Arch GIS Program. In here we are able to quickly review information based on the shapefile. Inside the attribute window we are able to select information based on selective information that can be found in the fields and rows. In our case this table allows us to quickly select trees based on different fields ranging from type to condition.

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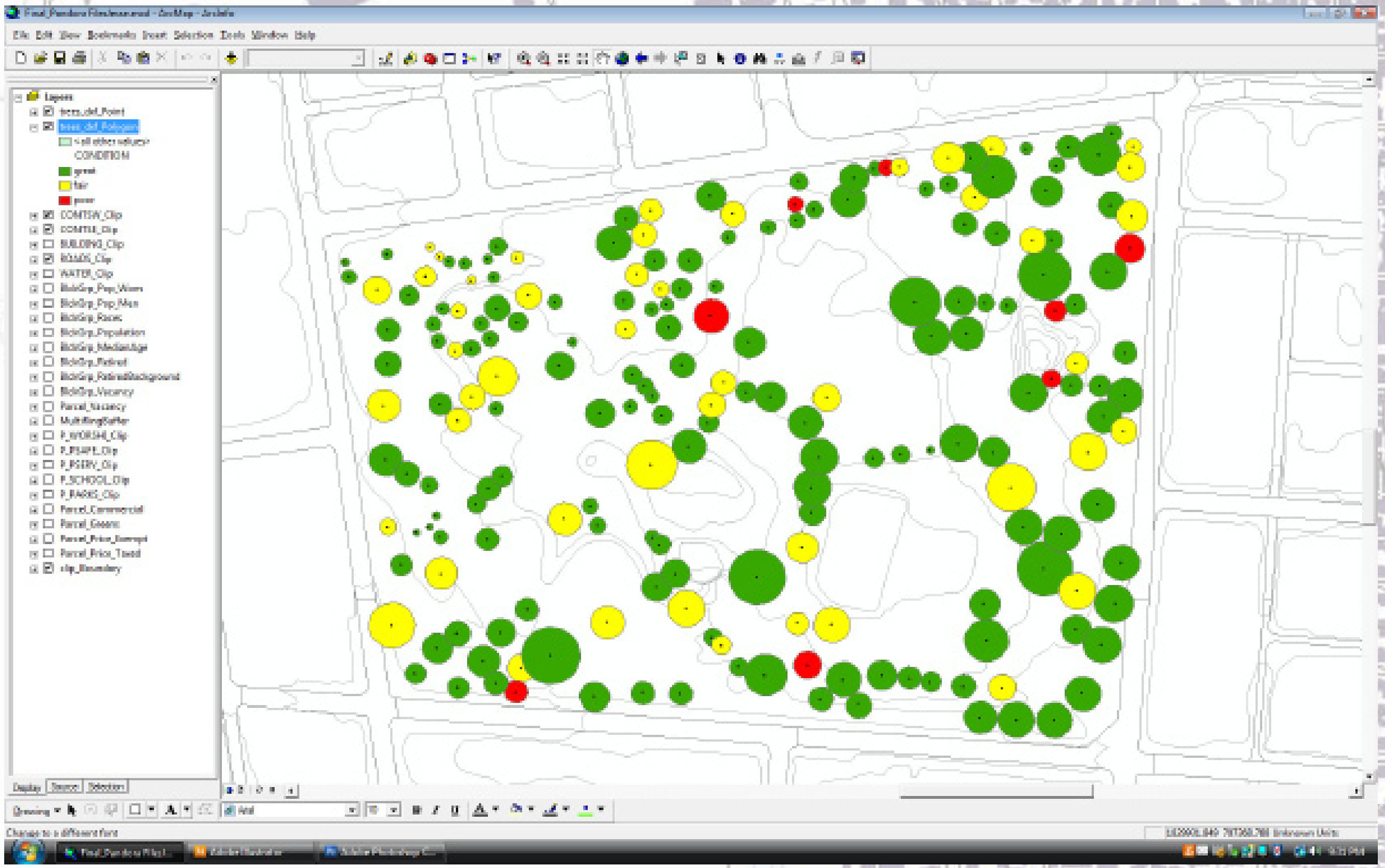

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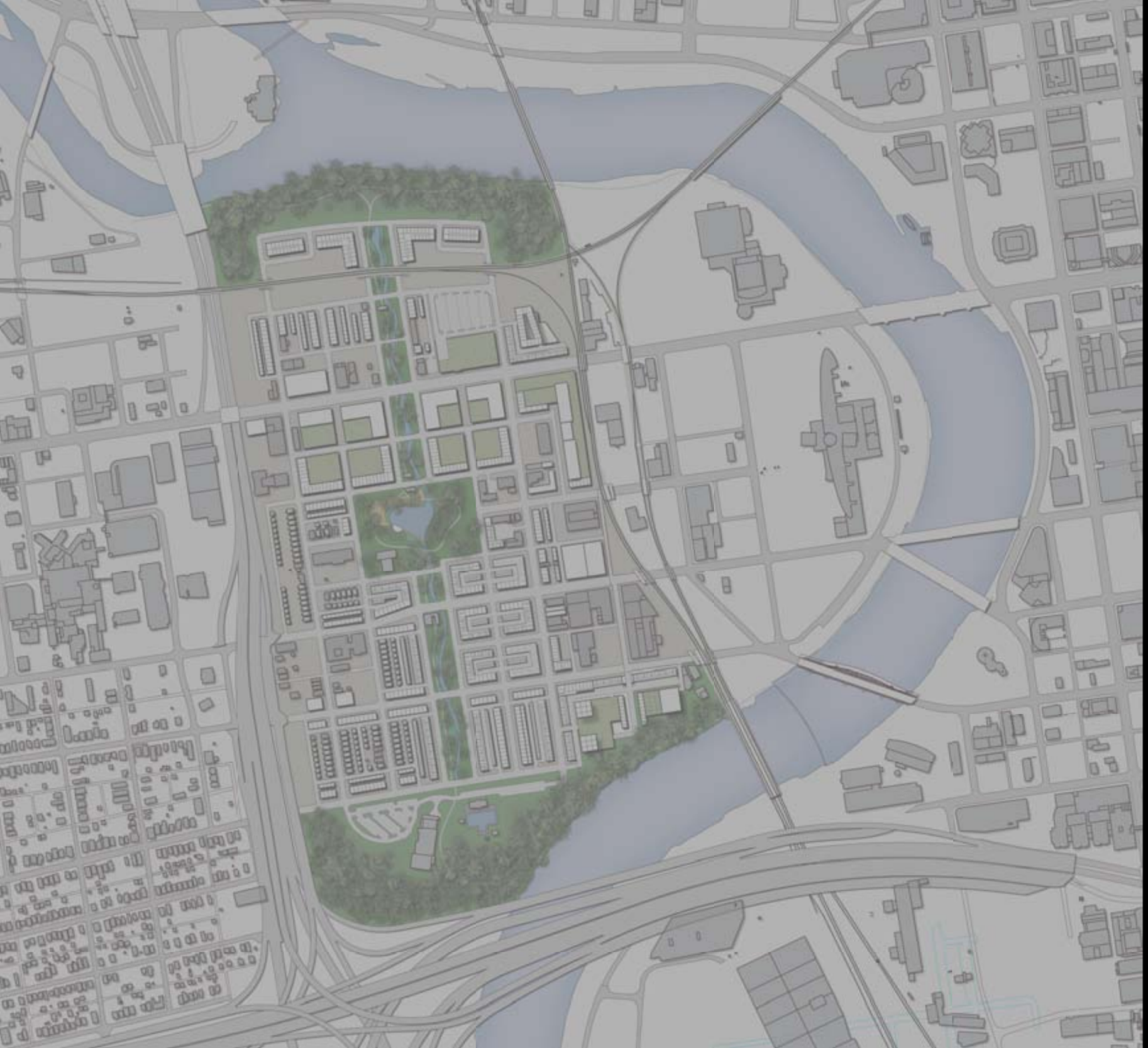
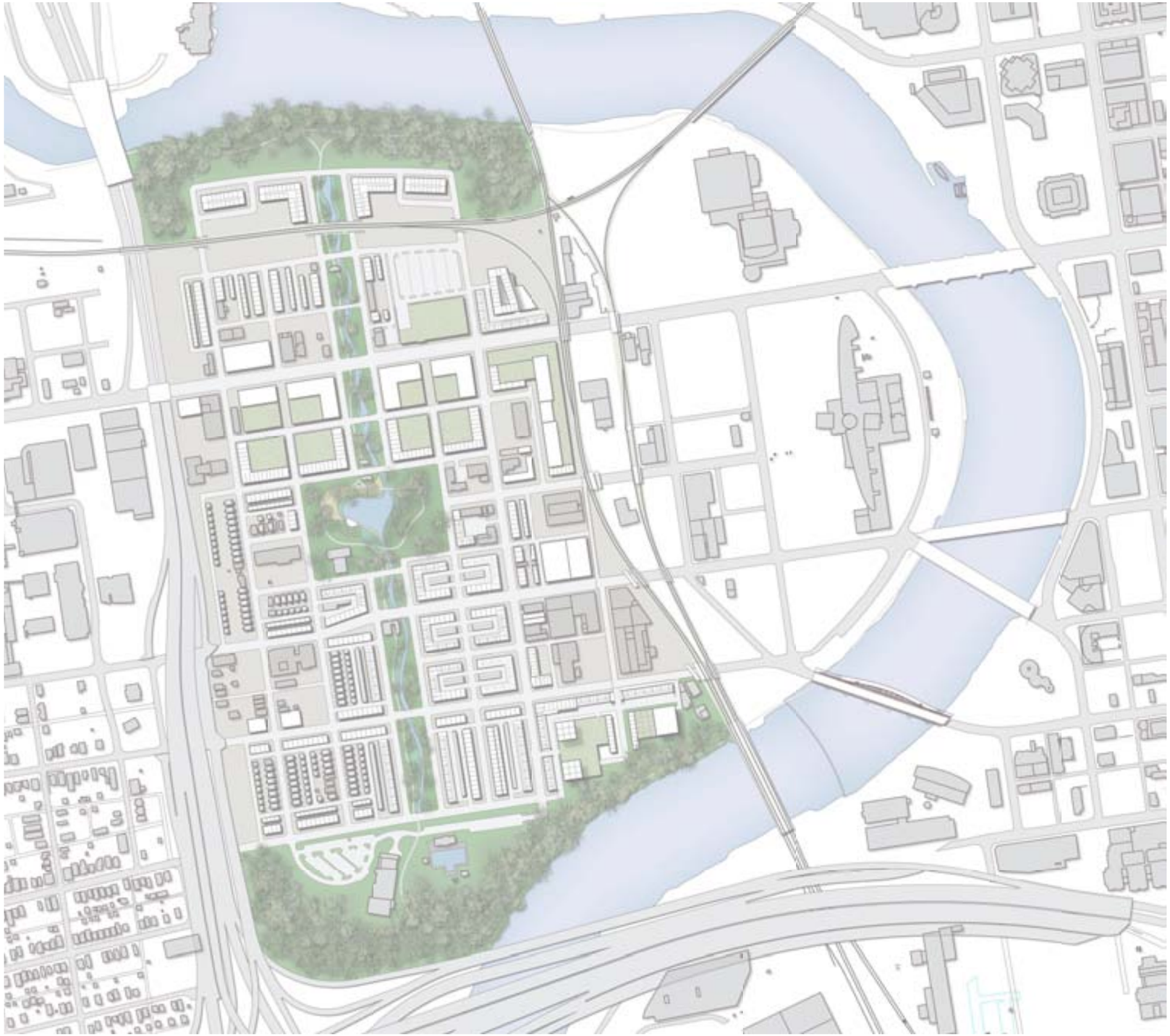


East Franklinton Development Study

Kwabena Aboagye
Kwabena Agyeman
Matthew Leasure
Chauncey Robbs
CRP 702
Instructor: Charles Cartwright
Spring, 2008



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Chapter 2:
Comparative Analysis

Kwabema Aboagye
Kwabema Agyeman
Matthew Leasure
Chauncey Robbs
CRP 702
Instructor: Charles Cartwright
Spring, 2008

COMMUNITYVIZ BACKGROUND

Introduction

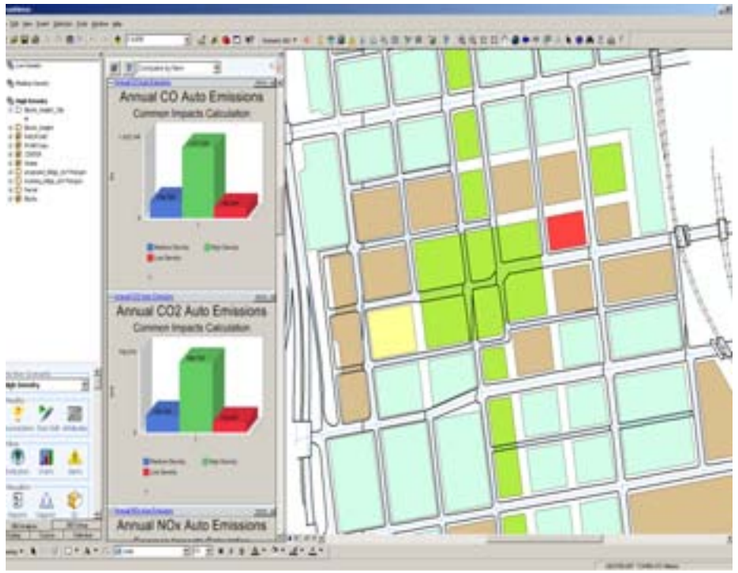
The CommunityViz software is produced in a partnership between the Orton Family Foundation and Placeways, LLC CommunityViz. It is the name of a group of extensions to ArcGIS Geographic Information System software.It is used for urban planning, land use planning, and resource management applications. CommunityViz provides several options for 3D visualization; many tools and capabilities for planning analysis.

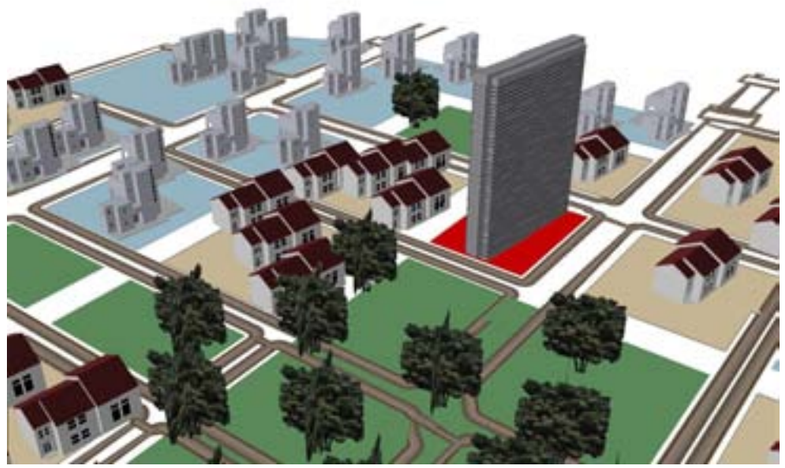
KEY FEATURES.

CommunityViz tools allow you to envision alternatives and their potential impacts; explore options and share possibilities and examine scenarios from all angles. CommunityViz 3.3 includes two complementary components, Scenario 360 and SiteBuilder 3D. Together or separately, these ArcGIS® extensions allow you to create geographic scenarios, analyze their impacts, and view them in photo-realistic 3-D scenes.

Scenario 360 makes navigating easy with a Scenario 360 toolbar, an interactive work flow guide for analysis Setup, and a designated Analysis tab for experimenting with analyses. Scenario planning allows you to create and study alternative land-use plans side-by-side.Dynamic analysis updates so that changes to a plan automatically cause recalculations of impacts.

Three choices for 3D modeling, including export to Google Earth Wizard-driven tools for creating common planning analyses like build-out and suitability analysis. Scenario 360 extends ArcMap™ to provide impact analysis, indicator tracking, and alternative comparison. and visualization tools for geographic decision-making whether your interest is in land-use planning, transportation, resource management, or conservation.





STUDY AREA

The East Franklinton Plan was initiated by the Young Professionals Commission and the City of Columbus as a means to study the future redevelopment potential of East Franklinton. The current site is bounded by 315 on the west, the Scioto river on the north and south, and the railroad tracks on the east. The site has a number of issues which required intervention for development.Based on the potentials of the site such as proximity to downtown and other urban neighborhoods, an excellent street grid, access to the river, and historical significance a number of scenerios were generated to facilitate development.

Along with considering redevelopment opportunities, it is important to note that the long term vision of the City of Columbus is to shift the focus of downtown to the riverfront. This will require high density mixed-use development along the west side of the river, including East Franklinton. With these factors in mind, the CRP 853 by Kimberly Gibson developed a plan for the east franklinton area as discussed in chapter 1.

The aim of this class is to use communityViz as an analyitcal tool to undertake various alternative development scenerios based on the data used by CRP 853 to ascertain the effectiveness of communityViz as a tool for landuse analysis and buildout.

ALTERNATIVE DENSITY STUDIES

One of the key component of the planning process is the Alternative scenerio generation and analysis. Being able to effectively assess the significance and impact of various alternatives will lead to the selection of the best option for development. Community involvement becomes more effective if planners are able to provide more information to participants in the decision making process based on every scenerio.

CommunityViz helps to do this by providing the impact of different scenerio options on development socially, economically environmentally etc. Based on the same goals set by the CRP 853 group summarised as follows:

1. Promote the neighborhood's history.
2. Create a walkable, pedestrian-oriented neighborhood that im proves the health and safety of its residents.
3. Become Columbus' first urban green neighborhood.
4. Attract artists and young professionals to start the rejuvenation of the neighborhood.
5. Become "Columbus' model mixed-use/mixed-income neighbor hood." What are some of the advantages of and means to this?

We came up with different scenerios to reflect the Goals set above but with different density implications on the development of East Franklinton.

The three scenerios generated includes the following

1. Low Density

2. Medium Density

3. High Density

Low Density

Alternative Density Studies

Alternative Density Studies

Assumptions		Medium Density	High Density	Low Density
Percentage Mixed Use	%	100	100	100
Floor Area ratio mixed use		3	5	2
Mixed use Proportion Residential	%	50	60	50
Percentage Residential	%	100	100	50
Floor Area ratio residential		1	10	1
Percentage Civic	%	100	100	100
Floor Area ratio civic		6	6	6
Cost per square feet		50	35	150
Percentage Park		1	1	0.5
Average Residents perDwelling		3	3	2
CI Assumption - Annual Household Energy Use		0.6	0.7	0.3
CI Assumption - Passenger Car Fuel Efficiency		101	101	101
CI Assumption - Auto Emissions - CO2		24	24	24
CI Assumption - Auto Emissions - Hydrocarbons		19.7	19.7	19.7
CI Assumption - Household Vehicle Trips per Day		60.22	60.22	60.22
CI Assumption - Daily Household Water Use		5.95	5.95	5.95
CI Assumption - Percent Employed		391	391	391
CI Assumption - Auto Emissions - NOx		40.89	40.89	40.89
CI Assumption - Average Vehicle Trip Length		29.89	29.89	29.89
CI Assumption - Auto Emissions - CO		9.78	9.78	9.78
CI Assumption - Persons per Household		476.76	476.76	476.76
CI Assumption - Percent School Children		2.56	2.56	2.56

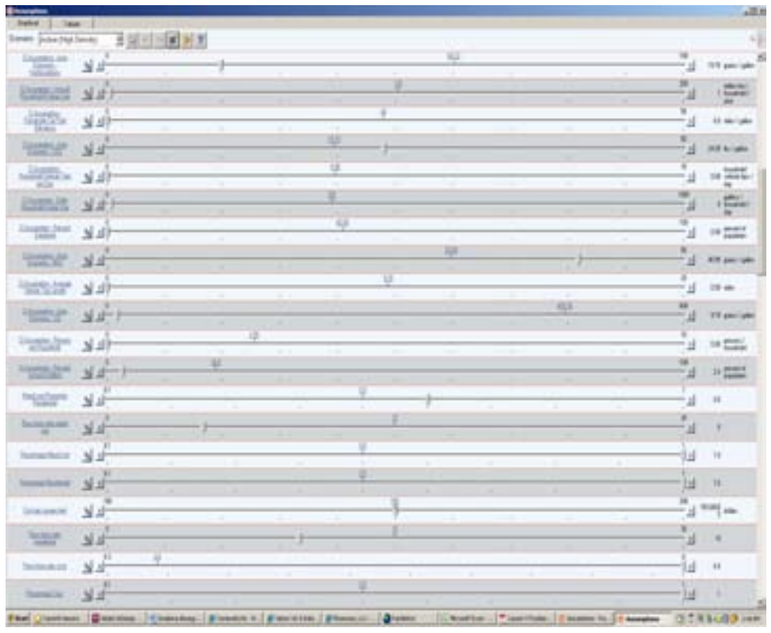
The table above shows the various assumptions used for the analysis.These assumptions were applied indicators changes in the different scenrios.

The final out of maps and charts used for analysis in the report were based on the combination of these assumptions to find the impact on development based on indicators.

PROJECT SETUP

ASSUMPTIONS

An assumption is a value that is used as input to an analysis. They are often changeable, and they always apply to an entire scenario. Assumptions can be a way to express subjective inputs, such as how much weighting to give to a particular community value like open space or economic development. Output values that depend on a particular assumption are automatically updated when the assumption is changed and you click the Apply button



Assumptions were developed to reflect changes in all four landuses.The four main land uses are:

Civic
Residential
Mixed-use
Parks

The assumptions reflected:

Percentage of Landuse for development
Floor area ratio
Average resident per dwelling
Mix use proportion residential etc.

INDICATORS

Indicators are impact or performance measures that can reference datasets anywhere in a scenario. They are used to provide an overall measurement and they apply to an entire scenario (as opposed to an attribute, which provides the individual characteristic of a map feature). Indicator values are automatically recalculated as you experiment with alternatives, and these values can be displayed in a chart. Indicators can help to choose alternatives that best match objectives or desired outcomes. In our analysissome of the indicators developed are as follows:

Buildable area residential
This was developed using the formula
([Assumption:Floor Area ratio residential] * (Sum ([Attribute:Blocks:Block_Size],
Where ([Attribute:Blocks:RefName] = “Residential”))) * [Assumption:Percentage Residential])

Number of Vehicle trips per day
This was developed using the formula
[Assumption:CI Assumption - Household Vehicle Trips per Day] * [Indicator:Number of dwelling units Residential]

Number of Dwelling units per acre
This was developed using the formula
((([Indicator:Buildable area Residential] + [Indicator:Proportion Mixeduse residential]) / 1000) / 137)

Population
This was developed using the formula
[Indicator:Number of dwelling units Residential] * [Assumption:Average Residents perDwelling]

DYNAMIC ATTRIBUTES

A dynamic attribute is an attribute that is automatically or manually updated as changes are made in the analysis using the unique capabilities of Scenario 360.

Unlike the normal attributes in ArcGis, dynamic attributes makes changes reflect in the various scenerios so as to see the impact of the various assumptions and indicators reflect in the different scenerios.

The dynamic attributes used in this exercise include the following attributes from the layer Blocks.The layer Blocks is the main layer used by the CRP 853 group. It shows the various parcels making up the East Franklinton study area.

1. Refname-: which is the name of landuses for all records
2. Blocksize-: this is the size of lots in the study area for al records

LAND USE PARAMETERS

INTRODUCTION

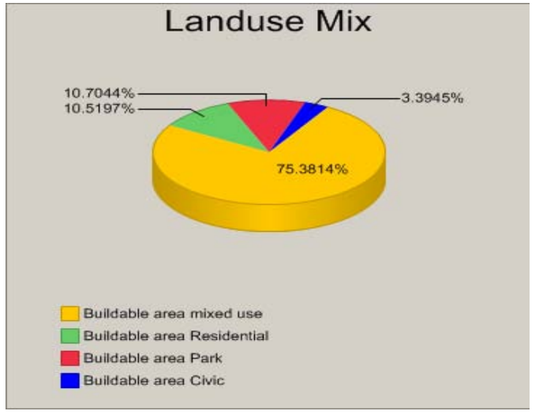
The output of scenerio 360 is seen in charts and 3d visualisations. Values for indicators and assumptions are automatically calculated as you experiment with alternatives, and the results can be displayed graphically in a chart. Charts are dynamically linked to assumptions and indicators. As changes are made in the analysis, chart displays will update automatically to reflect analysis results. Hatched areas on bar charts show the chart's previous value. Target lines may be included to demonstrate a particular goal or threshold. Charts can contain a single analysis value or many values from the same scenario. They can also display values from different scenarios for comparison.

In our study we developed a number orf charts to help tell our story in addition to the 3D visualisations shown above.The following gives a brief analysis of some of the charts produced from our analysis.

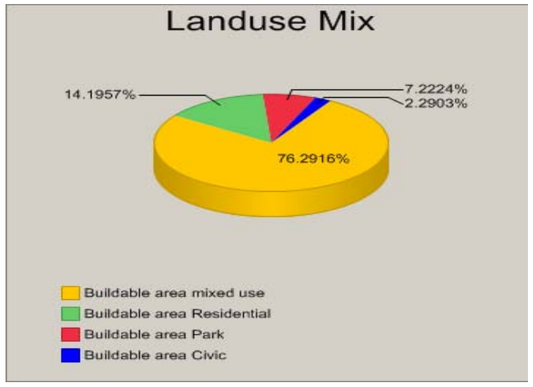
Land use mix
Based on our three scenarios (i.e. low density; meduim density, high density;) we developed assumptions and indicators with the object of determining the percentage composition of our land uses.
.

Various land use types require varying degrees of community services. These services include: water, sewer, police, fire, schools, street maintenance, infrastructure maintenance, garbage collection, etc.These land uses generate varying amounts of revenue to the community. Income tax affected by employees, property tax affected by values, sales tax affected by merchandise to sell, etc... Thus having an idea about the percentage distribution of the land uses for our scenarios will make us aware of the development implications and factor that into our planning.

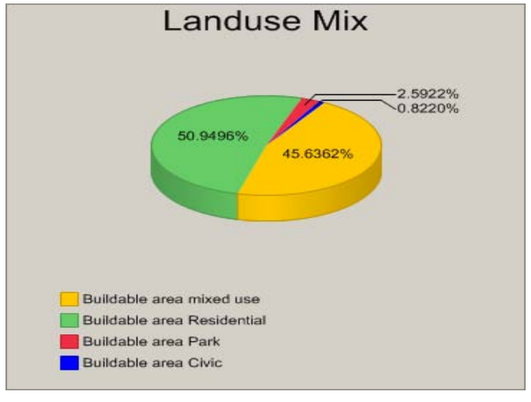
Low Density



Medium Density



High Density



For our low density scenario, mixed use residential had the highest percentage (75.38%) in terms of land distribution. A plausible development implication will be high traffic volume on roads. Our medium density scenario depicts a similar trend.

However for our high density scenario, residential landuse ranked high in terms of land distribution (50.94%). The obvious policy implication will be the demand for water, sewer, police, fire, schools, street maintenance, infrastructure maintenance, garbage collection, etc with a high cost of communtiy service ratio.

Beyond this, the high percentage of mixed use across all the scenarios reflects the goal of making Columbus " a model mixed-use/mixed-income neighborhood." as was previous stated above. See charts for the percentage distribution of the various land uses.

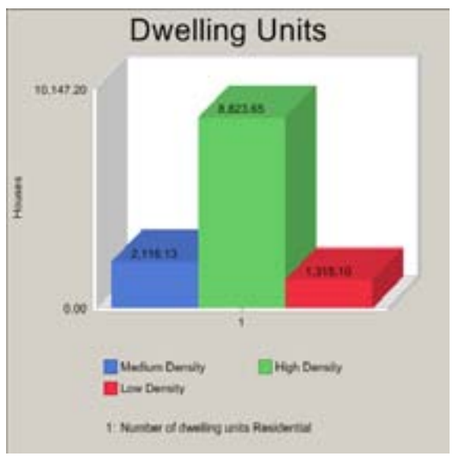
DENSITY STUDY RESULTS

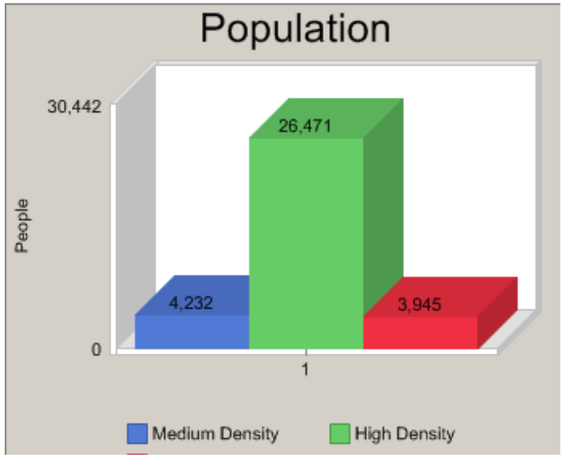
Dwelling Units:

A dwelling unit is a unit of housing with full housekeeping facilities for a family (i.e. a household). Based on Total Buildable area residential and the proportion of the mixed-use Buildable area residential we calculated the total number of dwelling units for the study area using a dwelling unit size of 1000 Sqaure feet.Based on our assumptions and indicators we forcasted 2116 units for our medium density scenario, 8,824 for the high density and 1,315 for the low density scenario. This provides summary statistics of housing available in Franklinton dependent on our development scenario. Beyond this, it is a key variable in estimating the population of a geographic region if the average house hold size is available.

Population

Using the number of dwelling units established above, we were able forecast the population accross all the three scenarios based on some assumptions for the average family size.For example assuming an average family size of 2 for our meduim density scenario we predicted a population of 4232 as shown in the population graph.The total dwelling units as well the population are essential to finding the necessary needs and requirements for utility provision such water and energy.

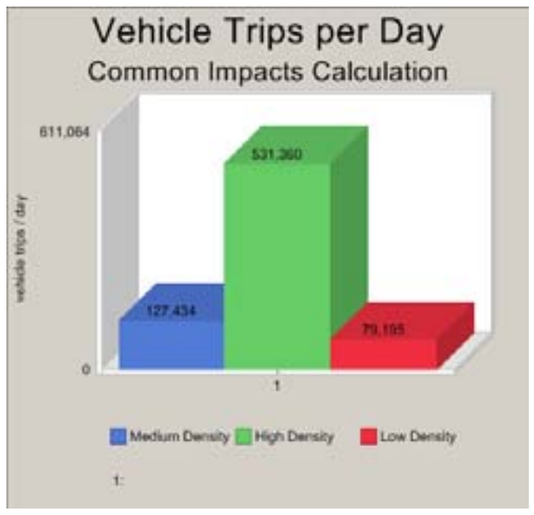


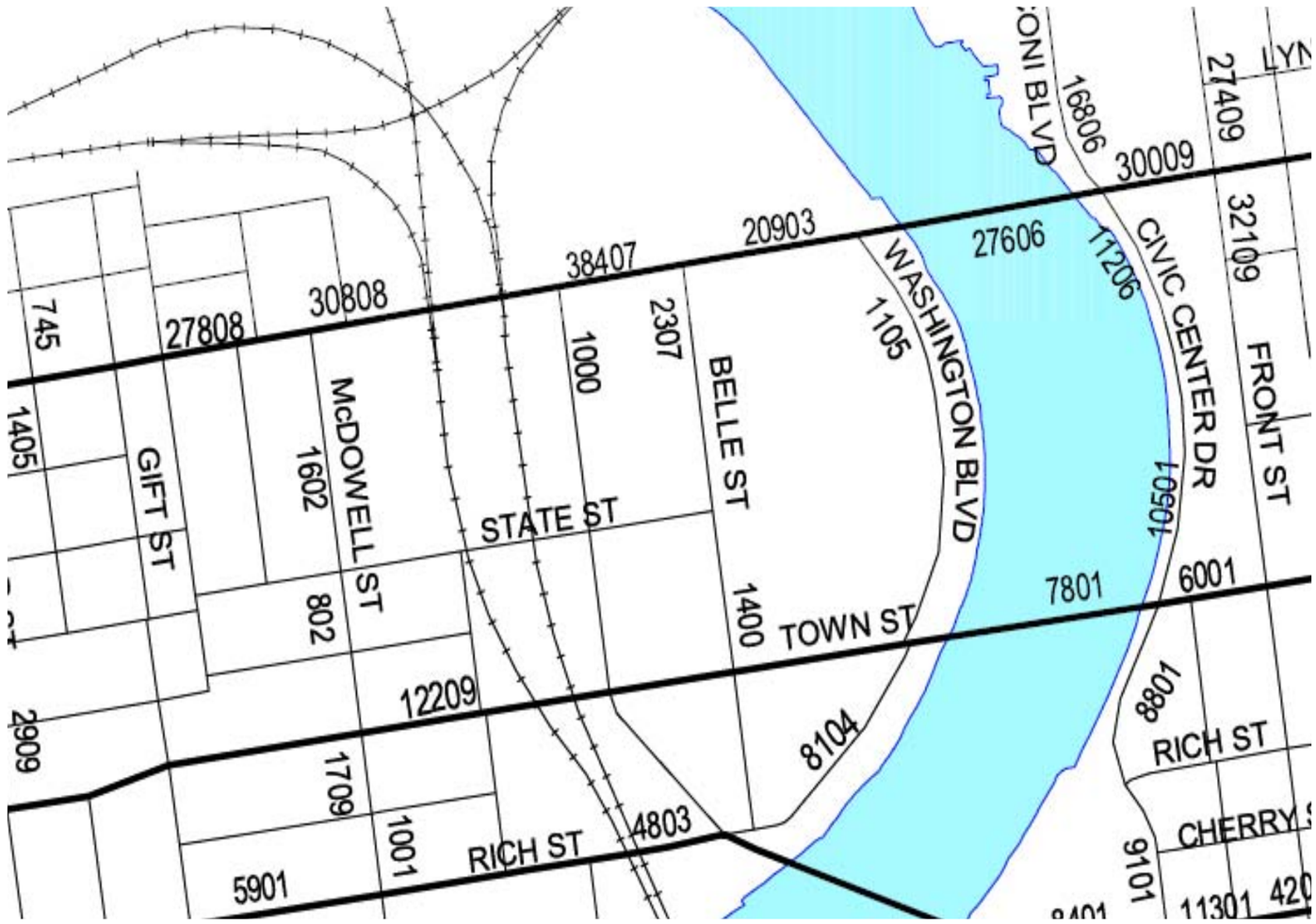


TRANSPORTATION IMPACTS

Vehicle Trips per Day

The purpose of this assumption was to be able to determine the traffic volume on roads in Franklinton. This assumption was based on the premise that a dwelling unit will generate a certain total vehicular trips in a day. This formula was automatically created by the Common Impacts Wizard to describe impacts associated with dwelling units.This is very useful information because it can be used in measuring the level of service on roads to determine if capacity has been exceeded and then consequently plan for an intervention. For example the vehicle trips per day for our high density scenario based on our forecast was 531,360. This seems very high with potentially a negative impact on traffic. However the numbers appear reasonable for our low and medium density scenario.





INFRASTRUCTURE DEMANDS

Residential Energy Use.

According to the 2001 Residential Energy Consumption Survey,an average household use about 101million btu energy every year.Using that as a default we measured the total energy consumption for the study area based on the total number of dwelling units for each scenerio.

We found that in the low density scenerio the total energy requirements based on the national average is 211613 million btu per year. And 891,189 million btu per year for the high density scenerio.

Residential Water use

The reason behind this assumption was to be able to determine the water consumption in Franklinton based on our scenarios and visualize the impact This formula was automatically created by the Common Impacts Wizard to describe impacts associated with the indicator dwellking units.

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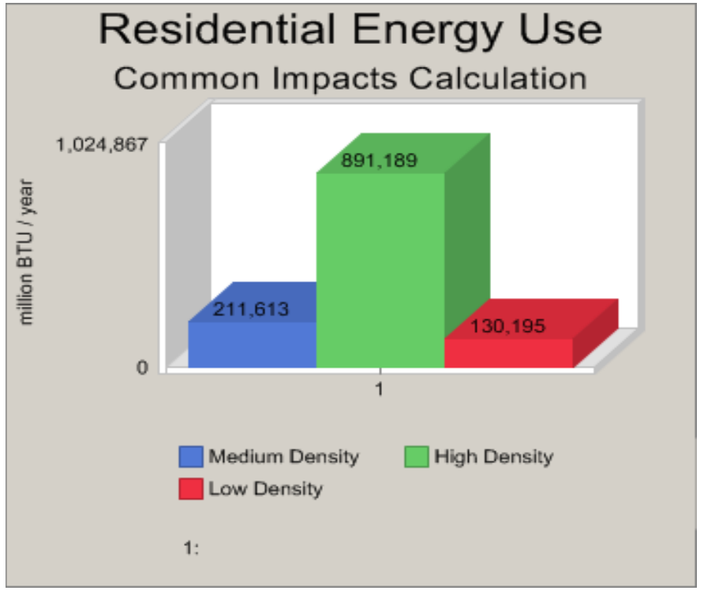
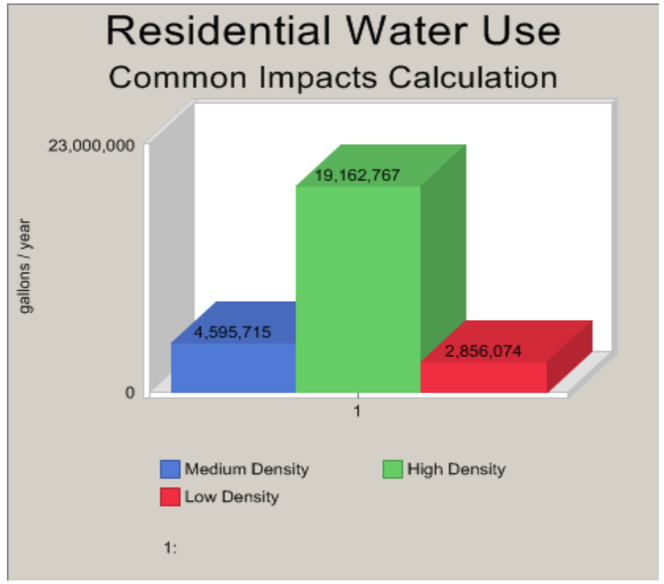
.Based on this assumption and the underlying indicators, as population or consumption per person increases, the total water consumption increases or vice versa. This information is very useful since it provides data for policy makers to make informed decisions on conservation and increasing capacity to meet demand.From our forecast, Franklinton will consume 19,162,767 gallons per year going with the high density scenario.





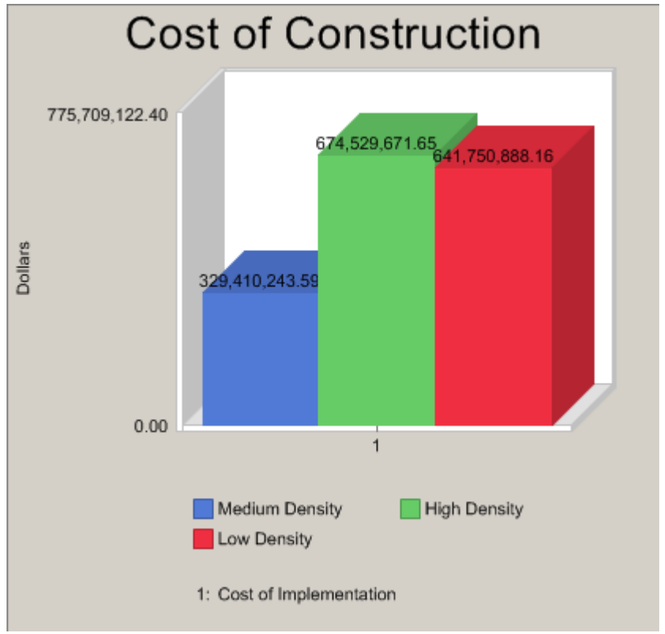
DEVELOPMENT COSTS

How Figures are Derived

The development costs associated with each density scenario illuminate the negative and positive externalities connected to each density level. The development costs for each scenario are base on square foot costs per building type. The square foot costs are obtained from RS Means, a leading research firm that monitors national construction data. The based square foot cost provided by RS Means before being applied must are normalized based on building type and are then divided by the average size, according to the RS Means project size modifier. Applying this procedure provides additional price accuracy.

After calculating the project size modifier the derived number is then multiplied by the base square foot cost to adjust the cost the square foot cost based on the size of the proposed building.

After the final square foot cost per building type is derived, the next step is standardizing the price per square foot based on the City Cost Index. The city cost index is necessary because cost can vary significantly depending upon the region. To account for the cost changes the price per square foot is then multiplied by the city cost index to derive the final cost per square foot for the City of Columbus



Square Foot Cost Methodology -

Step 1. Project Size Modifier

Proposed Building Size =80,000
=2
Typical Building Size =40,000

Step 2. Use Project Size Multiplier
Sq. Ft. Cost for Apartment Building =110*1.875=187.00 per Sq.Ft.

Step 3. Apply City Cost Index
City Cost Index for City of Columbus =.93
Apartment Building =187.00 *.93 =173.91

Total Square Foot Cost =173.91

LIFE CYCLE COSTS

How figures were derived

A life cycle cost analysis in real terms, provides an opportunity to gage the return on an investment thought the project's life span as the analysis takes into account the cost of capital, operating costs, maintenance, design fees and a host of additional parameters depending upon the analysis. Additionally, life cycle costing provides flexibility to change parameters in order to determine how market conditions will affect the internal rate of return, project loans, repayment, taxation and leveraging.

Life cycle costing was applied to the three density scenarios as method to illuminate the long – term economic feasibility over a over the projects life span. Applying such an analysis provides the developer and owner the opportunity to mitigate against potential risk in the long run while working toward the lowest long term cost of ownership. Additionally, the life cycle costing model was altered and applied to each of the park development scenarios to derive a percentage usage that is most economical in the long- run.

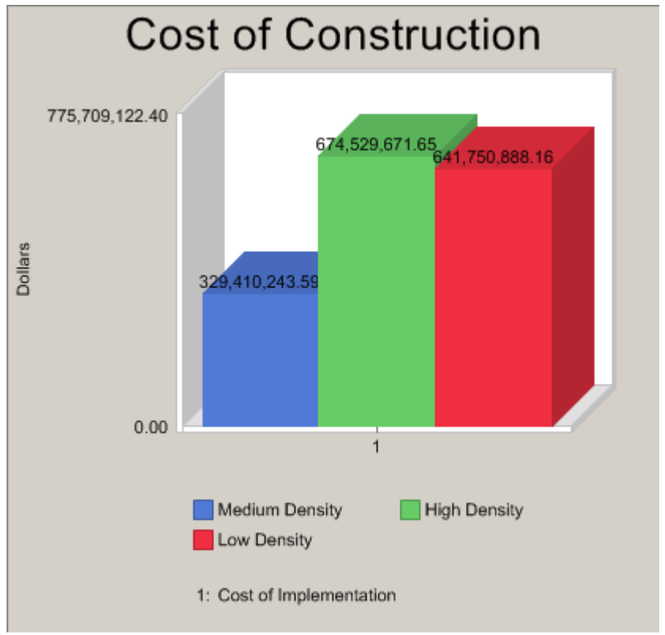
Life Cycle Cost Methodology:

Annual Cost Per Sq. Ft.
To determine annual cost per year the financial function of (PMT) or better know as payment on a annuity. The function allows the model derive annual cost based on the maintenance cost or a specified parameters required to maintain the building.

PMT(Rate,NPER,PV)

Example: Determine annual maintenance cost over the life span of building
Yearly Maintenance Cost : 30,000
Life Span of Building : 30 Years
Rate: 2%

Cost per year = $ 1339.50 or 111.63 per month



Chapter 3: Conclusions

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Kwabema Agyeman
Matthew Leasure
Chauncey Robbs
CRP 702
Instructor: Charles Cartwright
Spring, 2008

CONCLUSIONS

In this project, CommunityVIZ was utilized to explore alternative density scenarios for the East Franklinton study area. This was performed after a more detailed study was completed by a studio class within the CRP program of The Ohio State University. In the CommunityVIZ study, a medium density scenario was created to match the final density of the studio's neighborhood plan. This was the control. Two alternative densities were explored; 1) a low-density scenario of approximately 1/2 the proposed density, and 2) a high-density scenario approximately 4 times the proposed density. As such, it was effective in analyzing the results of the neighborhood design, and exploring how the planning process could have been had another density target been explored. The program was then utilized to create a visualization of how these alternatives may look and feel on the site.

Another advantage of CommunityVIZ is its built-in ability to analyze development impacts and costs. Using the program, the team determined potential future impacts on utility and transportation infrastructure. Also, environmental impacts were predicted using current data. These demonstrate how each density model can reduce or increase environmental and infrastructure impacts per capita. This is extremely valuable information for planners and engineers as they plan for future growth. Finally, the team was able to determine both development costs and life-cycle costs for each density model. This could be of particular interest for developers as they consider potential financial investment into the site.

Although the team explored these three density model, the true advantage of CommunityVIZ is the ability to quickly change a model to any desired density target. The model is then rebuilt automatically, and new graphical results can be obtained. This is extremely effective in making decisions "on-the-fly" and can help to find the "sweet-spot" for any environmental, economic, or social factor. As such, CommunityVIZ is an extremely effective tool in creating sustainable communities because it allows for inexpensive planning and design exploration in order to find a development scenario that satisfies all agendas.

In this study, we have determined that a density scenario slightly above the East Franklinton Studio's target of 20 dwelling units per acre was most desireable. This was based on all data analyzed in the CommunityVIZ model. A density of approximately 27 dwelling units per acre was considered to be most sustainable for the site.

In the future, CommunityVIZ should be utilized to determine an approximate density target prior to any detail planning exploration. This will provide planners with extremely valuable data related to achieving the most sustainable community design solution. Once this density target is obtained, planners can begin to incorporate public input, site analysis, and other factors to determine the best community design solution.

Appendix

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LOW-DENSITY LIFE CYCLE COSTS

Item	Development Costs		Periodic Cost Rehabilitation Parameters			Annual Cost Maint Parameters	
	% of Total Construction Cost	Costs ($'000)	% of Orginal Cost	Costs ($'000)	Frequency (in years)	% of Construction Cost	Cost pa ($'000)
Site Cost		**250,150**					
Site Acquistion		160,300					
Site Clearence		89,850					
Total Construction Cost		960,000	x			4%	38,400
Exterior Construction			x			x	
Foundations	15%	144,000	0%	0	100	x	
Structural Frame	20%	192,000	0%	0	100	x	
Roof	5%	48,000	115%	55,200	20	x	
Walls and Windows	10%	96,000	110%	105,600	30	x	
Exterior Construction Total	**50%**	**480,000**				x	
Interior Construction						x	
Mechcanical Systems	18%	172,800	70%	120,960	10	x	
Ventilation Systems	10%	96,000	60%	57,600	15	x	
Interior Walls	5%	48,000	15%	7,200	10	x	
Floors	5%	48,000	30%	14,400	10	x	
Plumbing	2%	19,200	100%	19,200	20	x	
Interior Construction Total	**40%**	**384,000**					
Furnishing and Interiors						5%	1,920
Carpets	2%	19,200	100%	19,200	10	x	
Furnishings	2%	19,200	50%	9,600	10	x	
Furnishing and Interiors Total	**4%**	**38,400**				x	
Design,Supervision, Studies						x	
Design	3%	28,800				x	
Supervision	1%	9,600				x	
Financial Consulting	2%	19,200				x	
Design,Supervision, Studies Total	**6%**	**57,600**				x	
						x	
Total Development Cost	**1.00**	**1,210,150**				x	

Operating Cost Parameters		**Other Parameters**	
Heating and Cooling	50,826	Discount Rate	7%
Other Utilities	78,660	Rentable Square Feet	16,815
Management	5	Construction Period (Years)	3
		Useful Project Life (Years)	30
Salvage Value	10,000	% of Usable Space	50%
Demolition Cost	0	Square Footage	33,629
Remaining Value of Land & Building	10,000		

	Annual Cost Over Useful Life								**Present Value Cost of Building Over Useful Life**						
Results	PV Devl Cost (Interst During Constr/1	Intial Invest-ment/1	Period Cost /2	Mainte-nance	Operating Cost	Total Cost	Annual Cost per sf ($)	%Cost Distribution	Initial Invest-ment/1	Periodic Cost/2	Main-tence	Operating Cost	Total Cost	PV Per sf ($)	%Cost Distribution
Site Cost	250,150.00	20,158.69	0.00			20,158.69	1.20	0.06	250,150.00	0.00			250,150.00	14.88	0.12
Site Acquisition	160,300.00	12,918.00	0.00			12,918.00	0.77	0.04	160,300.00	0.00			160,300.00	9.53	0.08
Site Clearence	89,850.00	7,240.69	0.00			7,240.69	0.43	0.02	89,850.00	0.00			89,850.00	5.34	0.04
Total Construction Cost	960,000.00	77,362.95	18,007.48	38,400.00		133,770.43	7.96	0.40	960,000.00	192,874.53	476,507.18		1,629,381.72	96.90	0.79
Exterior Construction Cost	480,000.00	38,681.47	2,464.41			41,145.89	2.45	0.12	480,000.00	30,581.01			510,581.01	30.37	0.25
Foundations	144,000.00	11,604.44	0.00			11,604.44	0.69	0.03	144,000.00	0.00			144,000.00	8.56	0.07
Structural Frame	192,000.00	15,472.59	0.00			15,472.59	0.92	0.05	192,000.00	0.00			192,000.00	11.42	0.09
Roof	48,000.00	3,868.15	1,346.49			5,214.64	0.31	0.02	48,000.00	16,708.64			64,708.64	3.85	0.03
Windows and Walls	96,000.00	7,736.29	1,117.92			8,854.22	0.53	0.03	96,000.00	13,872.37			109,872.37	6.53	0.05
Interior Construction	384,000.00	30,945.18	12,610.31			43,555.49	2.59	0.13	384,000.00	162,293.52			546,293.52	32.49	0.27
Mechcanical Systems	172,800.00	13,925.33	8,754.78			22,680.11	1.35	0.07	172,800.00	108,638.46			281,438.46	16.74	0.14
Ventilation Systems	96,000.00	7,736.29	2,292.17			10,028.47	0.60	0.03	96,000.00	28,443.64			124,443.64	7.40	0.06
Interior Walls	48,000.00	3,868.15	521.12			4,389.27	0.26	0.01	48,000.00	6,466.57			54,466.57	3.24	0.03
Floors	48,000.00	3,868.15	1,042.24			4,910.38	0.29	0.01	48,000.00	12,933.15			60,933.15	3.62	0.03
Plumbing	19,200.00	1,547.26	468.34			2,015.60	0.12	0.01	19,200.00	5,811.70			25,011.70	1.49	0.01
Furnishings and Interiors	38,400.00	3,094.52	2,084.47	1,920.00		7,098.99	0.42	0.02	38,400.00	25,866.30	23,825.36		88,091.66	5.24	0.04
Carpets	19,200.00	1,547.26	1,389.65			2,936.91	0.17	0.01	19,200.00	17,244.20			36,444.20	2.17	0.02
Furnishings	19,200.00	1,547.26	694.82			2,242.08	0.13	0.01	19,200.00	8,622.10			27,822.10	1.65	0.01
Design, Supervision, Studies	57,600.00	4,641.78	0.00			4,641.78	0.28	0.01	57,600.00	0.00			57,600.00	3.43	0.03
Design	28,800.00	2,320.89	0.00			2,320.89	0.14	0.01	28,800.00	0.00			28,800.00	1.71	0.01
Supervision	9,600.00	773.63	0.00			773.63	0.05	0.00	9,600.00	0.00			9,600.00	0.57	0.00
Financial Consulting	19,200.00	1,547.26	0.00			1,547.26	0.09	0.00	19,200.00	0.00			19,200.00	1.14	0.01
Interest During Constuction	125,048.83	10,077.24	0.00			10,077.24	0.60	0.03	125,048.83	0.00			125,048.83	7.44	0.06
Salvage Value	1,313.67	105.86	0.00			105.86	0.01	0.00	1,313.67	0.00			1,313.67	0.08	0.00
Total Development Cost (Net of Salvage)	1,336,512.50	141,776.24	20,091.95	40,320.00	129,491.05	331,679.24	**19.73**	1.00	1,336,512.50	218,740.83	500,332.54	1,606,859.77	2,055,585.88	**122.25**	1.00
Total Development Cost (% of Distributions)		0.43	0.06	0.12	0.39	1.00			0.65	0.11	0.24	0.78	1.00		

LOW-DENSITY LIFE CYCLE COSTS

Item	Development Costs		Periodic Cost Rehabilitation Parameters			Annual Cost Maint Parameters	
	% of Total Construction Cost	Costs ($'000)	% of Orginal Cost	Costs ($'000)	Frequency (in years)	% of Construction Cost	Cost pa ($'000)
Site Cost		**444,500**					
Site Acquistion		239,600					
Site Clearence		204,900					
Total Construction Cost		1,346,150	x			5%	67,308
Exterior Construction			x			x	
Foundations	17%	228,846	0%	0	100	x	
Structural Frame	18%	242,307	0%	0	100	x	
Roof	5%	67,308	115%	77,404	20	x	
Walls and Windows	10%	134,615	110%	148,077	30	x	
Exterior Construction Total	**50%**	**673,075**				x	
Interior Construction						x	
Mechcanical Systems	18%	242,307	70%	169,615	10	x	
Ventilation Systems	10%	134,615	60%	80,769	10	x	
Interior Walls	4%	53,846	20%	10,769	10	x	
Floors	2%	26,923	40%	10,769	10	x	
Plumbing	2%	26,923	100%	26,923	20	x	
Interior Construction Total	**36%**	**484,614**					
Furnishing and Interiors						5%	2,692
Carpets	2%	26,923	100%	26,923	10	x	
Furnishings	2%	26,923	50%	13,462	10	x	
Furnishing and Interiors Total	**4%**	**53,846**				x	
Design,Supervision, Studies						x	
Design	3%	40,385				x	
Supervision	1%	13,462				x	
Financial Consulting	2%	26,923				x	
Design,Supervision, Studies Total	**6%**	**80,769**				x	
						x	
Total Development Cost	**1.0**	**1,736,804**				x	

Operating Cost Parameters		Other Parameters	
Heating and Cooling	72,946	Discount Rate	7%
Other Utilities	112,892	Rentable Square Feet	22,500
Management	5	Construction Period (Years)	3
		Useful Project Life (Years)	30
Salvage Value	10,000	% of Usable Space	50%
Demolition Cost	0	Square Footage	45,000
Remaining Value of Land & Building	10,000		

	Annual Cost Over Useful Life								Present Value Cost of Building Over Useful Life						
Results	PV Devl Cost (Interst During Constr/1	Intial Invest-ment/1	Period Cost /2	Mainte-nance	Operating Cost	Total Cost	Annual Cost per sf ($)	%Cost Distribution	Initial Invest-ment/1	Periodic Cost/2	Main-tence	Operating Cost	Total Cost	PV Per sf ($)	%Cost Distribution
Site Cost	444,500.00	35,820.66	0.00			35,820.66	1.59	0.07	444,500.00	0.00			444,500.00	19.76	0.14
Site Acquisition	239,600.00	19,308.50	0.00			19,308.50	0.86	0.04	239,600.00	0.00			239,600.00	10.65	0.08
Site Clearence	204,900.00	16,512.15	0.00			16,512.15	0.73	0.03	204,900.00	0.00			204,900.00	9.11	0.07
Total Construction Cost	1,346,150.00	108,481.39	27,249.18	67,307.50		203,038.07	9.02	0.41	1,346,150.00	295,254.35	835,221.54		2,476,625.89	110.07	0.79
Exterior Construction Cost	673,075.00	54,240.69	3,455.70			57,696.39	2.56	0.12	673,075.00	42,881.90			715,956.90	31.82	0.23
Foundations	228,845.50	18,441.84	0.00			18,441.84	0.82	0.04	228,845.50	0.00			228,845.50	10.17	0.07
Structural Frame	242,307.00	19,526.65	0.00			19,526.65	0.87	0.04	242,307.00	0.00			242,307.00	10.77	0.08
Roof	67,307.50	5,424.07	1,888.10			7,312.17	0.32	0.01	67,307.50	23,429.52			90,737.02	4.03	0.03
Windows and Walls	134,615.00	10,848.14	1,567.60			12,415.74	0.55	0.03	134,615.00	19,452.38			154,067.38	6.85	0.05
Interior Construction	484,614.00	39,053.30	19,681.06			58,734.36	2.61	0.12	484,614.00	252,372.45			736,986.45	32.75	0.24
Mechcanical Systems	242,307.00	19,526.65	12,276.30			31,802.95	1.41	0.06	242,307.00	152,337.15			394,644.15	17.54	0.13
Ventilation Systems	134,615.00	10,848.14	5,845.86			16,694.00	0.74	0.03	134,615.00	72,541.50			207,156.50	9.21	0.07
Interior Walls	53,846.00	4,339.26	779.45			5,118.70	0.23	0.01	53,846.00	9,672.20			63,518.20	2.82	0.02
Floors	26,923.00	2,169.63	779.45			2,949.08	0.13	0.01	26,923.00	9,672.20			36,595.20	1.63	0.01
Plumbing	26,923.00	2,169.63	656.73			2,826.36	0.13	0.01	26,923.00	8,149.40			35,072.40	1.56	0.01
Furnishings and Interiors	53,846.00	4,339.26	2,922.93	2,692.30		9,954.48	0.44	0.02	53,846.00	36,270.75	33,408.86		123,525.61	5.49	0.04
Carpets	26,923.00	2,169.63	1,948.62			4,118.25	0.18	0.01	26,923.00	24,180.50			51,103.50	2.27	0.02
Furnishings	26,923.00	2,169.63	974.31			3,143.94	0.14	0.01	26,923.00	12,090.25			39,013.25	1.73	0.01
Design, Supervision, Studies	80,769.00	6,508.88	0.00			6,508.88	0.29	0.01	80,769.00	0.00			80,769.00	3.59	0.03
Design	40,384.50	3,254.44	0.00			3,254.44	0.14	0.01	40,384.50	0.00			40,384.50	1.79	0.01
Supervision	13,461.50	1,084.81	0.00			1,084.81	0.05	0.00	13,461.50	0.00			13,461.50	0.60	0.00
Financial Consulting	26,923.00	2,169.63	0.00			2,169.63	0.10	0.00	26,923.00	0.00			26,923.00	1.20	0.01
Interest During Constuction	179,469.75	14,462.82	0.00			14,462.82	0.64	0.03	179,469.75	0.00			179,469.75	7.98	0.06
Salvage Value	1,313.67	105.86	0.00			105.86	0.00	0.00	1,313.67	0.00			1,313.67	0.06	0.00
Total Development Cost (Net of Salvage)	1,917,587.42	203,416.23	30,172.11	69,999.80	185,843.03	489,431.17	**21.75**	1.00	1,917,587.42	331,525.10	868,630.40	2,306,133.79	3,117,742.92	**138.57**	1.00
Total Development Cost (% of Distributions)		0.42	0.06	0.14	0.38	1.00			0.62	0.11	0.28	0.74	1.00		

HIGH-DENSITY LIFE CYCLE COSTS

Item	Development Costs		Periodic Cost Rehabilitation Parameters			Annual Cost Maint Parameters	
	% of Total Construction Cost	Costs ($'000)	% of Orginal Cost	Costs ($'000)	Frequency (in years)	% of Construction Cost	Cost pa ($'000)
Site Cost		**444,500**					
Site Acquistion		239,600					
Site Clearence		204,900					
Total Construction Cost		1,346,150	x			15%	201,923
Exterior Construction			x			x	
Foundations	15%	201,923	0%	0	100	x	
Structural Frame	20%	269,230	0%	0	100	x	
Roof	5%	67,308	115%	77,404	20	x	
Walls and Windows	10%	134,615	110%	148,077	30	x	
Exterior Construction Total	**50%**	**673,075**				x	
Interior Construction						x	
Mechcanical Systems	18%	242,307	70%	169,615	10	x	
Ventilation Systems	10%	134,615	60%	80,769	10	x	
Interior Walls	5%	67,308	20%	13,462	10	x	
Floors	5%	67,308	30%	20,192	10	x	
Plumbing	2%	26,923	100%	26,923	20	x	
Interior Construction Total	**40%**	**538,460**					
Furnishing and Interiors						7%	3,769
Carpets	2%	26,923	100%	26,923	10	x	
Furnishings	2%	26,923	50%	13,462	10	x	
Furnishing and Interiors Total	**4%**	**53,846**				x	
Design,Supervision, Studies						x	
Design	3%	40,385				x	
Supervision	1%	13,462				x	
Financial Consulting	2%	26,923				x	
Design,Supervision, Studies Total	**6%**	**80,769**				x	
						x	
Total Development Cost	**1.00**	**1,790,650**				x	

Operating Cost Parameters		Other Parameters			
Heating and Cooling	75,207	Discount Rate			7%
Other Utilities	116,392	Rentable Square Feet			21,780
Management	5	Construction Period (Years)			3
		Useful Project Life (Years)			30
Salvage Value	10,000	% of Usable Space			50%
Demolition Cost	0	Square Footage			43,560
Remaining Value of Land & Building	10,000				

	Annual Cost Over Useful Life								Present Value Cost of Building Over Useful Life						
Results	PV Devl Cost (Interst During Constr/1	Intial Invest-ment/1	Period Cost /2	Mainte-nance	Operating Cost	Total Cost	Annual Cost per sf ($)	%Cost Distribution	Initial Invest-ment/1	Periodic Cost/2	Main-tence	Operating Cost	Total Cost	PV Per sf ($)	%Cost Distribution
Site Cost	444,500.00	35,820.66	0.00			35,820.66	1.64	0.06	444,500.00	0.00			444,500.00	20.41	0.09
Site Acquisition	239,600.00	19,308.50	0.00			19,308.50	0.89	0.03	239,600.00	0.00			239,600.00	11.00	0.05
Site Clearence	204,900.00	16,512.15	0.00			16,512.15	0.76	0.03	204,900.00	0.00			204,900.00	9.41	0.04
Total Construction Cost	1,346,150.00	108,481.39	28,126.06	201,922.50		338,529.95	15.54	0.53	1,346,150.00	306,135.58	2,505,664.62		4,157,950.19	190.91	0.85
Exterior Construction Cost	673,075.00	54,240.69	3,455.70			57,696.39	2.65	0.09	673,075.00	42,881.90			715,956.90	32.87	0.15
Foundations	201,922.50	16,272.21	0.00			16,272.21	0.75	0.03	201,922.50	0.00			201,922.50	9.27	0.04
Structural Frame	269,230.00	21,696.28	0.00			21,696.28	1.00	0.03	269,230.00	0.00			269,230.00	12.36	0.06
Roof	67,307.50	5,424.07	1,888.10			7,312.17	0.34	0.01	67,307.50	23,429.52			90,737.02	4.17	0.02
Windows and Walls	134,615.00	10,848.14	1,567.60			12,415.74	0.57	0.02	134,615.00	19,452.38			154,067.38	7.07	0.03
Interior Construction	538,460.00	43,392.55	20,557.94			63,950.49	2.94	0.10	538,460.00	263,253.67			801,713.67	36.81	0.16
Mechcanical Systems	242,307.00	19,526.65	12,276.30			31,802.95	1.46	0.05	242,307.00	152,337.15			394,644.15	18.12	0.08
Ventilation Systems	134,615.00	10,848.14	5,845.86			16,694.00	0.77	0.03	134,615.00	72,541.50			207,156.50	9.51	0.04
Interior Walls	67,307.50	5,424.07	974.31			6,398.38	0.29	0.01	67,307.50	12,090.25			79,397.75	3.65	0.02
Floors	67,307.50	5,424.07	1,461.46			6,885.53	0.32	0.01	67,307.50	18,135.37			85,442.87	3.92	0.02
Plumbing	26,923.00	2,169.63	656.73			2,826.36	0.13	0.00	26,923.00	8,149.40			35,072.40	1.61	0.01
Furnishings and Interiors	53,846.00	4,339.26	2,922.93	3,769.22		11,031.40	0.51	0.02	53,846.00	36,270.75	46,772.41		136,889.16	6.29	0.03
Carpets	26,923.00	2,169.63	1,948.62			4,118.25	0.19	0.01	26,923.00	24,180.50			51,103.50	2.35	0.01
Furnishings	26,923.00	2,169.63	974.31			3,143.94	0.14	0.00	26,923.00	12,090.25			39,013.25	1.79	0.01
Design, Supervision, Studies	80,769.00	6,508.88	0.00			6,508.88	0.30	0.01	80,769.00	0.00			80,769.00	3.71	0.02
Design	40,384.50	3,254.44	0.00			3,254.44	0.15	0.01	40,384.50	0.00			40,384.50	1.85	0.01
Supervision	13,461.50	1,084.81	0.00			1,084.81	0.05	0.00	13,461.50	0.00			13,461.50	0.62	0.00
Financial Consulting	26,923.00	2,169.63	0.00			2,169.63	0.10	0.00	26,923.00	0.00			26,923.00	1.24	0.01
Interest During Constuction	185,033.83	14,911.21	0.00			14,911.21	0.68	0.02	185,033.83	0.00			185,033.83	8.50	0.04
Salvage Value	1,313.67	105.86	0.00			105.86	0.00	0.00	1,313.67	0.00			1,313.67	0.06	0.00
Total Development Cost (Net of Salvage)	1,976,997.50	209,718.41	31,048.99	205,691.72	191,604.55	638,063.67	**29.30**	1.00	1,976,997.50	342,406.32	2,552,437.02	2,377,628.75	4,871,840.85	**223.68**	1.00
Total Development Cost (% of Distributions)		0.33	0.05	0.32	0.30	1.00			0.41	0.07	0.52	0.49	1.00		

FOUNDER'S PARK LIFE CYCLE COSTS

Item	Development Costs		Periodic Cost Rehabilitation Parameters			Annual Cost Maint Parameters	
	% of Total Construction Cost	Costs ($'000)	% of Orginal Cost	Costs ($'000)	Frequency (in years)	% of Construction Cost	Cost
Site Cost		**2,857,000**					
Site Acquistion		156,000					
Land Cost -Lots with Buildings		2,701,000					
Total Construction Cost		524,443	x			4%	20,978
Hard Costs							
Drainage	6%	270,000	100%	270,000	10	5%	26,222
Lighting	1%	52,500					
Traffic Control	1%	2,500					
Landscaping	10%	464,760	115%	534,474	10		
Misc	1%	25,000					
Pavement	10%	90,900	100%	90,900	10	7%	36,711
Hard Cost Total	**29%**	**905,660**					
Soft Cost							
Design Services	18%	357,510	0%	0	0	x	
Engineering Services	10%	268,133	0%	0	0	x	
Environmental Services	5%	35,751	0%	0	0	x	
Construction Inspection	5%	178,755	0%	0	0	x	
Soft Cost Total	**38%**	**840,149**				x	
						x	
Total Development Cost	**1**	**4,602,809**					
Operating Cost Parameters		**Other Parameters**					
Maintenance	150,000	Discount Rate			3%		
Landscaping	150,000	Square Footage			274,357		
Management	0	Construction Period (Years)			3		
		Useful Project Life (Years)			30		
		% of Park Usage			100%		

Results	Annual Cost Over Useful Life								Present Value Cost of Building Over Useful Life						
	PV Devl Cost (Interst During Constr/1	Intial Invest-ment/1	Period Cost /2	Mainte-nance	Operating Cost	Total Cost	Annual Cost per sf ($)	%Cost Distribution	Initial Invest-ment/1	Periodic Cost/2	Maintence	Operating Cost	Total Cost	PV Per sf ($)	%Cost Distribution
Site Cost	2,857,000.00	145,762.02	0.00			145,762.02	0.53	0.15	2,857,000.00	0.00			2,857,000.00	10.41	0.44
Site Acquisition	156,000.00	7,959.00	0.00			7,959.00	0.03	0.01	156,000.00	0.00			156,000.00	0.57	0.02
Site Clearence	2,701,000.00	137,803.02	0.00			137,803.02	0.50	0.14	2,701,000.00	0.00			2,701,000.00	9.84	0.41
Total Constuction Cost	524,443.00	26,756.69	109,103.38	20,977.72		156,837.80	0.57	0.16	524,443.00	1,069,237.22	411,172.57		2,004,852.79	7.31	0.31
Hard Cost Total	905,660.00	46,206.10	54,551.69			100,757.79	0.37	0.10	905,660.00	1,069,237.22			1,974,897.22	7.20	0.30
Lighting	52,500.00	2,678.51	0.00			2,678.51	0.01	0.00	52,500.00	0.00			52,500.00	0.19	0.01
Traffic Control	2,500.00	127.55	0.00			127.55	0.00	0.00	2,500.00	0.00			2,500.00	0.01	0.00
Landscaping	464,760.00	23,711.71	46,622.44			70,334.15	0.26	0.07	464,760.00	913,820.36			1,378,580.36	5.02	0.21
Drainage	270,000.00	13,775.20	23,552.24	26,222.15		63,549.59	0.23	0.07	270,000.00	461,634.24			731,634.24	2.67	0.11
Pavement	90,900.00	4,637.65	7,929.25	36,711.01		49,277.91	0.18	0.05	90,900.00	155,416.86			246,316.86	0.90	0.04
Interest During Constuction	475,623.60	24,265.96	0.00			24,265.96	0.09	0.03	475,623.60	0.00			475,623.60	1.73	0.07
Total Development Cost (Net of Salvage)	5,078,432.60	538,716.31	109,103.38	20,977.72	300,000.00	968,797.41	**3.53**	1.00	5,078,432.60	1,069,237.22	411,172.57	5,880,132.40	6,558,842.38	**23.91**	1.00
Total Development Cost (% of Distributions)		56%	11%	2%	31%	100%			0.77	0.16	0.06	0.90	1.00		

GREEN-SPINE LIFE CYCLE COSTS

Item	Development Costs		Periodic Cost Rehabilitation Parameters			Annual Cost Maint Parameters	
	% of Total Construction Cost	Costs ($'000)	% of Orginal Cost	Costs ($'000)	Frequency (in years)	% of Construction Cost	Cost
Site Cost		**2,854,000**					
Site Acquistion		153,000					
Land Cost -Lots with Buildings		2,701,000					
Total Construction Cost		806,750				4%	32,270
Hard Costs							
Drainage	2%	77,220	100%	77,220	10	5%	40,338
Lighting	4%	175,000					
Traffic Control	1%	15,833					
Landscaping	5%	243,339	115%	279,840	10		
Contingencies	3%	145,000					
Pavement	10%	90,900	100%	90,900	10	7%	56,473
Hard Cost Total	**25%**	**747,292**					
Soft Cost							
Design Services	18%	413,900	0%	0	0		
Engineering Services	10%	310,430	0%	0	0		
Environmental Services	5%	41,390	0%	0	0		
Construction Inspection	5%	206,950	0%	0	0		
Soft Cost Total	**38%**	**972,670**					
Total Development Cost	**1**	**4,573,962**					
Operating Cost Parameters		**Other Parameters**					
Maintenance	150,000	Discount Rate			3%		
Landscaping	200,000	Square Footage			71,553		
Management	0	Construction Period (Years)			3		
		Useful Project Life (Years)			30		
		% of Park Usage			30%		

	Annual Cost Over Useful Life								Present Value Cost of Building Over Useful Life						
Results	PV Devl Cost (Interst During Constr/1	Intial Invest-ment/1	Period Cost /2	Mainte-nance	Operating Cost	Total Cost	Annual Cost per sf ($)	%Cost Distribution	Initial Invest-ment/1	Periodic Cost/2	Maintence	Operating Cost	Total Cost	PV Per sf ($)	%Cost Distribution
Site Cost	2,854,000.00	145,608.97	0.00			145,608.97	2.03	0.15	2,854,000.00	0.00			2,854,000.00	39.89	0.45
Site Acquisition	153,000.00	7,805.95	0.00			7,805.95	0.11	0.01	153,000.00	0.00			153,000.00	2.14	0.02
Site Clearence	2,701,000.00	137,803.02	0.00			137,803.02	1.93	0.14	2,701,000.00	0.00			2,701,000.00	37.75	0.43
Total Constuction Cost	806,750.00	41,159.79	64,679.65	32,270.00		138,109.44	1.93	0.14	806,750.00	633,874.84	632,506.24		2,073,131.08	28.97	0.33
Hard Cost Total	747,292.00	38,126.28	32,339.82			70,466.11	0.98	0.07	747,292.00	633,874.84			1,381,166.84	19.30	0.22
Lighting	175,000.00	8,928.37	0.00			8,928.37	0.12	0.01	175,000.00	0.00			175,000.00	2.45	0.03
Traffic Control	15,833.00	807.79	0.00			807.79	0.01	0.00	15,833.00	0.00			15,833.00	0.22	0.00
Landscaping	243,339.00	12,414.98	24,410.57			36,825.55	0.51	0.04	243,339.00	478,457.98			721,796.98	10.09	0.11
Drainage	77,220.00	3,939.71	6,735.94	40,337.50		51,013.15	0.71	0.05	77,220.00	132,027.39			209,247.39	2.92	0.03
Pavement	90,900.00	4,637.65	7,929.25	56,472.50		69,039.40	0.96	0.07	90,900.00	155,416.86			246,316.86	3.44	0.04
Interest During Constuction	472,642.74	24,113.88	0.00			24,113.88	0.34	0.02	472,642.74	0.00			472,642.74	6.61	0.07
Total Development Cost (Net of Salvage)	5,046,604.74	535,340.04	64,679.65	32,270.00	350,000.00	982,289.69	**13.73**	1.00	5,046,604.74	633,874.84	632,506.24	6,860,154.47	6,312,985.82	**88.23**	1.00
Total Development Cost (% of Distributions)		54%	7%	3%	36%	100%			0.80	0.10	0.10	1.09	1.00		