FEASIBILITY STUDY FOR THE REDEVELOPMENT OF THE HISTORIC SACRAMENTO PG&E POWER STATION

A Project

Presented to the faculty of the Department of Public Policy Administration

California State University, Sacramento

Submitted in partial satisfaction of
the requirements for the degree of

MASTER OF SCIENCE

in

Urban Land Development

by

Jennifer Michelle Claiborne

FALL
2014

FEASIBILITY STUDY FOR THE REDEVELOPMENT

OF THE HISTORIC SACRAMENTO PG&E POWER STATION

A Project

by

Jennifer Michelle Claiborne

Approved by:

_____, Committee Chair
Nuriddin Ikromov, Ph. D.

_____, Second Reader
Robert W. Wassmer, Ph. D.

_____
Date

Student: Jennifer Michelle Claiborne

I certify that this student has met the requirements for format contained in the University format manual, and that this project is suitable for shelving in the Library and credit is to be awarded for the project.

_____, Department Chair _____
Robert W. Wassmer, Ph. D. Date

Department of Public Policy Administration

Abstract

of

FEASIBILITY STUDY FOR THE REDEVELOPMENT

OF THE HISTORIC SACRAMENTO PG&E POWER STATION

by

Jennifer Michelle Claiborne

This Master's Project was prepared to analyze the feasibility of the historic PG&E Power Station building and surrounding property into a regional science center located in Sacramento, California. The iconic and historic building has been siting vacant for over two decades; however, with its high visibility and ideal location to Downtown Sacramento and the future Railyard development, the blighted site has huge potential to not only revitalize the riverfront and River District neighborhood, but also assist in furthering the education of the local science-literate workforce and community. Assuming the role of a developer, I collected background information on the site's history, proposed scope of work, and analyzed the site's permits and environmental review. In addition, I evaluated several other feasibility studies done on other science centers, conducted a market study, and generated an operating pro forma. Lastly, I researched possible funding and financing for the development and construction of the Project. Although California redevelopment-funding opportunities are no longer a way to

finance capital improvement projects in blighted neighborhoods, I have concluded that this Project is feasible under a two-phased financial and construction approach. Assimilation of this approach by the City of Sacramento could potentially allow an undeveloped, dilapidated historical site to transform into a valuable multi-county community educational science center resource.

_____, Committee Chair
Nuriddin Ikromov, Ph. D.

_____
Date

TABLE OF CONTENTS

Page

LIST OF TABLES

Tables Page

LIST OF FIGURES

Figures Page

Chapter 1

INTRODUCTION

After the housing bubble and devastating recession in 2007, the State of California faced a major budget crisis. In an attempt to balance California's State budget, Governor Jerry Brown approved the dissolution of over 400 Redevelopment Agencies ("RDAs") as part of the 2011 Budget Act. By February 1, 2012, the State formally dissolved RDAs. (California Department of Finance, 2014)

Though controversial, the uses of redevelopment tax increments were still the most compelling economic development tool for local cities and counties to turn around distressed communities within their jurisdictions. The dissolution left cities and other public agencies searching for new ways to finance redevelopment of blighted, undesirable areas and other economic development projects within their communities. Redevelopment agencies and the associated tax increment dollars helped incentivize the private sector that typically would not have otherwise spent private funds in these blighted areas due to the high risks associated with those developments.

Today cities and counties are still looking for new creative ways to incentivize and encourage private money and development in these blighted neighborhoods. Often developers build these projects only through public-private partnerships.

One of these public-private partnerships in the City of Sacramento is the redevelopment of the historic PG&E Power Station building and site, located between the

Sacramento River and Interstate-5, just north of the downtown area. Most recently, on May 27, 2014, Sacramento City Council voted to help support the financing of the Powerhouse Science Center, which has plans to redevelop and revive the city-owned historic PG&E Power Station building and site into a regional science center. The historic building and surrounding site have been vacant and decaying for over two decades. With its high visibility and ideal location to Downtown and the future Railyards development, the blighted site has huge potential to not only revitalize the riverfront and River District neighborhood, but also assist in furthering the education of the local science-literate workforce and community.

Along with revitalizing a brownfield site and educating our workforce, civic amenities like the science center create places where people want to congregate. A local Sacramento professional, Tim Youmans, formerly the senior principal at the firm Economic & Planning Systems, stated in an *Inside Publications* interview,

> *"By having entertainment and recreation and educational opportunities, people want to be there to enjoy those. Right now, the trends are that people, particularly younger people, pick where they want to live first and then the jobs follow. So one of the efforts is to make Sacramento a better place in order to keep our graduates and others from leaving and attract others to come." (Warmerdam, 2013)*

These young professionals demand a rich life out of work with close proximity and access to the arts, culture, and recreation, wherein those elements become the key to attracting and retaining a quality workforce (Warmerdam, 2013). For these reasons, the City of Sacramento has invested both time and money to revitalize the PG&E Power

Station site and selected the Powerhouse Science Center to be the ideal opportunity to redevelop the riverfront and provide a civic amenity that not only educates the region's future workforce, but also attracts young and creative professionals.

Problem Statement

Even though the redevelopment of the site would provide many positive effects to the community, financing such a project without redevelopment funds makes the feasibility of the project questionable, and especially so when the particular site has substantial obstacles that need to be addressed and overcome. Through the remainder of this thesis, I will assume the role of the Developer for the Powerhouse Science Center ("Project") and analyze the feasibility to redevelop the historic PG&E Power Station building and site into a regional science center.

Thesis Outline

Through the remainder of Chapter 1, I will review the project site's history from the time PG&E built the Power Station in 1912, through to the City of Sacramento's ownership today. Chapter 2 will follow with a literature review of several feasibility studies on similar civic amenity projects. In Chapter 3, I will discuss the Powerhouse Science Center Project, specifically the purpose of the science center and its scope of work. Chapter 4 will provide an analysis of the site; including, zoning, entitlements, special permits, environmental review, cultural resources, and soil remediation. I will

present a market study in Chapter 5, and in Chapter 6, I will provide the Project's costs and operational cash flows. Lastly, in Chapter 7, I will review funding and financing opportunities and in Chapter 8, I will provide my recommendation of the Project's ultimate feasibility.

Property History

The history of the PG&E Power Station building and site are an important element to be aware of and understood before undertaking any redevelopment project at the Power Station site. The building and site is rich in historical significance to not only Sacramento, but also to California and the United States, wherein there are many redevelopment implications associated with its age, architecture, use, and environmental history, as well as with funding opportunities.

Register of Historic Places

The City of Sacramento nominated and placed the site, which includes the former PG&E Power Station, on the United States Department of the Interior National Park Service's National Register of Historic Places the site. The National Register of Historic Places is the nation's official list of buildings, structures, objects, sites, and districts worthy of preservation for their significance in American history, architecture, archaeology, and culture. Properties listed on the Federal register are eligible for financial incentives, which I discuss further in Chapter 6, *Project Financing*. In addition, the

Federal register automatically places the property on the California Register of Historical Resources listing. Resources listed on either of these registers require review under the California Environmental Quality Act ("CEQA").

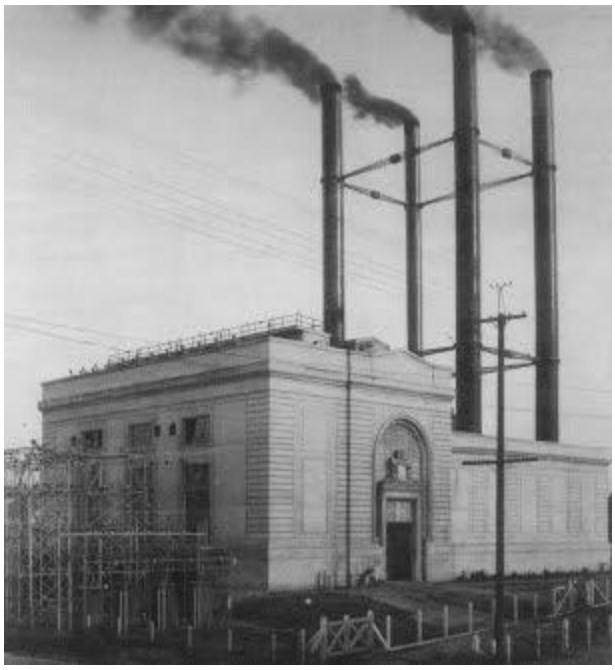
The City of Sacramento also listed the property on the City of Sacramento's Register of Historic and Cultural Resources. This register does not provide financial incentives, but rather gives the City the ability to protect a cultural resource for the community. Further, the register requires that the City's Preservation Commission review and approve any development plans per the Historic Preservation Chapter 17.134, Title 17, of the City Code, which follows the Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties.

Historical Significance

The property is significant at the local level for its role in Sacramento's transition from gas lighting to electric power and for its architectural and stylistic influence on the city (City of Sacramento, 2010, p.14). In 1912, Pacific Gas and Electric Company ("PG&E") finished constructing the Power Station building, referred to formally by historians as the Sacramento River Station "B." At that time, the main source of electricity was from another PG&E electric plant located at 6th and H Street, and during the winter months, there were frequent electrical power interruptions. PG&E built the Power Station to provide back-up electricity to the City of Sacramento and surrounding

areas. Once constructed, the Power Station was the largest electric steam station north of San Francisco. (Page & Turnbull, 2011)

Figure 1- Power Station, North and West Facades, 1912

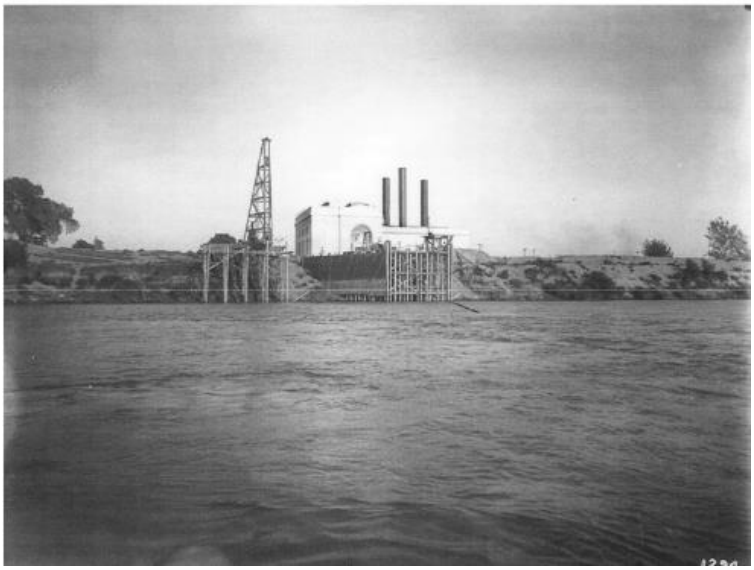


Source: Sacramento History Center

The total cost of construction for the Power Station in present value was a little over $13 million, and at that time, it was the most costly industrial building built in Sacramento (Page & Turnbull, 2011). Justifying the cost, *Sacramento Bee*, on July 27, 1912, reported that once it started generating power, the Power Station would provide the "best electrical service obtainable outside of Oakland and San Francisco." PG&E built the Power Station to produce 5,000 kilowatts of electricity with 6,702 horsepower. Yet, by 1924, PG&E was still concerned about frequent interruptions to Sacramento's electrical supply and decided to spend another $1,000,000 to add an additional turbine to

create 20,122 horsepower. This amount of electricity was three times the amount necessary to serve the City of Sacramento (City of Sacramento, 2010, p. 14). PG&E also constructed a piling pier and water intake structure at the same time as the Power Station to provide water from the river to the building's pump pit. The City of Sacramento removed the pipes that carried the water through the levee and into the building, but can still be seen onsite today.

Figure 2- View of Power Station from Sacramento River, Looking East, 1912



Source: Sacramento History Center

Along with providing electricity, the Power Station was, and still is, an excellent Sacramento example of the Beaux Arts Classical Revival style. The Power Station is 19,250 square feet and 66.5 feet at its highest point, designed by Willis Jefferson Polk (1867-1924), an American architect best known for his work in San Francisco (as cited in Wikipedia, 2014). Willis Polk built on the beautiful banks of the Sacramento River

and just South of the American River fork, and designed it so that the most adorned design feature on the "front" of the building, which was the West side of the building facing the river. This might seem backwards today since the freeway and most visible side of the building faces the East, however, at that time most transportation and activities involving the Power Station occurred from the river. In addition to the river, on the West side of the building, a rail spur flanked the riverbank and provided the Power Station with the necessary fuel to run the turbines. Today, Polks most grand Beaux-Art feature is the large cartouche featured over the main entryway.

Figure 3- Power Station Cartouche Over Main Entrance

Source: Sacramento History Center

Furthermore, Polk designed the Power Station to one day be surrounded by a public park because of the beautiful views of the rivers and the influence of the City Beautiful movement (a reform philosophy of urban planning with the intent of introducing

beautification and monumental grandeur in cities, Page & Turnbull, 2011). However, that vision never came to fruition at that time and instead PG&E simply landscaped the Power Station with lawn and simple bushes around the edges.

The above historical information is critically important for the future redevelopment of the property. For instance, the City's Preservation Commission will request the project's new design to incorporate the design of the building and site during that significant period of the property, between 1912 and 1957, when PG&E constructed and sold the building. I discuss these types of design implications further in Chapter 3, *Site Analysis*.

Post Electricity Generation

The Power Station's purpose as a back-up electricity source ended in the 1930s and PG&E used the building for test purposes through the early 1950's prior to the plant's formal closure in 1957. PG&E sold the property to the Associated Metals Company of Oakland in June of 1957. Associated Metals stripped and sold all the salvaged mechanical equipment and finishes from the building (Page & Turnbull, 2011).

Soil Remediation

The California Department of Transportation ("DOT") gained ownership of the site in 1965 to make way for Interstate-5 (City of Sacramento, "Staff Report," 2008). Soil sampling by the State in 1981 detected levels of heavy metals exceeding the State's

Total Threshold Limit Concentrations (Environmental Protection Agency [EPA], "Superfund," 2012). In 1986, the State placed the property on the National Priorities List as a superfund site. The National Priorities List ("NPL") is the list of the most hazardous sites across the U.S. and its territories. The cleanup consisted of the removal of underground storage tanks and contaminated soil around the Power Station (EPA, "Superfund," 2014). DOT transferred control and possession of the site to California's Department of Water Resources ("DWR") in 1988.

Finally, in 1991, the State had the site cleaned up and delisted from the NPL. The property is no longer a threat to human health, however, DWR required further investigations and completion of a Remedial Action Plan ("RAP") in regards to the site's contamination. The purpose of a RAP is to identify potential risks from conditions related to past site operations, make an evaluation and outline the proposed cleanup plans or "remedial alternatives" for the site. In brief, the RAP required that clay caps be constructed permanently over the previously contaminated areas and monitoring water wells installed to annually test the lead levels in the water. The California Department of Toxic Substances Control ("DTSC") approved the RAP and continues to monitor the site and the RAP requirements. Any development on the property must consider the locations of these caps and wells as a development cannot remove or puncture them. In 1998, DWR, along with DTSC, signed a deed restriction and an Operations and Maintenance Agreement ("O&M Agreement") that further protects the safety of the public by restricting the property owner's use or conveyance of the property, and the O&M Agreement outlines the required operations and maintenance of the property.

Post Remediation

After completing the cleanup, DWR considered reusing the building as a new California Water Center. They provided seismic upgrades to the building to secure the foundation and structure. However, DWR's vision for reuse never amounted to anything, and since the State is not in the business of owning land, they sold the property to the City of Sacramento's Department of Parks and Recreation in 2002. In 2007, the City completed Phase I of park improvements for the South portion of the property. The City of Sacramento dedicated the park as the Robert T. Matsui Park. Phase II involved additional park improvements to the property surrounding the Power Station, but they were never constructed.

As current owners, the City of Sacramento has a strong desire to see the Power Station site be a catalyst redevelopment project that will enhance the riverfront, preserve the historical nature of the site, and provide the community with an attraction that gives back to the community. The history of the site, including its historical significance producing electricity, the architecture, and site remediation, is critical in understanding and incorporating into the redevelopment of the site to achieve the goals of the City, national historical preservation, and the community.

In the following chapter, I will evaluate several different feasibility studies on science centers and children's museums to provide some viewpoints on how other organizations have attempted to analyze the feasibility of other centers.

Chapter 2

LITERATURE REVIEW

In this chapter, I researched different feasibility studies on comparable science centers and children's museum to provide a perspective other organizations approach to determining such a project's feasibility. The redevelopment of the PG&E Power Station building and site into a regional science center is a unique type of development. Finding similar projects to review was not only challenging, but also almost impossible. I searched extensively for any existing, reasonably comparable feasibility studies of proposed science centers and children's museum projects. The closest comparable projects found will be reviewed in this chapter, the feasibility studies of the Rockville, Maryland Science Center; the Page Paleontological Science Center in Lake Powell, Colorado, and the Pikes Peak Children's Museum in Colorado Springs, Colorado.

Rockville, Maryland Science Center

In March 2006, the Maryland Science Center completed a feasibility study for the future Rockville, Maryland Science Center. Its focus is on science and technology with goals to increase science literacy in the general public, encourage young people to develop and maintain interest in science, and to help people understand scientific principles of environmental concerns, technology development, and global systems.

This feasibility study reviewed the demographics of their target audience, a 10-mile radius around downtown Rockville and Montgomery County, and found that a majority of the population was affluent, well-educated, and increasingly ethnically diverse. In addition, they found the proportions of the area's population with bachelors and advanced degrees were higher than the U.S. national averages. Lastly, they noted the population was growing at both the upper and lower ends of the socio-economic spectrum. The study concluded that the affluent and well-educated population gave a "highly positive indicator for science participation." Interestingly, the study did not discuss the opportunities to reach the underserved and poorer population either through school participation or other government agencies.

The study calculated their estimated audience by using a penetration rate that calculates the total attendance as a percentage of the region. They found, using data from Associates of Science Technology Center ("ATSC"), which gathers data on science center performance, organizations, and budgets, that 20,000 square feet science centers have an average of 27% penetration rate. Using a more conservative penetration rate, the study used a 15% penetration rate on the population from a 10-mile radius or 860,000 people; they used an estimated annual attendance to be 129,000. In addition, through ATSC data, the study found that similar science centers had an average ticket fee of $5.50 for adults and $3.75 for children and operating revenues of $1 million.

The Rockville science center plans to be 20,000 square feet and include; easy location access; free parking; near other similar facilities to create a critical mass; good perception of safety; an iconic building; room to grow; and consider costs of

environmental issues/permitting. With these considerations and square footage, the Rockville Science Center estimates the cost of the science center to be $8.5 million, not including site acquisition or occupancy costs. The majority of the space would be for public exhibits and back of house needs, such as offices, and janitorial space. Other uses would be a learning center, multipurpose flex space, and public amenities.

The study assumed that the project would have to be a public-private partnership, in which the operating sources would come from public and private sources. Public funding sources include, annual appropriations from city/county/state; percent sales tax receipts from specified areas; mandated annual amounts; school system budget; government ownership; and grants. Private funds include, philanthropic gifts from individuals/corporations/foundations; and program support sponsorships/bequests/in-kind. Fundraising through a capital campaign will pay for the construction of the project.

The feasibility study found that the Rockville Science Center would be feasible, but they recommend phasing the project and emphasized that fundraising is a long-term effort and that there is "no single magic bullet in fundraising." Currently, the science center is operating in a small facility in John Hopkins University Montgomery County Campus and continues to fundraise to build their long-term vision of a vibrant new facility. (West, 2006)

Page Paleontological Science Center

The Page Paleontological Science Center ("PPSC") would be located in Page, Arizona, near the southern shores of Lake Powell and close to the Grand Canyon. The PPSC's mission is to provide interpretation and creative display of nearby paleontological discoveries on the Colorado Plateau (Page Paleontological Science Center Preliminary Feasibility Study, n.d.). The town of Page looks to build the PPSC to help expand the local economic base to reduce community dependency on summer water recreational activities. The science center would provide regional attraction year-round and meet tourist needs of educational and entertaining experiences. Further, they desire that the science center would improve scientific interpretation for the general public and the quality of scientific education in rural school districts. Lastly, the science center would help fund desperately needed paleontology research.

The market study conducted for the feasibility study included a comparison of local tourist attraction attendance; see a reduced list in Table 1.

Table 1- Page Science Center Comparable Tourist Attraction Attendance, 1999

Comparable Tourist Attraction	# Attendance in 1999
Grand Canyon	4.9 million
Glen Canyon Recreational Area	2.6 million
Carl Haydon Visitor Center	916,000
IMAX at Grand Canyon	2 million

Source: Page Paleontological Science Center Feasibility Study

Through the comparison, the study determined the expected visitation for the PPSC to be 20% of the visitors to the Glen County Recreational Area, which is 2.5 million x .2 = 500,000 visitors per year.

The study includes building a 15,000 square foot facility along the highly visible 89 Highway. The City of Page owns the site. The study assumes the City will donate or lease the 5 acres for the facility, and justifies that the future science center would increase sales tax revenues by $2.5 million annually. The 15,000 square foot facility would include, a retail gift shop; interpretive display areas; small lecture auditorium; research library/conference room; office space; small lab; and, a motion simulation ride (4D special effects).

The study presented several different funding opportunities, in addition to the city donating the land, including, grants; corporate sponsorships; private donations; donated labor/ scholarly expertise; co-funding and/or collaboration with other institutions; and, leasing spaces with Smithsonian Institute to host paleontological specimen. Along with capital funding, the study provided estimations for operating revenue sources (see Table 2). However, the study did not elaborate on the reasoning or the sources for such amounts.

Table 2- Page Paleontological Science Center Estimated Revenue Sources

Revenue Source	$ Amount	Quantity	Total Annual Revenue
Tickets (adults/children)	$3/$1	500,000 people	$1 million
4D Motion Ride	$5 per ride	400 per day summer/ 100 per day winter	$450,000
Gift Shop	$2	500,000 people	$1 million
Memberships	$25	250 memberships	$6,250
Office Space Rental	$300 month	Na	$3,600
Outdoor Field Experience	$500	100 events	$50,000
Private Donations & Grants	Unknown	Na	Na
		Total	$2.5 million

Source: Page Paleontological Science Center Feasibility Study

The initial feasibility study suggests the science center would be feasible, and the next steps would be to assemble a Strategic Plan and a more in-depth Feasibility Study. Currently, the PPSC is in its conceptual stages and is working towards gaining more political support. ("Page Paleontological Science Center Preliminary Feasibility Study," n.d.)

Colorado Springs Pikes Peak Children's Museum

The main goals of the Pikes Peak Children's Museum in Colorado Springs are to be a strong resource encompassing education, cultural, science, arts and humanities exhibits, activities, and workshops, and to reach out to underserved children and families. The new facility would also help revitalize local economies; restore children's natural connection to the outdoors; and become a destination tourist attraction.

The children's museum target audience would be 0-8 year olds. To estimate annual attendance, the study looked at Pike Peak's greater region and divided the market in two, the primary market, 25-mile radius, and a secondary market, 100-mile radius. Then they found similar children museums with similar Metropolitan Statistical Area (MSA) and found their annual attendance and its percentage of the MSA (see Table 3).

Table 3- Children's Museum Annual Attendance & Percentage of MSA, 2006

	EdVenture (Columbia, SC)	Exploration Place (Wichita, KA)	Creative Discovery Museum (Chattanooga, TN)	Kidzu (Raleigh, Durham, NC)	COSI (Toledo, OH)
Annual Attendance (% of MSA)	195,000 (35%)	143,632 (24%)	224,372 (47%)	196,003 (40%)	316,447 (48%)

Source: Colorado Springs Pikes Peak Children's museum Feasibility Study, 2008

The study calculated the estimated attendance for the museum to be 210,000, which is 30% of the MSA.

In addition to finding estimated attendance through percentage of MSA, the study reviewed local area attraction attendances and ticket prices. In total, the number of people visiting local attractions was 6.3 million in 2007 (see Table 4).

Table 4- Pikes Peak Most Popular Attractions, 2007

	# of Visitors	% of Annual Visitation	Ticket price (adult/child)
Annual Visitation	6.3 million		
Cheyenne Mt. Zoo	468,630	7.5%	$14.25/$7.25
Royal Gorge Bridge & Park	308,306	5%	$23/$19
Pikes Peak America's Mt.	270,528	4%	$10/$5
Pikes Peak Cog Railway	250,000	4%	$32.5/$18
Seven Falls	195,390	3%	$9/$5.5
Flying W Ranch	108,000	2%	$20/$10
Professional Rodeo Hall of Fame	17,308	0.3%	$6 to $3
Garden of the Gods Park	2 million	32%	Free
Garden of the Gods Visitor % Nature Center	442,226	11%	Free
USAFA Visitor Center	500,000	8%	Free
North Cheyenne Canon Park	442,226	7%	Free
Focus on the Family	195,000	3%	Free
Olympic Training Center	115,000	2%	Free
Pioneers Museum	52,179	1%	Free

Source: Colorado Springs Pikes Peak Children's Museum Feasibility Study, 2008

The local attraction attendance numbers confirmed the estimated 210,000 visitors was a conservative number. Table 4 also provided insight into the challenge with targeting children and families and competing with attractions that have free admission. Free admission attractions appeal to families with young children since young children are more unpredictable in temperament. Understandably, young parents / grandparents

would favor free entertainment in case the child gets fussy or tired, wherein the need to leave is more financially acceptable than vacating a paid attraction early. The study found and average admission to be $5 for children and $9 for adults. The local ticket prices assisted in estimating a ticket price of $9.

The children's museum is planned to be 30,000 square feet of exhibit space, common space, and outdoor exhibits, and would also include, free parking; affordable and kid-friendly dining area; high priority on security and cleanliness issues; and, as many "green" elements as possible. The study anticipates the total construction to cost $24 million.

Although they would prefer the museum to be downtown, the study noted that easy and accessible location was not as critical, as the very popular zoo is located in the most challenging to find location and 90% of those who live in the area visit the zoo.

The children's museum would have several different operating revenues, including, admission tickets; membership fees; dining; retail; special education programs; special event rentals; and, charitable donations. The study anticipates an annual funding need of $450,000 to $1.2 million for the first five years, in addition to the $24 million for construction. The study did not focus on many funding opportunities, but rather recommended that a consultant construct a comprehensive professional capital campaign.

The study suggests the children's museum is feasible and Pikes Peak is a "prime candidate for a children's museum." They did emphasize the importance to align the project with local government goals because public funding and other public support would be needed for the success of the project. Currently, the operations are running

without a physical location and the non-profit continues to focus on fundraising for the new facility. (Lattin, 2008)

Summary of Findings

Throughout the literature review, there were findings that were very similar and those that were different. The remainder of this chapter will address these similarities and differences.

Target Attendance

Through the literature reviews, I noted many of studies used a mile radius to determine their audience population. The studies suggested the size of the facility would determine how large a population radius would extend. For instance, if the facility planned to be very large and have a regional draw then the facility might have a radius of 25-miles. In addition, the studies considered how far someone would drive to visit the facility. Any distance beyond 75 miles was most likely not considered a day trip and would not make sense to be included in the target audience. In addition, some studies simply found the Metropolitan Statistical Area population to capture target audience.

Estimated Attendance

The Rockville study used a capture rate to determine their estimated attendance. They found industry averages and multiplied them against the target audience population. Whereas, the Page study simply took a percentage of a similar local attraction to determine their estimated attendance.

Estimated Ticket Price

The most common, and simply the cleanest way to predict ticket pricing was to compare ticket prices of local attraction ticket prices and/or similar centers/museum with similar population and demographics.

Construction and Site Assessment

I noted that some of the biggest impacts in construction and site assessment was the importance of free parking, a safe perception of the location, and easy of location access. However, the Pikes Peak study felt that accessibility was not as important because the local zoo was hard to find and had a 90% penetration rate. I feel using a comparable penetration rate of a zoo to that of a children's museum would be inaccurate. I would have to find more evidence that children's museums or even science centers are as popular as zoos.

Funding Opportunities

Throughout these studies, the funding opportunities were all very similar. They all had a huge reliance on public funding and high aspiration to run a successful capital campaign. None of the projects in these feasibility studies are located within California. Further research on civic amenities located in California could provide more relevant funding opportunities.

Researching other organizations feasibility studies on science centers and children's museum has provided an overview on different ways to approach analyzing the feasibility of this project and I will consider their findings and approaches into this study. In the following Chapter, I will review the Powerhouse Science Center's demand in the Sacramento region and its scope of work.

Chapter 3

POWERHOUSE SCIENCE CENTER PROJECT

Request for Proposal

In March 2005, Sacramento City Council authorized the distribution of a request for proposal ("RFP") for development of the PG&E Power Station. The City's criteria for selecting a proposal included the following:

a. Ensure public access to the Sacramento River;
b. Limited need for public funding;
c. Support development of a public park on the site;
d. Preserve distinctive architectural features of the Historic Landmark Building;
e. Establish visitor attraction, such as a museum, within the structure;
f. Include restaurant, cafes or retail; and
g. Serve as a catalyst redevelopment project.

On August 26, 2005, the city received five submissions. Proposals were submitted by the Discovery Museum (referred to now as Powerhouse Science Center), Sacramento's Children's Museum, Thiebaud Jibboom Street Museum and Sculpture Garden, the Jibboom Street Development Team (D,R. Horton and Ken Fahn) and the Water Center Alliance. City staff recommended entering into an Exclusive Right to Negotiate ("ERN") with team Jibboom Street Development who proposed a hotel, restaurant and mixed use

project. Less than a year later, the Jibboom Street Development withdrew its proposal and terminated its interest in the redevelopment of the Power Station building and site. (City of Sacramento, "Staff Report," 2005)

In the June 12, 2007 staff report to Sacramento City Council, City staff recommended selecting the Discovery Museum as the new preferred option best meeting the City's intent for the site. The Discovery Museum's proposal was favorable and was one of five proposals submitted in the original RFP competition. The proposal at that time included a science, space and technology museum, rehabilitated Power Station, restaurant and educational center, a planetarium, and an inviting open space park area with an amphitheater.

The Discovery Museum and the City of Sacramento entered into an ERN in August 2008. Currently, the Discovery Museum, now doing business as Powerhouse Science Center, is under a 50-year term lease for the Power Station site at 400 Jibboom Street, and continues to work on the financing for the project.

Powerhouse Science Center Presently

The Powerhouse Science Center ("Center") has operated continuously for 60 years as a 501(c)(3) nonprofit agency. Originally founded in 1951 as the California Junior Museum, it offers education through interactive science exhibits, planetarium shows, animal presentations, and outreach programs. In addition, it is home to the Sacramento

region's only public planetarium and Challenger Learning Center simulated space program.

The Center is currently located on Auburn Boulevard on the outer edge of the City of Sacramento, and its exhibits and programs, including offsite outreach programs, reach over 90,000 people annually. The visitors come from 10 counties through outreach efforts and based on the Center's current visitor demographics, 40 percent of students served are from economically disadvantaged populations and 64 percent are from self-identified ethnic groups other than Caucasian. The current building space measures 10,000 square feet, 4,000 of which is exhibit space. (Economic Planning Systems [EPS], "Powerhouse Science Center Business Plan," 2012)

Demand for STEM Education

As the world's economy becomes more knowledge-based and driven by the fields of science, technology, engineering and mathematics (referred to as STEM), companies become more dependent on employees with high-quality science education. California STEM Learning Network states,

> *"Seven of the 10 fastest growing occupations are in STEM fields, and demand for over 1 million STEM jobs is projected in California by 2018. Yet, our state faces shortages of qualified workers in precisely these fields…California students are falling behind their peers nationally and internationally in both science and math*

achievement. Our elementary and middle school students rank 44th or lower among all US states in science proficiency."

If high-quality science education does not meet the demand of companies, then technology companies will never come to California or those that exist today will simply leave due to a lack of qualified labor supply. This will affect not only local communities, but also the state in general, as other states will vehemently offer incentives to attract those companies. In addition, STEM-related talent is necessary to compete globally and keep the United States the leader in global innovation (Enger, 2012).

The public is also in need of increased STEM education; whether purchasing the newest iPhone or baking a cupcake, STEM affects our lives daily. Having a general knowledge of STEM concepts is important. Furthermore, we regularly face science-based public policies that warrant thoughtful debate and need the public's involvement and knowledge to make the necessary changes, such as global warming and renewable energy sources.

Need for Expansion

The Center at its current location cannot meet this strong demand for STEM education, as it is physically and programmatically inadequate. Currently, due to the size of the facility, the Center can only accommodate the public on the weekends, and separately, only students during the weekdays. Moreover, the Center turns away 25 percent of the school groups who apply for visits, which does not even include pre-K

children, who are a large portion of the Center's target audience. Along with not being able to reach the intended full audience, the current Center's size forces it to shut down for two weeks each year to rotate exhibits that are minimal in scope. (EPS, "Powerhouse Business Plan," 2012). For these reasons, the Powerhouse Science Center Board had plenty of motivation to begin efforts to expand its current facility and further their mission to be "a dynamic regional hub that engages and inspires people of all ages to explore the wonders, possibilities, and responsibilities of science."

Project Scope

The Center will expand into the historic PG&E Power Station. This Project will consist of the rehabilitation of the historic PG&E Power Station into 48,263 square feet of exhibit space and offices, a new 35,533 square foot building, called the Earth, Space, and Science Center ("ESSC"), that will feature more exhibits, retail space, a café, and a 150-seat Planetarium. Further, the project will include the construction of a 273 stall parking structure, outdoor amphitheater, terrace, wetland "living machine," and other outdoor hands-on exhibits. The Center will teach by example and feature low-impact and sustainable green practices for water, energy and resource efficiencies by obtaining at least LEED Silver certification.

Figure 4- Campus Site Map

Source: Dreyfus & Blackford Architects

Chapter 4

SITE ANALYSIS

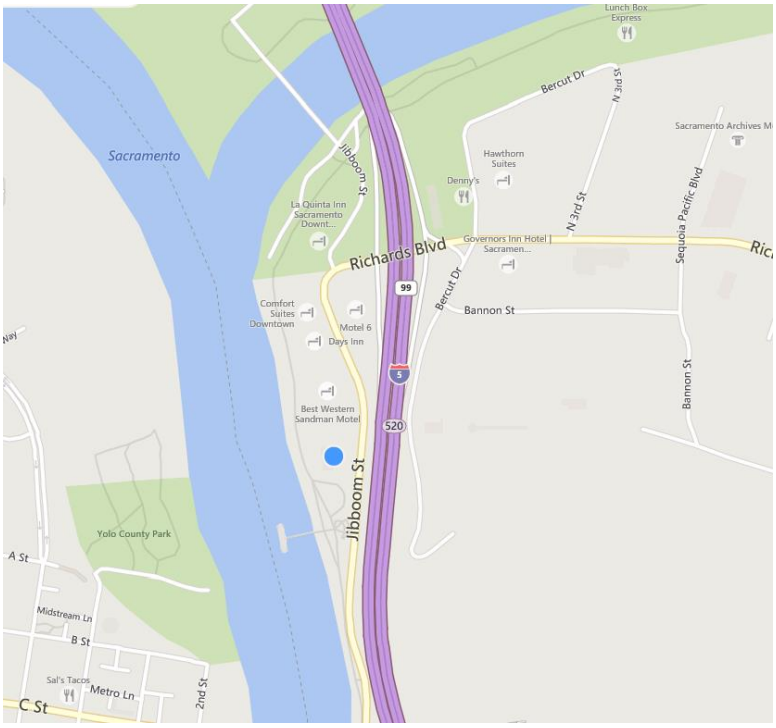
Location has always been a key focus when evaluating the success of a real estate project. In addition, a site location can provide a lot of information about a project's costs and dictate the design. This chapter will provide a site analysis of the PG&E Power Station site. The chapter will be broken into sections that will include a review on the physical location within Sacramento; a review of the site's zoning and entitlements; and in depth analysis of the state and federal environmental review. The environmental review covers the mitigation measures necessary for impacts on seasonal wetlands, the threatened habitat of the endangered Valley Elderberry Longhorn Beetle and other endangered species, impact on cultural resources, and the effects of past and future soil remediation.

Location

The Power Station site ("Project") is located at 400 Jibboom Street, Sacramento, California, and situated northwest of downtown Sacramento, between the Sacramento River and Interstate 5. The Project placement is within the Richards Boulevard Special Planning District, Section C-Highway Commercial Zone ("HC Zone"), the River District Redevelopment Project area, the Sacramento Riverfront Master Plan area, and the River

District Specific Plan area. The project boundary is approximately 6.35 acres in size and is comprised of seven parcels (001-0190-005, 001-0190-004, 001-0190-011, 001-0190-016, 001-0190-015, portion of 001-0190-006, and portion of 001-0190-009). (City of Sacramento Staff Report, 2010)

Figure 5- Vicinity Map with Blue Dot Marking for Project Site



Source: Bing.com map

Figure 6- Close-up Vicinity Map with Red Project Outline

Source: Bing.com map

Figure 7- Aerial View of Historic PG&E Power Station. Facing South.

Source: www.digitalsky.us

Zoning & Entitlements

The City's Zoning Code classifies the property as an amusement center and is an allowed use in the Highway Commercial Zone with approval of a Plan Review entitlement through the City of Sacramento. In addition, the following entitlements are required: Mitigated Negative Declaration and a variance to exceed the 45' height requirement in the Highway Commercial Zone.

The property is located within a Design Review District, which typically requires review and approval of the development plans by the City's Planning Commission. However, as previously mentioned in Chapter 2, *Property History*, since this site is a listed City Landmark Historic Structure, it requires review by the City's Preservation Commission as well and is subject to the City's Preservation Ordinance.

Park Approvals

With plans to enhance Robert T. Matsui Waterfront Park, the City of Sacramento requires the Project to amend the Park Master Plan and re-designate to Community Park.

Special Permit

In addition, a special permit is required to allow off-site bus parking for the Project, since there will not be enough parking for school buses that wait during the day for children on field trips.

CEQA

The Project has undergone both State and Federal environmental review. The California Environmental Quality Act, or CEQA, is a statute that requires state and local agencies to identify the significant environmental impacts of the project's actions and to avoid or mitigate those impacts, if feasible. The lead agency, the City of Sacramento, is responsible for conducting the CEQA review and has final approval of the project. The City of Sacramento reviewed the Powerhouse Science Center Project ("Project") in accordance with the CEQA.

Specifically, the City determined that the Project is consistent with the land use designation for the project site as set forth in the 2030 General Plan, and evaluated in the Master Environmental Impact Report ("EIR") for the 2030 General Plan. The City completed an EIR for the General Plan to assist in reducing time and costs in completing environmental review for future projects. Since the Project is consistent with the General Plan, the City prepared a Mitigated Negative Declaration ("MND") to identify potentially new or additional significant environmental effects that he Master EIR did not analyze.

Mitigation Measures

In the MND, the Mitigated Monitoring Plan ("MMP") enforces the implementation of the mitigation measures. The Project's MMP includes mitigation for Biological Resources, Cultural Resources, Geology, Hydrology, and Noise impacts. The

owner/developer/applicant bears the cost of implementing the mitigation measures in the MMP.

The MMP's measures mitigation measure for biological resources include mitigating for the .046 acre seasonal wetland located east of the historic building; mitigating for a 25 foot elderberry shrub with exit holes present; and, minimizing potential impact on special-status species, including, Valley Elderberry Longhorn Beetle ("VELB"), burrowing owl, Swainson's hawk, white-tailed kite, purple martin, pallid bat, and Townsend's big-eared bat.

Mitigation measures for impacts on cultural resources include implementing City, State, and Federal historic preservation laws, regulations, and codes; encouraging adaptive reuse of historic building; and minimize potential impacts to historic and cultural resources by consulting with Native American groups and individuals. In addition, mitigation measures require the development and compliance with protocols that protect or mitigate impacts to archeological, historic, and cultural resources, including prehistoric resources; and pursue eligibility and listing for qualified resources, including historic districts and individual resources under the appropriate register(s).

Mitigation measures to reduce impact on geology and soils include coordinating with Central Valley Flood Protection Board for excavation within 10 feet of levee, and by obtaining encroachment permit from U.S. Army Corps of Engineers to determine if project features or construction pose a risk to levee integrity.

The MMP mitigates for hydrology and water quality impacts by making sure all new groundwater discharges to the City of Sacramento's Combined or Separated Sewers that the City's Department of Utilities regulates and monitors.

Lastly, the MMP includes mitigation measures to reduce negative noise impacts. A mitigation measure for noise requires that the construction company use ride-on machinery to compact the ground five feet or more away from the building faces. In addition, to prevent vibration impacts, the construction crew avoid rolling vibrating equipment within 25 feet of the historic building.

NEPA

Due to the Project's use of federal funds, the Project must also complete review under the National Environmental Policy Act ("NEPA"). NEPA is the Federal equivalent of CEQA. The NEPA process is an evaluation of a project's effect on the environment. There are three levels of analysis: categorical exclusion determination; preparation of an environmental assessment/finding of no significant impact ("EA/FONSI"); and preparation of an environmental impact statement ("EIS").

Pursuant to NEPA, the Powerhouse Project must receive approval of an Environmental Assessment ("EA") and Finding of No Significant Impact ("FONSI"). An EA determines whether a federal undertaking would significantly affect the environment. If the answer is no, the Federal Lead Agency issues a FONSI. The FONSI addresses measures that will mitigate potentially significant impacts.

The Powerhouse Federal Lead Agency is the Department of Housing and Urban Development ("HUD"). When the City moved some utility pipes from the Project site into the street, they used funds from HUD, which triggered the HUD as the Federal Lead Agency under NEPA. Sacramento Housing and Redevelopment Agency is a Responsible Entity under NEPA, acting on behalf of HUD.

The EA requires the Project to obtain approval from the following agencies: U.S. Army Corps of Engineers ("USACE")- CWA Section 404 Permit; U.S. Fish and Wildlife Service ("USFWS")- ESA Section 7 Consultation; California Department of Fish and Game ("DFG"); State Water Resources Control Board- CWA Section 402, Storm Water Pollution Prevention Program; and, Central Valley Regional Water Quality Control Board- CWA Section 401.

Seasonal Wetland

When the City of Sacramento built the water intake structure, just south of the historic Power Station, they laid some utility pipes, as briefly discussed above, across the top of the Power Station site instead of in the street, which is more typical. The City laid the utility pipes on top of the site, in front of the Power Station, because they cannot puncture the clay caps, thus creating a berm onsite. Over several years, the berm created a seasonal wetland due to precipitation collecting between the berm's slope and ground.

Figure 8- Aerial Photo of Site with Yellow Box Outlining Seasonal Wetland.

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods during the year. The California wetland regulation that protects aquatic resources, called Section 404, permits the Project to provide compensation to a mitigation bank for unavoidable impacts to the seasonal wetland. Mitigation banks are a third party that provides compensatory mitigation where a wetland, stream, or other aquatic resource area has been restored, established,

enhanced, or preserved for purposes of removing aquatic resources, such as the seasonal wetland. (EPA, "Wetlands," 2012)

PG&E Towers & VELB

Prior to September 2010, PG&E had two-power generation towers onsite. Per the Project's plans, those towers had to be removed. The towers were no longer in use, so the City of Sacramento requested PG&E crews to dismantle the conductor wires and power pole.

Figure 9- PG&E Crew Removing Electrical Tower- Taken in 2010

Source: Dreyfus & Blackford Architects

Before PG&E dismantled the towers, the pole closest to Jibboom Street had to have a large elderberry shrub removed. There must be mitigation on the elderberry shrubs or trees because the endangered Valley Elderberry Longhorn Beetle ("VELB") lives their entire life in them ("Valley Elderberry," n.d.). The CEQA document requires mitigation of the Elderberry shrub to avoid significant impact on the endangered VELB.

In California's Central Valley, the elderberry shrub/tree is associated with riparian forests, which occur along rivers and streams. To mitigate the elderberry shrub, the Project worked with a conversancy group called Wildlands. Wildlands provided a contract that would transplant the elderberry shrub from the Project site to the River Ranch VELB Conservation Bank where the shrub would be maintained and monitored in perpetuity in accordance with July 9, 1999 U.S. Fish and Wildlife Service VELB Guidelines (Wildlands, 2012). The transplant allows the plant to thrive and the endangered VELB have a protected habitat.

Endangered Species

Along with the VELB, the CEQA document listed all other endangered species that could inhabit the site. As previously listed, they include, burrowing owl, Swainson's hawk, white-tailed kite, purple martin, pallid bat, and Townsend's big-eared bat. Before construction initiation, the construction crew must conduct surveys to determine if and how many specimens inhabit the site and then follow appropriate mitigation measures laid out in the CEQA document.

Cultural Resources

The Project's site proximity to two rivers, Sacramento River and American River, made it a premier location for human inhabitance thousands of years ago (City of Sacramento, "MND," 2010). In compliance with the MND and EA, more specifically, Section 106 of the National Historic Preservation Act, the Lead Agencies (Sacramento Housing Redevelopment Agency ("SHRA") and the City of Sacramento) were required to consult with local Native American tribes. The tribe that provided interest in the site was the Shingle Springs Band of Miwok Indians ("Tribe"). The Lead Agencies entered into a Cultural Resources Treatment and Monitoring Agreement ("Monitoring Agreement") with the Tribe, which addresses concerns associated with construction in this culturally sensitive area. The Monitoring Agreement provides protocol for working in this area and handling Native American human remains and cultural items, if uncovered during construction. (City of Sacramento, "MND," 2010).

In addition, in the event that any prehistoric subsurface archeological features or deposits, including locally darkened soil ("midden") that could conceal cultural deposits, animal bone, obsidian and/or mortars discovered during construction all work within 50 meters of the resources must be stopped. At that time, the Powerhouse Science Center's contractor must consult with a qualified archeologist to assess the significance of the find. (Sacramento Housing Redevelopment Agency [SHRA], "Environmental Assessment," 2010)

Soil Remediation

As previously mentioned in Chapter 2, *Site History,* the Project site was used for heavy industrial purposes and unfortunately left behind a variety of toxic materials in the building and surrounding soils. The EPA placed the site on the Superfund list and conducted remediation work to clean up the site. In 1991, the site was removed from the list after remediation was completed, which included installing monitoring wells to measure ground water contamination and a clay cap.

Monitoring Wells

There are several monitoring wells throughout the site that must remain in place. Under the Land Use Covenant, and Operations and Maintenance Plan, which the California State Department of Toxic Substance Control ("DTSC") monitors, the City of Sacramento, and therefore the Powerhouse Science Center under the current 55-year lease, must sample and test the water pulled from the wells annually for lead contamination. To date, the water samplings have shown no presence of lead or other contamination in the water. (City of Sacramento, "Jibboom Street Site Study," 2000).

Clay Cap

In 1997, the State enforced the installation of a clay cap on the East side of the historic PG&E Power Station to encase hydrocarbon and lead containing soils. The building is acting as a cap as well. These "caps" minimize the risk of toxic exposure for

future commercial or industrial land use. The caps must not be disturbed or removed without extensive evaluation of the site, soil and extensive consultation with the DTSC.

To remove or disturb the clay cap is not in the Project's best interest, as it would be very expensive and time consuming. Instead, the design of the Project avoids any penetration by paving over a majority of the cap with hardscape and planting trees in pots. Even further, the Project incorporates a cantilever design for the Earth Space and Science Center ("ESSC") building, so the edge of the building will hang over the southeast corner of the clay cap, rather than puncture it. However, the historic PG&E Power Station will need to be redeveloped and used for the Project; therefore, the building will no longer be used as an acting cap. For the reuse of the building, soil is to be removed from beneath the historic PG&E Power Station building.

Figure 10- Project site plan with clay cap outlined.

Source - Geocon Consultation Inc.

Previous remediation work on the site has confirmed the soil beneath the building is contaminated, but the level of contamination is still unknown. The Project will require the excavation of soil, so per DTSC request, the Center hired a consultant to conduct a Soil Management Plan to remove and test the potentially contaminated soil. The Soil Management Plan provides guidelines for management of the soil impacted by contamination, such as lead and petroleum. Once the necessary soil is removed, the basement cement floor will provide a barrier to the soil and act as the new cap. (GeoCon, 2012).

Site Implications

Site implications, whether reducing negative impacts to the environment or constructing around permeant clay caps, are important to understand and consider for future development. The Project site has significant history and its location adjacent to the river provides a multitude of additional costs and hurdles for the project to overcome and incorporate. This chapter provided an overview of these additional costs, including zoning, entitlements, special permits, environmental review, cultural resources, and soil remediation. These issues are very common among infill development and must be considered in the construction timeline, as well as considered financially. In the following chapter, Chapter 5, *Market Study*, I will review the market implications as they effect the Center's estimated annual admissions and ticket prices.

Chapter 5

MARKET STUDY

This chapter will focus on calculating the expected average attendance and estimated ticket sales price. These calculations will determine the operating revenue for the Center, including revenue from ticket sales, memberships, café and gift shop sales. The chapter will first calculate the estimated attendance using three different methods; historical data from the current Discovery Museum, using a capture rate of the immediate population, and calculating the average attendance of similar science centers. Later in the chapter, I will also determine the average ticket price among similar science centers to find the estimated ticket price for the Powerhouse Science Center ("Center").

Calculating Estimated Attendance

To find the expected annual attendance for the Center I will take the average attendance calculated from each method listed:

1. Historical data from current Discovery Museum;
2. Use a market capture rate on a 50- mile radius county population; and,
3. Take an average of similar science centers and local civic amenity attendances.

Discovery Museum Historic Attendance

Originally founded in 1951, the board designed the Discovery Museum as a place where children could experience science and nature through interactive programs and exhibits. Today, the Discovery Museum is one of the few primary institutions that have an emphasis on STEM (science, technology, engineering, math) education and hands-on learning. The Discovery Museum's historic attendance over the last five years has averaged 85,305 attendees (Randy Beaton, personal communication, October 10, 2014). However, simply using Discovery Museum's average annual attendance to project the Center's annual attendance would be grossly insufficient. The gross building space at the Discovery Museum measures 10,000 square feet, 4,000 of which is exhibit space (Randy Beaton, personal communication, October 10, 2014), whereas, the gross building space at the Center will measure 85,199 square feet, which is eight times larger than the Discovery Museum.

To correct this projection, I will use a multiplier of two on the historical five-year attendance average to estimate the Center's estimated attendance. I do not think this method is too high since the new Center will be eight times larger, rather I could argue that it is too low. However, since this project is unique compared to other more typical development projects, there is no other precedent to using a higher multiplier when simply looking at the average historical attendance. Therefore, to use the historical average method to estimate the Center's annual attendance, I will use 170,610 annual attendances.

Discovery Museum 5-year historical attendance 85,305 x 2 = 170,610 annual attendance

Description of the Market

Another method to estimate annual attendance is to measure the potential market population and determine an appropriate capture rate. The market for the Center is the Sacramento Region and the surrounding 50-mile radius with the epicenter being the proposed Center site, located just outside Downtown Sacramento on 400 Jibboom Street, Sacramento, California. The 50-mile radius captures visitors that would more than likely take a day trip to the Center, rather than visiting overnight. In addition, the 50-mile radius captures all the adjacent county schools that the Discovery Museum currently serves. These counties include; Sacramento, Sutter, Yolo, and portions of El Dorado, Placer, Nevada, Yuba, Solano, San Joaquin and Amador. For ease in calculating and purposely leaning towards the conservative side, the partially served counties will only have 50% of their estimated population included in the potential market population analysis. In total, the potential market population of these counties is 2,705,210 (U.S. Census Bureau, "Quick Facts," 2013), as seen in Table 5.

Table 5- Potential Market Population

County	Population
Sacramento	1,462,131
Sutter	95,350
Yolo	204,593
El Dorado	181,737 x .5 = 90,868.5
Placer	367,309 x .5 = 183,654.5
Nevada	98,200 x .5 = 49,100
Yuba	73,340 x .5 = 36,670
Solano	424,788 x .5 = 212,394
San Joaquin	704,379 x .5 = 352,189.5
Amador	36,519 x .5 = 18,259.5
Total	**2,705,210**

Source- U.S. Census Bureau, 2013 County Quick Facts

Market Capture Rate

I based the market capture on the total population in the targeted market and a surrounding community capture rate. The capture rate for this market study focuses on the Center's future ability to attract a percentage of the estimated visitor population, calculated above in Table 5. I based the capture rate on several considerations:

1. Target audience- Pre-school, K through college students, families, adults without children, and seniors.
2. Site location- High visibility along Interstate 5 and close proximity to largest metropolitan city in the region.

3. Industry average capture rate- The local, Sacramento based economics consulting firm, Economic Planning Services (2012) claims, that the industry average for science centers is 12% (p. 11).
4. Discovery Museum is too small and cannot serve the Sacramento Region, leaving the region underserved for science-enriched entertainment and education.

For these reasons, I used the capture rate of 13% to calculate the projected Center attendance. Using the 13% capture rate, the Center's calculated attendance per the capture rate method is as follows:

Potential market population of 2,705,210 x capture rate of 13% = 324,625

Competitive Analysis

The last method to calculate the expected annual attendance is to find similar science centers and any local attraction's average attendance. Table 6 below, lists the similar science centers name, location, county, county population, average household income and annual visitors. The average annual attendance between all similar science centers is 371,500.

Table 6- Similar Science Center Average Household Income and Annual Visitor Comparison

Attraction Name	Location	County	County Pop.	Average Household Income	Annual Visitors
Fleet Science Center	San Diego, CA	San Diego County	3,105,989	$63,373	285,000
Chabot Science Center	Oakland, CA	Alameda County	1,513,952	$71,516	164,000
McWane Science Center	Birmingham, AL	Jefferson County	658,555	$45,415	430,000
Kentucky Science Center	Louisville, KY	Jefferson County	742,172	$46,701	550,000
Iowa Science Center	DesMoines, IA	Polk County	602,095	$58,096	300,000
Maryland Science Center	Baltimore, MD	Baltimore County	1,426,670	$66,068	500,000
			Average	**$58,528**	**371,500**
Powerhouse Science Center	Sacramento, CA	Sacramento County	1,421,959	$55,864	

Source: Attendance from attraction's websites on March 26, 2014. Population data from U.S. Census Bureau 2013. Household Income from U.S. Census Bureau 2008-2012 American Community Survey 5-Year Estimates.

Average Annual Attendance

Using just one of these methods to determine annual attendance would not provide an accurate estimated annual attendance, as each of them does not perfectly represent the environment or market the Center will actually be serving. To find the best estimate I took the average of all three methods to find an average estimated annual attendance of 288,911 (see Table 7). The calculated average annual attendance will

forecast operating revenues and other calculations such as revenues from café sales, gift shop sales, memberships, etc.

Table 7- Average of Three Methods to Calculate Estimated Annual Attendance

Method of Calculating Annual Attendance	Attendance Per Method
Historical & Square Footage	170,610
Capture Rate	324,625
Similar Science Centers & Local Attractions	371,500
Average Estimated Attendance	**288,911**

Ticket Price

To calculate an estimated ticket price for the Center I found similar science centers and local attraction's ticket prices for adults, seniors, and children. Finding the average ticket price provides the best ability to estimate what the target audience is willing to pay for similar entertainment and education provided. I found the average ticket price for adults at similar science center to be $14.98, $13.65 for seniors, and $11.65 for children (see Table 8). I also found the average ticket price for local Sacramento attractions that are comparable in size. The average adult price for local attractions is $10.63, $9.25 for seniors, and $6.13 for children (see Table 9).

Since the local attractions ticket prices are lower than the similar science center prices, and the average household income in the Sacramento region is relatively lower than the average of the other science centers compared (see Table 6), I estimate lower ticket prices for the Center than the average similar science centers. For this study, I will use $12.00 for adults, $10.00 for seniors and $8.00 for children. At the end of the day,

community members will compare local attraction prices. For example, a family of four might be deciding to visit either the Center or the zoo, and the cost to enter will weigh heavily on their decision.

Table 8- Average Ticket Price for Similar Science Centers

Attraction Name	Adult Ticket Price	Children Ticket Price
Fleet Science Center	$17.95	$14.95
Chabot Science Center	$16.00	$12.00
McWane Science Center	$13.00	$9.00
Kentucky Science Center	$13.00	$11.00
Iowa Science Center	$11.00	$7.00
Maryland Science Center	$18.95	$15.95
Average Ticket Price	**$14.98**	**$11.65**

Source: Collected pricing from attraction's websites on October 10, 2014.

Table 9- Average Ticket Price for Local Attractions

Local Attractions	Adult Ticket Price	Children Ticket Price
Crocker Art Museum,	$10.00	$5.00
Sacramento Zoo	$11.25	$7.25
Average Ticket Price	**$10.63**	**$6.13**

Source: Collected pricing from attraction's websites on October 10, 2014.

Calculating Operating Revenue

To conclude, I found three different methods to estimate annual attendance at the Center. Taking the average of all three methods, the estimated annual attendance I will use throughout the remainder of this study is 288,911. Further, by comparing similar science centers in the country, I found the average adult ticket price to be $14.98. However, since local attractions are significantly less than the average comparable science centers and Sacramento's average household income is less than the average of

the comparable science centers, I decided to lower the estimated adult ticket price to $12.00, and similarly lowered the children ticket price to $8.00. Both the estimated attendance and ticket price will help determine projected revenues and net operating income, which will assist in determining how much of the financial budget can be financed for project construction, an issue discussed further in Chapter 6, *Project Costs & Cash Flows.*

Chapter 6

PROJECT COSTS & CASH FLOWS

In this chapter, I outline the project's capital costs and then use the estimated attendance and ticket prices as previously calculated in Chapter 5, *Market Study*, along with other operating revenues and expense estimates, to determine the operational viability of the Center in the current market. If the Center's revenue is greater than its operating expenses, including debt service, then it can be determined viable. Moreover, as briefly discussed earlier, calculating the Center's operating revenue will help support the amount of debt the Center can afford for constructing the new facility, which I will cover in the next chapter.

Capital Costs

The construction of the Center includes the rehabilitation of the historic PG&E Power Station into 48,263 square feet of exhibit space and offices. A new 35,533 square foot building, called the Earth, Space, and Science Center ("ESSC"), will feature more exhibits, a retail space, a café, and a 150-seat Planetarium. In addition to the ESSC, the Center will construct a 273 stall parking structure of 89,774 square feet. The project will also include site work construction of an outdoor amphitheater, terrace, wetland "living machine," and other outdoor hands-on exhibits and, feature low-impact and sustainable

green practices for water, energy and resource efficiencies by obtaining at least LEED ("Leadership in Energy & Environmental Design") Silver certification.

Guaranteed Maximum Price

I based the estimated costs on a Guaranteed Maximum Price ("GMP") contract, which is a cost-type contract where the Center would compensate the contractor for actual costs incurred plus a fixed fee subject to a ceiling price. The contractor is responsible for cost overruns, unless the Center increases the GMP through a formal change order, such as adding new scope of work. The contractor returns any savings resulting from the cost underruns to the owner, in this case the Center. The contractor's fee assumed in the project costs are 5% of the total contract amount.

Contingencies, Bond & Insurance Fees

There are projected 4% contingencies throughout the entire project costs, except for under "construction costs" for the Power Station, where they are 10%. I increased the Power Station contingency because there are more unknowns and risk with historic buildings and redevelopment, therefore, increasing the contingency mitigates for cost overruns. In addition, I projected a 1% bond and builder risk insurance costs throughout the entire project costs.

Contract Price

Table 10 lists Otto Construction's (the selected construction company for the Center) 100% design document costs, including the direct construction cost, indirect costs, and soft and exhibition costs. In addition, I have projected two million dollars for "start-up" costs, which includes budget for capital campaign, hiring, training, and other expenses related to opening the doors once the projects is constructed.

In 2015, I estimate the total Project capital cost to be $86,715,535. This figure includes the contractor fees, contingencies, and 1% bond and builder risk insurance. If the Center does not build the Project in the year 2015, than they will have to update the cost estimate to account for inflation and any other reflection of the market.

Table 10- Powerhouse Science Center Cost Breakdown

USES	ESSC	POWER STATION	PARKING STRUCTURE	SITE WORK	TOTALS
CONSTRUCTION COSTS					
Direct Costs & General Conditions	$ 19,710,687	$ 17,460,958	$ 6,443,877	$ 5,819,205	**$ 49,434,727**
Contractor Fee (5%)	$ 985,534	$ 873,048	$ 322,194	$ 290,960	**$ 2,471,736**
Bonds & Builder Risk Insurance (1%)	$ 197,107	$ 174,610	$ 64,439	$ 58,192	**$ 494,347**
Contingency (varies)	$ 788,427	$ 1,746,096	$ 257,755	$ 232,768	**$ 3,025,047**
Total Direct Construction Costs	$ 21,681,756	$ 20,254,711	$ 7,088,265	$ 6,401,125	**$ 55,425,857**
INDIRECT COSTS CONTRACTOR SUPPLIED					
Architecture Design & Engineering	$ 1,757,417	$ 2,201,211	$ 724,534	$ -	**$ 4,683,163**
Preconstruction	$ 301,909	$ 365,925	$ 147,400	$ 95,249	**$ 910,483**
CEQA Mitigation	$ -	$ -	$ -	$ 2,675	**$ 2,675**
Subtotal	$ 2,059,326	$ 2,567,137	$ 871,934	$ 97,924	**$ 5,596,321**
Contractor Fee (5%)	$ 102,966	$ 128,357	$ 915,531	$ 4,896	**$ 1,151,751**
Bond & Builder Risk Insurance (1%)	$ 20,593	$ 25,671	$ 8,719	$ 979	**$ 55,963**
E/O & Liability Insurance	$ 100,000	$ 100,000	$ 35,000	$ 15,000	**$ 250,000**
Contingency	$ 82,373	$ 102,685	$ 34,877	$ 3,917	**$ 223,853**
Total Indirect	$ 2,365,259	$ 2,923,850	$ 1,866,062	$ 122,717	**$ 7,277,888**
SOFT & EXHIBITION COSTS					
Permits, Inspection, Plan Review	$ 386,270	$ 262,150	$ 374,500	$ -	**$ 1,022,920**
Sanitation/School/Debris / Sewer Fees	$ 128,400	$ 128,400	$ 64,200	$ 95,318	**$ 416,318**
Planetarium & Challenger Exhibit	$ 2,229,238	$ -	$ -	$ -	**$ 2,229,238**
Exhibits	$ 4,260,842	$ 11,584,623	$ -	$ 877,400	**$ 16,722,864**
Kitchen Equipment Allowance	$ 374,500	$ -	$ -	$ -	**$ 374,500**
Subtotal	$ 7,379,250	$ 11,975,173	$ 438,700	$ 972,718	**$ 20,765,840**
Contractor Fee (5%)	$ 368,962	$ 598,759	$ 21,935	$ 48,636	**$ 1,038,292**
Bonds & Builder Risk Insurance (1%)	$ 73,792	$ 119,752	$ 4,387	$ 9,727	**$ 207,658**
Total Soft & Exhibition Costs	$ 7,822,005	$ 12,693,683	$ 465,022	$ 1,031,081	**$ 22,011,790**
START-UP COSTS	$ 2,000,000	$ -	$ -	$ -	**$ 2,000,000**
TOTAL DEVELOPMENT COST	$ 33,869,019	$ 35,872,244	$ 9,419,349	$ 7,554,923	**$ 86,715,535**

Operating Pro Forma

Accurate budgeting can make or break a business. To predict the Center's operating pro forma, I have complied all potential operating income and costs to run the Center. Apart from my estimated ticket price and annual attendance, I derived the remaining operating income and costs from an interview I had with the current Discovery Museum's Chief Financial Officer, Randy Beaton on October 17, 2014. The Discovery Museum forecasted the Powerhouse Science Center's operating income and costs on a combination of current operating data from the Discovery Museum and the Reuben H. Fleet Science Center's financial data. The Reuben H. Fleet Science Center is located in San Diego and is similar in size to the proposed Powerhouse Science Center.

To get a general understanding of the operating feasibility of the Center, I created Table 11 - Operating Pro Forma to include a forecast of the first three years of the Center's operations. The first year of any new attraction will attract a higher amount of visitors than in the following years, since the newness of the Center will undeniably wear off in the second year. Therefore, for Year 2 I dropped the attendance estimate by 10%, which affected the revenues for ticket sales, retail and café sales. However, throughout the remaining revenue sources and expenses I estimated an increase in revenues and expenses of 1.7%. Ending in October 2014, the annual inflation rate for the United States is 1.7%, as published by the US government on November 20, 2014 (US Inflation Calculator, 2014). Therefore, using the inflation rate would be a good predictor for

increases in cost and sales. In Year 3, I estimate a 1.7% increase in attendance, as well as all other costs and income.

In the remainder of this chapter, I will outline Table 11 - Operating Pro Forma revenue sources and then highlight its main operating expenses.

Table 11- Operating Pro Forma

Operating Pro Forma			
Item	**Year 1**	**Year 2**	**Year 3**
General Public Attendance	288,911	260,020	264,440
Attendance Growth		-10%	1.7%
Revenues			
Ticket Sales	$ 2,889,114	$ 2,600,203	$ 2,644,406
Field Trips	$ 578,000	$ 587,826	$ 597,819
Retail Sales	$ 108,840	$ 97,956	$ 99,621
Café Sales	$ 38,674	$ 34,807	$ 35,398
Special Activities	$ 165,000	$ 167,805	$ 170,658
Memberships	$ 850,000	$ 864,450	$ 879,146
Education Programs	$ 190,000	$ 193,230	$ 196,515
Government Support	$ 404,000	$ 404,000	$ 404,000
Private Support	$ 300,000	$ 305,100	$ 310,287
Total Revenues	**$ 5,523,628**	**$ 5,255,377**	**$ 5,337,850**
Expenses			
Staffing Costs			
Salaries	$ 1,215,200	$ 1,235,858	$ 1,256,868
Payroll Taxes	$ 91,100	$ 92,649	$ 94,224
Benefits	$ 364,500	$ 370,697	$ 376,998
Subtotal Staffing Costs	$ 1,670,800	$ 1,699,204	$ 1,728,090
Other Expenses			
Administrative	$ 300,000	$ 305,100	$ 310,287
Advertising & Public relations	$ 550,000	$ 559,350	$ 568,859
Programs & Exhibits	$ 775,000	$ 788,175	$ 801,574
Engineering & Utilities	$ 500,000	$ 508,500	$ 517,145
Subtotal Other Expenses	$ 2,125,000	$ 2,161,125	$ 2,197,864
Contingency on Other Expenses	$ 637,500	$ 648,338	$ 659,359
Total Operating Expenses	**$ 4,433,300**	**$ 4,508,666**	**$ 4,585,313**
Net Operating Income	**$ 1,090,328**	**$ 746,711**	**$ 752,537**

Operating Revenues

The Center is a nonprofit corporation; however, a science center is not like most museums and has many opportunities to generate revenue. These different revenue sources include; ticket sales; field trips; retail sales; café sales; special activities; memberships; education programs; government support; and private support.

Ticket Sales

Revenue from ticket sales must consider the ratio of adult tickets and children tickets, and account for members who get free entry with their memberships. I will assume that 50% of the attendance will be made of children and the other 50% adults. In Chapter 5, *Market Study*, I determined the estimated adult price to be $12.00 and children's $8.00 and that I would use a base annual general public attendance of 288,911.

288,911 attendees ÷ 2 = 144,456 x $12 adult ticket price = $1,733,466 annually

144,456 x $8 children ticket price = $1,155,648 annually

$1,733,466 + $1,155,648 = $2,889,114 annual ticket sales revenue in Year 1

Field Trips

The Center will continue to serve surrounding schools with hands-on learning opportunities through the planetarium and exhibitions. The field trip attendance is in addition to the general attendance estimated previously. Field trips include general field

trips through the Center, self-guided tours, and the Challenger Learning Center, which is where students simulate a space mission to work together through challenges.

1. General field trips assumptions and calculations:

    a. 170 school days

    b. 6 classes per day – based on exhibition area available

    c. 30 students per class – Discovery Museum average

    d. Rate charge per student is $10.00 – Discovery Museum average

    170 days per year x 6 classes per day x 30 students per class = 30,600 students per year

    30,600 students x $10.00 per student = $306,000 annual general field trip revenue

2. Self-Guided tours assumptions and calculations:

    a. 170 school days

    b. 4 classes per day – based on exhibition area available

    c. 30 students per class – Discovery Museum average

    d. Rate charge per student is $5.00 – Discovery Museum average

    170 days per year x 4 classes per day x 30 students per class = 20,400 students per year

    20,400 students x $5.00 per student = $102,000 annual self-guided tour revenue

3. Challenger Center assumptions and calculations:

    a. 170 school days

b. 2 missions per day – based on available time and space

c. 30 students per mission

d. Rate charge per student is $16.67 – Discovery Museum average

170 days per year x 2 missions per day x 30 students per mission = 10,200 students per year

10,200 students x $16.67 per student = $170,000 annual Challenger revenue

Retail Sales

The Center will outsource their retail space. Outsourcing to another company will allow the Center to provide their visitors with the desire to buy memorable items, but not distract from their core mission. The Center has discussed these plans with Event Network, a consultant and potential retail operator, who projects the average retail spending of each visitor to be $2.00. They have also provided a contract that proposes that the retailer will pay a percentage rent within each operating period, such as 15 percent of net sales up to $750,000; 20 percent of net sales above $750,000. Event Network defines net sales as total sales in each operating period less all discounts, merchandise returns, sales tax and bank transaction fees (estimated to be approximately 1.5 percent).

368,325 Annual attendance x $2.00 = $736,650 x 1.5% = $11,049

($736,650 - $11,049) x 15% = $725,601 x 15% = $108,840 annual retail revenue

Café Sales

The Center will also outsource its café space since the primary mission of the Center is not in the restaurant business. Arthur M. Manask & Associates, a national foodservice consultant for cultural institutions, consulted with the Center and projected a café capture rate of 25 percent, where the average spending per person at the café is $6.00, and an estimated 7 percent of net sales from café operator to the Center.

368,325 Annual attendance x 25% = 92,081 café visitors

92,081 café visitors x $6.00 = $552,487 revenue annually

$552,485 x 7% net sales = $38,674 annual café revenue

Special Activities

Special activities at the Center will include non-school Challenger programs, special events, summer camps, and birthday parties. Non-School Challenger Missions will be public Challenger missions, including community missions, and corporate missions, expected to run regularly. The Center's education staff projects that these programs will serve 4,200 people per year.

1. Special Events

   Based on information from the Reuben H. Fleet Center, the Center expects special event attendance of 10,000 at $11.50 per person that generates $115,000 in annual special events revenue.

2. Summer Camps

The Center expects summer camp attendance to increase by 50 percent of the current figure. Assuming fees will not increase, this amounts to $35,000 per year in summer camp revenue.

3. Birthday Parties

   The Center currently charges $10.00 per person and holds an average of three birthday parties per month, serving about 750 visitors per year. Based on information from the Reuben H. Fleet Center, the Center expects birthday party attendance of 1,500 at $10.00 per person that generates $15,000 in annual birthday party revenues.

Memberships

Based on data from the Reuben H. Fleet Center, the Center is targeting a membership of 8,500 in its initial year, to 8,840 in the stabilization year. I found that the average five-person membership for similar science centers to be $104.66, as found in Table 12. Using a membership of $100.00, memberships will provide $850,000 in revenue.

Table 12- Family Membership Prices for Similar Science Centers

Science Centers	Family Membership Prices
McWane Science Center	$95
Fleet Science Center	$109
Chabot Science Center	$99
Iowa Science Center	$90
Louisville Science Center	$85
Maryland	$150
Average	**$104.66**

Source: Membership prices from all science center websites on October 10, 2014.

Education Programs

The Center will provide classrooms and other space to host educational programs and workshops. Discovery Museum educational staff anticipates similar opportunities for the Center as the Reuben H. Fleet Science Center educational programs, with estimated revenues of $190,000.

Government Support

The Center currently receives about $150,000 from the City of Sacramento and $94,000 from the County of Sacramento each year, and expects these amounts to remain the same. As it transitions to a larger facility, the Center will gain the ability to run a greater variety of targeted programs, making it more attractive to state and federal granting agencies. The Center projects that it will achieve levels of $100,000 per year in state funding and $60,000 per year in federal funding for an annual total in government funding of $404,000.

Private Support

Current revenue from private support, including donations and corporate and foundation gifts, is over $300,000 per year. The Center expects to sustain these levels.

Operating Expenses

Operating costs for the Center there will be costs to run the facility that will include; staffing costs (salaries, payroll taxes, benefits); administrative costs; advertising and public relations; programs and exhibit costs; and lastly, engineering and utilities.

The Discovery Museum based the Powerhouse Science Center staffing costs from the Reuben H. Fleet Science Center's organizational chart, as their facility is similar in size to the Powerhouse Science Center. Outside of staffing costs, the other operating costs are only estimates and may be different when the Center opens. Therefore, I added a 30% contingency to the operating expenses, outside of staffing, to help alleviate the possibility of these estimates being too low (see Table 11- Operating Pro Forma).

Project Net Operating Income

With the project revenue sources and expenses, I estimate the Center will have a net operating income (NOI) of $1,473,950 in Year 3, the assumed year of stabilization. Having a positive NOI suggests that the Center would be feasible if the estimates used in calculating the NOI are accurate. Furthermore, the NOI provides the Center with the ability to use the NOI to pay some type of debt service for capital costs. However, the NOI will not cover a loan to cover the entire $86 million in capital costs. Traditional models require a business to project a range of internal rate of return (IRR), for instance at least 10% return to be viable. The Center will never be in a positon, as a civic amenity, to have their NOI cover all the debt needed to build the entire project. Therefore, they

will have to rely on other funding sources to make up the difference. In Chapter 7, *Project Funding and Financing*, I will discuss these funding opportunities needed to construct the Center and determine if the redevelopment of the historic PG&E Power Station into the Powerhouse Science Center is possible with the addition of other funding sources outside of the NOI.

Chapter 7

PROJECT FUNDING AND FINANCING

In this chapter, I will review different capital costs funding opportunities for the redevelopment of the historic PG&E Power Station into the Powerhouse Science Center ("Center"). The chapter will include sections on fundraising, sponsorships, ticket surcharges, bonds, grants, and tax credits.

The capital costs of civic amenities, such as science centers and museums, typically rely heavily on public funding. Since California eliminated redevelopment tax increments in 2013, many civic amenities have been forced to find other sources of funding for their facility construction. Likewise, the Center will need to rely more heavily on fundraising and other creative sources of financing to complete construction.

Fundraising

Many nonprofits focus largely on fundraising. Fundraising can help raise money through cash or in-kind services. The Center has already created within their capital campaign two different programs that target individuals and businesses.

The first program the Center created is the Founding Member Paver Program. This program allows individuals to support the Center by purchasing a paver with their name engraved on it. The Center will use the pavers to construct the front entrance. These pavers run between $1,000 and $10,000, depending on the size.

The second program, called the Founding Partner Program, targets local businesses to support the development of the Center. Businesses who want to support STEM education and the construction of the Center donate $25,000 to the Center and in return are listed on all Powerhouse Science Center marketing and materials.

There are other fundraising opportunities, such as having special events or golf tournaments. Various and creative fundraising ventures are important not only to raise initial Center capital funds, but also to cover future ongoing operating expenses.

Sponsorships

Another prospect to raise money for the Center's capital costs is through sponsorships. Sponsorships can be a way for public and private entities to donate annually to sponsor an exhibit or building at the Center. Providing the entities sign up for long-term sponsorships, the Center could use the annual sponsorship funds to borrow larger amounts of money up front for capital costs. For example, a company may have a mission to educate the public on clean energy, so they will sponsor a clean energy exhibit for $350,000 over twenty years, or $7 million in total. Sponsorships can also be for larger items, such as naming rights to the planetarium or the overall Center itself. Not unlike large sports arenas, a very large naming right opportunity for the entire Center could provide a significant sponsorship.

Ticket Surcharge

In addition to sponsorships, ticket surcharges are another way to earn a consistent, dedicated revenue stream for debt financing repayment. Ticket surcharges are simply an additional sum added to the usual amount or cost of a ticket.

As an example, in 2013, the local Sacramento Kings basketball team and the City of Sacramento agreed to add a 5% ticket surcharge onto every event ticket at the arena. They designed this ticket surcharge to assist the owners in paying off the $74 million loan the City issued to the Kings in 1997 (Bizjak, 2013). Similarly, the Center could either add a ticket surcharge to the current ticket price, pending further research into the elasticity of the estimated $12 adult ticket price, or dedicate a portion of the ticket price already proposed to a ticket surcharge, as long as there was still a Net Operating Income. The money raised or dedicated could pay back some of the debt financing for the construction of the Center.

Tax-Exempt Bonds

Nonprofit corporations are increasingly taking advantage of tax-exempt bond financing to fund capital improvements and expansion (Monacell & Brooks, 2012, p. 1). Bond financing takes the form of loans from a state government entity, such as the California Municipal Finance Authority (the "Issuer"). The Issuer obtains the funds from selling revenue bonds that are payable only from moneys or other security provided by the Center (Davis, 2011, p. 21).

The advantage of tax-free bond financing is the low interest rate that is acquired since bonds issued by the Issuer can be qualified to pay tax-exempt interest to the investors, and the low interest rate is then passed on to the Center. The Issuer re-loans the money raised from the bonds to the Center and the Center then pays back the loan with the raised sponsorships and ticket surcharges. Another advantage to tax-free bond financing is the flexibility in structuring terms, such as variable and fixed interest rates, prepayment, and long and short bond maturities. This flexibility provides the Center with a better opportunity to find an investor whose portfolio is looking for a risky investment with a higher yield. Elena Zaretsky, a bond underwriter for FirstSouthwest, considers the Center risky because they would be bonding for the first time and do not have a secondary repayment source or guarantee (Elena Zaretsky, personal communications, November 6, 2014)

Grants

Grants provide another funding opportunity to raise capital. In 2010, the Center successfully received a $7 million grant from the California Parks and Recreation Proposition 84 Nature Education Facilities Program. This grant will help address some of the capital costs in building the Earth, Spaces, and Sciences Center. Along with this grant, the Center also received smaller grants from California's First Five Program and the State's Department of Fish and Wildlife. Hiring a grant writer would be very helpful in finding and writing a winning grant application. As government agencies find

themselves with higher surpluses in their budgets, more grant opportunities will become available.

Tax Credits

The Federal government has several tax incentive programs that encourage private sector investments and encourage economic growth. Specifically, the Federal Historic Preservation Tax Incentive program and the New Market Tax Credit program could both offer funding opportunities for the Center.

The Historic Preservation Tax Incentive program encourages the rehabilitation of historical buildings, thus creating new jobs and revitalizing communities. The National Park Service and the Internal Revenue Service administer the program in partnership with the State Historic Preservation Office. The program provides a 20% income tax credit for the "rehabilitation of historic, income-producing buildings… certified historic structures (National Park Services [NPS], 2006)." This process occurs when the owner of the historic building successfully integrates an investor into the ownership structure of the building, in so much the investor can claim the credits in exchange for equity to the project.

The City of Sacramento had the historic PG&E Power Station certified as a historic building and would qualify for those tax credits; however, the design and rehabilitation work would have to comply with the Secretary's Standards for Rehabilitation. One area to evaluate further is the cost to design, incorporate, and meets

the Secretary's Standards for Rehabilitation versus the amount of funding received from the historic tax credits.

Another Federal tax credit is the New Markets Tax Credit Program ("NMTC Program"). Congress established the program in 2000 to encourage investment of private capital in distressed, low-income communities. The NMTC Program permits individual and corporate investors to receive a tax credit against their Federal income tax return in exchange for making equity investments in specialized financial institutions called Community Development Entities ("CDEs") (Community Development Financial Institutions Fund [CDFI Fund], 2014). The Federal government certifies CDE's and then CDE's compete to receive the tax credit authority. Once the Federal government awards the CDE, they then select projects to receive the tax credit equity. The projects, such as the Center, use the tax credit equity for low-cost capital (USBank, 2014). The investor claims the tax credit over a seven-year period and provides 39% of the original investment amount (CDFI Fund, 2014).

The Center meets the New Markets Tax Credit programs eligibility because the site is located within a low-income community. However, meeting the eligibility is not enough to receive the equity from the CDE's. CDE's selects projects with strong community impacts aligned to their organizational mission, such as creating quality jobs for low-income persons, generate environmentally sustainable outcomes, and/or catalyst development in underserved communities.

As of November 2014, there have been no NMTC projects in the Sacramento region. The NMTC Program requires that the programs funding be the last dollar into a

project financing. Further, the Federal government does not guarantee which CDE's will receive tax credit awards. Therefore, even if a CDE selects the Center as its top project, they may not receive the award. In Spring 2014, the Center attempted to receive NMTC, however, even though the CDE had the Center as their number one project, the Center did not receive any tax credit awards. This funding avenue is extremely complicated, but if the stars align, the NMTC Program could provide a significant portion of the capital funding needs.

Funding Opportunities

Although redevelopment funding opportunities are no longer a way to finance capital improvement projects in blighted neighborhoods, the Center has many other opportunities to fund and finance the redevelopment of the historic PG&E Power Station. The Center has already received significant grants from the State of California Parks Department and rolled out two capital campaign fundraising programs. In addition, the Center could focus on raising sponsorships and ticket surcharges to pay back tax-free bonds or other debt financing. Lastly, federal tax credits, although complicated, are another creative funding source that can help provide the necessary capital to redevelop the blight site.

Even with all of these funding sources, the Center would be much too optimistic to assume all of these funding opportunities will line up at the same time. The Center will have a lot of work on their hands to secure all of these funding opportunities, along

with being success at fundraising. This work will not only take time, but also resources beyond the Center's current staff. Therefore, I believe that it is more realistic for the Center to raise and finance a portion of the capital costs needed. In the next chapter, I will review the event in which the Center cannot raise enough capital for the full $86 million scope of work and discuss the overall feasibility to redevelop the PG&E Power Station site into a premier science center and provide my final recommendation.

Chapter 8

CONCLUSION

In this chapter, I will review this study's findings and conclude on the feasibility of converting the historic PG&E Power Station site into a regional science center. The Discovery Museum has proposed to redevelop the historic PG&E Power Station building and site into a premier science center. The site is located in Sacramento, California and has been siting vacant for over two decades. With its high visibility and ideal location to Downtown Sacramento and the future Railyards development, the blighted site has huge potential to not only revitalize the riverfront and River District neighborhood, but also assist in furthering the education of the local science-literate workforce and community.

Assuming the role of a developer, I have collected background information on the site's history, proposed scope of work, and analyzed the site's permits and environmental review. In addition, I have composed a market study and operating pro forma based on similar science center data, the current Discovery Museum operating information, and my own investigated and studied assumptions. Lastly, I researched possible funding and financing for the capital needed to construct the project. All information was gathered and analyzed to determine the project's feasibility that as well provides the framework for a developer to make decisions during different stages of the project. Reflecting on this project analysis, I have drawn certain conclusions to make a feasibility recommendation for this project.

Recommendation

Based on my research and studies, the redevelopment of the historic PG&E Power Station into a regional science center is only feasible if the project is phased. If my assumptions and analysis are accurate, the Center will be able to receive the appropriate permits and approvals to construct the Center at the historic PG&E Power Station. With current market conditions and demands, I estimate the Center will have a positive net operating income ("NOI"). With a positive NOI, the inclusion of a ticket surcharge, and long-term sponsorships from both private and public entities, the Center will be able to undertake a tax-free bond issuance to finance a large portion of the capital need. However, between fundraising and the tax-free bond issuance, there will likely not be enough money to fund the entire $86 million in capital costs. The economy is still slow at recovering and both public and private entities are unlikely to be as forth coming with donations and providing other funding mechanisms. Phasing the project into two smaller capital budget projects will allow the Center to break ground sooner; in so, it will further encourage more fundraising, as people are more likely to feel comfortable donating when they see the project is no longer a proposal and is physically developing. In addition, by opening a smaller portion of the Center, there will be a smaller operating budget and smaller financial outlay to pay back. Both of these circumstances will ease the transition from the smaller Discovery Museum into an eight-time larger Powerhouse Science Center. Lastly, phasing will allow additional time needed to take advantage of historic and new market tax credits for each phase of the project.

Phasing will only be successful if the revenue generating operations open in the first phase, such as the Challenger, Café, and Gift Shop. In addition, any phasing will need to account for any additional costs associated with split permitting, mitigation, and other design elements. Most importantly, phasing will have to consider how to continue operations while the second phase is constructed.

Following this feasibility study, the next step is to have an in-depth and detailed feasibility study completed on a two-phased approach. The developer, the Powerhouse Science Center board of directors, along with the construction team and architectures will need to analyze the possibility of phasing and how it could confidently affect the reality of the redevelopment of the historic PG&E Power Station into a regional science center.

REFERENCES

Bizjak, Tony. (2013) Kings to impose sleep train ticket surcharge. *SacBee.* Retrieved from http://www.sacbee.com/news/local/city-arena/article2578859.html#storylink=cpy

California Department of Finance, (n.d.) Retrieved October 6, 2014, from http://www.dof.ca.gov/redevelopment/

California Office of Historic Preservation. (2014). *When does CEQA apply?* Retrieved from http://ohp.parks.ca.gov/?page_id=21723

CDIFI Fund. (2014). New market tax credit. Retrieved from http://www.cdfifund.gov/what_we_do/programs_id.asp?programID=5

City of Sacramento. (2000). *Jibboom street site study*. Sacramento, CA: Author

City of Sacramento. (2005). *Transmittal of draft jibboom street power station request for proposals and confirmation of schedule staff report*. Sacramento, CA : Author

City of Sacramento. (2008). *PG&E building site report.* Sacramento, CA.

City of Sacramento. (2010). *National register for historical places*. Sacramento, CA

City of Sacramento. (2010). *Powerhouse science center mitigated negative declaration.* Sacramento, CA: Author

City of Sacramento. (2010). *Robert T. Matsui waterfront park environmental documents, master plan and park designation amendments staff report*. Sacramento, CA: Author

Davis, Roger L. (2001). Borrowing with tax-exempt bonds. Retrieved from http://www.orrick.com/Events-and-Publications/Documents/172.pdf

Economic Planning Systems. (2012). Powerhouse science center business plan. Sacramento, CA: Author

Engler, John. (2012). The future of science education in california. Received from http://www.usnews.com/opinion/articles/2012/06/15/stem-education-is-the-key-to-the-uss-economic-future

Environmental Protection Agency. (2012). *NPL site narrative for jibboom junkyard*. Sacramento, CA. Retrieved from http://www.epa.gov/superfund/sites/npl/nar909.htm

Environmental Protection Agency. (2012) *What are wetlands?* Received from http://water.epa.gov/type/wetlands/what.cfm

Environmental Protection Agency. (2014). *Superfund*. Sacramento, CA. Retrieved from http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/ViewByEPAID/cad980737613?OpenDocument

GeoCon. Consultants. (2012) *Powerhouse science center soil management plan*. Rancho Cordova, CA: Author

Lattin, Thomas W. (2008, December). Market and feasibility study proposed pikes peak children's museum colorado springs, colorado. Retrieved from http://www.pikespeakchildrensmuseum.org/PPCM_feasibility_study.pdf

Monacell, James P. (2012) Overview of bond financing for nonprofit schools. Retrieved from http://www.sgrlaw.com/resources/briefings/bond_practice/460/

National Park Service. (2006) Federal preservation program notes. Retrieved from http://www.achp.gov/docs/BRAC/Federal_Historic_Preservation_Tax_Incentives_Program-June_06.pdf

Page and Turnbull. (2011). Cultural Resources Report, Sacramento, CA: Author

Page Paleontological Science Center Preliminary Feasibility Study. (n.d.) Retrieved October 7, 2014, from http://www.lakepowell.net/sciencecenter /feasibility_study.htm

Sacramento Housing Redevelopment Agency. (2010). *Powerhouse science center environmental assessment.* Sacramento, CA: Author

USBank. (2014) New market tax credit conference. Sacramento, CA.

U.S. Census Bureau. (2013). *County quick facts.* Washington, DC: U.S. Government Printing Office.

US Inflation Calculator. (2014) Retrieved from http://www.usinflationcalculator.com/inflation/current-inflation-rates/

Valley Elderberry Longhorn Beetle. Received from http://essig.berkeley.edu/endins/desmocer.htm

Warmerdam, Catherine. (2013, January 30). Tim Youmans, He Says, 'Build It And They Will Come. *Inside Publications*. Retrieved from http://www.insidepublications.org/index.php/conversation-piece/227-tim-youmans

West, Robert Mac, & Ucko, David. (2006). Feasibility study for a science center in rockville, MD. Retrieved from http://www.rockvillescience.org/science-ctr-feasibility-study.pdf

Wildlands. (2012) *VELB Mitigation Contract*. Sacramento, CA: Author

William Polk. (n.d.). Retrieved October 17, 2014, from the Wiki: http://en.wikipedia.org/wiki/William_R._Polk