

PLANNING FOR THE NEXT BRAC:

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REDEVELOPMENT
ALTERNATIVES FOR DOBBINS
AIR RESERVE BASE AND AIR
FORCE PLANT NO. 6 IN
MARIETTA, GEORGIA

Table of Contents

<u>Introduction</u>	2
<u>Literature Review</u>	3
<u>Description of Methods</u>	13
<u>Analysis and Results</u>	18
<u>Policy Recommendations</u>	27
<u>Bibliography</u>	37

INTRODUCTION

For nearly 75 years, Dobbins Air Reserve Base (Dobbins) and Air Force Plant No. 6 (AFP #6) have been key military installations supporting America's national security. Some fear that shifting budgetary trends and mission goals may jeopardize the future of these two facilities (Trubey 2015). The future of Dobbins will be determined through a Base Realignment and Closure (BRAC) process. The Department of Defense (DOD) uses the BRAC process to assess the costs and benefits of each base and their capacity to support current and future missions. The DOD then recommends for the realignment or closure of bases deemed too costly to maintain or inessential to maintaining national security.

The next BRAC round could potentially occur in 2019 (21 Century Partnership 2016). When this happens, the DOD could recommend for Dobbins to stay at the same capacity, realign and expand its responsibilities, realign and lose some responsibilities, or to close entirely. While AFP #6 is recognized as a separate institution, some fear that if Dobbins closes entirely, Lockheed Martin, who leases AFP #6, may independently choose to terminate its lease and consolidate its operations to other Lockheed Martin operated facilities across the country. Both Dobbins and Lockheed Martin are huge economic drivers for Cobb County and the metro Atlanta region. Aware of the negative economic shock of a closed base, Cobb County officials, regional representatives, and military advocates have been lobbying to keep Dobbins open and to be a gaining facility in the next BRAC round. While the work of this lobbying group is important, there has been little planning conducted for scenarios in which Dobbins' responsibilities shrink or evaporate. This document will make the case that officials also need to plan for these alternate scenarios. It will also explore the economic recovery of three formerly closed bases to suggest a superior redevelopment route for Cobb County officials to pursue. Lastly, this document will suggest planning and policy recommendations for Cobb County to research in advance of the next BRAC round. While not ideal, planning for these scenarios now will help prepare Cobb County and the affected communities to recover more quickly in the event that Dobbins and AFP #6 are closed or realigned in the future.

This document is divided into four sections. The four sections include a literature review, research methods, analysis and results, and planning and policy recommendations.

1. The first chapter is a literature review describing a brief history of BRAC and the BRAC process. It also provides a brief history of BRAC closures and their impacts in Atlanta, a review of relevant research on BRAC bases, and a brief discussion of common issues encountered in the BRAC redevelopment process.
2. The second chapter describes the research methods used to evaluate the performance of the three case studies.
3. The third chapter describes the results of the analysis using the research methods. This section includes both quantitative and qualitative analysis of the three cases studies. Based on the different analyses, this section also concludes that redeveloping Dobbins as a technology research park would result in the strongest economic recovery following a BRAC closure.
4. The last chapter examines potential costs, benefits, and general considerations for redeveloping the base to serve particular uses. The chapter focuses on the considerations associated with the redevelopment typologies discussed in the case studies. It also discusses potential partners and stakeholders that may benefit from or be hindered by particular redevelopment scenarios. It briefly discusses strategies that may influence the likelihood of certain redevelopment scenarios. Lastly, it offers suggestions and tasks Cobb County officials and planners should be undertaking to best prepare for the scenario in which Dobbins and AFP #6 close.

By reviewing this document, Cobb County officials should feel a sense of urgency and widen their current planning efforts to include alternate scenarios for a post-closure future. These occurrences could dramatically impact the regional economy in the short-term. There are, however, tremendous opportunities that could be created by redeveloping these properties. Planning now will help position the potentially affected communities to be more resilient following the loss of such historic bases and regional economic drivers.

Literature Review

The role of the American military in shaping America's developed landscape cannot be overstated. Much change occurred during the World War II and early Cold War eras, with the rapid expansion of bases used to train soldiers and assist strategic military efforts. New bases, laboratories, and some cities were developed to support these national defense efforts. This rapid growth, however, was not sustainable because it required larger budgets to maintain the properties and their aging infrastructure. Over time, the military's attitude towards maintaining all of the bases began to change. The DOD wanted to decrease the number of bases and infrastructure it was required to maintain for cost efficiency and strategic purposes. Any nonessential bases were to be closed down and sold or given to local authorities so the DOD could reallocate money and people to better serve national defense efforts.

To that end, the Secretary of Defense ordered the closure of 83 bases from 1961-1982 (Rowley and Stenberg 1993). These bases were closed without much regard to how closures would impact the communities which surrounded the bases. At this time, the DOD could dispose of its property without much oversight from Congress and without any way for Congress to intervene. As a result, many of the communities that were built up around the bases had come to depend on the base and were devastated when the DOD ordered their closure (Rowley and Stenberg 1993). Eager to save jobs and votes within their districts, Congress intervened to enact legislation in 1977 halting the closure of any bases that employed more than 300 people without first conducting an Environmental Impact Statement to receive Congressional approval (Defense Secretary's Commission 1988; Barney Warf 1997). With this act, the base closures were temporarily halted.

Ten years later, the DOD still wanted to downsize. With the Cold War nearing its end, a shrunken military budget, and a country feeling the economic effects of Black Monday, the DOD effectively lobbied a Democratic-majority Congress to allow the military to gradually sell or give away nonessential bases. The enabling legislation was called the Base Realignment and Closure Act (BRAC). Since 1988, there have been five BRAC rounds that have led to 121 base closures and 1,079 realignments (Lepore et al. 2013).

Table 1. Summary of BRAC Realignments and Closures

Round	Major base closures	Major realignments	Minor closures and realignments	Total actions
1988	16	4	23	43
1991	26	17	32	75
1993	28	12	123	163
1995	27	22	57	106
Total for four prior rounds	97	55	235	387
BRAC 2005	24	24	765	813

Source: GAO analysis of DOD data.

Note: For BRAC 2005, DOD defined major base closures as those that had a plant replacement value exceeding \$100 million, and defined major base realignments as those that had a net loss of 400 or more military and civilian personnel. In prior BRAC rounds, closures and realignments were often difficult to tabulate precisely, and GAO relied on DOD's characterization of which bases were considered to be major in the absence of a consistent definition.

This table was copied from a Government Accountability Office and states how many bases were closed or realigned during each of the previous BRAC rounds (Lepore et al. 2013).

The DOD claimed that this downsizing would generate massive cost savings while also stimulating economic development for new businesses choosing to relocate on the redeveloped bases. In fact, it has been estimated that the cost savings to taxpayers through 2001 has been \$17 billion plus \$7 billion annually since 2001 (Beaulier, Hall, and Lynch 2011). These numbers do not include the 24 base closures, 24 realignments, and the 765 minor closures and realignments that took place during the 2005 BRAC round (Lepore et al. 2013).

Despite supposed governmental cost savings, BRAC rounds are highly controversial within each political party and have always been difficult to be approved by Congress. For example, the DOD lobbied for 10 years before Congress approved the 1988, 1991, and 1993 BRAC. Since 2011, the DOD has unsuccessfully lobbied Congress for another BRAC round each year (Serbu 2016). This comes in light of evidence that despite short-term job losses, the majority of realignments and closures may be beneficial to the regional economy in the long-term (Poppet and Herzog 2003; Hooker and Knetter 2001; Poppet 2001). Many members of Congress recognize closures' connections to efficient spending but also want to prevent job losses in their district. The complex realignment and closures processes described in 1988 BRAC legislation and the revised legislation for subsequent BRAC rounds offered a political solution for bases to be shut down. It also removed the responsibility from Congress and "shield[ed] them from the wrath of their constituents" (Barney Warf 1997; Ashley and Touchton 2015; Beaulier, Hall, and Lynch 2011). The remaining portions of this chapter will discuss a brief history of the impact of previous BRAC closings in metro Atlanta and outline the BRAC process, actors, and their roles. It will also discuss common hurdles that impact the BRAC redevelopment process. The chapter will conclude with evidence suggesting why Cobb County planners and officials should begin investigating alternative redevelopment scenarios that would result in the closure of Dobbins.

History of BRAC in Metro Atlanta

Metro Atlanta has experienced the impact of both realignments and closures. Dobbins has expanded multiple times to accommodate new missions. It has also been negatively impacted by BRAC. Following the 2005 BRAC round, the Naval Air Station Atlanta-- which was realigned to be stationed on the southwestern portion of Dobbins during an earlier round--was closed. This land now houses the Georgia Department of Defense National Guard. Fort McPherson and Fort Gillem, former Army bases in South Atlanta and Forest Park, respectively, were also closed in the 2005 BRAC. All told, these closures resulted in the immediate loss of over 11,000 jobs in 2005 (Principi et al. 2005).

Table 2 Summary of Job Changes in Metro Atlanta

Installation	Net Job Changes			Direct Job Changes	Indirect Job Changes	Total Job Changes	Changes as % of Area's Employment
	Military	Civilian	Contractor	Area's Total Employment = 2,777,548 jobs			
Dobbins ARB	73	45	0	118	72	190	0.0%
Fort Gillem	-511	-570	0	-1,081	-734	-1,815	-0.1%
Fort McPherson	-2,260	-1,881	0	-4,141	-2,705	-6,846	-0.2%
Leased Space - GA	0	-6	-2	-8	-6	-14	0.0%
Naval Air Station Atlanta	-1,274	-156	-68	-1,498	806	2,304	-0.1%
Peachtree Leases Atlanta	65	97	0	162	114	276	0.0%
Net Changes for this Economic Area	-4,037	-2,665	-70	-6,772	-4,293	-11,065	-0.4%

This table displays the net loss or gain of jobs tied to the military installations in Metro Atlanta following the 2005 BRAC round (Principi et al. 2005).

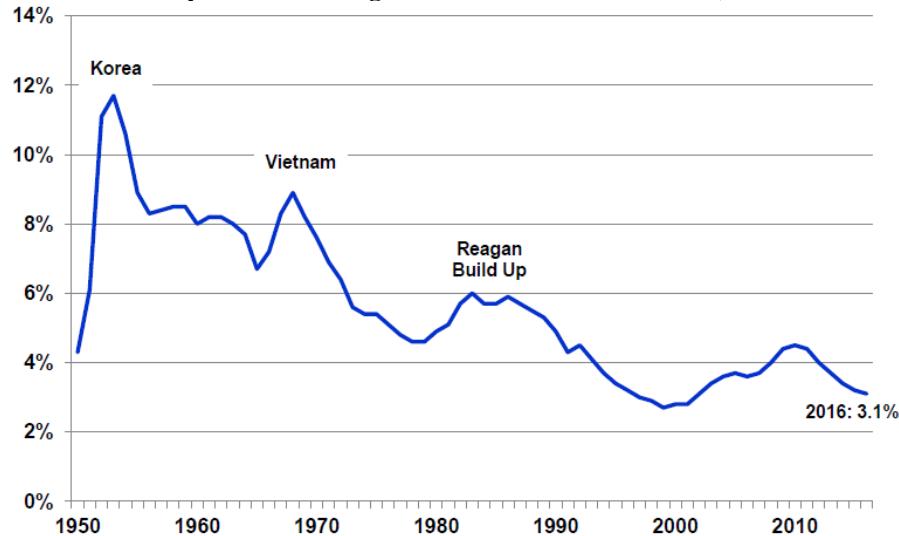
While the loss of 11,000 jobs is significant, it represents a very small percentage of the region's total employment. Military employees, which accounted for 61% of these job losses, were transferred to other military bases throughout the country. The civilian and contractor jobs accounting for the other 39% were likely absorbed by the regional economy. In fact, many times an area's regional economy is stronger two years after a BRAC closure announcement (Poppett and Herzog 2003). Hooker and Knetter also found that counties with closures tend to "average slightly faster per capita personal income growth than their state in the years after a closure" (2001). They suggest that this could likely be tied to the loss of military employees that relocated to new bases. Because military employees tend to have lower salaries than the area median income, the loss of military employees from the overall population could increase the median income and increase the per capita income. In other cases, there have been clear regional economic gains where companies have relocated to the affected area following the closure of a base.

Despite the potential for a more resilient and diversified economy in the long term, the impact of base closures still poses a significant threat to the regional economy in the short-term. This is especially true if an area does not have a diversified economy. Unlike the period from 1977-1988, Congress can no longer directly halt the closing or realigning of a base once a BRAC has been initiated. Political prowess and lobbying has proven to be ineffective in stopping bases recommended for closure (Beaulier, Hall, and Lynch 2011). Even in the metro region, significant lobbying efforts by Congressman David Scott, then Governor Sonny Perdue, and Senators Johnny Isakson and Saxby Chambliss were not enough to keep Fort McPherson and Fort Gillem open in the 2005 BRAC (LegiStorm 2016; *2005 BRAC Commission Regional Hearing* 2005).

In present day, a group in Cobb County dubbed 'Team Dobbins' has already begun an extensive campaign, lobbying for Dobbins to stay open (Trubey 2015). Their chief strategy is to assert that Dobbins is an essential asset, contributing to the success of the surrounding communities and the regional economy. They are also trying to position Dobbins to be a gaining installation if it is realigned in future BRAC rounds. However, if past lobbying efforts are any indication of the success of this approach, Cobb County should also be planning for the event in which Dobbins closes.

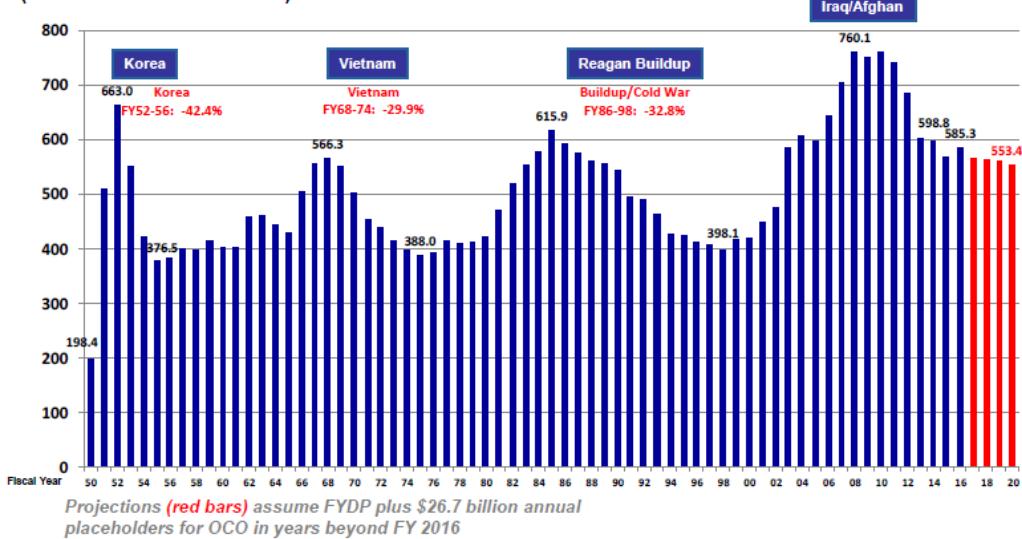
This issue should be gaining more attention. As can be seen in the figures below, sequestration has decreased military budgets significantly, with further cuts expected to continue. Sequestration or "The Sequester" refers to a bill passed in 2011 that was initially intended to reduce the government deficit by \$4 trillion. When Congress could not agree on a plan to make this happen, more than \$1 trillion was automatically cut from the federal government's budget starting in 2013 (The White House 2017). Much of this money directly reduced military spending. To help address these losses, the DOD has asked Congress for a BRAC every year since 2011. Some media outlets predict that the next BRAC round will occur in 2019 (Cohen 2016).

Figure 1. DOD Outlays as a Percentage of Gross Domestic Product (FY 1950 - FY 2016)



This graph depicts gradually declining military outlays as a percentage of American GDP following the end of WWII. Peaks are during periods of heightened conflict followed by force drawdowns. The most recent drawdown took effect following withdrawal from Iraq and sequestration (Office of the Under Secretary of Defense (Comptroller)/CFO 2015).

Figure 2. Total Yearly Military Budget Trends (FY 1950 - FY 2016)
(FY 2016 Dollars in Billions)



The graph above displays yearly military budget trends. There are buildups during times of conflict followed by drawdowns. The graph projects the budget to continue to decrease in light of sequestration (Office of the Under Secretary of Defense (Comptroller)/CFO 2015).

A recent DOD report adds to this sense of urgency by claiming that the DOD has 22% excess infrastructure (Serbu 2016). This report also points out that a quick way to meet these budget needs is to order another BRAC round. Given the estimated excess of infrastructure as shown in the Table 3, the Army and Air Force Departments are likely to face the largest cuts.

Table 3. Percentage of Surplus Infrastructure by Division

Department	Estimated Percentage of Excess Capacity (above 1989 baseline)
Army	33%
Navy	7%
Air Force	32%
DLA	12%
Total DOD	22%

This chart displays the amount of surplus infrastructure held by the DOD as of 2016. The numbers would suggest that the Army and Air Force are likely to face the largest cuts pending another BRAC round (Department of Defense 2016a).

There is other mounting evidence that supports that Dobbins' potential closure; the chief reason being that it is facing issues of encroachment by Cobb County, Marietta, and Smyrna. A Joint Land Use Study was conducted in 2014-2015 to "identify existing and potential future threats, and the potential actions that might be carried out to eliminate, mitigate, or avoid [development] compatibility conflicts" between Dobbins and the surrounding municipalities (Matrix Design Group 2015). The commercial and residential districts of Smyrna, Marietta, and unincorporated Cobb County were found to have development, zoning, land use, lighting, sound, and transportation policies incompatible with some of Dobbins' missions. This would seem to point out that Dobbins is unlikely to expand its boundaries or be positioned as a gaining base for future BRAC rounds.

The one asset that Dobbins has which may keep it largely unaffected pending another BRAC round is the presence of AFP #6. This facility has produced airplanes for the United States and other governmental powers since WWII. It is positioned in the northwest portion of Dobbins. AFP #6 is owned by the Department of Defense, but the facility is managed and leased by the Bethesda, Maryland-based aerospace defense company Lockheed Martin. If Dobbins is closed in a future BRAC round, the company may independently choose to consolidate and relocate to one of its other locations around the country. A scenario in which Lockheed Martin chooses to relocate would arguably have a larger economic impact on the regional economy than the closure of the actual Air Force managed portion of Dobbins. Lockheed Martin employs a large number of highly skilled, high-wage workers. If the plant were to relocate, the lost tax revenue and skilled labor force would be hard to replace in the short-term. Thankfully for Cobb County, the Lockheed Martin Marietta facility recently secured a \$10 billion contract to deliver an indefinite amount of C-130 J airplanes. This contract will not expire until 2026 (Department of Defense 2016b).

While it is important to portray the base as an essential part of the regional economy, only planning for scenarios in which closure is avoided or delayed is not always helpful. Not preparing for alternative scenarios in which Dobbins closes is short-sighted. Aside from being ill-prepared for the economic shocks that will immediately follow a closure, it could also limit the community from being able to recover or even improve the current economic standing of Cobb County. With more than 2,000 acres at Dobbins, many redevelopment opportunities exist that would expand Cobb County's economic base. Many of these redevelopment opportunities could expand the tax base or even fundamentally alter the physical development patterns currently shaping Cobb County. Planners and county officials should begin to investigate potential redevelopment opportunities now in the event that the next BRAC round orders Dobbins' closure.

BRAC Process

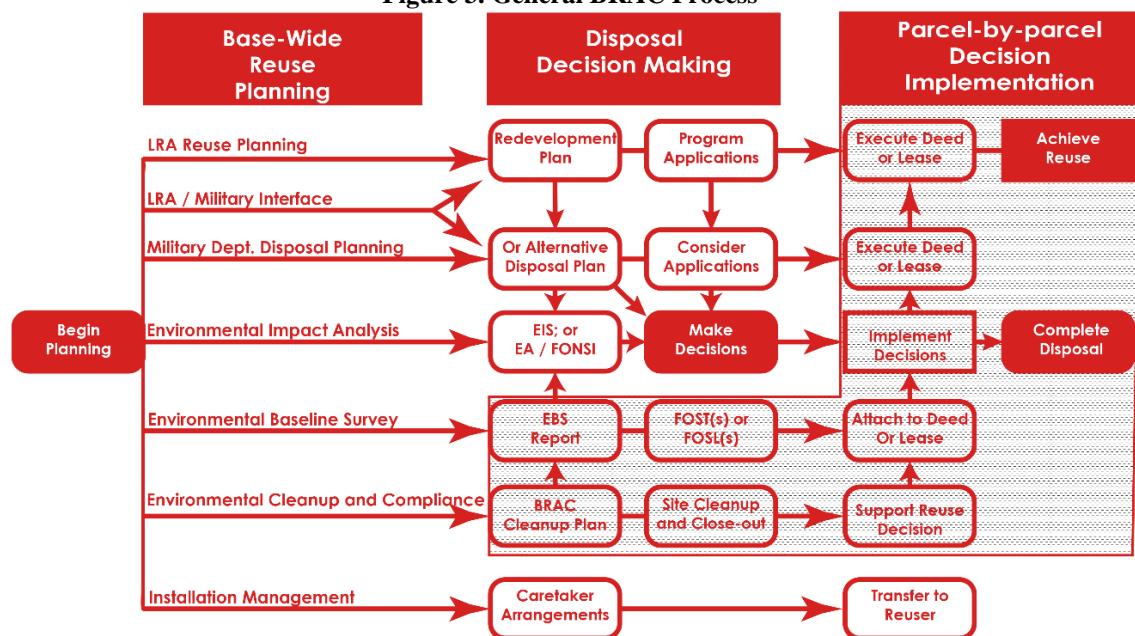
When a BRAC round is initiated, there are four possibilities for a base. It can be closed, realigned as a gaining base, realigned as a losing base, or have no changes. When designated for closure or realignment, there is an extended and highly regulated process to navigate the transition period in which missions and property are transferred. If a base closes, it means that the base's missions and supporting troops are incrementally consolidated and relocated to other bases better-positioned to carry out particular missions. Realigned bases can gain or lose mission responsibilities. Gaining bases are receivers of more missions, duties, or troops from other closed or realigned bases. Losing bases are partially closed, shifting specific missions and goals to other gaining bases.

Any property located on a closed or realigned (losing) base must undergo an extensive redevelopment and reuse process. Generally, this requires the parcels be offered to a number of federal agencies for reuse. Any property not acquired by other federal agencies is then deemed surplus property and is transferrable to a quasi-governmental agency called Local Redevelopment Authority (LRA). The land must be purchased at fair market value. An LRA consults with the DOD and other federal agencies and stakeholders to create a comprehensive redevelopment plan for the surplus property.

The LRA's plan serves as master plan with visions, goals, and strategies guiding the base's gradual redevelopment. The redevelopment plan is shaped by an extensive community input process, market feasibility studies, and the type and amount of environmental remediation required for the base. Pending DOD approval, the plan helps to designate how the community wants certain portions of the military base to be redeveloped or disposed of through a number of conveyances.

The two figures below depict a general process and timeline of the BRAC redevelopments. The figures have been modified from graphics in the Base Redevelopment and Realignment Manual for the 2005 BRAC to reflect the possible timeframe for the next possible BRAC in 2019 (Office of the Deputy Under Secretary of Defense 2006). The Base Redevelopment and Realignment Manual, published in 2006 for military installations and communities impacted in the 2005 BRAC round, describes the BRAC process in great detail. Community leaders should refer to this document for more detailed requirements and processes.

Figure 3. General BRAC Process*

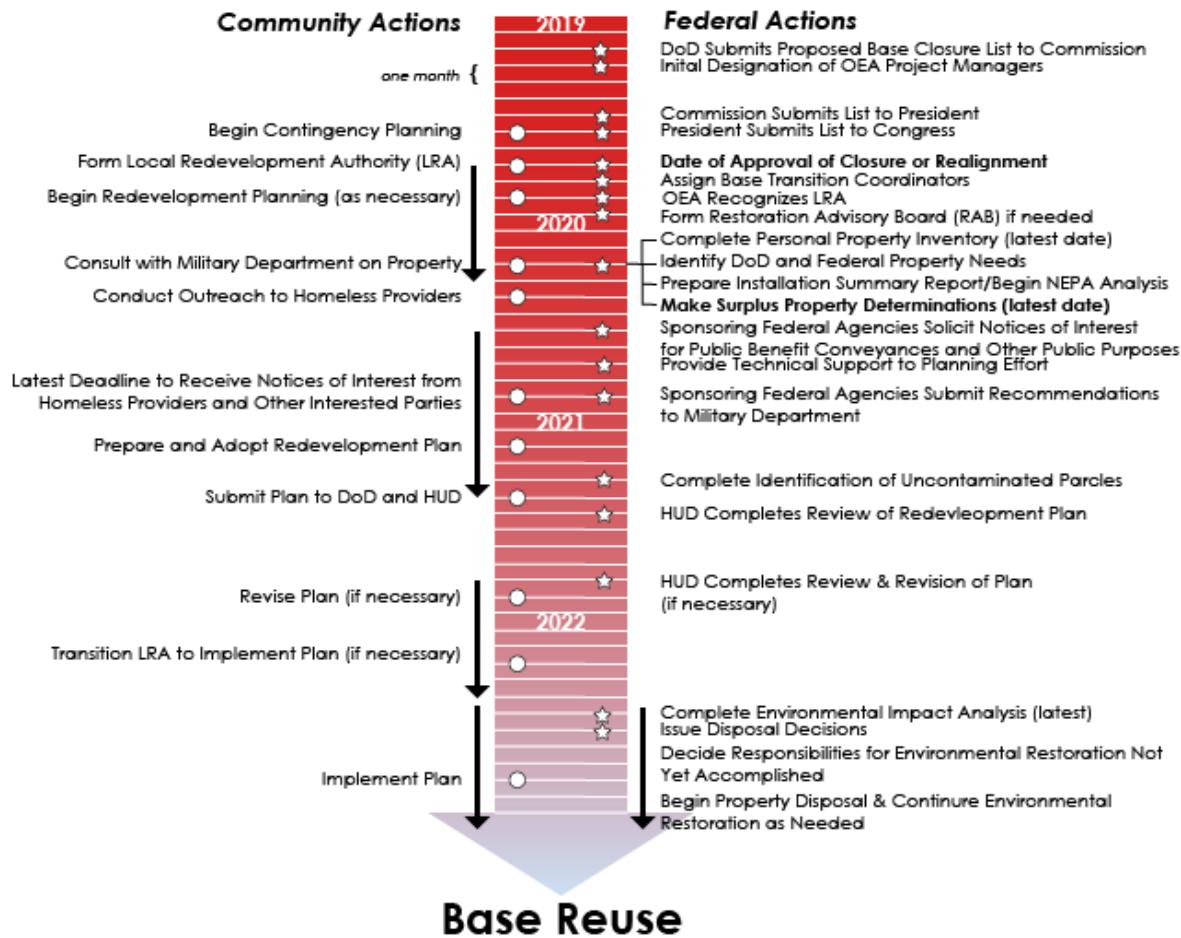


The diagram above displays the general BRAC process. Different actors evaluate how parcels should be mitigated and disposed of according to the LRA's redevelopment plan. (Office of the Deputy Under Secretary of Defense 2006).

*Modified in Adobe Illustrator.

The BRAC process can be subdivided into three general steps: base-wide reuse planning, disposal decision making, and parcel-by-parcel implementation. While each step is highly regulated with a suggested timeline for completion, the actual timeline for the complete reuse and redevelopment is highly contingent upon the location and amount of environmental degradation, the LRA's redevelopment plan, and the overall market conditions. The general steps described below represent the decision-making process at both the local and federal levels. These decisions are made over the course of at least three years, or until all the surplus property has been remediated and transferred.

Figure 4. BRAC Closure General Timeline *
Closure Proposal



This diagram displays a general timeline for a base closure if it were enacted in 2019. The timeline is subject to change pending the level of contamination of the military base (Office of the Deputy Under Secretary of Defense 2006).

*Modified in Adobe Illustrator to reflect the projected 2019 BRAC timeline

BRAC Actors and Their Roles

Given the complexity of the BRAC process, it requires great leadership and communication skills between all the actors involved to help speed an economic recovery. While there are many actors in this process, the main actors involved are the DOD, the Department of Housing and Urban Development (HUD), and the LRA.

The DOD largely serves as the voice of the federal agencies, namely the Environmental Protection Agency (EPA) and the Office of Economic Adjustment (OEA). The DOD is responsible for determining which properties are deemed surplus. It also manages the transfer of surplus property to the LRA pending the evaluations of both the EPA and HUD.

The EPA evaluates the level and type of environmental contamination and monitors cleanup efforts. These cleanup efforts are guided by the LRA's redevelopment plan, such that the type of environmental remediation aligns to the individual parcel's eventual intended use. The cleanup must also abide by regulations under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This legislative act holds the DOD responsible for past environmental damages and requires the military to finance any environmental mitigation needs for the property in perpetuity. It essentially assures developers they will not be held responsible for the costly mitigation and insurance requirements that usually come with previously contaminated properties. Although CERCLA helps to ensure a level of quality remediation and helps to protect both tenants and developers, the cleanup process can significantly delay the redevelopment process. Cleanup periods can take several years to more than a decade. Despite not having to pay for remediation, such variability in the timeframe could deter many developers from investing in a site, as their timeline for a return on investment can be uncertain.

The OEA "has been charged with facilitating resource conversion and reutilization" (Poppert 2001). The OEA largely serves as the financial and economic development arm of the DOD during the BRAC process. It helps to offset the economic impacts of the base closure by providing grants to the affected communities. Some OEA money can be used to implement parts of the redevelopment plan by leveraging capital for the LRA while other OEA grants can be used for more traditional economic development incentive or workforce development training for the civilians who used to work on the base. The OEA also helps to prepare the sites for transfer, oversees the markets on the sites, and helps the LRA with general organizational tasks (Poppert 2001).

HUD serves as the leader representing the homeless and the homeless provider agencies in the affected areas. Under the Base Closure Community Redevelopment and Homeless Assistance Act of 1994, the LRA must follow strict guidelines to ensure that homeless assistance agencies are informed of available surplus property and facilities available at closing or realigning bases. Examples of ways the LRA could accommodate homeless' needs include setting aside appropriate parcels or "former military buildings [that could] provide immediate, transitional, and permanent housing; support services; food and clothing banks; treatment facilities; and other items that fill gaps within the community's Continuum of Care" (U.S. Department of Housing and Urban Development 2014). HUD has the power to reject the proposed LRA redevelopment plan if it is deemed inadequate in addressing homeless needs.

All in all, the LRA has the most involved role compared to the other aforementioned agencies. The LRA largely serves as the voice of the local government and the affected communities. One of its primary roles is to consult with the military and HUD as well as conduct public meetings with all of the involved actors. The LRA would also closely work with private developers and non-governmental organizations (NGOs). All of these meetings eventually culminate in the creation of a redevelopment plan for the military installation. The LRA can choose to serve as the long-term development authority to implement the plan. Alternatively, it could sell the parcels to a master developer to help implement the plan. For the 2005 BRAC, Fort McPherson LRA chose to be the master developer, and Fort Gillem LRA chose to sell the parcels to a master developer.

It should be noted that assuming the lead role implies that the LRA is responsible for purchasing the property directly from the DOD at fair market value. Although loans, bonds, and grants from the DOD's OEA and other traditional funding sources are available to secure funding for purchasing the land, managing such large debts can be a crippling task to less experienced governments or communities that are not economically diverse. The plan does, however, play a major role in shaping the feasibility of future redevelopment options (Association of Defense Communities 2006). This is because the DOD is supposed to work with LRAs to create plans representative of the affected communities' desires. Plans with more intensive or higher intensity uses require more detailed market analytics to be conducted to make sure plans are financially feasible, such that both the LRA and DOD can recoup, at minimum, a neutral return on investment.

Although a very detailed plan that results in higher property values could help the community recover more quickly, a higher sales price could be overly restrictive and impact the types of incoming development, especially if the local market demand is overestimated, the real estate market slows, or the environmental cleanup takes longer than expected. This could endanger the recovery of the community if the LRA cannot attract well-funded developers. This was the case for Fort McPherson. Their original redevelopment plan, published in 2007, called for higher density development surrounding a bioresearch lab. It was later scrapped during the great recession when the Fort McPherson LRA could not attract any developers. Higher densities could also leave the LRA responsible for paying the higher property taxes on the land with deteriorating infrastructure if they decide to hold out for the perfect developer. A less detailed plan, however, often correlates to a lower market value, allowing for the LRA to be more flexible and selective with new development proposals. The LRA would also be paying less in property taxes during the redevelopment period.

Because the plan has many requirements, it is important for the LRA to be creative in designing the redevelopment plan. They must foster economic development and ensure that each parcel is developed to the "highest and best use" while also navigating complicated regulations. Aside from accommodating homeless provider agencies, it might also have to accommodate schools or other non-profit organizations that file for public benefit conveyances. The LRA must plan for the possibility of lengthy environmental cleanups that limit future uses and the financial viability of potential redevelopment scenarios.

The DOD, the EPA, and HUD will determine the suitability of parcels for future redevelopment uses. These determinations will likely play the largest role in how the base is redeveloped. For example, if portions of a base have parcels that are heavily contaminated, it is unlikely that the LRA will be able to zone those particular parcels for high densities, residential, or public benefit conveyances (such as a parks or school), as these zones are more restrictive in the allowable base level contaminants. It would be prudent for communities and the LRA to be flexible when assigning uses to particular parcels in the redevelopment planning process, as inflexibility could threaten the success of the base's redevelopment.

Common Issues with Redevelopment

Keeping this in mind, the area's LRA needs to be prepared to encounter and overcome common obstacles with BRAC redevelopments. The largest driver impeding redevelopment is the extent of environmental mitigation needed to accommodate the redevelopment plan. As previously mentioned, BRAC invokes CERCLA regulations. These federal regulations are often more stringent than many state remediation regulations, often delaying construction (until full remediation is carried out) or even prohibiting the redevelopment of certain uses entirely. More intensive and public uses, like mixed-use residential and parks, require more stringent guidelines for redevelopment, which can extend the remediation period, thereby delaying redevelopment and driving up costs for the LRA or other private developers. In a business contingent upon finding financing for the right site at just the right time, any delays could cause a deal to fall through.

The next big redevelopment hurdle is to create a comprehensive redevelopment plan to accommodate the needs of the community. The lengthy public engagement period required by BRAC legislation necessitates the need for

clear communication avenues between all stakeholders involved. BRAC closures are not like other master planned communities that can be developed or delivered in a few short years. Sometimes the BRAC redevelopment process can take a decade before meaningful progress is made. This timeline must be clearly communicated to the public from the beginning of the process.

Along these lines, it can be a struggle to balance the needs of the existing community with the desire to catalyze long-term, sustainable economic development. As was the case in every other BRAC closure, the unemployment rate grew for the next two years following a BRAC round (Beaulier, Hall, and Lynch 2011; Schliemann 2012). Any LRA would love to put the on-base civilian employees and regional employees indirectly tied to the base back to work as quickly as possible. However, this process has many parties involved, and the desire to reduce unemployment must be balanced and flexible enough to attract the qualified candidates aligned to the region's long-term economic priorities.

Lastly, time may negatively affect BRAC communities. Each sale of surplus parcels to or from the LRA must be aligned with the DOD and HUD-approved redevelopment plan. This added level of bureaucracy can be time-consuming and costly.

Other challenges are raised and amplified by the type of development and the implementation strategies the LRA employs to redevelop the BRAC bases. The next portion of the paper will discuss multiple case studies that each followed different redevelopment paths. I employ analytical methods to gauge the level of success of each redevelopment. This information could allow Cobb County to conduct similar calculations to suggest possible outcomes if they redeveloped similarly to one of the case studies.

Description of Methods

Proper analysis of a BRAC communities' economic recovery requires a knowledge of BRAC-- specifically, what has been done in past studies and at past bases. This section highlights academic literature and methods used to study the impacts of BRAC closures. This section also introduces the three most common redevelopment typologies taken on by BRAC. It then introduces the three case studies, each representing one of the three redevelopment typologies. This section describes the methods used to evaluate the success of the three case studies. The next chapter will discuss the results of the analysis using these methods. Cobb County officials can use the methods provided in this chapter and results provided in the next chapter to identify which BRAC redevelopment typology will most successful in stimulating the best long-term economic recovery for Dobbins.

Most relevant work regarding quantitative economic data has been described in more detail in Dr. Bernd Schliemann's dissertation entitled *From Tank Trails to Technology Parks: The Impact of Base Redevelopment for New England*. In his dissertation, he provides a list of prominent post-ante econometric BRAC studies and then constructs his own econometric model based on his findings. I borrowed from his methods to assess the performance of redeveloped bases. Base performance was evaluated in order to predict which redevelopment form would result in the quickest economic recovery period for Cobb County following the closure of Dobbins.

Most studies of BRAC communities involve using per capita income and the unemployment rate as the dependent variables and primary indicators of economic recovery or decline. The unemployment rate is a "common and reliable indicator of regional economic health, which is also highly sensitive to changes in local economic conditions...[while] per capita income provides a better indicator of long-term impacts to communities" (Schliemann 2012). Other variables typically included in the studies measure economic diversity--typically defined as growth in particular industries such as the arts or manufacturing-- as well as changes in educational attainment, owner-occupied housing, and percent of population over age 65. Inclusion of each of these variables is rooted in neoclassical economics or New Growth Theory (45). Higher education is associated with higher per capita incomes and more spending, so measuring the growth or decline of educational attainment is also commonly tracked following a closure. Schliemann postulates that higher levels of education empowers people to use new technology to create businesses in old bases. Percent of population age 65 or older was tracked because higher percentages of senior citizens (possibly early-retired military) are likely to "stimulate the economy through their pensions" (46).

Figure 5. Previously Studied Variables of BRAC Bases

Variable Name	Brief Description	Precedent Studies
dependent: <i>per capita income</i>	annual per capita personal income in dollars	Hooker & Knetter (2001)
<i>unemployment rate</i>	percent county unemployment rate	Hooker & Knetter (2001)
county specific: <i>art establishments</i>	number of art establishments in county	Florida (2003)
<i>economic diversity</i>	measure of industry variety	Poppett & Herzog (2003)
<i>education establishments</i>	number of educational establishments in county	Florida (2003)
<i>educational attainment</i>	years attended school including college	Romer (1990), Florida (2003)
<i>owner-occupied housing</i>	percent of housing occupied by home owner	Florida (2003)
<i>population over age 65</i>	percent of county residents sixty-five years or older	Bradshaw (1999)
base specific: <i>announce</i>	year of BRAC closure announcement	Poppett & Herzog (2003)
<i>base civilian employment</i>	number of base civilian employees	Poppett & Herzog (2003)
<i>base military employment</i>	number of base military civilian employees	Poppett & Herzog (2003)
<i>base total employment</i>	number of base military and civilian employees	Poppett & Herzog (2003)
<i>close</i>	year of base closure	Poppett & Herzog (2003)
<i>base to county population</i>	percent of base employment to county population	Poppett & Herzog (2003)
<i>superfund</i>	indicates whether base is on EPA's superfund list	Bradshaw (1999)
proximity: <i>airport distance</i>	miles from base to nearest airport	Porter (1995)
<i>city distance</i>	miles from base to nearest urban area	Porter (1995)
<i>port distance</i>	miles from base to nearest sea or inland port	Porter (1995)

This table displays common variables that have been studied to determine their impact on the economic recovery of regions with BRAC bases (Schliemann 2012).

Other BRAC academic literature commonly uses a case study approach. These studies typically take on a mixed-methods approach, using some of the quantitative methods previously discussed, as well as a qualitative analysis of a specific base in question. Schliemann, for example, performed quantitative analysis of all the BRAC bases for all the BRAC rounds, and then supplemented his findings by performing a post-ante case study of five BRAC bases in the northeast. In other studies, authors typically discuss the redevelopment strategies used by the LRA and how and why these bases redeveloped at the speed and quality they did (63).

Like Schliemann, this study uses a mixed-methods approach, compiling quantitative and qualitative historical case study data. However, this approach differs in that the research can be used to predict the redevelopment typology that would likely lead to the quickest economic recovery for Cobb County.

To do this, a case study approach was employed to analyze the performance of single base redevelopments. The three case studies that were evaluated were:

1. Moffett Field in Sunnyvale, CA
2. Austin-Bergstrom International Airport in Austin, TX
3. The former Lowry AFB in Lowry, Colorado

Each of these bases was designated for closure in 1991 and finally closed in 1993. The bases chosen for case studies exhibited similar geographic (urban) and economic characteristics as the areas surrounding Dobbins. The case studies have also taken on different built forms following redevelopment. Below is a list of the redevelopment types that were studied in this project:

1. Industrial or technology research parks (Moffett Field)
2. Airports with commercial, cargo, charter flights, or operations and maintenance facilities (Austin-Bergstrom International Airport)
3. Mixed-use residential and commercial infill development (Lowry, Colorado)

Aside from being held as successful redevelopments, each of these case studies represent the most common forms BRAC bases take following their closure. While not comprehensive, evaluating the performance of these redevelopments will provide Cobb County a broader range of potential redevelopment possibilities and general ideas of their performance level.

Analysis of the case studies, which will be discussed in the next chapter, revealed that each of the case studies are redevelopment successes. This was determined through measuring the temporal growth or decline of demographic and economic variables in redevelopment area and affected communities. More specifically, quantitative data was analyzed at two different geographies – census tracts at the county-level and in the census tracts surrounding the base. The smaller geography contained the base itself, census tracts immediately contiguous to the base, and the tracts immediately contiguous to the contiguous tracts. This ranged from 25-35 tracts. The temporal demographic variables that were compiled are shown below.

1. Population
2. Per capita income
3. Unemployment rate (for population age 16+)
4. Educational attainment (percent of population with some college or more)
5. Percent of population aged 65 or older
6. Percent of population that are veterans

The DOD announced the closure of the case study bases in 1991. The bases officially closed in 1993. To capture the demographic change stemming from the closures, quantitative data for each of the variables was gathered at four different periods: 1980, 1990, 2000, and 2010. This allowed for easy comparison across different time periods. Since the BRAC program did not start until 1988, the 1980 Decennial Census served as the base year to provide a common benchmark for each county and tract. The 1990 Decennial Census worked to provide data immediately before the closure was announced. While none of the case studies were closed in 1988, county officials, businesses, and civilians may have predicted that their local base could be closed in the subsequent BRAC rounds. The 1990 Census may capture some of these anxieties. Unfortunately, there is not quality data for all of the variables measured between the 1990 and 2000 Census. These datasets would have captured the initial shock of each base's closure, as well as the early planning and initial redevelopment periods. The 2000 Census and 2010 American Community Survey (ACS) were both used to measure the long-term impacts of the bases' closures and redevelopments. Each of these datasets captured how the BRAC-affected areas have changed over time. Additional information was also gathered for census tracts in Fulton County and the areas surrounding Fort McPherson in Atlanta, GA. This base was announced for closure in 2005 and finally closed in 2007, just before the great recession. Since then economic recovery has been mixed. This study could also be used to suggest ways to bolster the recovery of the Fort McPherson area in the coming years.

These economic, demographic, and geospatial data were downloaded from the Census Bureau's American Fact Finder, Social Explorer, and USGS at the census tract and county geographies across all four periods. The county-level data served as a general comparison of the county's economic health throughout the redevelopment period. Joining this data to geospatial data revealed which areas of the counties improved or declined in relation to their proximity to the base.

Many of the census tract boundaries changed over the thirty-year period. To normalize for these changes, the data was weighted using the pre-determined weights from Brown University's Census Tract Crosswalk database. This resource consists of comma-delimited files that join 2010 census tracts to each of the 1980, 1990, and 2000 census tracts that previously existed within in the 2010 boundary. It then interpolates a weight to be assigned to each 2010 tract. The weight helps to measure how much the census tract boundaries changed from one period to another either through splits, mergers, or both. The weight can then be multiplied by any past attribute data to provide an estimate for the 2010 census tract boundaries. For example, Table 4 below shows how one census tract in 1980 was split into eight separate tracts by 2010. Multiplying each cell in column (a) by column (d) returns the approximate number of people in 1980 that would be living in the 2010 boundaries. By comparing column (e) with the actual number of people living in the 2010 boundaries during the 2010 census will provide a change rate for the tract for that specific variable. Without crosswalking the data to the 2010 boundaries, measuring the changes with some level of accuracy would be impossible.

Table 4. Example Crosswalk Table

(a) Weight	(b) 1980 Tract	(c) 2010 Tract	(d) 1980 Population with 1980 Boundaries	(e) 1980 Population with 2010 Boundaries
0.144875738	48453002408	48453002436	9144	1324.743748
0.209385016	48453002408	48453002435		1914.616583
0.062157385	48453002408	48453002434		568.3671302
0.181795468	48453002408	48453002433		1662.337761
0.08155766	48453002408	48453002432		745.7632412
0.218202825	48453002408	48453002431		1995.246634
0.052705487	48453002408	48453002428		481.9389738
0.049320416	48453002408	48453002426		450.9858844

Once each of the variables was computed and crosswalked to the present, descriptive statistics were performed to determine the mean, median, standard deviation, and z-scores for each of the six variables. Previous studies have used per capita income and the unemployment rate to determine the rate of economic recovery (Hooker & Knetter 2001).

Using the six variables, two composite indexes were created to comprehensively score the quantitative performance of each of the case studies—one weighted and one unweighted. This approach provided a standardized score to compare the recovery of each of the case studies and their rates of change. Theoretically, the county and base with the highest index score would indicate which of the three case studies was most successful. The highest index score should also, in theory, determine the redevelopment form Dobbins should model pending its closure. The results section provides a more in-depth discussion of the individual base's performance. This section includes a brief description of other qualitative data that may be reflected in the indexed score.

The qualitative data adds context by improving internal validity and helps to gauge the sensitivity of the model. Qualitative data is largely tied to LRA strategies or base-specific issues such as extensive environmental contamination that may have delayed redevelopment. Being able to separate qualitative data from economic performance and form will help determine if the redevelopment strategy was truly flawed or if there were other outside factors affecting the local real estate market. Qualitative data may also help to guide the redevelopment strategy for Dobbins. For example, if poor LRA leadership and risky strategies resulted in poor economic performance of a case study, the future Dobbins LRA could choose a lower scoring redevelopment form and

simply refine the redevelopment strategies to result in better economic performance and recovery for Cobb County.

After the case studies were analyzed using quantitative and qualitative methods, the current standings of Cobb County and Dobbins were assessed. Using the composite scores from the case studies, the redevelopment form's feasibility in Cobb County was projected. The analysis and results will be discussed in the following sections.

Results and Analysis

Base recoveries were evaluated by analyzing quantitative and qualitative data at different geographies. Quantitative data analyze percent changes in population, per capita income, unemployment, educational attainment, and population age 65 or older. Per capita income and unemployment rates are correlated with many other socioeconomic factors. Hooker and Knetter believe per capita income to be associated with long-term recovery and unemployment rates to be associated with short-term recovery (2001). Changes in population, educational attainment, and populations age 65 and older are also correlated with economic recovery following BRAC closures. Quantitative data was analyzed at two geographies: the county-level and a smaller base-level. Qualitative data describe the results of the individual case study redevelopments. Evaluating qualitative data was done more objectively by comparing the case studies to Dobbins and risks that may arise from redeveloping Dobbins with a typology similar to the individual case studies. The results of the analysis revealed that Dobbins should redevelop as a technology research park. This will produce the best long-term economic recovery for Cobb County. The remaining portion of the chapter discusses the results of the county-level, base-level, and qualitative analysis.

County-Level Results

The county-level results of these changes are shown below in Table 5. Each of the numbers in the table represent z-scores, or standardized values, allowing for easy comparisons across the different counties. The standardized values were computed in SPSS. Columns *a*, *b*, and *c* capture percent changes in per capita income and unemployment. Columns *d* and *e* are composite variables capturing percent changes in population, percent per capita income, unemployment, educational attainment, and population age 65 or older.

Table 5. County-Level Z-Score Summary Statistics Report

Base / County	Statistics	County Z-Scores 1990 - 2010				
		<i>a.</i> Percent Per Capita Income Change	<i>b.</i> Percent Unemployment Change	<i>c.</i> Percent Per Capita Change – Percent Unemployment Change	<i>d.</i> Unweighted	<i>e.</i> Weighted
Bergstrom / Travis, County, TX	Mean	-.0160839	-.3945188	.3784	-.5120	-.0538
	Median	-.0534029	-.5095288	.4666	-.6204	-.0798
	Std. Deviation	.26537967	.65654551	.71816	1.05446	.19924
	N	222	222	222	222	222
Dobbins / Cobb County, GA	Mean	-.0456233	.1601954	-.2058	.0667	.0574
	Median	-.0534644	.0932969	-.1342	.0770	.0611
	Std. Deviation	.02559324	.89905958	.89762	1.39428	.25022
	N	126	126	126	126	126
Lowry / Denver and Arapahoe Counties, CO	Mean	.0423252	-.0990780	.1414	.0835	.0535
	Median	-.0593165	-.3414899	.2909	-.4072	-.0345
	Std. Deviation	1.45615196	1.00812039	1.81810	3.90169	.70472
	N	307	307	307	307	307
McPherson / Fulton County, GA	Mean	-.0482727	-.0050754	-.0432	.2889	.0967
	Median	-.0538618	-.2034784	.1813	-.0349	.0334
	Std. Deviation	.01813204	.95139878	.95003	2.13998	.38450

	N	208	208	208	208	208
Moffett / Santa Clara County, CA	Mean	.0169310	.2629553	-.2460	.0520	.0686
	Median	-.0565336	.0232670	-.0772	-.2297	.0151
	Std. Deviation	1.23503076	1.12728193	1.69714	2.19586	.48759
	N	376	376	376	376	376
Total	Mean	.0000000	.0000000	.0000	.0000	.0465
	Median	-.0563653	-.2257449	.1792	-.2652	-.0040
	Std. Deviation	1.00000000	1.00000000	1.43787	2.53926	.48507
	N	1239	1239	1239	1239	1239

Columns *a* and *b* display z-scores measuring each county's percent per capita income and unemployment rate changes from 1990 to 2010. Ideally, column *a* (percent per capita income change) would have highly positive mean and median values indicating long-term wage growth. Column *b* (percent unemployment rate change) would ideally have a highly negative mean and median values indicating declining unemployment rates. Column *c* represents an attempt to capture the combined short and long-term recovery. In theory, a county that has recovered well will have a positive mean and median values. Column *c* was calculated using the following formula:

$$\text{Column } C = (\text{Zscore Percent Per Capita Income Change}) - (\text{Zscore Unemployment Rate Change})$$

Column *d* and *e* represent composite scores for the recovery at the county-level. Column *d* shows an unweighted composite scores capturing percent changes in the followingwing variables:

1. Population
2. Per capita income
3. Unemployment rate (for population age 16+)
4. Educational attainment (percent of population with some college or more)
5. Percent of population aged 65 or older

The unweighted composite score was calculated using the following steps:

1. Calculate the percent change of each of the six demographic variables from 1990 – 2010;
2. Standardize the percent change for each variable; and
3. Add the standardized percent changes for each variable to get the unweighted score.

An example of the calculation for an unweighted score is shown in Table 6 the formula below.

Table 6. Example of Unweighted Calculation

Base	Statistics	Z-Scores for County-Level Variables					
		Per Capita Income Change	Unemployment Rate Change	Population Change	Educational Attainment Change	Population Age 65+	Unweighted
Bergstrom	Mean	-.0160839	-.3945188	-.0312702	-.1092499	.0391371	-.5120
	Median	-.0534029	-.5095288	-.0423730	-.1784428	-.1143166	-.6204
	Std. Deviation	.26537967	.65654551	.04578949	.55876027	.65069612	1.05446
	N	222	222	222	222	222	222

$$\text{Mean} \Leftrightarrow -0.0160839 + (-0.3945188) + (-0.3945188) + (-0.0312702) + (-0.1092499) + 0.0391371 = -0.5120$$

Using this metric it is easy to compare the mean or median values for each county. It can be assumed that the county with the largest mean value grew the most over the 20-year period. Column *e* was constructed in a similar manor as column *d*. The only difference is that some of the standardized variables are weighted more than others. Higher weights were given to variables that were more important or highly correlated. Per capita income is weighted most heavily because of its association long-term growth. Education is also weighted highly because it is highly correlated with per capita income and unemployment. Unemployment, percent of population age 65 and older, and percent population growth were weighted less. Below is the formula for column *e* showing the weights of each variable.

$$\begin{aligned} \text{Weighted Score} = & 0.1 * \text{Population} + 0.3 * \text{Per Capita Income} + 0.2 * \text{Unemployment Rate} \\ & + 0.25 * \text{Educational Attainment} + 0.15 * \text{Age 65} \end{aligned}$$

Using the methods described above, interpretation of the results suggests Denver County and Arapahoe County, Colorado, recovered the best. These counties both contain census tracts that made up Lowry Air Force Base. While individual counties sometimes scored higher for individual variables, Denver and Arapahoe Counties comprehensively performed better than the other counties. Denver and Arapahoe Counties were the only counties that showed signs of recovery in every metric. The mean z-score for percent per capita income change (0.423252) was the higher than other counties. The mean z-score for unemployment rate change (-.0990780) declined over the period. Column *c* representing the combined effects of per capita income change and unemployment rate change was positive (.1414). This suggests that the county recovered well in the short-term and is positioned to improve in the long-term. Denver and Arapahoe Counties' unweighted score (0.0835) was higher than any other county, and its weighted (0.0535) was also positive, coming in just beneath Santa Clara County.

Each county may have performed well for individual variables, but comprehensively, this was not the case. Travis County had significant declines in unemployment (-0.3945188), suggesting significant job growth. However, this did not equate to high wage positions, as can be seen in the in per capita incomes (-0.0160839) declines. Travis County also scored significantly worse than Denver and Arapahoe Counties and Santa Clara County for the unweighted and weighted calculations. Santa Clara County had per capita income growth (0.169310) and a higher weighted scored (0.0686) than Denver and Arapahoe Counties. However, Santa Clara County also saw increases in unemployment (0.2629553) across the county. Taken together, Denver and Arapahoe Counties showed the most signs for positive economic recovery following their BRAC closure.

The county-level analysis suggests that Cobb County should create a redevelopment plan with infill development similar to Lowry, CO, if Dobbins is closed. While the county-level analysis is helpful in capturing of the economic resiliency following BRAC, it alone should not be used to decide how Dobbins could be redeveloped. This analysis is very broad and may not actually show causal relationships between the typology and the county's recovery. A county is large geography, and there may be other economic factors in the county influencing the growth seen in these measures.

Base-Level Results

A finer grain analysis using the same methods was also performed on a smaller geography. This was done to minimize the distortion of other economic activity occurring elsewhere in the county. The geography only captures socioeconomic changes that occurred in the census tracts containing the military base, tracts immediately contiguous to the base, and tracts contiguous the contiguous tracts (referred to as base-level analysis). Capturing the growth or decline in these census tracts is important because it could be more reflective of the impact of the base closure. While not necessarily causal, the base-level growth or decline is likely to more correlated with the redevelopment at the bases than the metrics calculated at the county-level. The results of this analysis can be seen in Table 6.

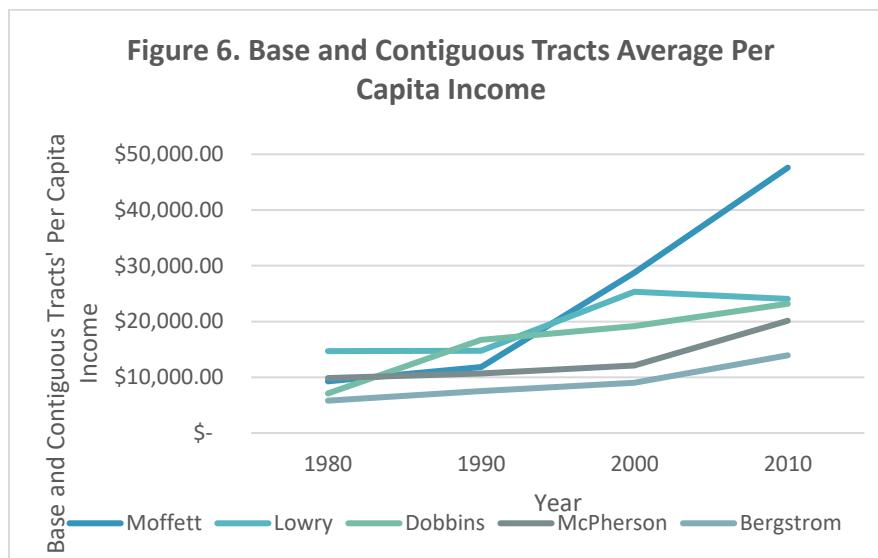
No bases showed recovery for every metric. Of the three case studies, Moffett Field appears to show the most signs of recovery. It has a positive Z-score for percent per capita income (0.0554924) and scores the highest in the unweighted (0.8275) and weighted (0.2053) metrics. Moffett Field did experience an increase in unemployment (0.4622911) during the period. However, this number most likely skewed by a few census tracts with high rates of unemployment, considering the median value for Moffett Field's unemployment rate showed a decline (-0.0720953). Lowry and Bergstrom were the only case studies to experience a mean percent unemployment decline. However, the increases in jobs were arguably negated by declines in per capita income and negative scores for the unweighted and weighted metrics. This suggests Bergstrom and Lowry's redevelopments increased the area employment but resulted in a decreased per capita income.

Other interesting things to point out are that Fort McPherson tracts experience a large per capita income growth despite having a relatively unsuccessful redevelopment. This growth can likely be attributed to the expansion of the nearby Hartfield-Jackson Atlanta International Airport (ATL) in 1994 and again in 2004. ATL employs many low-skill workers in neighboring census tracts. As seen in Figure 6, despite having the highest standardized score for percent per capita income growth, Fort McPherson still had a very low mean per capita income compared to the other bases. Bergstrom is the only other base in the analysis with a lower per capita income. Percent per capita income growth in the Moffett Field base-level can be attributed to the economic growth occurring in response to growth in technological innovation sectors. This will be discussed in more detail in the qualitative analysis. Similarly, Lowry Field and Moffett Field both had positive weighted and unweighted composite scores. Taken together, the redevelopment of Moffett appears to have resulted in the best long-term economic recovery following its BRAC closure. This can be seen in the largest percent per capita income (other than Fort McPherson) and the highest weighted (0.2053) and unweighted (0.8275) composite scores.

Table 6. Base-Level Summary Statistics Report

Base	Statistics	Base-Level Z-Scores 1990-2010				
		a. Percent Per Capita Income Change	b. Percent Unemployment Change	c. Percent Per Capita Change – Percent Unemployment Change	d. Unweighted	e. Weighted
Bergstrom	Mean	-.0872222	-.4850432	.3978	-.2340	-.1397
	Median	-.2793088	-.5026490	.2874	-.1206	-.1819
	Std. Deviation	.71546840	.51593988	.69088	2.86927	.57984
	N	29	29	29	29	29
Dobbins	Mean	-.1071649	.1356239	-.2428	-.3953	-.0763
	Median	-.1970977	.1413526	-.4444	-.3887	-.0808
	Std. Deviation	.71474599	.83520805	1.36952	.92261	.22688
	N	28	28	28	28	28
Lowry	Mean	-.0710242	-.2482589	.1772	-.4651	-.1276
	Median	-.4427525	-.3684704	.0831	-1.1881	-.2625
	Std. Deviation	.99838212	.63795381	1.13118	3.06580	.58449
	N	33	33	33	33	33
McPherson	Mean	.2494633	.1143096	.1352	.2112	.1423
	Median	-.2875456	-.2892503	-.2218	-.0795	.0878
	Std. Deviation	1.50876065	.99500373	1.94072	2.09322	.53698

	N	24	24	24	24	24
Moffett	Mean	.0554924	.4622911	-.4068	.8275	.2053
	Median	-.2951379	-.0720953	-.0681	.5279	.1525
	Std. Deviation	.98955091	1.43512599	1.83132	2.42451	.52295
	N	34	34	34	34	34
Total	Mean	.0000000	.0000000	.0000	.0000	.0000
	Median	-.3088855	-.2857681	-.0034	-.4207	-.0851
	Std. Deviation	1.00000000	1.00000000	1.46523	2.45570	.52539
	N	148	148	148	148	148



As with the county-level analysis, the base-level analysis should not be the only technique used to decide which case study performed the best. Each case study may have had other factors influencing the outcome of the results. To help compensate for this and add internal validity to the analysis, a qualitative analysis was also performed for each of the case studies.

Qualitative Analysis

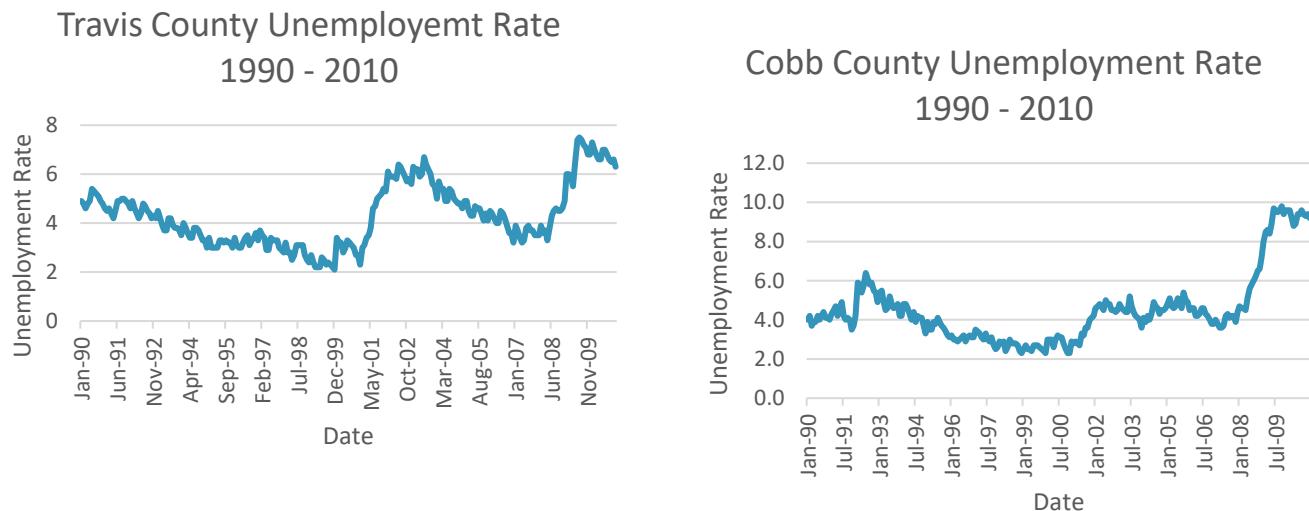
Based on the quantitative analyses performed at the county-level and base-level, it would appear that it would be best for Dobbins Air Force Base are mixed. Before a recommendation is made it would be prudent to carry out a more qualitative analysis to see if that type of development would make sense for Cobb County. This section of the analysis will provide more details into the redevelopment of each of the case studies to provide insight into their quantitative performances. It will also highlight similarities between each of the case studies and Dobbins that may influence the base's potential redevelopment. Lastly, this section will provide a foundation for the final policy recommendations for the last chapter.

Bergstrom Air Force Base

The redevelopment of Bergstrom Air Force Base into an international airport has been a big success for Travis County, Texas. The community unsuccessfully lobbied to keep the base open during the 1991 BRAC, citing its \$339 million yearly economic impact and the loss of 3,940 military and 927 civilian positions. Following its redevelopment and re-opening as Bergstrom-Austin International Airport in 1999, the site now contributes around \$1.8 billion a year, and has created roughly 35,700 jobs, in addition to 21,500 "visitor-related" jobs in the local area (Sample, 2005). By 2012, its 25 gates were serving 9.4 million passengers, with plans for expansion (Grattan, 2013). Aside from creating thousands of jobs and billions of dollars in revenue, the BRAC process saved State and local taxpayers an estimated \$200 million in land acquisition and construction costs alone by transforming the former Air Force base into the \$690 million international airport. This construction has also allowed the City of Austin to sell its former municipal airport to private developers who will redevelop the site into movie studios and a housing development (Sample, 2005).

Similar to Travis County, Cobb County and the neighboring suburban counties would benefit economically from an additional airport. It could provide more jobs to blue-collar workers living nearby. While not necessarily high wage jobs, Figure 7 shows that the Bergstrom airport may have played a part in keeping the unemployment rate lower than Cobb County during the Great Recession. Additionally, many neighboring communities may prefer a closer municipal airport in Cobb County so they could avoid Atlanta traffic. There have been multiple feasibility studies completed arguing for another regional airport in the north Atlanta metro region. To date, Hartsfield-Jackson Atlanta International Airport has successfully lobbied against each campaign for fear of competition.

Figure 7. Travis and Cobb County Unemployment Rates



Source: (Census Bureau)

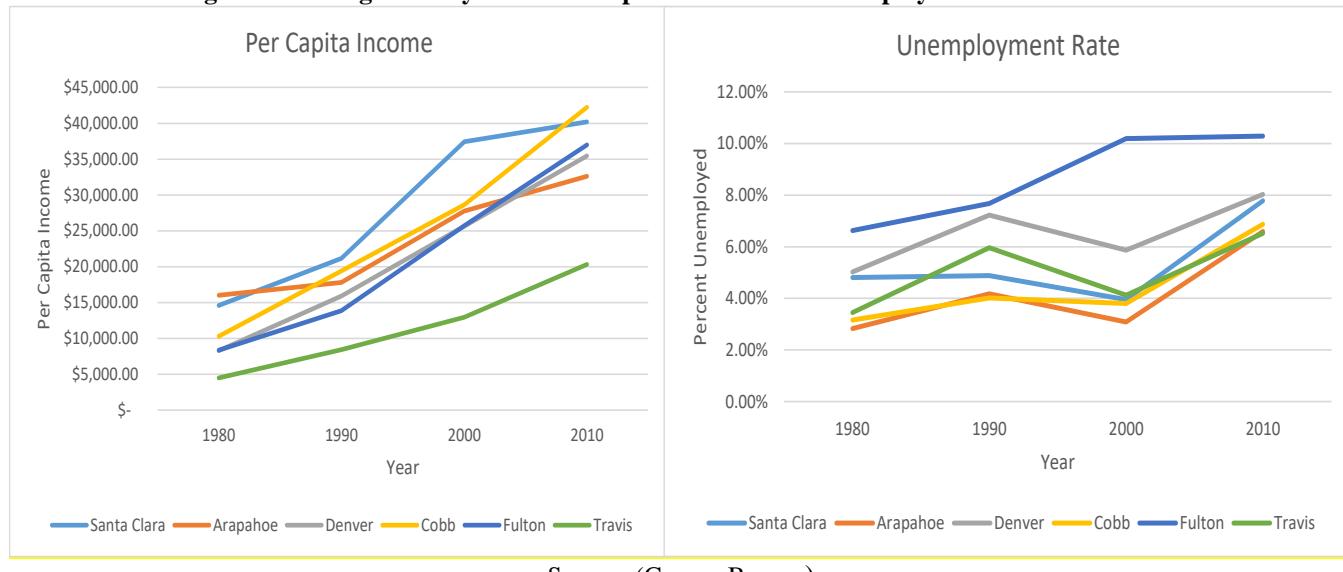
Redeveloping Dobbins as an airport offers the opportunity to redevelop the base more quickly and produce a large number of jobs in the process. However, this would likely not produce the long-term economic improvements that Cobb County citizens would want. As seen from the base-level analysis, the per capita income is not likely to increase with this redevelopment scenario. This scenario would also not retain the high-skilled employees currently employed at Lockheed Martin. Lastly, this option would impose long-term restrictions on the built environment surrounding Dobbins. The next chapter discusses these issues and other considerations if Cobb County should continue to investigate with this redevelopment alternative.

Lowry Air Force Base

Pegged for closure in 1991, Lowry AFB is one of the few successful transitions from military base to a mixed-use community. Located close to Denver on the border between Denver and Arapahoe Counties, the 1,866-acre base has been integrated into the surrounding area's infrastructure by constructing a gridded network of streets that hold three new neighborhoods and a vibrant town center. Since 1994, the new urbanism-minded Lowry Redevelopment Authority has transferred property to multiple developers enabling the construction of over 3,000 residential units, including single-family homes and multi-family duplexes, condos, and apartments. The Lowry Redevelopment Authority has pushed for public conveyances enabling the construction of 4 public, private, and charter schools, a community college, over 800 acres of parks and open space, a multi-use trail, and a public library. Their redevelopment plan included also included over 1.8 million SF of office and 130,000 SF of retail (Urban Land Institute, 2006).

While large portions of the former base were completely demolished and redeveloped, several landmarks, including the base's hangars, were repurposed. Two of the former hangars now house the Wings Over the Rockies Air and Space Museum, an ice rink and hockey team, and many smaller offices and stores. A former steam power plant was also redeveloped into modern residential lofts (Lowry Community Master Association, 2016). The LRA was able to grind up one of the base's two runways to repurpose it for the newly constructed streets. The other runway now serves as the spine and central boulevard of the Lowry communities.

Figure 8. Average County-level Per Capita Income and Unemployment Rates 1980-2010



Source: (Census Bureau)

Cobb County has developed similarly to Denver and Arapahoe Counties. Census data shown in Figure 8 shows that both areas have comparable per capita incomes and unemployment rates. Dobbins and Lowry are both located in suburban semi-dense autocentric areas. Just as Lowry is positioned between Denver and Aurora, Dobbins is located between residential and commercial districts on all sides, and borders Marietta and Smyrna. It could be plausible for both of these cities to expand their boundaries and develop portions of the base as residential, commercial, and recreational hubs for the county. Its close proximity to the interstate and other regional business hubs could prove to be great assets for spurring redevelopment similar to Lowry AFB.

While this redevelopment typology could be beneficial to Cobb County, it also poses significant risks. Lowry was plagued with delays. Residential and greenspace uses require more intensive environmental cleanups than other uses, delaying the redevelopment of the site and prolonging the economic recovery of the affected communities. AFP #6 has been in operation since WWII and is the source of known contaminants on the property. Despite having fewer known environmental hazards than many other military properties and the

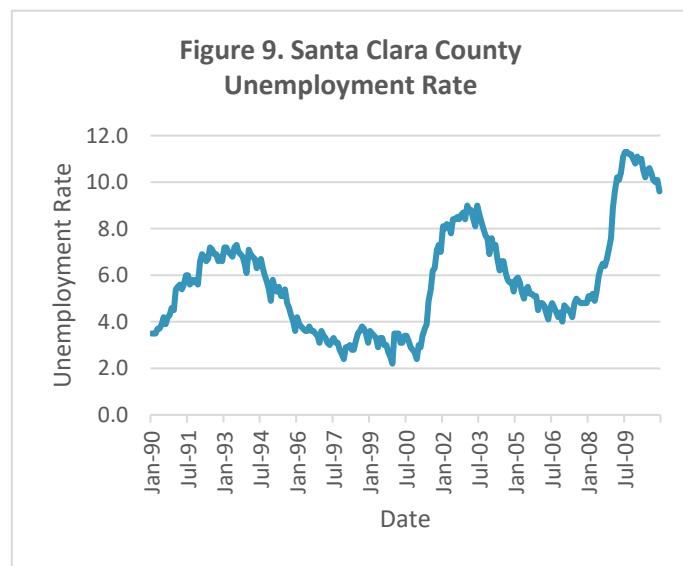
legislative protection provided by CERCLA, environmental risks will likely limit its residential development potential. This issue will and other infill development considerations are discussed in the next chapter.

Moffett Field

Once a 500-acre naval air base for dirigibles, Moffett field was announced for closure in 1991. Ownership of the base was transferred to its neighbor, the NASA Ames Research Center, in 1994. Following transfer, NASA Ames then partnered with the nearby communities of Mountain View and Sunnyvale to develop a re-use plan to transform the former naval air station into an R&D center dedicated to furthering the goals of the nation's space program (NASA Research Park, 2016).

Today the facility is known as NASA Research Park (NRP) and has created over 70 partnerships with academia, industry and non-profits to stimulate innovation and education in science and research disciplines critical to space exploration. NRP has attracted major universities such as Carnegie Mellon University, University of California, Santa Clara University, Singularity University, Tasksha University and others to operate classes and R&D programs onsite. Non-profits, including the Unmanned Aerial Vehicle (UAV) Collaborative, the Mars Institute, and the Kentucky Science and Technology Institute also operate programs on-site (NASA Research Park, 2016).

Since 2002, NRP has secured permits for 5 million SF for new on-site construction and has executed leases in many of Moffett Field's existing building spaces to house many technology start-ups and university facilities. NRP has also extended two separate ground leases for new construction with Planetary Ventures LLC (Google) on 42 acres and 1.2 million SF of R&D office facilities and University Associates LLC (University of California) on 77 acres and 3 million SF of R&D labs, classrooms and on-site housing. Google's lease is a 60-year agreement for more than \$1.16 billion (Novak, 2016). The other land sells are also substantial. Together, these developments will continue to further activate the surrounding area, stimulating further economic growth (NASA Research Park, 2016).



Source: (Census Bureau)

presence in the area. It should also be noted that the composite scores for Santa Clara County and Moffett Field were skewed by the unemployment rates during the peak of the recession and the DotCom Bubble. As can be seen in Figure 9, the unemployment rate rose sharply in 2000-2001 and again 2008-2009. If not for these increases, the weighted and unweighted composite scores would have been much higher for Santa Clara County and Moffett Field.

It is no surprise that the per capita income surrounding Moffett Field increased 13.1 percent following its redevelopment. It could be argued that is much of its success is attributed to growth that would have occurred regardless of a BRAC closure. Much of the success is largely tied to NASA. The presence of a national laboratory means that educational attainment and its corollary, per capita income, are given significant boosts. Santa Clara County is also located in Silicon Valley, which has experienced the formation of a large technology and innovation cluster. Many tech companies have located in neighboring census tracts. For example, Google's corporate campus is located in a tract contiguous to Moffett Field. There is also a tremendous university

While much of the success would have occurred because of the pre-existing tech community, the BRAC closure did enable for the continued development of a technology cluster. Given the area's population density, it is unlikely that new airfields will be constructed, so closely to existing commercial hubs. This makes the airstrips and hangar spaces a major asset to Moffett and any potential owners or lessees. Close proximity to its headquarters and a thriving commercial market give Google the ability test and potentially implement new flight and space technologies for the next 60 years. This would not have been possible without BRAC.

There is not a major federal agency like NASA located at Dobbins. However, given its location and current tenant mix, it is plausible for Dobbins to be redeveloped as a technology park similar to NRP. For example, Georgia Tech currently has an R&D campus operating within the boundaries of Dobbins. Georgia Tech is also currently expanding its R&D capabilities at Dobbins. In 2016, Georgia Tech purchased a 52-acre site previously owned by Lockheed Martin. This site contains a large office building and warehouse that Georgia Tech is looking to retrofit. Kennesaw State University, which has an engineering school, also shares a border with Dobbins. It should also be noted that Lockheed Martin was able to expand its presence at Moffett Field following the BRAC transfer to NRP. Perhaps Lockheed Martin's campus in Marietta would try to expand and purchase its currently leased facility at AFP # 6 if the redevelopment authority decides to market Dobbins as a technology park. While more market feasibility studies would need to be done, it is most plausible for Dobbins to be redeveloped as an innovation technology park.

Conclusion of Analysis

Based on the findings of quantitative and qualitative analysis described in this chapter, Dobbins should redevelop as a technology research park if it is closed in the next BRAC round. The county-level analysis suggests that Dobbins should redevelop as a mixed-use infill development. However, the finer-grain base-level analysis suggests that Dobbins should redevelop as a technology park. Redevelopment as a technology park would lead to increases in per capita income. Similar to NRP, this strategy would also attract more high-skilled, high-wage employees to the region to help speed the economic recovery following a closure. These finding are consistent with the qualitative analysis. It revealed that Dobbins currently has similar R&D tenants, a growing university presence, and existing buildings that could be retrofitted to serve R&D uses. Assuming it can continue to attract similar tenants as NRP, this could result in the most long-term growth for the county and tracts surrounding the base. Implications and additional considerations for this redevelopment typology are discussed in the next chapter.

This quantitative and qualitative analysis conducted were somewhat simplistic and should be researched by Cobb County planners on a much larger scale before the next BRAC round. Planners should conduct a more in-depth market analysis and feasibility study leading up to the base closure round. Future analysis of more case studies may reveal differing results. The next portion of the paper will discuss policy recommendations to consider should Cobb County officials choose to implement one of the three redevelopment scenarios previously discussed.

Policy Recommendations

As this document has shown, there are many different considerations for Cobb County in the BRAC and redevelopment process. Each redevelopment option provides costs and benefits. This section of the document is provides some of the implications and considerations of the potential redevelopment scenarios, as well as policy recommendations for preparing for the next BRAC round.

General Considerations

Broadly speaking, Cobb County should consider the changing population and the economic impacts of a base closure. Forms Dobbins Air Reserve Base website claim Dobbins supports 2,433 personnel, with 1,702 being military and the remaining 724 holding civilian positions (Dobbins Air Reserve Base 2014). In a closure scenario, the majority of the military personnel will be relocated to another base. However, some of the military personnel may decide to stay behind and find other means of employment. Military members that are closer to retirement and have spouses, children, and homes are the most likely to stay in the area following a closure (Hooker & Knetter 2001). Planners could begin to estimate the number of Cobb County residents that will move or stay behind based on these factors. The majority of the 724 civilian positions are expected to stay.

The previously mentioned forms also claim Dobbins' economic impact in FY 2014 to be \$164 million. This number is most likely overestimated, but it is still significant. Much of the economic impact of its closing will be felt off-base. For example, closing the base will decrease public school enrollment, which could necessitate teacher layoffs. Spouses holding jobs off-base would be lost. Many military spouses have been employed in the health and nursing sectors. A sharp decline in these jobs may negatively impact the healthcare quality in the short-term. Additionally, the housing market could be overloaded, causing a decrease in the home values. Of course, the number of jobs lost and overall economic impact would be much more significant if Lockheed Martin consolidated and relocated. Lockheed Martin employs approximately 6,000 people. Many of these are highly skilled engineers with high salaries. Although there is not a public economic impact assessment available for Lockheed Martin, a 2014 CHMURA report estimated that the Marietta plant receives \$2.5 billion dollars in DOD funding in 2014 (CHMURA Economics & Analytics 2016). This does not include the revenue gained from contracts with foreign governments. Any plan should work to account for these losses to improve the socioeconomic status of the area. Plans should also try to retain as many of the high-skilled laborers as possible.

All redevelopment scenarios should allow for extensive public input. This aspect is already mandated by the BRAC process in order for the redevelopment plan to be approved by the DOD and HUD. However, allowing for public input beyond the minimum requirements may help to leverage future funding for infrastructure improvements. For example, Fort McPherson conducted a Livable Centers Initiative (LCI) study to gather public input following their 2005 BRAC process. The LCI process has helped to raise funds from the Atlanta Regional Commission (ARC) for infrastructure improvements. It can also help provide future developers with a vote of confidence if they know the public will approve of their proposed project.

New developments should mesh with the character of the area and be aligned to the surrounding communities' vision for the area. Surrounding Dobbins, each cardinal direction exhibits different zoning and land use characteristics. The unincorporated Fair Oaks community located directly west of the base largely consists of smaller single-family residential homes with commercial corridors abutting Atlanta Road SE and South Cobb Drive. Fair Oaks has a different demographic profile than many of the surrounding districts, so they may have a different vision for the future of the base than other neighborhoods contiguous to Dobbins. To the south, Dobbins backs up to two golf courses and the northern border of Smyrna. Farther south is still largely single family residential with pockets of gated multi-family residential complexes. The eastern border of Dobbins is bounded by Cobb Parkway. This is a commercial corridor with traditional suburban style developments and some light industrial parcels. This corridor will likely face increased development pressure in the future as a result of increased activity around the Cumberland CID area and the increasing density in the Franklin/Delk LCI Study

area. North of Dobbins is an assortment of office industrial, light industrial, commercial and institutional zones. Life University and the former Kennesaw State University reside in this area. Just beyond these zones is downtown Marietta. Despite regulatory restrictions of BRAC, the redevelopment plan would be able take all of these differences into account to create a robust plan that blends current and future redevelopments seamlessly.

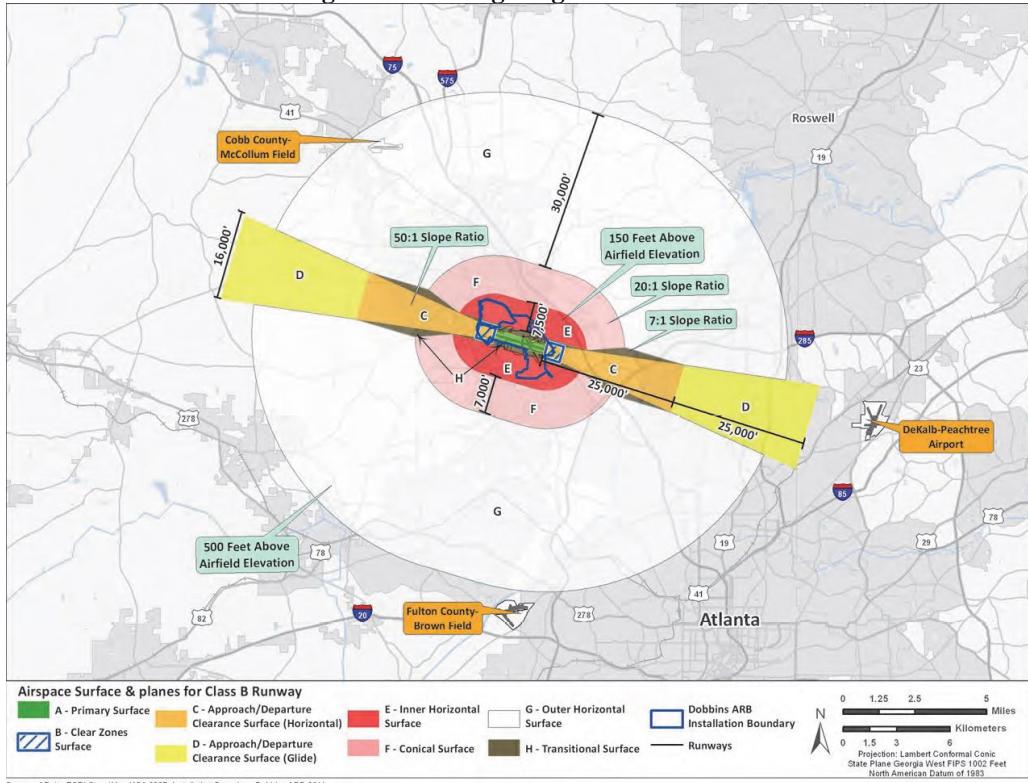
International / Regional Commercial Airport Considerations

One aspect of this process that many officials may not be aware of is that Dobbins imposes additional restrictions on future developments. The DOD and Federal Aviation Administration (FAA) impose density regulations in the vicinity of bases and airports. This is meant to minimize risks associated with possible airport accessibility; aircraft crashes; and ambient environmental, lighting, and noise pollution. It also helps to minimize risks associated with possible security breaches. Planners should reference the 2011 Air Installation Compatible Use Zone (AICUZ) Study and a 2015 Joint Land Use Study (JLUS) regarding these considerations. Both reports discuss encroachment issues surrounding the Dobbins. Data collected in these studies suggest compatible uses for future developments in the areas surrounding Dobbins. These compatible uses are dependent on their distance from the base (Headquarters Air Force Reserve Command 2011), (Matrix Design Group 2015).

As the maps in Figures 9 and 10 suggest, future developments surrounding the base must meet certain height restrictions depending on the different zones the in which the development is planned. If Dobbins remains open or continues to function in some type of airport capacity after it is redeveloped, the density, use, and height of the vicinity will be limited. For example, all future developments within 7,500 feet (approximately 1.4 miles) of the runway are not to exceed 150 feet tall. According to the Council on Tall Buildings and Urban Habitats, the 150 feet building height maximum would allow for approximately an eight-story office building, a 12-story residential or hotel building, or a 10-story mixed-use building (Council on Tall Buildings and Urban Habitat 2016). If downtown Marietta, downtown Smyrna, or other communities or organizations in the first buffer range ever envision creating this level of density, it would not be allowed. There are two other buffer zones restricting building heights. The second buffer extends an additional 7,500 feet (approximately 2.75 miles from the airstrip) and restricts building heights to 150 to 500 feet. This would directly impact future developments surrounding the SunTrust Park.

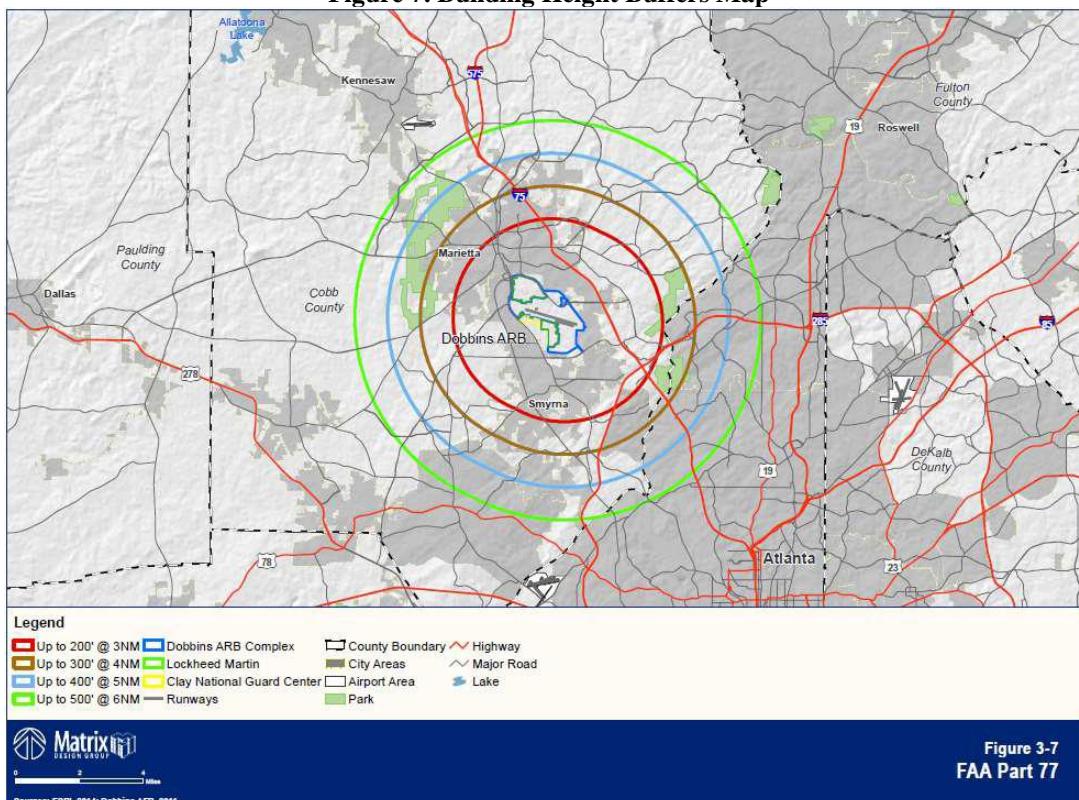
The last buffer extends an additional 30,000 feet (approximately 8.4 miles from the airstrip) beyond the second buffer and caps development at 500 feet. This is the equivalent of a 34-story office building, a 46-story residential or hotel building, or a 40-story mixed-use building (*ibid.*). While Marietta and Smyrna may not ever have the desire to develop density to these levels, it might restrict landowners in some areas of Buckhead. Deciding how to redevelop the base will require input from stakeholders in these areas. This information should be communicated clearly to the community and stakeholders. Dobbins and Cobb County face many considerable hurdles for it to become an airport. Other than the building heights restrictions, many complaints will come from the surrounding community. The added noise and increased vehicle traffic would likely reduce the property values of the surrounding residential communities. These restrictions may conflict with the property owners or the future vision for the area. Some stakeholders may envision a more dense area with a variety of uses that would not be suitable if it continues to serve in an airport capacity.

Figure 6. Building Height Buffer Zones



Source: (Headquarters Air Force Reserve Command, 2011)

Figure 7. Building Height Buffers Map



Source: (Atlanta Regional Commission, 2015)

There are also many opportunities associated with redeveloping Dobbins as an airport. Existing airstrips, taxiways, buildings, hangars, and aviation support facilities could be retrofitted at a significantly reduced cost. Additional infrastructure to support this use would be minimal. Another benefit of serving as an airport would be that parcels would be much larger, meaning there would be fewer transfers to negotiate. Disposal and transfer of each parcel requires negotiations with multiple federal agencies and the public. If there are fewer parcels and allowable uses for these parcels, this would be a major timesaver and could allow for quicker reuse of the facilities.

Redevelopment as an airport could allow for multiple uses of the property. It could possibly serve as regional airport with a small passenger terminal. Given that there are only two airstrips, serving as a major hub for passenger airlines is unlikely. What might be more suitable would be for the LRA to attract tenants who operate private charters, transport cargo, or provide aircraft maintenance services. The ample warehouse space at Dobbins and AFP #6 and its proximity to multiple interstates would make transporting cargo another viable option. Tenants that would be interested in this option might include Delta Airlines subsidiary Delta Cargo, UPS, FedEx, or the other 15 cargo airlines and e-commerce tenants that currently own or lease space at Hartsfield-Jackson Atlanta International Airport (ATL) (Hartsfield-Jackson Atlanta International Airport 2016).

In 2015, the Delta Cargo transported 626,201 metric tons of cargo at ATL (Hartsfield-Jackson Atlanta International Airport 2015). Although the 2014 ATL master plan wants to expand its cargo operations, an airport at Dobbins could assist Delta Cargo's business. Dobbins might also be an attractive option for Delta Airlines to house their aircraft maintenance, repair, and overhaul (MRO) operations. Currently, Delta has two MRO facilities—one in Minneapolis and one at ATL (Delta TechOps 2016). Given that AFP #6 facilities are already equipped to perform MRO work, Delta could expand to Marietta relatively easily. If Lockheed Martin does decide to close the Marietta location following a BRAC, this would be an attractive option to retain and employ the highly skilled workforce. Alternatively, it could be possible for Lockheed Martin to expand operations by retrofitting the Dobbins buildings to serve similar MRO capabilities. Lockheed Martin currently has MRO operations in Marietta, Greeneville, SC, and San Antonio, TX (Lockheed Martin, 2016). Consolidating MRO operations in Marietta might also be an attractive cost-saving measure for the defense company. Cobb County and the LRA should further investigate the costs, benefits, and feasibility of conversion into a commercial airport.

Mixed-Use Residential / Commercial Infill Redevelopment Considerations

Another redevelopment possibility is to push for infill development similar to Lowry, CO. The possibility of up to 2,400 acres at Dobbins and Lockheed Martin is enough to construct a small town. The development pattern of Lowry is strikingly similar to that of Marietta and Smyrna, which have nestled around Dobbins. In less than 20 years, Lowry transformed 1,866 acres to a completely built-out and activated area. A similar development could happen at Dobbins and could be a real boon for the local economy, attracting both people and businesses to a new area.

Infill development on this scale offers great opportunities and risks. If officials and residents ever wanted to change the trajectory of current development trends in Cobb County, redeveloping Dobbins with infill development offers the best opportunity to do so. This could entail the construction of a gridded street network and allow for a multitude of uses with varying intensities. A very involved visioning process might reveal that community members want a new urbanist development similar to Lowry's plan with a town center and varying mixed-use and single family developments. It might also reveal the desire for more intense mid-rise to high-rise developments similar to the Midtown or Buckhead neighborhoods. Contrastingly, it could result in more traditional suburban developments.

Aside from the site being deemed environmentally unsuitable, the main risks associated with this type of development route tend to be related to the real estate market. For example, if the real estate market slows, proposed projects could be put on hold for years or dropped altogether. Through extensive market analysis, some

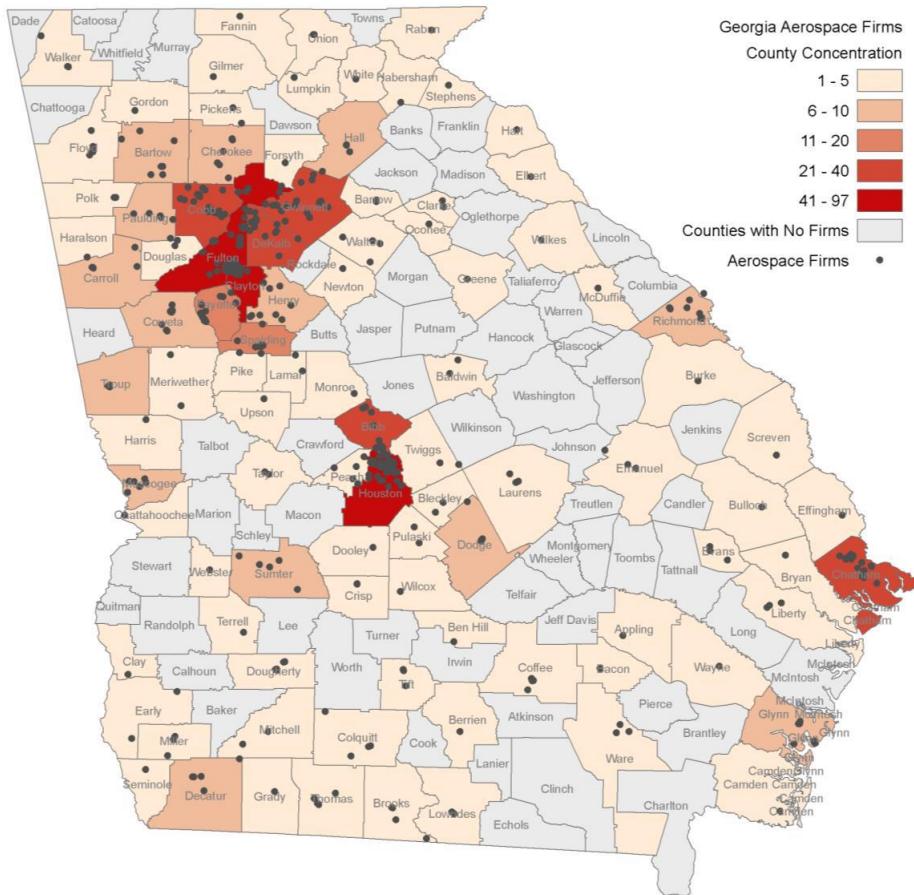
banks or real estate developers may also conclude that the market demand would not support the type of development. As discussed in earlier sections, if the community decides infill development is the preferred redevelopment route, a more descriptive redevelopment plan will be needed.

Infill projects at Dobbins could become more feasible with generous public support and leveraged development funds. This could be done through such things Livable Centers Initiative (LCI) studies through the ARC or possibly even the formation of Tax Allocation Districts (TADs), New Market Tax Credits, property tax abatements, municipal bonds, or other local funding programs. State legislation could also be passed to leverage funds for capital improvement projects that will spur economic development. Another possibility is the extension of the MARTA rail lines into Cobb County to help generate transportation-oriented developments. The original MARTA plans were intended to follow the same CSX rail corridor that snakes along Dobbins' southern and western borders. This same corridor also runs due west of SunTrust Park and could be connected in a regional transit plan. While controversial, choosing to extend MARTA could help to connect the two areas while also increasing economic development and pedestrian activity in addition to alleviating some of the automobile congestion.

Industrial or Technology Park Considerations

As mentioned in the previous chapter, redevelopment of Dobbins and possibly AFP #6 into an industrial or Technology Park could likely produce the best long-term economic recovery. This presents similar benefits and challenges as the airport conversion possibility. Similar to airports, industrial parks can sometimes face considerable pushback from the public over concerns of their impact on residential property values and increased truck traffic. The level of industrial intensity also inhibits the mixture of some property uses. However, developing an industrial park with a particular focus might prove to be beneficial and more attractive to the public. For example, creating a technology park that builds off the metro Atlanta's current cluster of aerospace industries and focuses on attracting aerospace technology tenants could prove economically viable. As Figure 11 depicts, there are already a large number of aerospace firms in the metro Atlanta area. Pursuing this option would help to retain and attract a highly skilled labor force and attract similar tenants as NRP in Santa Clara County.

Figure 8. Georgia Aerospace Firm Locations (2013)



Source: (Enterprise Innovation Institute, 2015)

One possibility that might improve the feasibility of a technology park option is to partner with area universities, much like NRP. This could be a very attractive option for Georgia Tech and the Georgia Tech Research Institute (GTRI) who already has a research facility at Dobbins. In 2014, GTRI received from the military \$303 million for applied research, and \$255 million was for military defense research (Georgia Tech Research Institute 2014).

GTRI already has plans of expanding operations in the area. In June 2016, GTRI purchased 52 acres from Lockheed Martin on the southern border of Dobbins (Wallace 2016). Three weeks later, GTRI issued a request for qualifications (RFQ) from firms to develop plans for rehabilitation of the properties on a \$20-27 million budget (Allison 2016). This move could prove to be the starting point of a full-scale Georgia Tech research campus in Cobb County. Kennesaw State University has engineering programs located on campus at the northern border of Dobbins and could also be a viable partner. University of Georgia (UGA) currently conducts unmanned aircraft research for agricultural uses, making them a plausible university tenant at Dobbins. There are many possibilities for redevelopment if a technology university park is the central focus of redevelopment.

Other considerations for Cobb County and the LRA if they pursue the technology university park option might be to include residential and commercial components. This might include having uses for campus residence halls and other non-university infill development. Adding mixed-use facilities might lead to the creation a more vibrant and welcoming place and generate increased activity in the surrounding communities. It should be noted that the amount of residential use is contingent upon environmental suitability determinations.

Environmental Considerations

Additional hurdles the LRA will encounter largely stem from environmental issues. Cobb County officials should advocate for environmental assessments and mitigation measures to be conducted immediately upon the announcement of the Dobbins' closure. Officials should also consult third party environmental professionals that can interpret environmental assessments previously conducted on the Dobbins sites. Doing this will enable planners to predict where contaminants might be found and possible suitable uses for future development.

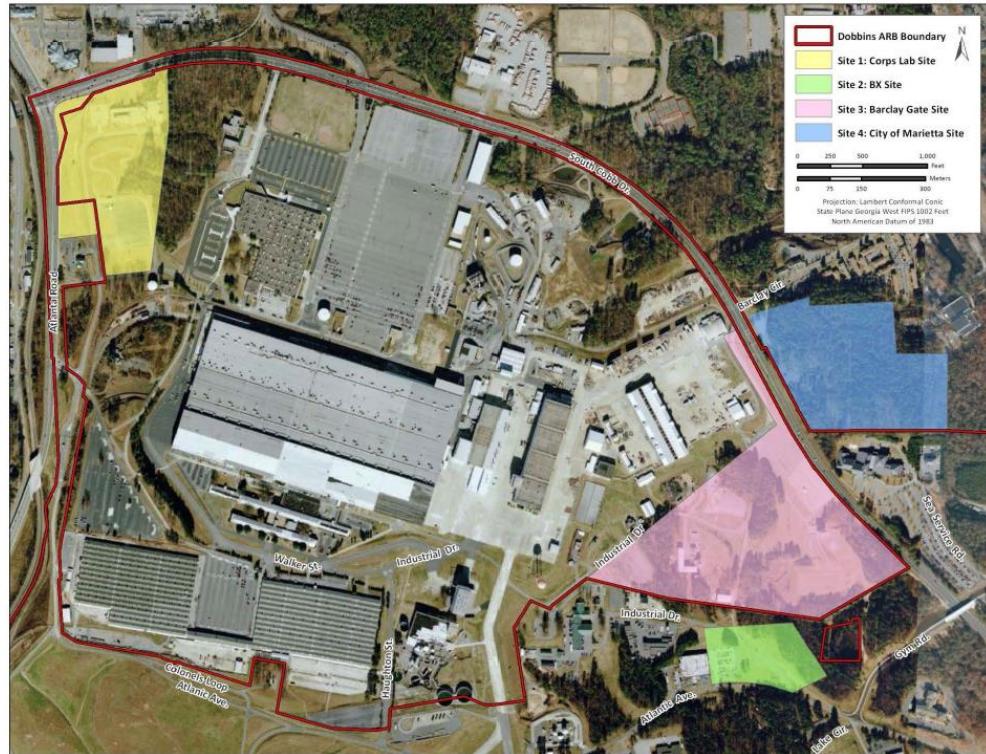
Environmental regulations have not always been as stringent as they are today. Many past construction, operational, and disposal procedures are now prohibited because of their negative environmental health implications. With these ever evolving regulations, many military installations have not always been able to meet compliance standards. Older buildings are not likely to undergo costly retrofits to meet new codes unless the building's use changes or the building is renovated or expanded. Any new construction, however, is required to meet the most up-to-date building requirements. Common building code violations that must be mitigated before reuse might include not having a sprinkler system; poor ventilation; the presence of asbestos; and contaminated pipes, soil, and building materials caused by years of improper storage and disposal of chemicals. Many of these contaminants can be predicted based on the specific building's age and its historic use. Historically, portions of BRAC bases that have produced tested, or stored ammunition and weapons tended to have longer mitigation and remediation periods. Sometimes these portions can never be restored to an acceptable level suitable for commercial and residential uses. Other sites that have disposed of irradiated materials have suffered from similar cleanup delays. Although not readily available to the public, a prudent planner could request documents describing such topics through the Freedom of Information Act (FOIA) website.

While building interiors are not likely to be brought up to code prior to base closure, bases are required to implement periodic environmental testing and mitigation efforts outside the buildings. Dobbins and AFP #6 have complied with these requirements and have made public some of these tests on their website. Other documents can be requested through the FOIA website.

The most in depth study available to the public is the "Final Base-Wide Background Study Report: U.S. Air Force Plant No. 6" (CH2M HILL, 2011). This 2011 report was a follow-up study to one completed in 2004. It was carried out to improve statistical estimates of background levels of inorganic compounds and organochlorine pesticides located in soil (surface, shallow subsurface, and deep subsurface), groundwater (both overburdened and bedrock), sediment, and surface water locations around AFP #6 (Lockheed Martin). Planners and environmental consultants should review this document to become aware of background pollutant levels and the locations of testing locations.

Another report entitled "Final Environmental Assessment Addressing a Proposed Commissary at Dobbins Air Reserve Base, Georgia" provides additional details some other known contaminants on the site. The 2012 report describes detailed environmental assessments of four potential sites for the newly constructed Commissary (Stell Environmental Enterprises, 2012). Figure 12 depicts the four sites that were under consideration. The report outlines the costs associated with constructing the Commissary by noting the environmental remediation that will be required at each of the proposed sites. It also lists the locations of known hazardous wastes on the four sites and predicts where contaminants might be discovered with more in depth studies. According to the report, "[h]azardous wastes that might be present at the Dobbins include asbestos and lead-based paint (LBP), radon, regulated wastes, petroleum products, and solid wastes" (*ibid.*). It provides a detailed history of some of the older building's uses, the contaminated building materials used in the construction of the building, and the actual chemicals the buildings contained in their lifetimes. Planners should refer to the report for more specific details about the specific pollutants identified and suggested remediation measures. Doing so might enable the community to get a jump start on the cleanup process and plan for the possible delays or suitable uses.

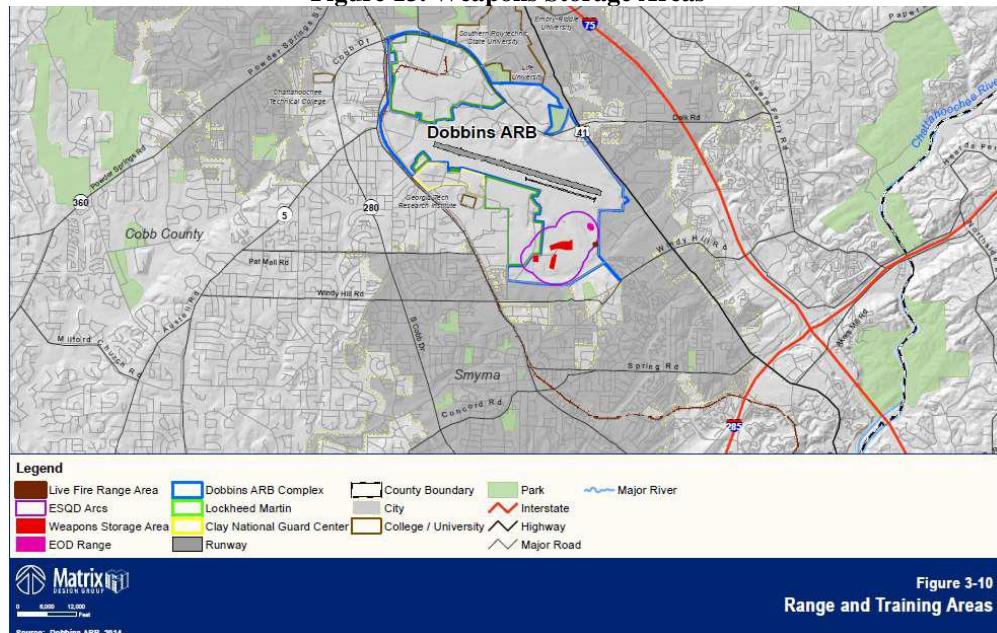
Figure 12. Proposed Commissary Locations



Source: (ibid.)

Other areas that are likely to undergo extensive testing are those that have stored historically stored weapons. These areas are in underground bunkers located in the southeastern corner of the base. The weapons storage areas are designated in red in Figure 13 below. It is not public knowledge what type of weapons were historically stored on-base. Planners should request documentation via the FOIA portal to help predict the possible contamination or the existence of unexploded ordnances.

Figure 13. Weapons Storage Areas



Source: (Atlanta Regional Commission, 2015)

In November of 2017, the Air Force and EPA will be conducting tests for possible groundwater contamination at Dobbins and AFP #6. The EPA will be specifically testing soil, sediment, and ground and surface water for perfluorinated compounds (PFCs). The two PFCs that are being tested for are used in Aqueous Film Forming Foam (AFFF) for extinguishing chemical and petroleum fires. These PFCs have been found to seep into groundwater supplies when used in large amounts for firefighting efforts or training scenarios. If PFCs are found to be above the EPA Public Health Analysis levels, immediate remediation will take place on the sites to address the issues (Air Force Public Affairs, 2016). Planners should be made aware of the results of these tests and the locations that were tested, as they will likely be retested and scrutinized in the event of a BRAC.

Compared to many bases, Dobbins and AFP #6 does not have nearly as many publicly known sites that are out of compliance. Majority of sites requiring continued testing, mitigation, or cleanup are concentrated on the site of the former USACE Laboratory in the northwest corner of the base or the northeast quadrant of AFP #6. These areas have been undergoing mitigation efforts with reoccurring updates every few years or any time there is new construction. No environmental reports have been public since 2015. In the event that Dobbins is closed, the EPA will conduct its own more in-depth study in order to make mitigation recommendations and rulings of future redevelopment uses. The EPA findings will likely be similar to current studies. It would be prudent for officials to periodically request environmental documents via the FOIA website and to update redevelopment plans based on these findings in order to prepare for possible future redevelopment delays.

Planners should be actively consulting with the Dobbins and Lockheed Martin officials to see how the previously mentioned issues are currently being monitored or remediated. Planners should also periodically file FOIA requests to research where other contaminants are known to exist or where previous cleanups have been done. In the event of a BRAC, the community leaders should also actively lobby for testing and remediation of these sites as soon as the base closure or realignment is announced. Doing all these tasks will speed the planning and redevelopment processes.

Conclusions

By carrying out the tasks discussed above, Cobb County planners can be better prepared for the next BRAC closures to hit metro Atlanta. While lobbying to protect Dobbins is important, careful attention should be paid to plan for the alternative scenarios in which Dobbins and AFP #6 are closed. Without careful planning, Cobb County and the census tracts surrounding the base are likely to face large economic shocks if the base is closed.

The analysis described in this document revealed that redeveloping Dobbins into a technology research park would likely result in the best economic recovery for Cobb County. Its redevelopment into a technology park would result in higher per capita incomes, retention and expansion of a high-skilled workforce, and other positive externalities. Additionally, Dobbins already has a growing cluster of aerospace, defense, and R&D industries and universities on or in the immediate vicinity of the base, make this redevelopment scenario more feasible. The other redevelopment typologies considered in this analysis were a mixed-use infill development and a commercial airport. Neither of these alternatives would likely result in the long-term economic recovery desired by the locals. They also pose additional risks that would be encountered in the redevelopment periods.

Cobb County officials and planners should continue to investigate the alternative scenarios presented in this document and the implications they would have for the affected communities. The feasibility of these scenarios is tied to many issues, including existing environmental damages, the real estate market, available funding, and the input and expectations gathered from the stakeholders and community members. Planners should continue to investigate environmental issues that could impact future redevelopment scenarios by communicating with Dobbins and Lockheed Martin officials about existing environmental hazards and mitigate of these damages. Planners should also conduct more detailed real estate market analyses to project the feasibility, socioeconomic impacts, and timelines of different alternatives. Not planning for these alternatives is shortsighted and could result

delay the base's redevelopment. With thorough planning leading up to the next BRAC round, Cobb County will be more prepared allowing for a smoother transition and a quicker recovery in a post-Dobbins future.

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