

CHAPTER 2

The Birth of the Research Triangle Metropolitan Area

A metropolitan area is defined by the U.S. Census Bureau as “a core area with a large nucleus, together with adjacent communities that have a high degree of economic and social integration with that core.”¹ In 1950, when the first metropolitan areas were designated, Raleigh and surrounding Wake County were included in one area, while Durham and Durham County in another. In 1971 Chapel Hill and Orange County were added to the Durham metro area and in 1981 the two areas were combined into one, until further growth led to their being separated again in 2005. This chapter describes the three major development projects that were critical to the economic and social integration of what has become known as the Research Triangle. The development of the Research Triangle Park, the expansion of the Raleigh-Durham Airport, and the construction of Interstate 40 were all critical to its transition from a collection of separate communities to a metropolitan area.

THE RESEARCH TRIANGLE PARK

It is impossible to know exactly how the Research Triangle metropolitan area would have developed without the creation of the Research Triangle Park, but it's safe to say that it would be different in both size and form. RTP filled the hole between the three towns of Raleigh, Durham, and Chapel Hill. It created a center where none had existed before. The gravitational pull of the RTP has drawn development toward it and distorted what probably would have been a more conventional concentric zone or sector pattern of development around the individual towns.

As a metropolitan center, however, the form of RTP is radically different than those of other urban areas. Rather than a forest of tightly clustered high-rise buildings, the RTP consists of a collection of low-rise buildings cloaked by stands of pine trees. Rather than a mix of office, retail, and residential land uses, RTP is almost exclusively inhabited by research and development operations and some related production facilities. It's the urban equivalent of a monoculture. The RTP has also provided the area an identity, both nationally and internationally, as an area on the forefront of the new knowledge-based economy: an area rich in human capital and containing a critical mass of new economy businesses such as pharmaceutical, biotechnology, and high-technology companies.

The creation of the RTP was critical in knitting together the distinct towns of Raleigh, Durham, and Chapel Hill and in creating the social ties that define

a metropolitan area. But what led to the creation of the park? What was the thinking behind the low-density development model? What were the obstacles that had to be overcome? What impact has the park had on the region and what challenges is it facing?

THE ECONOMIC AND SOCIAL CONTEXT

To understand the impetus for the creation of the RTP one needs to appreciate the economic position of the South in general and North Carolina in particular in the early 1950s. Compared to the rest of the country, the South was “relatively disadvantaged and economically depressed.”² In spite of World War II defense spending in southern industries, the South's economy was still heavily based on agricultural production such as cotton, tobacco, and peanuts. Employment in manufacturing lagged other regions. In 1950, for example, the South accounted for only 16 percent of all manufacturing employment in the nation. Moreover, much of this was concentrated in textile and other low-wage manufacturing. Another telling figure is that in the mid-1950s only eighteen of the Fortune 500 companies were headquartered in the South.³

Economic conditions in North Carolina were similar to those in the larger region. A large proportion of the state's jobs were in low-skill, low-pay occupations. In 1952 the state's per capita income was about two-thirds of the national figure, the second lowest in the continental United States.⁴ The lack of well-paying jobs contributed to a “brain drain” as many educated young people left the state to find suitable employment. In a speech delivered at a meeting to announce the Research Triangle Park, Governor Luther Hodges observed that “two thirds of these young people trained in science at these three institutions [Duke, North Carolina State, and the University of North Carolina] are forced to leave North Carolina, and indeed the entire South, to find suitable employment.”⁵ A promotional movie produced by the N.C. Department of Commerce in 1954 showed a set of sad parents seeing their child off at a train station while the announcer says: “Every year many of our best educated young people leave to find a living elsewhere. Of all our state's resources these young people are the most valuable and we're still losing them by the thousands.”⁶

During the early 1950s the Raleigh-Durham area, although better off than many other areas of the state, still lagged the country in high-technology employment.⁷ Moreover, the area's population was small. The total population of the Raleigh and Durham metropolitan areas in 1950 was 238,000. Among the major towns Durham was the largest at 71,000, followed by Raleigh at 66,000, and Chapel Hill at 9,000. This meant that the area had “few of the agglomeration and urbanization economies that characterized larger metropolitan regions.”⁸ Airline connections to major business centers, for example, were limited to several East Coast cities.

What the Raleigh-Durham area did have, however, was three major universities and other smaller colleges, and a highly educated workforce. It was these assets that the founders of the RTP seized upon as the basis for the economic transformation of the metropolitan area and the state. The original goals of the RTP were to: (1) "attract industrial research laboratories and facilities" to North Carolina; (2) "increase opportunities of citizens of North Carolina for employment," and (3) "increase the per capita income of the citizens of the State."⁹

By 1954 the idea of capitalizing on the proximity of three major research universities to each other had been discussed but not acted upon.¹⁰ It took a businessman from Greensboro, Romeo Guest, to get the ball rolling. Guest owned a business that catered to the development of new facilities for textile firms moving to the state from New England. As that trend began to wane he sought other development opportunities. He seized on the idea of using the Triangle universities to attract industrial research operations to North Carolina.

Guest began by developing a marketing brochure to lure research facilities to the area and began a series of meetings to promote the idea with representatives of the three universities and state political leaders. Guest is generally credited with coining the phrase "research triangle" to refer to this area. Among the many meetings Guest held were sessions with Malcolm Campbell, dean of the School of Textiles, and William Newell, director of the Textile Research Center, at North Carolina State University, who supported the idea of an industrial park for research and formed a delegation to present the idea to Governor Hodges. The governor requested reports containing an objective assessment of the potential impacts of the idea, which were prepared by Newell and Campbell and provided to the governor in early 1955. After several follow-up meetings, the governor, although not willing to support the idea financially, was willing to use his position to advocate for its creation. He saw the RTP as "the marriage of North Carolina's ideals for higher education and its hopes for material progress."¹¹ His hope was that if research and development facilities could be attracted to the Raleigh-Durham area, production facilities would locate in other parts of the state. This is indeed what happened.

In May 1955 the governor created the Research Triangle Development Council to take the idea to the next level. Robert Hanes, president of Wachovia Bank, was appointed chairman of that committee, which included other prominent business and government leaders. One of the first tasks of this committee was to convince the universities to cooperate in the development effort since it would be their knowledge and staff resources that would be marketed to potential occupants of the RTP. The universities were seen as "providing a wellspring of knowledge and talents for the stimulation and guidance of research by industrial firms."¹² Some university officials, how-

ever, were uncomfortable with the idea of the universities becoming too closely involved in industrial research: "Guest was explaining the Research Triangle idea and how he would sell to companies the talents of the faculty. William Carmichael of the Consolidated University said, 'Let me see Romeo, if I really understand what it is we're talking about here, you want the professors here and all of us to be the prostitutes and you're going to be the pimp.'" ¹³

One idea to bridge the gap between basic university research and industrial research was suggested by Paul Gross, then vice president of Duke University. Early on he argued that it would be important to have a nonprofit research institute associated with the park. This led to the creation of the Research Triangle Institute, which has played an important role in the park's development.

The Research Triangle Development Council also conducted an inventory of university resources and expertise that would be used to market the area to corporations. It identified approximately nine hundred individuals at the three universities who could potentially contribute to the mission of the RTP. ¹⁴ In September 1956, the council was incorporated as the Research Triangle Committee Incorporated, a "non-profit, benevolent, charitable and educational corporation," with Governor Hodges, Brandon Hodges, the State Treasurer, and Robert Hanes as the directors. ¹⁵

One of the first activities of the Research Triangle Committee was to hire an executive director. The committee chose George Simpson, a protégé of the eminent sociologist Howard Odum, and a well-respected UNC-Chapel Hill professor of sociology. The choice of Simpson was a wise one in that it countered the skepticism toward the project held by many university officials. Walter Harper recalled that it "gave assurance to the universities that one of their men was in a position to give guidance to the Philistines." ¹⁶ In January 1957 Simpson presented a plan for moving the RTP project forward. First, he proposed beginning to market the idea to the heads of companies involved in industrial research. Second, he proposed beginning to acquire land and building laboratory buildings for lease. Third, he proposed moving forward on the establishment of a research institute to anchor the park.

The marketing effort began with the development of brochures targeted to several types of industries including pharmaceuticals, chemicals, electronics, ceramics, food, forest products, and textiles. ¹⁷ Simpson also put together a team of faculty members from UNC, Duke, and N.C. State to visit chief executive officers and sell them on the RTP idea. "Simpson assembled one of the most unusual teams of traveling salesman ever seen in business offices," Harper noted. ¹⁸ By the end of 1957, this team had visited over two hundred businesses.

One of the difficulties in marketing the RTP idea was that no specific site had been selected. Simpson and others believed that they needed something

tangible to sell. Simpson commented: "There is great value in having something concrete, something that can be mapped and walked over.... Something tangible stimulates the imagination."¹⁹ Upon studying maps of the area, they focused on an area equidistant from Durham and Raleigh with access to the Southern Railway line and to two highways, N.C. 54 and U.S. 70-A. The area was largely composed of worn-out farmland with "nothing but scrub pine and opossums."²⁰

Simpson also believed that this land purchase would be best handled by a private company: "Someone might care to buy a substantial acreage of land, build a laboratory building or buildings, on the assumption that a profit would be made."²¹ Thus a search for investors began. On the advice of the director of the N.C. Department of Commerce and Development, Governor Hodges contacted Karl Robbins, a retired North Carolina textile mill owner who had moved to New York. He agreed to invest \$1 million in the project and formed Pinelands Incorporated to sell stock. Romeo Guest, who had done business with Robbins in the past, was elected president and treasurer of this new company and Robbins was the chairman of the board and the sole stockholder.

Upon Robbins's commitment, William Maughan, a consulting forester, was hired to quietly begin purchasing options on tracts of land for the park. The goal was a whopping five thousand acres. By the time of the official announcement of the park he had successfully optioned or purchased four thousand acres at an average price of \$175 per acre.²²

In what was to be the first of several significant obstacles to development of the RTP, private investors showed very little interest in buying shares of the company and Robbins began to be concerned that his investment was going down the drain. Albert Link notes, "Robbins wanted North Carolinians to own 49 percent of Pinelands, and as of then, there were no investors."²³ Many of the options on land were coming due and Robbins was not willing to invest additional funds in the company. In addition, "questions of propriety were being raised about the promotion of a privately owned research park by public universities and other state government agencies."²⁴ The solution to both these problems was to make a fundamental shift in the conception of the park and the approach to fund-raising.

In response to the lack of investors, Governor Hodges and Robert Hanes met with Archie Davis, the new head of Wachovia Bank, to ask him to take a lead role in selling Pinelands stock. In that discussion Davis suggested that the fund-raising concept was flawed: "To me, I just felt without knowing anything about it, it just didn't make sense. If this indeed was designed for public service, then it would be much easier to raise money from corporations and institutions and the like, who were interested in serving the State of North Carolina, by making a contribution."²⁵ Davis accepted the task of raising

funds from private and corporate donations rather than investments. In accordance with this change, the Research Triangle Committee became the Research Triangle Foundation (RTF) and the Pinelands Company would operate as a subsidiary of the foundation. On September 10, 1957, Governor Luther Hodges held a news conference to officially announce the creation of the RTP. Former UNC system president Bill Friday recalled: "The new model worked amazingly well. It changed the whole venue. We were in the public arena from that day on. Nobody was making a personal profit. It was the pivotal day, because everyone was either on the team or you had to explain why you weren't."²⁶ Davis began fund-raising in September 1958 and by January of the following year he had raised \$1.425 million for the project.²⁷ It is interesting to note that many of those donations came from outside the Raleigh-Durham area as the "citizenry of North Carolina came forth to invest in the future of the state."²⁸ The funds raised were used to buy out Pinelands stock and transfer land to the RTF and to create the Research Triangle Institute, which was to become one of the first anchor tenants of the park.



Figure 14. Picture of Governor Luther Hodges presiding over a ground breaking in the Research Triangle Park circa 1959 (courtesy of the Southern Historical Collection of the University of North Carolina at Chapel Hill Libraries).

THE ORIGINAL ANCHORS: RESEARCH TRIANGLE INSTITUTE AND CHEMSTRAND

As noted earlier, the idea for creating a nonprofit research institute to anchor the park and to provide an intermediary organization between university and corporate researchers is credited to Paul Gross, the Duke vice president. On January 18, 1957, a committee was formed to assess the feasibility of the idea, and how it would fit into the Research Triangle Park. Robert Hanes appointed Brandon Hodges, business executive and former state treasurer, as the chair

of this committee.

The committee's report presented that May concluded that a research institute was feasible, that it should engage in both basic and applied research as a way to encourage faculty participation, and that it would not require financial support from the universities. Based on the committee's positive assessment, funding to create an institute was added to the Research Triangle Park's fund-raising goals.

In late 1957, Brandon Hodges died and George Watts Hill, board chairman of a local bank, was appointed as the chairman of the Research Triangle Institute Committee and by the end of that year Archie Davis, as part of his overall fund-raising efforts, had collected \$500,000 for the creation of an institute. The Research Triangle Foundation donated land for the creation of RTI and a portion of funds raised was used to construct what was to be named the Robert M. Hanes Memorial Building, after he died in 1959. The Hanes Building was the first of numerous buildings to house RTI's expanding research activities.

With funding in hand, the Research Triangle Committee lost no time in hiring George Herbert, who had served as executive associate director of the Stanford Research Institute, as the first president of RTI, a position he held from December 1957 until he retired in 1989.²⁹ Soon after, Gertrude Cox, a world-renowned statistician, agreed to move her Survey Operations Unit from the University of North Carolina to RTI. Her unit became the first part of "a scientific institution that had no name, no staff, no money, an optimistic but vague mission, and a small, enthusiastic cheering section."³⁰ Yet Cox's move provided credibility to this fledgling effort. Eighteen of the institute's first twenty projects were in statistics.

A \$2.5 million gift from the Camille and Henry Dreyfus Foundation was also instrumental in RTI's success. In late 1958, "after she had inspected RTI's expanse of nothing," Camille Dreyfus, in honor of her late husband, provided the support for basic research in polymer physics and chemistry. A portion of those funds was used to construct a second building on the RTI campus. By the end of 1959 RTI had contract revenues amounting to \$142,000 and a staff of thirty-five. Within three years of its opening, RTI's financial statement showed it had reached the break-even point, and its revenues have grown steadily since.

There is little doubt that RTI played an important role in the success of the RTP. It provided tangible evidence to the world and to potential occupants that the Research Triangle Park was for real and that something was indeed happening out there in those all but empty acres that once were, in Pearson Stewart's phrase, "useful mostly for holding two counties together."³¹ It also has been successful in involving university faculty in research projects on topics as diverse as mass spectrometry, semiconductors, implants for people

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Chemstrand (later purchased by Monsanto) was the other company that acted as an early anchor for the RTP. Headquartered in Decatur, Alabama, this maker of synthetic fibers was interested in building a new research facility. A consultant hired by the company to assist with the site-selection process recommended twenty-one sites for consideration but the RTP was not on that

list. In fact, at the time a Chemstrand employee talked to William Little, UNC-CH professor of chemistry and a member of the original team of professors spearheading the recruiting effort, the company had decided to locate its new facility in Princeton, New Jersey.³²

Undeterred, Little talked up the benefits of the RTP, and a multiuniversity faculty delegation was formed to visit Chemstrand officials in Decatur. The company was impressed by this initiative and the helpfulness and cooperation of local officials. It was also drawn to the RTP by the presence of the three universities, the high quality of life, and the relatively inexpensive cost of living.³³ In October 1959, Chemstrand purchased a hundred acres of land in the RTP and quickly began construction of its new facility. Over the succeeding years Chemstrand's scientists taught courses at both N.C. State and UNC-Chapel Hill, while university faculty members participated in the company's research projects.

THE DOLDRUMS

The early momentum generated by RTI and Chemstrand ground to a halt in the early 1960s. The foundation had gone through its initial funds and risked losing some of the parcels that it had under option. George Watts Hill, now chairman of the RTI Board of Governors, came to the rescue by buying a critical parcel and holding it for almost two years until the RTF had the funds to purchase it from him. RTI also paid local property taxes for some of the property that the RTF was holding for future sale.³⁴

Still, additional funds were needed to purchase land, develop the infrastructure, and pay the staff. According to the vice president for development at that time, "In the early '60s it was touch and go. Archie [Davis] had to go back to his backers and get some more money to keep us going. The second time these were not gifts, these were loans from the insurance companies and banks."³⁵ The only encouraging announcement was in November 1960 when the U.S. Forest Service said it would build a small biological laboratory in the park.

Concerned about the lack of interest in the park among corporate officials, at the beginning of 1962 the RTF decided to open an office in New York City. Although this office may have "planted some seeds among corporate officers" it did not produce tangible results in the form of corporate commitments to move to the park and it was closed at the end of 1963.³⁶

THE TURNING POINT

The pivotal year for the RTP was 1965. It began in January with an announcement by Governor Terry Sanford that the Environmental Health Sciences Center (later the National Institute for Environmental Health Sciences) would be moving to the park. This was a highly sought after plum, with forty-six states

in the competition. The fact that Governor Sanford was one of the first southern politicians to support the candidacy of John Kennedy for president and that former Governor Luther Hodges was the sitting Secretary of Commerce certainly had something to do with this decision. The RTF also donated a 509-acre site, the cost of which was subsequently reimbursed by the state, and constructed eight buildings that were leased to the federal government for this facility.

Following on the heels of the Health Sciences Center announcement, in April 1965 IBM announced that it would open a research facility occupying 600,000 square feet on 400 acres in the park. That announcement was the culmination of seven years of courting by the RTF staff. IBM's announcement was seen as a critical vote of confidence, validating the park's mission and paving the way for the explosive growth that would follow. The sale of land to IBM also allowed the RTF to pay off its debts, and operate in the black for the first time. The executive secretary of the RTP quipped that they had to "send out for some black ink because we'd been operating in the red for so long."³⁷

By the end of the 1960s twenty-one companies had committed to opening research facilities in the park. Of particular note was the arrival of Burroughs Wellcome in 1972, the first pharmaceutical company to join the mix. At this time the RTP area was viewed by many as part of the "old South," so many Burroughs Wellcome employees were not happy about the move. In reflecting on the move, Burroughs Wellcome researcher Gertrude Elion, who in 1988 would be honored with a Nobel Prize for physiology or medicine, said, "We heard rumors that the company might be moving but we never anticipated that it would be any further than Connecticut.... The company did send us down to see what it was like. We didn't see any sign of civilization. We wondered, 'what in the world are we getting into?'"³⁸ The RTP area still had a way to go to impress those who were accustomed to big-city amenities and lifestyles.



Figure 15. IBM building in the late 1960s (courtesy of the Southern Historical Collection of the University of North Carolina at Chapel Hill Libraries).

The early inhabitants of the RTP created a gravitational pull that attracted other companies. During the 1970s, seventeen companies moved to the park. Most notably, in 1971 the Environmental Protection Agency established its largest research facility in the park. To strengthen its relationship with the Triangle's universities, in 1975 the RTF donated 120 acres of land for the creation of the Triangle Universities Center for Advanced Studies Inc. (TUCASI), which provided a site for collaborative university activities within the park. In 1978 the National Humanities Center was attracted to the TUCASI campus, and in subsequent years it became the home to the North Carolina Biotechnology Center, the North Carolina Supercomputing Center, the National Institute of Statistical Sciences, and a variety of other research-oriented organizations.

Growth in the number of companies locating research and development facilities in the park continued during the 1980s. Thirty-two companies or research organizations set up operations there during that period. Many of the companies specialized in microelectronics including Northern Telecom, General Electric, DuPont Electronics, and the Semiconductor Research Corporation, the chip industry's first research consortium. Glaxo, the pharmaceuticals company that evolved into what is now pharmaceuticals giant GlaxoSmithKline, also established a major research facility in the park.

In the 1990s forty-two new companies moved to or established research or manufacturing facilities in the park, including Ericsson, Cisco Systems, Biogen Idec, and Corning BioPro. In a move to accommodate smaller, start-up companies, the RTF also created the First Flight Venture Center, which provides space and technical assistance to start-up businesses, many of which

are spin-offs from university research efforts.

Over the years the park has continued to add to the approximately 4,000 acres originally purchased. As of 2007, the park consisted of 6,971 acres, roughly configured in the shape of a rectangle eight miles north to south and two miles east and west. On that land stands twenty million square feet of buildings, housing 157 firms and other organizations, employing 39,000 people. The largest employers include IBM (10,800 employees), Glaxo-SmithKline (5,000 employees), Cisco (3,400 employees), Nortel (2,800 employees), the Environmental Protection Agency (1,500 employees), and the National Institute of Environmental Health Sciences (1,000 employees). By 2007, the park approached its maximum facility capacity with only 460 undeveloped acres remaining.

THE PHYSICAL LOCATION AND FORM OF THE RTP

The RTP is located in the center of a scalene triangle formed by connecting the three major research universities of the three core municipalities in the area. It is approximately seven miles from central Durham, eleven miles from downtown Chapel Hill, and eighteen miles from the center of Raleigh. The physical form of the RTP is distinct from other research parks in both its overall size and its density of development. The average-sized research park is only six hundred acres, half of which is developed with buildings and other infrastructure.³⁹ RTP started with a four-thousand-acre site and as time went by it was expanded to nearly seven thousand acres. Why was so much land required?

One explanation is that the park's designers wanted to "preserve the balance and beauty of the land."⁴⁰ Hired in 1958 to oversee the planning of the park, Pearson Stewart, an MIT-trained professional planner, surveyed the property and identified three prominent north-south ridges: "We built our plan based on that knowledge.... The tops of the ridges are good building sites, the bottoms are poor building sites. The sewer mains went down the valleys."⁴¹

Stewart and his colleagues took the "park" idea seriously. During the late 1950s and early 1960s Americans were moving to the suburbs and "company executives loved the idea of providing their employees with a similar work environment."⁴² Those same executives were also interested in keeping their employees from fraternizing with the competition, and large corporate campuses with on-site eating facilities served that purpose well. When asked about this, Stewart replied, "No question. That was not hidden at all. They didn't want their people talking to other workers."⁴³

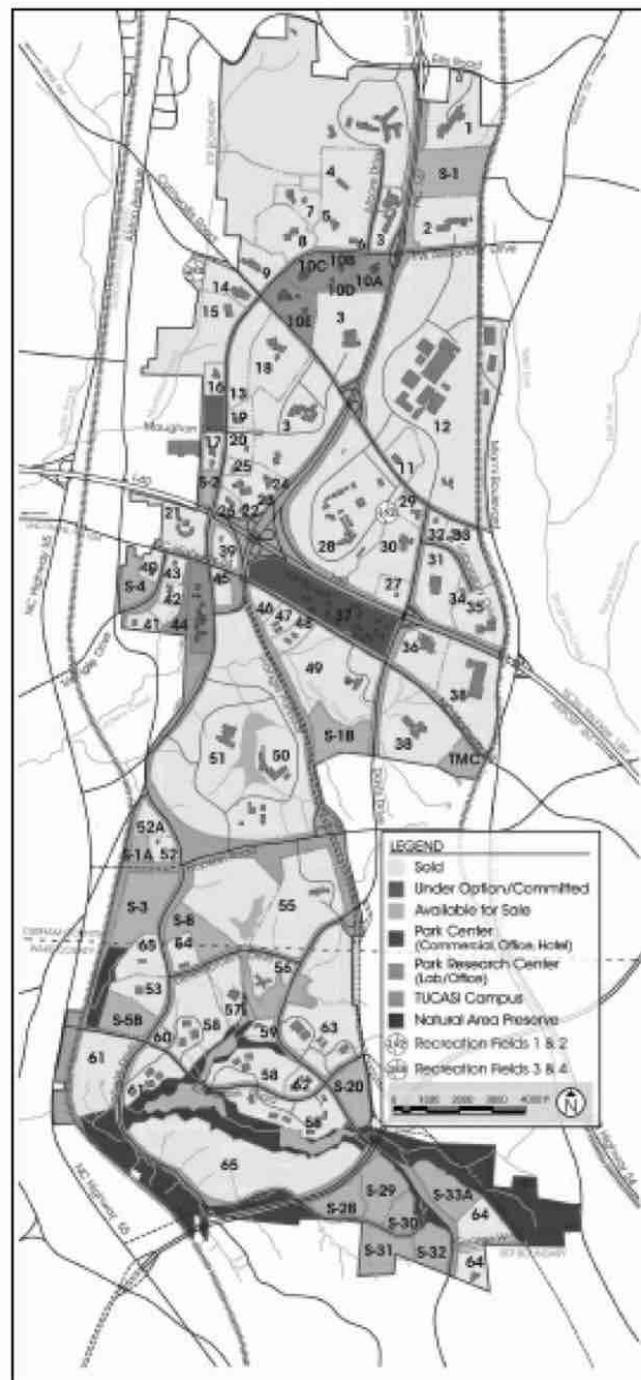


Figure 16. The low-density, seven-thousand-acre Research Triangle Park in 2009 (courtesy of the Research Triangle Foundation).

For these reasons the original zoning provisions approved in January 1960 established an eight-acre minimum lot size and required that buildings be set back at least 150 feet from the road and 100 feet from the side and back property lines. They also limited building coverage to a mere 5 percent of each tract, although after RTP lost a prospective company, this was changed to 15 percent, where it remains today. In addition, all site improvements, including

buildings, access roads, and storage areas, are limited to 30 percent of the site, which means that 70 percent of each site is left in its natural state. Thus, the park's buildings and parking are hidden from the view of passers-by and most park employees look out on large stands of loblolly pines. Companies also commonly offer an opportunity for on-site recreation in the form of exercise courses, running paths, and pedestrian greenways.

The homogeneity of land use in the park is another one of its distinct features. An early plan developed by consultant Robert Anderson included a residential area within the park but this was quickly dropped. As Pearson Stewart explains, “[Residential development] didn't get any further than Bob Anderson's initial plan. That was a conscious decision. We thought we could make a research triangle park, with research facilities, but that's all we have the money to do. So [we thought we would] let the residential areas go to the three cities. They know how to do that and we don't. So we won't try. At the time there was no thinking at mixing [types of land use] at all, just the reverse.”⁴⁴ Thus, the park's covenants do not permit residential development and the legislation creating the park's special tax district also limits residential development.

The park's planners did, however, see some need for commercial services, since the surrounding area had little to offer. The nearest hotels were located in the three towns and park employees had to drive miles just to get to fast food outlets. Yet only two acres of land were set aside for a commercial services center, which once developed included a hotel, post office, several branch banks, and rental office space.

IMPACT OF THE PARK

The RTP has had profound impact on the growth and development of the metropolitan area. First and foremost, the RTP provided the area with a name and an identity. As discussed in [Chapter 1](#), Raleigh, Durham, and Chapel Hill had little in common and poor transportation links greatly limited the extent of commuting among them. The success of the RTP helped change all that.

The RTP created an overarching image of the Triangle as one of the nation's high-technology hot spots. It created a “global brand that has built the reputation of the region and state as one of the leading areas for high-technology innovation.”⁴⁵ It has put the area “on the map” as a place with a substantial concentration of research and development activity.⁴⁶ Liz Rooks indicated the extent of this reputation: “We had one company that located here and their CEO was making a speech in Japan and said that he was moving his company to North Carolina and [someone in the audience] said, ‘Oh yes, we know that. It's in Research Triangle Park.’”⁴⁷ Clearly, the RTP was instrumental in creating an image of the three towns and the surrounding area as one that is on the forefront of science and technology, ripe with opportunity for both es-

established businesses and entrepreneurs. It began to forge a common identity among area residents.

Studies of the impact of the RTP show that it has been successful in attracting high-technology firms, not only to the RTP but to the larger metropolitan area: "Before the Park was established, fewer than 15 percent of the businesses in the three counties surrounding the Park—Orange, Wake, and Durham—were in what was defined as 'New-line' industries. This included businesses involved in chemical, electronics, communication, business services, educational services, and engineering and management services. As more companies came to the Park and created other benefits, the share of new-line industries increased. By 1966, nearly 30 percent of businesses in the three counties were in new-line industries, by 1995, nearly 47 percent were new-line and by 2005, the percentage had reached 51 percent."⁴⁸ Other evidence of the impact of the park on the regional economy comes from a 1988 survey of firms in the RTP, in which 47 percent said they would not have located in the Raleigh-Durham area if it were not for the existence of the RTP.⁴⁹ Together those firms employed almost nineteen thousand workers. An additional 16 percent of high-technology businesses outside the park in the region would not have located in the region if the park had not existed. Counting all jobs resulting from the RTP, including those generated by the expenditures of park businesses and employees in the region, the RTP was responsible for fifty-two thousand jobs, which represents 24 percent of the total increase in nongovernmental employment in the region between 1959 and 1988. If this study were to be repeated today the figures would undoubtedly be considerably higher.

The RTP has also helped to increase the per capita income in the Research Triangle area. In 1960 the area's per capita income was 93 percent of the national figure. By 1987 it had climbed to 107 percent and by 2008 it was within one percentage point of the national figure.⁵⁰ Although there may be other reasons as well for this increase, it is safe to say that the high-paying jobs attracted to the area by the presence of the RTP played an important part. As of 2005 the average salary of all park employees was \$56,000 per year, although the average salaries being paid by some of the newer additions to the park top \$80,000.⁵¹ This increased income and spending power, in turn, has helped expand the range of goods and services available in the Triangle region.

The existence and support of the Triangle's three major research universities have been instrumental to the success of the RTP. The RTP has returned the favor in a variety of ways. RTP companies have, for example, hired many university students, with both undergraduate and graduate degrees. In 1998, approximately one-quarter of all new professional employees hired by park firms came from Duke, N.C. State, or UNC-Chapel Hill.⁵² In addition, many RTP scientists have contributed to the universities' teaching missions by serving as adjunct faculty, teaching classes, and serving on doctoral committees.

The universities have also benefited from collaborations with RTP firms in developing state-of-the-art laboratories, as when Glaxo paid in the late 1980s for the renovation of chemistry labs at UNC-Chapel Hill. University faculty members and RTP scientists have teamed up to conduct numerous research projects, which have led to important scientific advancements. Moreover, TUCASI has been used, Rooks noted, “as a way of funneling funds to projects that all three universities have agreed on. [For example,] we computerized the library systems and interconnected them so researchers out here in the park or the universities have access to the combined collection. And since they have been coordinating their collections since the 1930s, there's very little duplication among them so it makes the library system, when you add it together, I think second only to Harvard. That was a big deal.”⁵³

RTP firms and their employees have also contributed to local communities in a variety of ways including making major contributions to arts organizations, local schools, health and social service organizations, and civic projects. In summarizing interviews conducted with a variety of civic leaders, Hammer, Siler, George Associates suggest that “many of those interviewed commended the role of RTP entities and their employees in strengthening the community fabric and quality of life. Several companies have adopted public schools, donated computer and other equipment, contributed generously to major civic projects, supported educational initiatives and encouraged their employees to become involved in their communities and the central city problems.”⁵⁴ IBM alone reports that in 2004 its employees spent over fifty thousand hours volunteering and the company donated \$7 million to schools and other civic institutions.

The RTP has also had an important impact on the urban spatial structure of the Triangle. The RTP has transformed the land it occupies from “the outskirts of town to the center of everything.”⁵⁵ Many of the highways built in the area over the last forty years have been designed to provide better access to the park, which has drawn development toward the center of the region rather than to the periphery. Although it took time for the road, water, and sewer infrastructure to be extended from the surrounding communities into the rural area surrounding the park, once it was the area developed rapidly. As of mid-2007, thirteen million square feet of office, commercial, and industrial development and more than 40,550 housing units were within four miles of the park.⁵⁶

THE FUTURE OF THE RTP

By 2007 when the RTP celebrated its fiftieth birthday, it had grown from an audacious idea to an internationally recognized cluster of knowledge-intensive businesses. But how might the RTP fare in the future given the dramatic changes taking place in the worlds of business and work? Will the RTP's suburban business park model continue to attract leading-edge businesses and

professionals?

The RTP was designed in the 1950s to accommodate large companies interested in protecting corporate secrets by sequestering employees on large self-contained campuses and in providing their employees with a bucolic setting in which to work. More recent trends, at least in selected knowledge-based businesses, have shifted toward encouraging more interaction and collaboration among employees of different companies, and providing them with dense, diverse, and vibrant environments in which to both work and live: "The employees and human resources that are the foundation of the knowledge-based companies and activities that are the core of the RTP are changing. Today's researchers and scientists seek work environments that provide more opportunities for interaction in a variety of activities and settings."⁵⁷ Clearly the RTP campus does not offer such variety.

At the same time competition for leading-edge businesses has been heating up. According to Rick Weddle, president and CEO of the Research Triangle Foundation, regions such as those surrounding Philadelphia, Phoenix, and Chicago "have made focused investments in the biotechnology/life sciences clusters to try to better their competitive positions in those areas. Similarly, governments in Asia and Europe are expending substantial resources to build science cities to jump start innovative and entrepreneurial activity. These initiatives are investments that have helped these regions close the gap on the park's lead."⁵⁸ Many more regions around the world are competing for the knowledge-intensive businesses that have been the mainstay of the RTP.

These trends have not been lost on RTP's leadership. To better understand those trends and how to respond to them the RTF asked both IBM and the Urban Land Institute (ULI) to conduct studies and offer recommendations on reinventing the park. The IBM study concluded that the park needed to strengthen its ties between its companies and both government and academia. It also suggested positioning the park to take advantage of emerging industries (such as nanomaterials, nanorobotics, computational medicine, biodefense, and green technology) so that it would have a first-mover advantage in recruiting related companies to the park.⁵⁹

For its part, the ULI advisory panel report presented a variety of ideas for the physical transformation of the park. It called for the creation of a sense of place by introducing "residential, high-density office, civic, special purpose and recreational uses."⁶⁰ It also recommended the development of a series of urban villages and of an "iconic structure such as a monorail to the airport, a tower sculpture or a global market place to help brand and advertise the RTP."⁶¹

It is uncertain, however, whether these recommendations will be acted upon, as to do so would require major changes to the park's covenants, its zoning laws, and the state legislation that created it.⁶² In addition, some of the

park's companies work with hazardous chemicals, nuclear materials, and biological agents that are best distanced from residential and commercial development. As Rooks observed, "You have to be very careful that you don't create an atmosphere that makes it impossible for these companies to do what they came here to do."⁶³ In the short term the RTF has been redeveloping its small "service center" and supporting the development of higher-density, mixed-use developments immediately adjacent to the park.⁶⁴

RALEIGH - DURHAM INTERNATIONAL AIRPORT

Critical to the economic development of any metropolitan area is a modern airport offering nonstop service to a variety of locations. The airports serving most metropolitan areas are located on the periphery, often twenty to thirty miles from their downtowns. Raleigh-Durham International Airport (RDU), however, is conveniently located in the heart of the metro, immediately adjacent to the Research Triangle Park and within eleven miles of both downtown Raleigh and downtown Durham and seventeen miles from downtown Chapel Hill. How did this unusual placement come to be?

The first regularly scheduled commercial airline service to the area began in 1931, when Eastern Air Transport (later Eastern Airlines) began regularly scheduled flights to Curtiss Field, located on the south side of Raleigh.⁶⁵ By the late 1930s Eastern Airlines' president, Eddie Rickenbacker, was promoting civil airports around the country. He was particularly interested in the development of a new modern airport in the Raleigh-Durham area to serve as a stopover for Eastern flights from New York to Miami.⁶⁶ Through newspaper ads and other means he urged the counties of Wake and Durham and the cities of Raleigh and Durham to partner in the development of such an airport: "Do not allow civic jealousies or selfish motives to creep into a project that means so much to all of you."⁶⁷ Following this advice the N.C. General Assembly chartered the Raleigh-Durham Aeronautical Authority, later renamed the Raleigh-Durham Airport Authority, to build and operate a new airport convenient to both Raleigh and Durham. The authority was composed of representatives from Raleigh, Durham, and Wake and Durham counties. This was the first major example of regional cooperation in the Triangle.

In 1940, on the advice of the Civil Aeronautics Administration, the authority bought 890 acres of land in western Wake County equidistant between Raleigh and Durham.⁶⁸ As the airfield was being constructed, however, the military took it over to train pilots for World War II. Thus, in 1942 the authority leased the airport site to the U.S. government and the Army Corps of Engineers assumed the responsibility for developing it for military use. The U.S. government also purchased an additional thousand acres adjacent to the Raleigh-Durham Army Air Field to be used as a camp.⁶⁹ Once the airfield was opened the Airport Authority persuaded the military to allow commercial airline service and Eastern Airlines moved its existing service there. After the

war the U.S. government turned the airport, including the camp and all the site improvements, over to the Airport Authority. Soon thereafter other airlines, including Capital Airlines (later renamed United Airlines) and Piedmont Airlines, began to provide airline service at the renamed Raleigh-Durham Airport. During the early years of operation, the army mess and barracks building was used as the terminal. The first permanent terminal building opened in 1955, about the time the plans for creating the Research Triangle Park were being made.

As the area grew so did the need for continual expansion and improvement of the airport. The original modest, single-story terminal was expanded in the 1970s and a new terminal, originally called Terminal B, was added in 1981.⁷⁰ Several years later American Airlines selected RDU as a new East Coast hub and it contracted with the authority to build a new terminal and a new runway for this purpose. What became known as Terminal C was opened in June 1987. Soon after, American introduced the first nonstop international flights to Paris, Bermuda, and Cancun and the RDU Airport became the RDU International Airport. At its peak American's hub served millions of passengers a year.

The success of this hub and the jobs it brought to the Triangle, however, were short-lived. The acquisition of other routes, competition from airline hubs in Charlotte and Atlanta, and changes in the airline industry led American to begin downsizing its RDU hub and to close it in 1996. The vacuum created by American's departure was filled over the next several years by a variety of other carriers including Southwest, America West, Metro Jet, Northwest, and Continental. Thus, the passenger numbers rebounded over the next several years. In the late 1990s the demand was such that eighteen new gates were added to Terminal 1. In calendar year 2000 RDU exceeded ten million passenger trips, its highest number to date.⁷¹



Figure 17. The Raleigh-Durham Airport terminal circa 1956. Two terminals have been added and one of those has been replaced (courtesy of the Southern Historical Collection of the University of North Carolina at Chapel Hill Libraries).

In 2003 the RDU Airport Authority announced plans to renovate Terminal C, which was designed as a hub and lacked sufficient check-in, baggage check, and passenger screening areas. Three years later, however, the authority decided instead to replace the existing terminal of three hundred thousand square feet with a new terminal of nine hundred thousand square feet with thirty-six gates. Key design elements include a rolling roof inspired by the landscape of central North Carolina, exposed wooden roof trusses representing the area's heritage, and carpet patterns of DNA sequences alluding to RTP research.⁷² The first half of the new Terminal 2 was opened in October 2008, and the building opened in January 2011 in time for the National Hockey League All-Star Game. Now the authority is turning its attention to the redevelopment of Terminal 1.

As the terminal capacity has expanded so has the total land area of the airport and the number of parking spaces. As of 2010, RUD Airport covered fifty-one hundred acres. It has 11,700 public parking spaces in the terminal area, most of which are located in a seven-story parking deck between the two terminals. An additional ninety-seven hundred park-and-ride spaces are also available. An economic impact study commissioned by the Airport Authority in 2006 found that the airport has a \$1.2 billion annual impact on the area's economy.⁷³

As of 2010, the airport has approximately 350 daily departures and arrivals with nonstop service to thirty-four destinations. Its passenger count for 2008 was over nine million, 95 percent of which were nonconnecting.⁷⁴

RDU does not compare well, however, to airports in major competitor cities on the number of nonstop flights to the West Coast and the number of international flights. Before Delta introduced a nonstop flight to Los Angeles in June 2010 there were no direct flights to West Coast cities. The two international nonstop flights are American's service to London's Heathrow and an Air Canada flight to Toronto. The Triangle metro is still not large enough to support expanding those flights. This undoubtedly discourages companies and residents who regularly fly to West Coast and international destinations from moving to the area.

INTERSTATE 40

As mentioned earlier, when the RTP was created its road access was limited to one two-lane, north-south road and one two-lane, east-west road. If the area was to grow and prosper, its highway infrastructure had to be improved. The development of Interstate 40 through the Triangle was the key project that linked Triangle towns and cities with the RTP.

Interstate 40 is often referred to as the Triangle's Main Street since it connects most of the principal cities and towns in the area. This major artery snakes through the middle of the Triangle connecting Mebane in western Orange County to Hillsborough, Chapel Hill, Durham, Raleigh, and on to Benson in eastern Johnston County where it crosses I-95 on its way to Wilmington. Its importance is evident in the amount of traffic it accommodates and the number of times it has been expanded since it was originally constructed. It has also spurred urban sprawl as it has enabled people to live in locations far from where they work.

I-40 is one of the country's original interstate highways authorized in the 1956 Federal Aid Highway Act. The original plan for I-40 called for its eastern terminus to be at Greensboro, where it would merge with I-85.⁷⁵ This left Raleigh, to the chagrin of its business community, as one of only six state capitals not to be served by the interstate system. During the early discussions of interstate routes the state "sat on the sidelines" focusing on improving its secondary road system. Its head highway engineer, Vance Baise, said that he "did not feel justified in improving any part of the system [with state funds] except as traffic needs require."⁷⁶

It was not until much later that North Carolina applied for approval to extend I-40 from Greensboro to I-95 at Benson, skirting the south side of Raleigh. When the first phase of the extension—from RTP to the Raleigh Beltline—opened in 1973, RTP was at last accessible via a four-lane highway and Raleigh could be dropped from the list of state capitals without interstate access. It would take another twelve years, however, before I-40 was completed around the southern side of Raleigh and east to I-95.



Figure 18. Traffic congestion on I-40 in 2010 (photo by author).

The extension of I-40 westward from the RTP also took many years. It was not until 1987 that it reached Chapel Hill.⁷⁷ During those years it was not uncommon to see bumper stickers around Chapel Hill that read “Pray for me. I drive 54” (referring to the narrow, curvy two-lane road connecting Chapel Hill with the RTP). The westward expansion was completed in 1988 when I-40 was connected to I-85 southwest of Hillsborough where it joins with I-85 until the roads separate again near Greensboro. In 1990, I-40 was completed to its eastern terminus in Wilmington, where a sign on the westbound side of the highway reads “Barstow, California 2,554 miles.”

Even before I-40 was completed through the Triangle, lanes were being added to various sections. Currently, sections of I-40 in the heart of the Triangle have eight lanes while most have at least six, with more lanes being added. As is often the case, these newer lanes have offered only temporary fixes. They have encouraged additional auto-dependent development, which filled up the new lanes. Thus, I-40 is often congested, leading to frustrated and disgruntled commuters. The state Department of Transportation (DOT) has studied the use of carpool and bus lanes but the road is not conducive to them due to its frequent interchanges. Many believe that the only real solution to accommodating more growth in the Triangle is to develop a light rail system, which is discussed in [Chapter 5](#).

CONCLUSION

By 1980 the success of the RTP had created thousands of new jobs in the center of the Triangle and the expansion of the RDU Airport along with the construction of I-40 provided access to those jobs. By this time the population in the Raleigh-Durham-Chapel Hill MSA had grown to 531,000 residents.⁷⁸ Col-

lectively the changes in the area were sufficient for the U.S. Census Bureau to combine the Raleigh and Durham metropolitan areas into a single Raleigh-Durham metropolitan area. Thus, one might say that 1980 is the official beginning of the Research Triangle metro.

The physical form of the Research Triangle metro, with its low-density core, is certainly one of its distinctive features. Also distinct, however, is the intentionality behind its creation. The RTP, the key ingredient in creating the metro, was the result of a public-private effort to address a perceived problem (limited opportunities for high-wage employment), by identifying the area's main assets (the universities and the relatively high quality of life), and marketing those assets to key businesses.

This is not to say that the developers of the RTP did not benefit from good timing and good location. They certainly did. But this should not take away from an appreciation of their creativity and their tenacity. Archie Davis's counterintuitive idea that what couldn't be raised through investments could be raised through donations was nothing short of brilliant, as was the idea to create a nonprofit research company, RTI, to act as anchor of the park. The tenacity of the founders was evident in their sticking with the effort before IBM committed to opening operations in the park. It is hard to think of another metro area in the country that was the result of a more intentional and successful public-private development strategy.

RTP's success in attracting large numbers of firms and employees to the area, however, has had a downside. As with other rapidly growing areas, Triangle communities have had great difficulty keeping up with road and school construction, and other infrastructure needed to accommodate growth. More will be said about these challenges in [Chapter 3](#).