Land Use

Buildings for Biotechnology Firms

The buildings and workspaces used by biotech companies reflect the diversity of their operations and products. The industry uses the three major commercial building types: office, flex, and industrial. However, this does not mean that every biotech firm can easily locate in any type of building. Some really need the physical flexibility of flex buildings to accommodate labs, and others, in the information end of the industry, use computers more than test tubes and are better housed in traditional office buildings. Industrial or warehouse buildings are used for storage, shipping, raising lab animals, and are occasionally converted to lab space. To some extent all these commercial buildings are blank slates, especially if the whole building is under the control of the biotech firm. The building can be stripped to an empty shell between floors and all utility lines, ductwork, and special fixtures can be configured in a wide variety of combinations. The only immutable factor in typical multi-story office buildings is the slab-to-slab ceiling height.

Both powerful computers and petri dishes represent the biotechnology industry and many biotech firms use office space. "Searches for compounds that bind to and have the desired effect on drug targets still take place mainly in a biochemist's traditional 'wet' lab, where evaluations for activity, toxicity, and absorption can take years. But with new bioinformatics tools and growing amounts of data on protein structures and biomolecular pathways, some researchers say, this aspect of drug development will also shift to computers, in what they term 'in-silico' biology."[15] Since DNA codes are information, some bioinformatics firms use computers as their main tools and have little if any lab space. These firms primarily use office buildings, and almost as many Montgomery County biotech firms are in office buildings as are in flex buildings. Statistical research firms are another type of biotech industry firm found in office buildings.

Many biotech companies do grow organisms and study the expression of their genes in wet labs, which are most easily constructed in one- or two-story flex buildings. Flex buildings, as their name implies, offer great flexibility and are often fitted out with only a relatively small portion as office space and the remainder in labs or production areas. Flex and industrial buildings offer the most flexibility in fitting out because of high ceilings, loading docks, large doors, and heavy-duty floors. As biotech firms expand, they need to find new and larger working space every few years. For the many firms that use wet lab space this is often a formidable challenge.

Use of Buildings by Type

We matched the County's biotech firms with building type using our CoStar database of 1,300

15 Ken Howard

commercial buildings and other sources. We identified 91 commercial buildings used by 152 of the 198 County biotech firms. Flex buildings, office buildings up to 14 stories, and industrial warehouses are all used. Seventy-four of the firms in commercial buildings, (49 percent) are in flex buildings, 68 (45 percent) are in office buildings, and nine (6 percent) are in industrial/warehouse buildings. Twenty-five companies are based in single-family houses or apartments. Of the firms in office buildings, 71% are in buildings with fewer than five stories.

In all areas where biotech firms are located, including the greater Shady Grove area (outside the Shady Grove Life Sciences Center), they are dispersed among, and outnumbered by, firms in other industries.

The 35 firms covered in our interviews used the different building types in about the same proportions as the County biotech industry as a whole. Nearly one-half of the respondents occupied flex space in buildings. Somewhat less than one-third of them occupied space in office buildings, and about 10 percent of them were located in industrial/warehouse type buildings. Several of the interviewed firms have expanded their space over the past five years, a reflection of the remarkably fast growth rate in this industry. In fact, the industry has grown so fast in recent years that prime existing space has become quite scarce.

Leasing Versus Owning Buildings

Most biotech firms find that leasing their space is a more attractive option than owning a building. Ninety percent of the companies interviewed leased their space. This makes sense in this rapidly evolving industry where firms are rapidly growing and need the increased nimbleness of leasing versus owning. Owning may make sense for a maturing company, large enough to occupy an entire building, with a need for maximum flexibility in modifying its space.

Wet Lab Space

Appropriate wet lab space is hard to find in this expanding industry. While office space has an extensive market of potential users and is relatively easy and inexpensive to renovate and reconfigure for the next user, wet lab space is expensive, each wet lab configuration is unique and succeeding users may have to do extensive refitting and adaptation. Most companies that require wet lab space in this rapidly changing industry struggle to find and fund the lab facilities they need when they need them. Only the rare biotech companies that have the combined luxuries of a long planning horizon and adequate financing can easily secure the space they need.
This shortage of wet lab supply has several roots.

- The rapid expansion of the industry means that the amount of lab space needed is always increasing.

- Wet lab space is extremely expensive relative to other types of space. Costs of finishing and equipping a wet lab range from $100 to $150 per square foot for typical lab space[16] and up to $1,200 for highly specialized space such as clean rooms. This compares to about $15 per square foot for average low-rise office interior finish.[17]

- The financing of this wet lab space is risky because of the high cost, the long time before profitability in developing new drugs, and the risk of failure of the firm. Many traditional institutional lenders that finance other commercial real estate projects are not interested in this type of project because it does not meet their risk standards. Venture capital must be found and several investors usually share the risk of a single project. Therefore wet lab space is not yet built on speculation and biotech firms needing new space must either hunt for the rare space vacated by a previous user, modify an existing commercial building, or have new space built. [18]

- The commercial space that competes with biotech lab space is also in strong demand in today's expanding economy. Standard office and flex space for other industries have broader markets and are easier to bring from empty shell condition to ready-to-occupy by providing common finishing elements such as paint, carpet, lighting, and partition walls. Many builders and agents would prefer to take the easier path and lease to non-biotech firms to take advantage of this broader market demand.

While most lab-using firms are located in one or two-story flex space that is most easily adapted to intensive wet lab use, others have adapted office and warehouse buildings to lab space by greatly augmenting the ventilation and other utility systems. The massive amounts of wiring, pipes, and ductwork that these utilities require makes good use of the high ceilings in most industrial and flex buildings. Converting an existing office building with only nine to ten feet of slab-to-slab height to intensive wet lab use, while possible in some instances, is challenging and expensive. Although multistory buildings can be used for wet labs this is much easier to accomplish if they are designed for this use from the beginning.

The lack of appropriate flex space that could readily be outfitted with labs was the most common real estate problem mentioned by interview respondents. Of the 13 companies in the survey that had either recently moved into their present quarters, were currently constructing new space or exploring opportunities for relocating, seven either had experienced or were experiencing considerable difficulty in locating appropriate space. This anecdotal evidence was corroborated by Kenneth Berkman, a Vice President of the Biotechnology Group of Scheer Partners, Inc., the leading leasing agency for biotechnology space in the Montgomery County area. He indicated in a phone interview,

16 Dana Hedgpeth, "At a Loss for Laboratory Space," *Washington Post*, Washington Business, March 6, 2000, pages 18-21
17 R.S. Means, Square Foot Costs, 1999.
18 Patricia L. Larrabee, Director Biotechnology Services Group, Scheer Partners Inc., interview March 22, 2000

that the market for Class A and B flex space in the less than 150,000 square feet category was extremely tight, with space under 5,000 square feet almost impossible to find. In addition, Berkman was recently quoted in the press as asserting that "there is approximately 500,000 square feet of pent-up demand, with less than 100,000 square feet available, most of which is functionally obsolescent and in need of substantial investment to meet current needs."[19]

When asked if this situation had eased in the past few months, Berkman responded that there is still less than 100,000 square feet of available flex space that has been outfitted with labs in the County. The sizes of the four available spaces were generally in the less than 15,000 sq. ft. range. He speculated that the vacancy rate for this type of space might be in the 2 to 3 % range. The July 2000 vacancy rate for all flex space is 7.1% Countywide and 6.9% in the I-270 corridor, according to CoStar data. He also noted that some of this space, which was built more than 15 years ago, might be functionally obsolete. In any event, the space that has already been outfitted with laboratories would generally be more attractive to biotechnology firms, given the extremely high costs of modifying existing space, as noted above.

The relatively high costs of building lab space for the biotechnology industry, the highly risky nature of the business and limited the access to external sources of private capital, have combined to discourage developers from entering this market. Richmond Farren, a Vice President with Manekin Corporation, which has formed a strategic alliance with Minkoff Development Corporation to market and develop the Seneca Meadows Corporate Center, provided a good insight into the developer=s perspective in the course of a phone conversation. Seneca Meadows Corporate Center is a 156-acre tract of land along the east side of I-270 between Route 27 and Route 118, which is zoned I-1 for light industrial use including research and development. The developers have received approval to construct 1.66 million square feet in one- to four-story buildings on this prime site. The first phase of this three-phase development calls for the construction of about 300,000 square feet in two-story buildings. Three buildings, totaling 130,000 square feet of flex and office/retail space, were scheduled for completion in July 2000. The developer will proceed with further speculative buildings as previous ones reach 50 percent leasing.

Mr. Farren indicated that the focus of the site would be on the information technology and prototype light manufacturing industries rather than the biotech industry. A major reason is the considerably smaller cost of fitting out space for the infotech industry, which is expected to approximate $25 per square foot, a small fraction of the cost of fitting out biotech labs. Farren indicated that most developers would be reluctant to finance the bulk of these high fit out costs because of the very risky nature of the biotechnology industry, in which companies are confronted with high front-end costs and a long interval preceding profitability. If the tenant is unable to sustain rent payments, the developer may stand to lose a substantial share of its huge investment in a highly specialized facility, which could require

[19] MdBioNotes, Facilities Roundtable: Advance Planning is Key to Successful Expansion,@

substantial additional modifications to attract another tenant.

The costs of fitting up laboratory space for biotechnology firms can deter some building owners and brokers from seeking them as tenants. In this emerging field, the complexity and high costs of installing special air handling equipment, extensive plumbing, and upgraded electrical service can be a daunting challenge. This is probably similar to the challenge faced by new electronic manufacturing firms and real estate interests in Silicon Valley twenty-five years ago. Many would prefer to keep their business simpler and rent to firms in other industries, with simpler requirements. However, some real estate leasing agents are expanding their business by mastering the complexities of fulfilling these requirements. Scheer Partners Biotech Services Group is one broker who has taken on the challenge of the expansion of the biotechnology industry and provides many services to help firms find, equip, finance and operate the space they need. As the industry grows and the requirements and rewards are better understood, more brokers will probably provide similar services. These services help young biotechnology firms meet their complex needs for space. Of the 91 buildings in the CoStar database which house biotech firms, Scheer Partners is the leasing agent for ten, housing fifteen biotech firms.

Most of the 13 companies that had either recently expanded their space or were currently exploring their options for doing so preferred to lease existing space as opposed to building a new facility. In this rapidly evolving industry, leasing gives more flexibility than owning. The build-to-suit option doesn't appear to be a viable one for the small- and medium-size firms participating in the survey because of the high construction costs involved and the small amount of space that they need. As noted above, most of these companies experienced problems in locating appropriate space, most often in the 25,000-50,000 square foot range, but also smaller space. The companies that did not have this problem were generally seeking space in excess of 50,000 square feet. The ones building new facilities did not complain about a lack of suitable vacant land at a reasonable price in a convenient location in the County, with only one exception. This company was leaning toward relocating in Frederick County because of the availability of large and relatively cheap lots there.

Recommendation

Since finding appropriate wet lab space is a major constraint facing new and growing biotech firms, assistance with fitting out of these spaces might be an appropriate focus for incentives for this industry. Such assistance might take the form of loan guarantees to reduce the risks associated with financing these expensive spaces.

Needs of Startup and Expanding Firms

Almost all new biotech companies face years of development before revenues equal costs. During this period they depend on their investors to keep them operating. A major hurdle in starting a company that does laboratory research is the extremely high cost of outfitting a laboratory. Fully equipped research and development laboratory space will typically cost $100 to $150 per square foot

to equip. Therefore, with a minimum requirement of approximately 500 square feet, the equipment can cost about $75,000. Essential items are centrifuges, autoclaves, freezers, specialized HVAC systems for fresh air supply, and elaborate exhaust systems for fume hoods. A minimum height of 14 feet (20 feet is most desirable) is required to assure sufficient space for cables and air ducts. One-story buildings are therefore best for ventilation purposes. In the case of multi-story buildings, high floor load capacity is important because of the weight of some of the essential equipment. These facilities also tend to be heavy users of electric power and are very sensitive to fluctuations in the power supply. Utility costs consequently tend to be quite high. One factor that goes in favor of the startup firm is that the highest standards for space and equipment are not required for the earliest stages of drug development. The standards increase through successive stages of clinical trials and as the manufacturing stage is reached. Thus a company has time to demonstrate its concept and attract backers before its highest costs for equipping a lab are encountered.

Most of the smallest commercial spaces available in the leasing market tend to be larger than are needed by startup biotechnology firms seeking lab space; several mentioned 1,000 square feet as a desirable startup size. Among the 61 of 206 flex buildings in the I-270 Corridor, which listed their smallest available space, spaces ranged from 400 square feet to 50,000 square feet. Only a few were near the desired 1,000 square feet. Twelve were available at or below 1,500 square feet. Fifty percent of the spaces were 4,500 square feet or smaller and the average of the smallest available spaces is 5,800 square feet.

Randall Kincaid, who formed Veritas, a biotech R & D firm located in Rockville, in 1995, explained the difficulties in starting these companies. Mr. Kincaid is a well-known lecturer in the biotechnology community in the metropolitan area and has been quoted in the local press. He indicated that an entrepreneur generally has three options for starting a business. He or she can rent space in an appropriate lab type facility, share space with an existing company, or move into an incubator. Kincaid was discouraged from renting lab space by the high costs, which range between $15 and $18 per square foot annually for the shell space plus the amortized cost of fitting out the space, the bulk of which is often financed by the tenant. This rent payment does not include the cost of utilities, taxes, and maintenance, which can easily add $5 to $6 per square foot. Kincaid found that a minimum of 3,000 square feet was available (far exceeding his own need for about 1,000 sq. ft.), with a minimum lease term of two years. He estimated the total cost over a two-year period at $120,000, including fitting out costs.

Kincaid also explored the second option, but concluded that problems of autonomy and control would overwhelm the cost savings from sharing space with an existing company. He also explored locating in a state-owned incubator, but found that the capital requirements were too high. He concluded that this facility was designed for people with adequate sources of outside financing. He was not prepared to sacrifice the control of his company that would be required in order for him to attract outside financing. Instead, he decided to rent an empty bay in a nearby warehouse and equip it with used equipment. The rent amounted to less than one-half that for comparably equipped lab space in a

flex-type building.

In the mid-1990s, Montgomery County officials recognized the growing need of start-up or early stage biotech companies to obtain lab space and outside financial assistance. To that end, the County created the Maryland Technology Development Center (MTDC) and started two financial assistance funds. As previously discussed, MTDC is a 50,000 square foot incubator that opened in January 1999 and is located in the Shady Grove Life Sciences Center. MTDC contains 24 modular wet labs fully fitted with work and lab benches, sinks and fume hoods. One of the 20 large labs (800 sq. ft.) is used to house shared equipment, including an autoclave, and provides open access to all tenants. The remaining 19 large labs are $2,000 per month (equivalent to $30 per square foot per year), the two medium labs (600 sq. ft.) are $1,600 per month and the two small labs (400 sq. ft.) are $1,000 per month. Rents are full service except for electricity. Additionally, reception, conference, private meeting and support service are available to all tenants. Currently, MTDC is home to 12 biotech companies. To date, MTDC is 100% occupied and 14 biotech firms have been wait-listed. Space may be available in the fall of 2000, when MTDC expects to graduate one biotech tenant. The County is currently planning an MTDC expansion of 5,000 square feet.

MTDC is a joint venture between Montgomery County and the Maryland Economic Development Corporation (MEDCO). MTDC was financed through a $4.49 million taxable lease revenue bond issued by MEDCO; a $4 million grant from the State of Maryland; and a $1 million donation by Montgomery County of a 5-acre site in the Shady Grove Life Sciences Center. MEDCO was the MTDC developer and is the owner of the facility. MTDC ownership will revert to the County in 2019 when MEDCO bonds are paid in full. The County entered into a partnership agreement with MEDCO, where the County assists with the operation of MTDC through an annual appropriation of $250,000.

The Montgomery County Economic Development Fund (EDF) and the Technology Growth Fund (TGF) are available to biotech companies for direct financial assistance. Since its inception in 1995, EDF has made 16 grants and/or loans to biotech companies totaling $1,088,000. In FY01, $1,121,000 was appropriated for EDF; a $4.1 million supplemental funding request is expected. While EDF awards are based predominately on the company's employee growth projections, Technology Growth Fund awards are based on the company's innovative technology. TGF is specifically designed to assist emerging or early stage tech companies. TGF, a new program with a fund balance of $900,000 will make its first round of awards in July 2000.

Despite the success of MTDC and the County's Economic Development Fund and Technology Growth Fund, three of the 35 interviewed companies had perceived lack of financial incentives and support from both the State and County a few years ago. One specifically stated his belief that the State and County were only interested in supporting businesses once they achieve a certain level of success, but not emerging companies. The new Technology Growth Fund addresses this perception. One anonymous private entrepreneur stated that the County has not provided much incentive for the

private sector to initiate or expand incubator space. Two these companies chose not to locate in the County incubator for various reasons, including more space was needed than could be leased to a single tenant (1,000 square feet); the equity requirement was too high and the rent was too high.

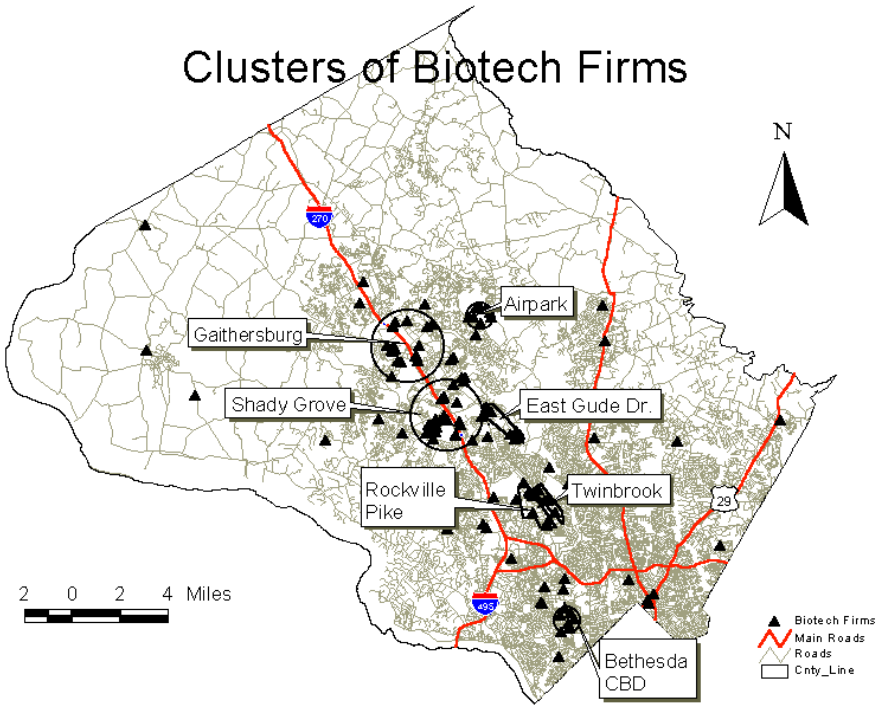
Employment Centers Used by Clusters of Biotechnology Firms

Montgomery County is home to a large concentration of biotechnology firms researching and developing primarily medical biotechnology applications. Almost 200 biotechnology firms were identified from state and national directories (the list appears in the appendix). The map below shows the locations of the County firms. Most of them are in the seven clusters identified on the map. Eighty percent are in the I-270 Corridor, extending from North Bethesda to Clarksburg. A few companies are found away from the major concentrations in such places as Olney and Silver Spring.

These firms have selected sites in areas of diverse land use density and character, reflecting their diverse needs. Although biotechnology firms are found in many locations throughout the County, there are seven areas in the County with notable concentrations of biotech firms. The seven clusters of biotech firms are in diverse areas including industrial parks like the County Airpark and East Gude Drive, office/ R&D parks like the Shady Grove and Gaithersburg areas, and mixed use areas like Rockville Pike and the Bethesda and Silver Spring central business districts. There are also stand-alone sites apart from the clusters that may serve as anchors to spur future biotech development. An example is QIAGEN Science's building under construction in Germantown. In all of the cluster areas, outside of the Shady Grove Life Sciences Center itself, biotech firms are in the minority and coexist with firms from many other industries.

Montgomery County is currently in the expansion phase of the real estate investment cycle. As of July 2000, in the I-270 Corridor, there are 137,000 square feet of flex space under construction and another 295,000 feet proposed for completion within the next twelve months. There are also 777,000 square feet of currently vacant flex space, including sublet space, in the Corridor.[20] Biotech firms can compete with firms in other industries for some of this over one million square feet of flex space.

20 CoStar Office-Flex-Industrial database, July 10, 2000, CoStar Group Inc., Bethesda, MD



Note: The black triangles on this and succeeding cluster maps locate biotech firms.

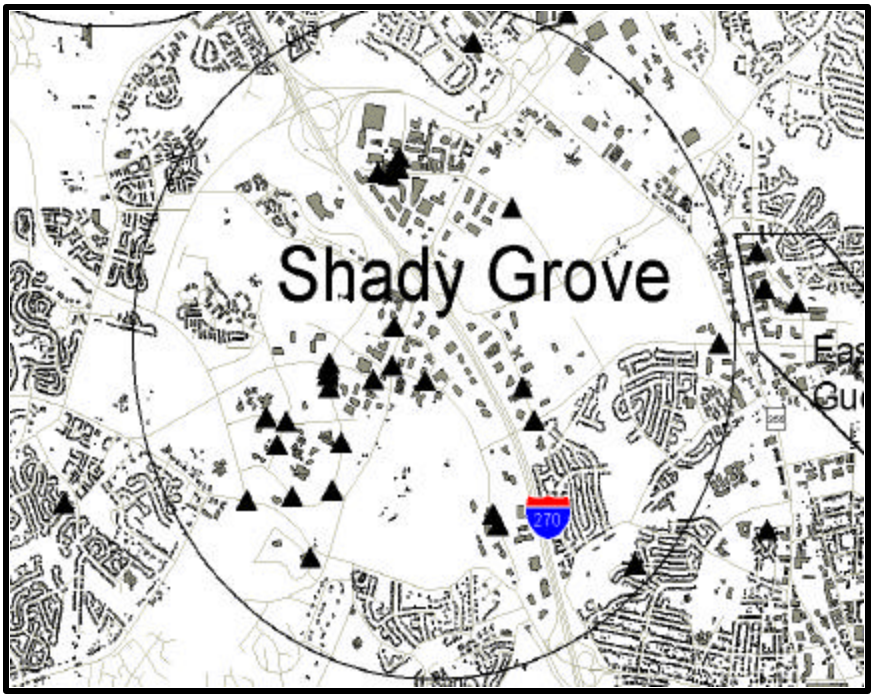
Buildings in Biotechnology Cluster Areas

The following pages describe the seven areas in the County where biotech firms are most heavily clustered. The tables summarize **all** the commercial buildings in each area to indicate the type of space available in the real estate market where biotech firms are found. The locations of biotech firms in these areas are indicated by the black triangles on the maps.

Shady Grove

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1 story	BioTech Firms
Flex	38	2,073,000	43,400	2.1%	4	$ 15.11	45%	17
Industrial	13	1,209,000	-	0.0%	1	$ 8.00	100%	0
Office	83	6,979,000	421,000	6.0%	25	$ 21.75	4%	14
Total	134	10,261,000	463,400	4.5%	30	$ 20.45	25%	31



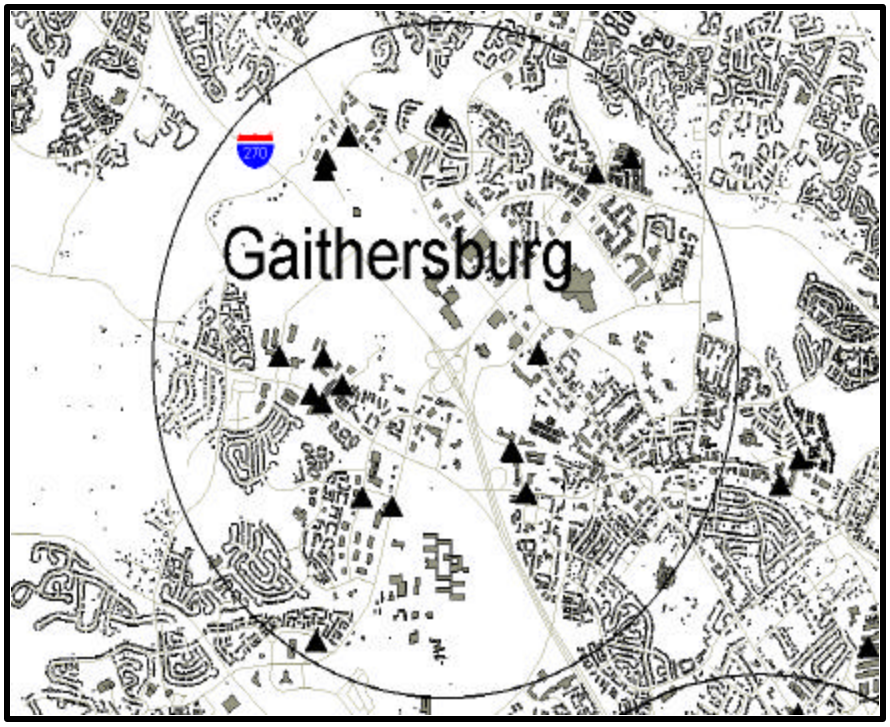
Shady Grove is the core of the biotechnology sector in the County with the Shady Grove Life Sciences Center, Johns Hopkins and University of Maryland campuses and a number of important firms. The University of Maryland campus houses the Center for Advanced Research in Biotechnology (CARB). The area includes three important players in the human genome game: Human Genome Sciences, The Institute for Genomic Research, and Celera Genomics. Also in this area are Life Technologies, Otsuka America Pharmaceutical, Westat, BioReliance, Atto Instruments, and EntreMed among others. This area lies right at the heart of the County's I-270 Corridor within a few minutes drive to all of the other clusters. Even in this very important cluster of biotechnology firms, they compete for office and flex space with firms from a variety of other industries, occupying less than half the flex buildings and less than one-sixth of the office buildings. Buildings in this area date back as far as 1965 but new buildings are also currently under construction. The average year built in the area is 1983.

Gaithersburg

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1 story	BioTech Firms
Flex	41	1,880,000	171,000	9.1%	12	$13.06	66%	12
Industrial	9	355,000	11,700	3.3%	1	$ 8.00	67%	0
Office	69	3,783,000	415,000	11.0%	23	$17.73	6%	8
Total	119	6,018,000	597,700	9.9%	36	$15.86	31%	20

The Gaithersburg cluster is grouped within a mile-and-a-quarter of the interchange of I-270 and Montgomery Village Avenue. There are eight firms in six flex buildings in the 200-block of Perry Parkway and three firms on Professional Drive. Visible from Clopper Road is an important complex housing Digene, Genetic Therapy, Gene Logic, HT Medical and MedImmune. The area has experienced much building recently as well as a major boom in the 1980s. The average year built for buildings in this area is 1983.

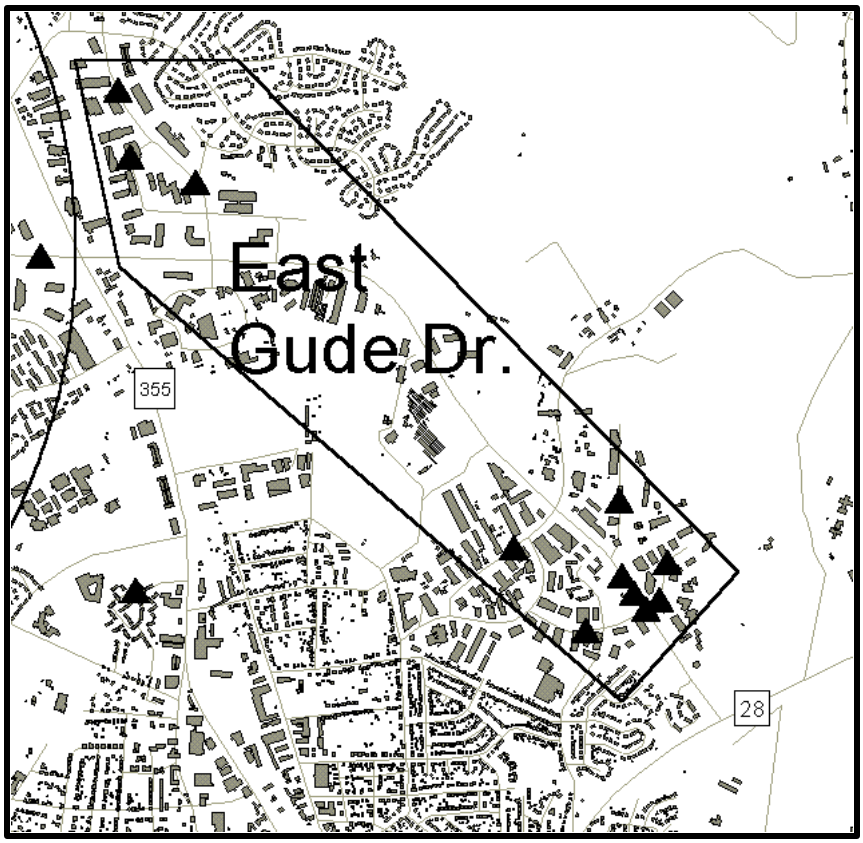


East Gude Drive

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1-Story	BioTech Firms
Flex	26	858,000	102,000	11.9%	10	$12.36	77%	16
Industrial	77	1,963,000	13,000	0.7%	3	$ 8.00	78%	1
Office	17	953,000	239,000	25.1%	6	$21.17	6%	1
Total	120	3,774,000	354,000	9.4%	19	$14.55	69%	18

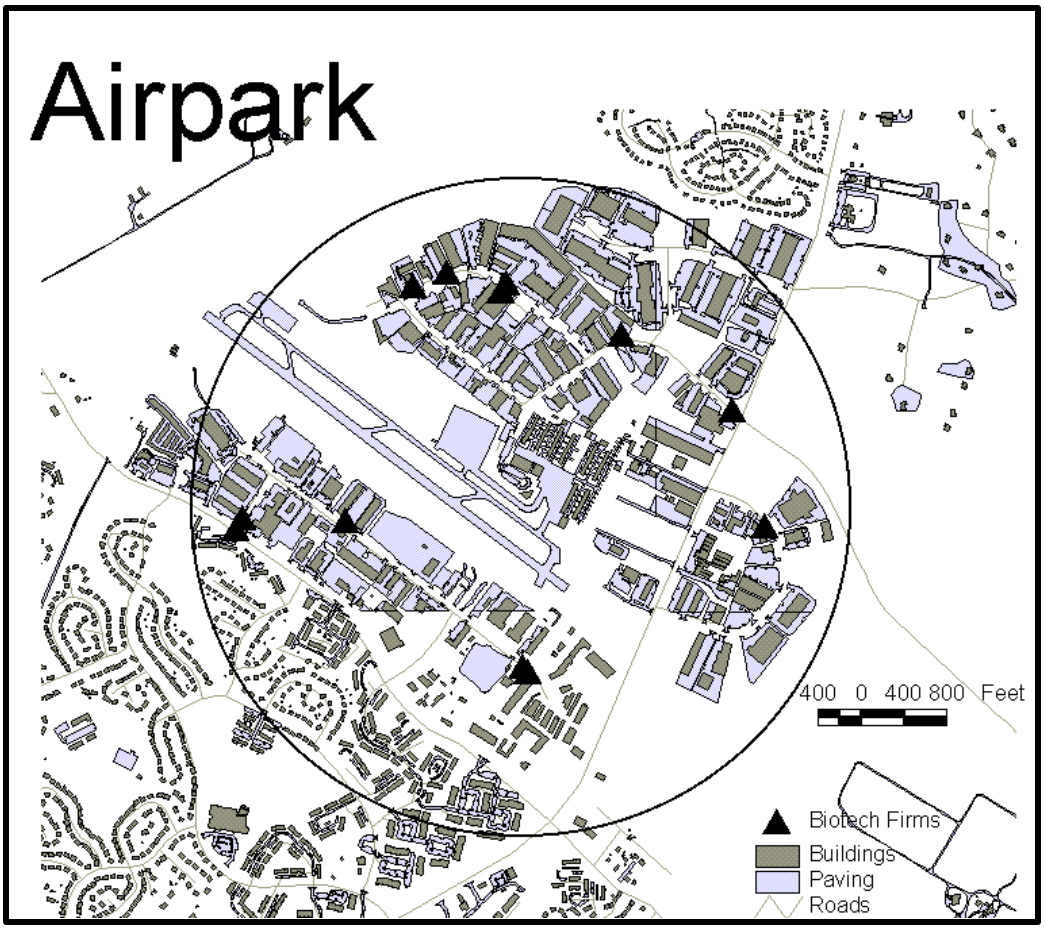
The East Gude Drive industrial area has low-rise industrial and flex buildings stretching along the arc of East Gude Drive from Route 355 to Route 28, Norbeck Road. Fifteen of the eighteen biotechnology firms in the area are tightly clustered in 5 flex buildings around the intersection of East Gude Dr. and Taft Court. On average the buildings here were built in 1981.



Airpark

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1 story	BioTech Firms
Flex	33	1,293,000	54,000	4.2%	11	$ 9.40	82%	9
Industrial	73	2,022,000	60,200	3.0%	12	$ 9.38	95%	5
Office	2	25,000	5,000	20.0%	1	$12.00	50%	0
Total	108	3,340,000	119,200	3.6%	24	$ 9.49	90%	14

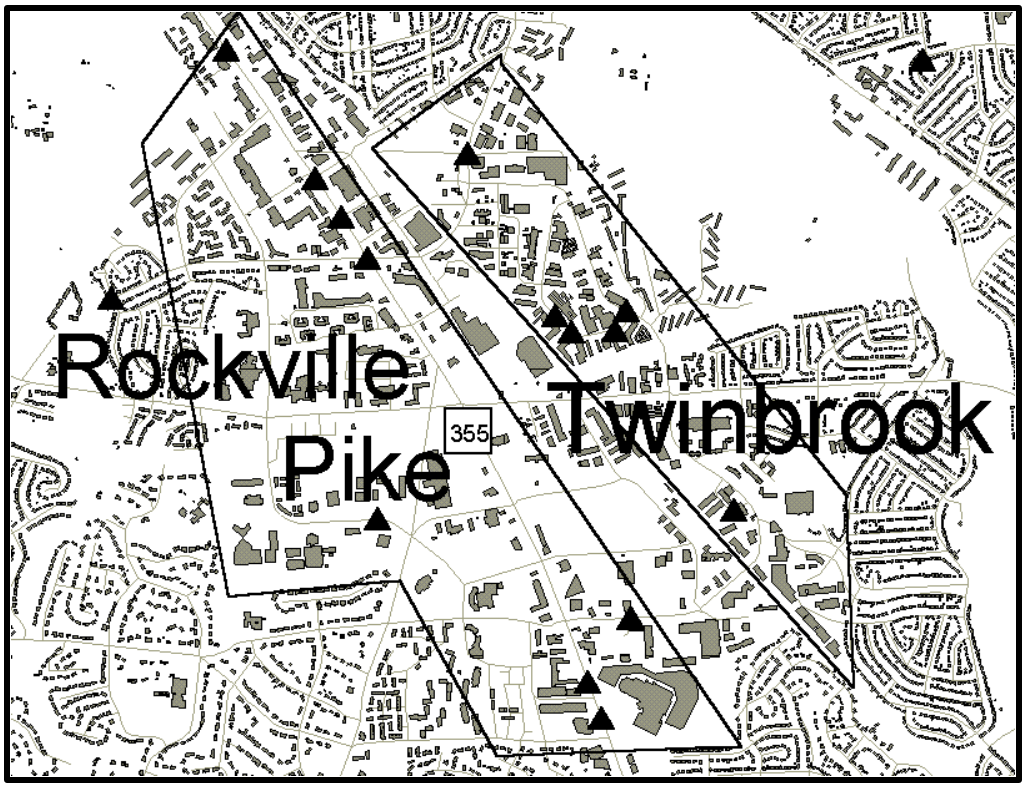


The Airpark industrial area is to the northeast of Gaithersburg, surrounding the runways of the Montgomery County Airpark. Its 108 buildings are two-thirds industrial and one-third flex. The buildings are newer than the Twinbrook area with the oldest building built in 1970 and the newest in 1999. The average year built is 1984. The average asking rents are relatively inexpensive, below ten dollars per square foot annually. Fourteen biotech firms, ranging in size from 5 to 75 employees, are located here.

Rockville Pike

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1 story	BioTech Firms
Flex	-	-	-	-	-	-	-	-
Industrial	-	-	-	-	-	-	-	-
Office	51	4,259,000	164,000	3.9%	18	$ 23.51	4%	12
Total	51	4,259,000	164,000	3.9%	18	$ 23.51	4%	12

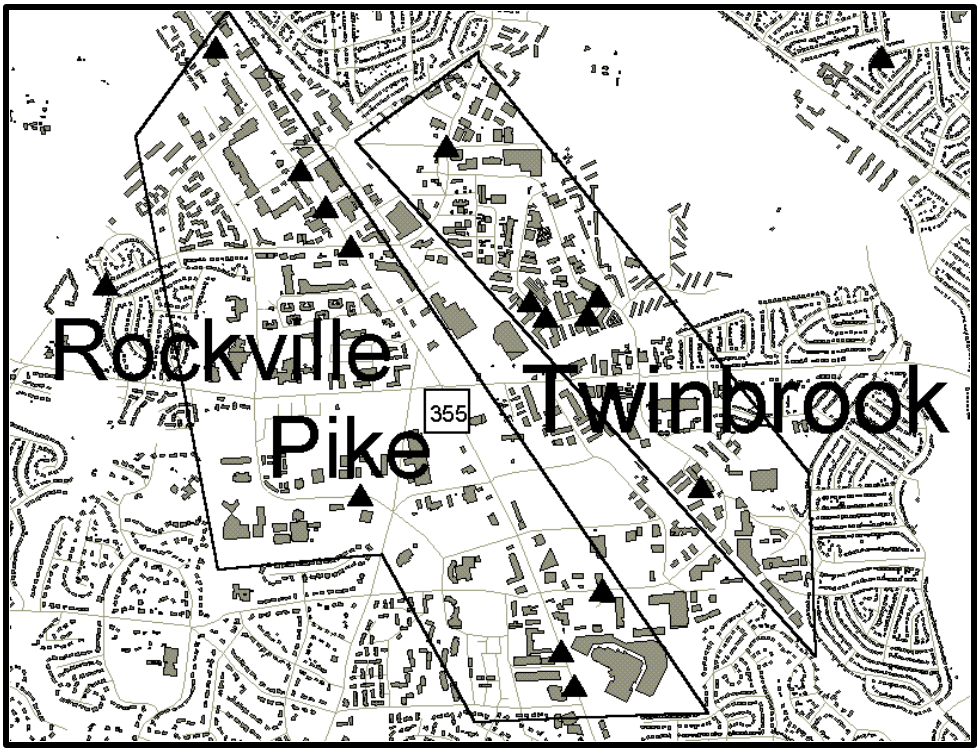


Along Rockville Pike, within about a mile of the intersection of the Pike and Montrose Road, are 12 biotech firms in 51 office buildings. Three firms in 1801 Rockville Pike, Geo-Centers, Inc., Prospect Associates, Ltd., and Quintiles BRI, Inc. together have almost 500 employees. Also there are two firms on Executive Blvd, InforMax and LT Industries.

Twinbrook

Buildings in the CoStar Database

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	% 1-story	BioTech Firms
Flex	30	955,000	76,542	8.0%	7	$ 11.19	57%	3
Industrial	33	1,327,000	58,000	4.4%	5	$ 10.40	64%	1
Office	32	2,852,000	87,000	3.1%	9	$ 17.81	9%	6
Total	95	5,134,000	221,542	4.3%	21	$ 13.07	43%	10



The Twinbrook area stretches along Parklawn Drive east of Rockville Pike and the Metrorail line. The area has been called the "First Life Sciences Center," with a half million square feet of FDA and NIH leased lab space in the area. Much of this space has been recently renovated and is under new ten-year leases. It also contains the Parklawn Building, the largest office building in the County, which currently houses U.S. Health and Human Services Offices including the Food and Drug Administration (FDA). The FDA oversees the lengthy clinical trials required before approval of new drugs is possible. (Over the coming decade, the FDA will move its operations to White Oak in the Eastern County.) Most of the area is built out with one-to-three story office, industrial and flex buildings; the massive, 18-story Parklawn building is an exception. The commercial building owner-manager, TrizecHahn, has shown interest in the area and now owns thirteen buildings. The buildings in this area are mostly 20 to 40 years old, built in the 1960s and 70s. The average year built is 1972.

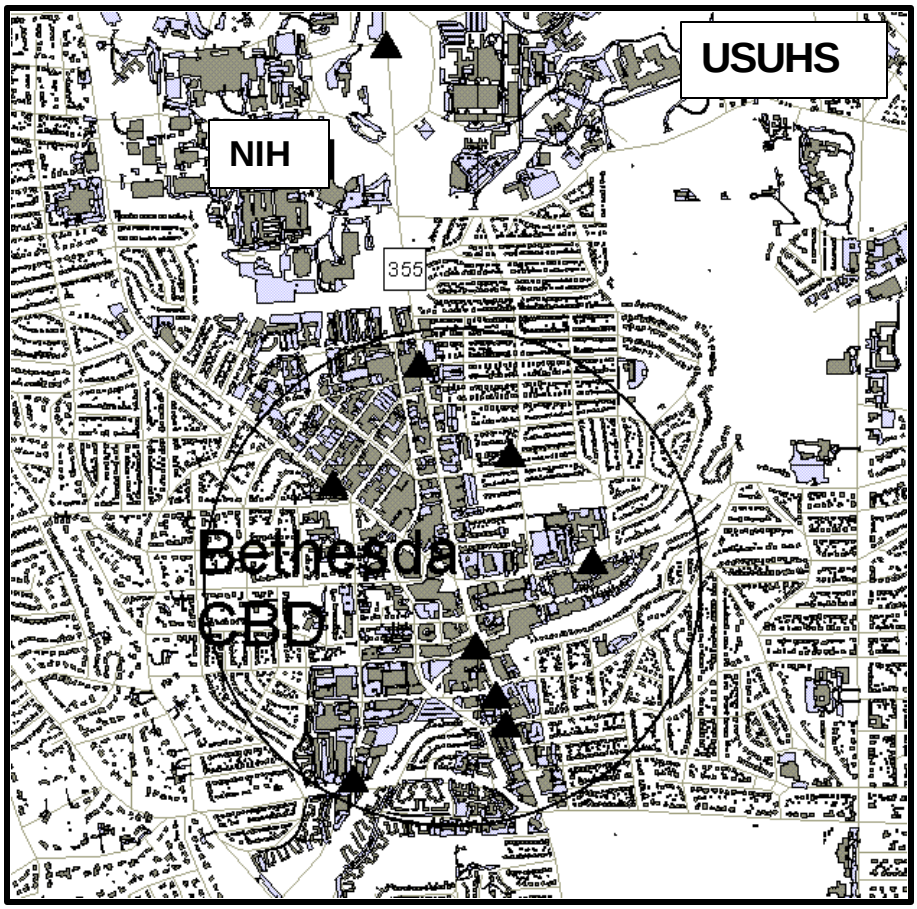
The only privately owned biotechnology incubator in the County, a subsidiary of the Biomedical Research Institute, is located at 12111 Parklawn Drive in this area. This facility offers 42,000 square

feet of lab space and presently has six biotech tenants.

Bethesda CBD

Buildings in the CoStar Database (CBD)

Type	No.	Sq. Ft.	Vacant SF	Vac. Rate	Bldgs w/ Vacancies	Avg. Rent	%1 story	BioTech Firms
Flex	1	8,000	4,000	50.0%	1	$ 26.00	0%	-
Industrial	-	-	-	-	-	-	-	-
Office	91	6,356,000	274,000	4.3%	34	$ 24.80	0%	7
Total	92	6,364,000	278,000	4.4%	35	$ 24.82	0%	7



The Bethesda Central Business District is the premier business district in the County, with many modern office buildings and extensive amenities. As such it has relatively high rents. Seven biotechnology companies are found in the area. Most of them appear to be small, with less than ten employees. An exception, Social and Scientific Systems, Inc., with 270 employees, is headquartered at 7101 Wisconsin Ave. They have provided biomedical research support to NIH and private pharmaceutical companies since 1981. The technical staff for their biomedical operation, with about 100 employees, is located at 6101 Executive Blvd. off Rockville Pike.

Satisfaction With Montgomery County as a Business Location

Nearly all of the interviewees were satisfied with Montgomery County as their business location. The major advantages cited were the proximity to the multitude of federal government health-related agencies (especially NIH), the existence of a highly trained workforce in the metropolitan area (related to the presence of excellent medical schools and graduate level science programs at area universities, such as Johns Hopkins and the University of Maryland), as well as the presence of a large number of similar firms in the area. In addition, many of the founders of these firms had spent a large part of their working careers in this area and were therefore firmly rooted here.

Interview participants generally expressed overall satisfaction with their physical space. A few firms had experienced parking problems or complained about traffic congestion, but the vast majority was satisfied with their facilities (including convenience of location) and the neighborhood amenities (i.e., presence of commercial establishments, such as restaurants and banks). The parking problem can be attributed at least in part to the County minimum parking space requirement, which is based on square footage of building area rather than the number of employees. This requirement can have the effect of limiting the ability of biotech firms, which tend to have relatively low ratios of employees to space, to expand their building space when the amount of undeveloped land on their sites constrains their ability to expand surface parking. Surface lots are much less expensive to construct per space than structured parking. For example, a firm wishing to expand its space by adding a second floor may not have sufficient available vacant land on its site to permit the required expansion of surface parking, even though additional parking spaces may not be needed to accommodate the needs of its staff because of a low ratio of employees to space. One of the larger participants in this survey, Igen, Inc., is currently confronting this situation. Two other participants in the survey faced a similar problem of insufficient additional vacant land on their sites to accommodate more surface parking, although these firms would actually need additional spaces to accommodate the needs of any added employees.

Satisfaction With the Shady Grove Life Sciences Center

The eight survey participants located in the SGLSC were generally satisfied with their space and the nearby amenities. Some companies had been there since the late-1980s, when the park opened. Three of the survey participants were concerned about the lack of additional space in the center for expansion. There are no more vacant parcels left to sell or lease, according to Henry Bernstein of the Montgomery County Department of Economic Development.

Five of the eight firms in the survey group located in the SGLSC were either building new space (or modifying existing space) or considering the prospects for moving into new quarters. All but one of these firms were able to find a conveniently located site, although not necessarily within the SGLSC. Most of them owned or were able to rent additional space in the SGLSC or were able to build or modify additional conveniently located space. The fact that no more vacant unclaimed parcels of land exist in the SGLSC does not mean that the present tenants/owners all lack additional space into which

to expand, although this is apparently the case with some of them. The firm that experienced problems in accommodating its expansion was forced to relocate into 25,000 feet of space located a few miles away. One of the eight survey respondents located in the SGLSC complained about the lack of nearby restaurants of good quality. Perhaps this complaint was not more general because some of the larger companies have their own in-house cafeterias. It should also be noted that at least five new restaurants have opened or are scheduled to open in the summer of 2000 at the nearby Washingtonian Center. Another respondent complained about the lack of a neutral meeting space in the SGLSC. Yet, both Johns Hopkins and University of Maryland facilities contain large auditoriums and various size classrooms that are available for company use. Historically, both academic institutions have generously accommodated the County's requests to host biotech meetings.

Johns Hopkins University has a 35-acre site on the SGLSC for its Montgomery County Campus. In January 2000, the school opened its second building that is used primarily for additional classrooms. The third floor of this building is 12,000 square feet and will house the Rockefeller Neurological Institute and a few biotechnology firms. In addition, Johns Hopkins' preliminary master plan allows the construction of an additional 270,000 square feet of rentable space for use by biotechnology firms. The school is currently discussing the site with potential tenants. Building construction, however, cannot proceed until additional infrastructure is put in place. Johns Hopkins did not provide any estimate of how much additional space would be available to the industry or when it may come on line at this site.

Johns Hopkins also owns a 100-acre site, known as its Belward Research Campus, about one quarter mile away. The deed contains a covenant that the site will continue in use as a farm until the owner, an elderly woman, vacates the property. The University may consider making this land available to the biotechnology industry once the restriction on its use is removed. Of more immediate interest to the industry, Johns Hopkins sold a 30-acre site adjacent to this site to Montgomery County and, through the Maryland Economic Development Corporation; the County leased one of the five parcels on this site to Human Genome Sciences. The company recently constructed an 110,000 square foot manufacturing facility on the parcel and plans to build additional production facilities on a number of the remaining parcels.

Approximately quarter mile away from its Belward production facilities, Human Genome Sciences is currently negotiating to purchase the Traville property. HGS would build a new one million square foot headquarters campus in Shady Grove adjacent to the University of Maryland.

As previously discussed, Montgomery County's incubator, the Maryland Technology Development Center, is located in the SGLSC and is currently home to 12 biotech companies. Two companies included in this survey, GenoQuest and TherImmune Research Corporation, rent a total of three labs in this facility. Both of these companies were satisfied with the availability of parking and access to meeting rooms, although one of them commented about a perceived lack of administrative support (e.g., phone service).

The Future of the Biotech Industry in the County

The biotechnology industry in Montgomery County is highly diversified. Its companies create and manufacture new therapeutics, diagnostics and medical devices; sequence the human and other genomes; identify new drug targets from gene expression data; perform preclinical animal testing; manufacture equipment and chemicals used throughout the industry; design statistical validity tests for clinical trials; and provide many other products and services.

The questions for Montgomery County are how much of this work will continue to be done here and how much growth related to the biotechnology industry will fit comfortably into the County. As this report demonstrates, there is a remarkably intricate network of interrelationships among Montgomery County's biotechnology firms, government agencies, and institutions of higher education. Also, the highly educated labor force, including many with experience in biotechnology fields (e.g. 10,000 scientists at NIH), provides the most important resource for pursuing this work. Several firms have expanded beyond the pure research and development phase in manufacturing and sale of products without leaving the County. Furthermore, Montgomery County is working with other counties to facilitate the industry's future manufacturing needs. The County's biotech companies are maturing. As of June 1, 2000, 12 publicly traded life sciences companies that are headquartered in Montgomery County had a combined market capitalization of $23.3 billion. As the biotech industry grows rapidly nationwide over the coming decades, the County will continue to participate in that growth.

The County is advantageously positioned in the young field of genomics. Although the mapping of the human genome and much of what follows will be information distributed via electronic media and there is no overriding reason that the work continue in the County near NIH or private firms such as Celera Genomics or The Institute for Genomic Research, the County has a genomics critical mass. The R&D work supporting new drug development is apt to grow phenomenally following the June announcement that decoding of the human genome is complete. Now that this information is available, a major resource will exist to support medical and pharmaceutical research at the molecular genetic level. The Herculean tasks of piecing together the complexities of gene function and creating new drugs that interact with that functioning will take decades and will fully utilize the resources available in Montgomery County.