

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GODDARD SPACE FLIGHT CENTER

**National Environmental Policy Act:
Finding of No Significant Impact (FONSI)**

ACTION:

Pursuant to Council on Environmental Quality regulations (40 CFR Parts 1500-1508), implementing procedural provisions of the National Environmental Policy Act (NEPA) of 1969 amended (42 U.S.C. 4321 et seq.) and the National Aeronautics and Space Administration's (NASA) Procedures for Implementing NEPA (14 CFR Subpart 1216.3), NASA gives notice that an Environmental Assessment (EA) has been completed and an Environmental Impact Statement (EIS) will not be prepared for the construction of the Earth Observing System Data Information System (EOSDIS) Building and the Earth System Science Building (ESSB) at the Goddard Space Flight Center located in Greenbelt, Prince George's County, Maryland.

SUMMARY:

The EOSDIS and ESSB, proposed facilities for the Goddard Space Flight Center, will provide support for the Earth Observing System (EOS) Program data acquisition, and consolidation of the Earth Science Directorate, Code 900, in support of the science for this mission. In addition, the ESSB will create a centralized environment for interdisciplinary scientific communication and collaboration for research in global change. This research is part of the EOS Program and encompasses investigations into global warming, ozone depletion, acid rain deposition, deforestation, and desertification. The EOS program will support observation of the Earth from space via a series of satellites. The remote sensing data, along with ground-truth observations, will be used by scientists to construct, and test models and theories about global environmental change. The EOSDIS facility will house the data processing, storage, and retrieval functions for the Earth Observing System into the next century.

The ESSB will house 800 personnel transferred from other buildings within the Goddard complex and 100 visiting scientists. The EOSDIS will operate on three shifts staffed with 500 contractors on the prime shift and two 125 person shifts.

An EA was prepared to consider the environmental effects of the proposed project and its alternatives. NASA has determined that the EA combined with a subsequent letter from the Maryland Historic Trust (MHT) represents an accurate assessment of the proposal's environmental impacts and these

impacts are acceptable.

Four alternatives for providing expanded and consolidated facilities have been considered. They include: 1) no-action; 2) expansion and conversion of existing space at GSFC; 3) construction of facilities at Sites A and B; and 4) proposed action of constructing both facilities at Site C.

The no-action alternative was evaluated and eliminated from further consideration because it did not allow for the consolidation of the Earth Science Directorate staff. Further, the specialized requirements of the data acquisition and archiving facility (EOSDIS) cannot be met at any existing facility. Due to the difficulty in expanding and consolidating existing space at GSFC, this alternative was also eliminated from further consideration. Many of the existing buildings at GSFC are not suitable for expansion and there is not adequate space for the magnitude of expansion needed. Two alternative sites (A and B) in or adjacent to GSFC were also evaluated as sites for the EOSDIS and ESSB facilities. Site A is located at the northwest side of the Center off the Baltimore Washington Parkway. Site B is located on the Beltsville Agriculture Research Center and requires land purchase from the Department of Agriculture. Site A has insufficient buildable area for both facilities which would adversely impact the research effort. In addition, development of Sites A and B presents significant engineering difficulties and would have comparable levels of environmental impacts as the preferred Site C.

Impacts associated with the proposed action are not considered to be significant. The wooded, gently sloping, 105 acre (42.5 hectares) site has enough buildable area for both facilities and additional developable land for future expansion. Approximately 43 acres of mature forest will be selectively cleared as part of the proposed action. The construction of the two buildings, parking, and an internal road network will require filling .55 acres (0.22 hectares) of non-tidal wetlands. No practicable alternative exists to the location of a portion of the project in a wetland. These unavoidable wetland impacts are eligible for Nationwide Permit 26 from the U.S. Army Corps of Engineers under Section 404 permit guidelines. Wetland mitigation will be provided on-site. No threatened or endangered species will be impacted by this action. Coordination with the Maryland Department of the Environment is currently underway.

No significant long-term adverse impact will result to air quality or noise levels. There will be short term minor impacts to air and noise quality during construction. The increase in impervious cover related to the two buildings, associated roads, and parking necessitates a stormwater management facility which meets Maryland State requirements for water quantity and

quality management.

Background research and a Phase I archeological investigation identified no archeological, historical, or cultural resources listed or eligible for listing in the National Register of Historic Places within the area to be impacted.

Traffic impacts directly and indirectly related to the construction of the EOSDIS and ESSB facilities represent an adverse impact. A recent traffic analysis investigated the impact of the development of the EOSDIS and ESSB facilities and found that roadway improvements would be necessary to provide an adequate level of service at five critical interactions. The improvements, which include signalization and the addition of separate right or left turning lanes at critical intersections on site will be in place by the anticipated 1995 completion date for the two facilities. Coordination with state and local transportation planning offices is currently in progress to upgrade Greenbelt and Good Luck Roads.

The preferred site (C) is located on land currently owned by GSFC. The proposed action is consistent with the GSFC Facilities Master Plan and does not conflict with the local comprehensive planning objectives. Nor is the proposed action in conflict with any other known regional, state, or federal policies. No other matters of environmental concern have come to NASA's attention.

Based upon information gathered during preparation of the EA, NASA finds that the development of the EOSDIS and ESSB facilities at Site C of the Goddard Space Flight Center will not significantly affect the quality of the human environment. Consequently, an Environmental Impact Statement will not be prepared.

SUPPLEMENTARY INFORMATION:

Subsequent to the preparation of the final EA in May 1991, NASA received a letter of concurrence from the Maryland Historic Trust with regard to the findings of the cultural resources investigation. MHT concurred that the construction of the facilities will have no effect on National Register eligible historic properties (MHT letter of June 10, 1991).

DATES:

Any comments on the FONSI, EA, or environmental impacts of the proposed project must be in writing and received by the information contact listed below no later than August 31, 1991.

ADDRESS:

The EA is on file and may be reviewed by interested parties at:

Prince George's Libraries
Greenbelt Branch
11 Centerway Road
Greenbelt, MD 20770
301-345-5800

-or-

Facilities Engineering Division
Code 270, Building 17 - Room N200
NASA/Goddard Space Flight Center
Greenbelt Road
Greenbelt, Maryland 20771
301-286-8931

A limited number of copies of the EA are available to fill single copy requests through the information contact listed below.

FOR FURTHER INFORMATION CONTACT:

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Greenbelt Road
Greenbelt, MD 20771
301-286-3889



John M. Klineberg
Director

8/15/91

Date

Environmental Assessment for the EOSDIS and ESSB Facilities Goddard Space Flight Center

**NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION**

FEBRUARY 1991



GREENHORNE & O'MARA, INC.

9001 EDMONSTON ROAD

GREENBELT, MARYLAND 20770

ENVIRONMENTAL ASSESSMENT
FOR THE GODDARD SPACE FLIGHT CENTER
FOR THE EARTH OBSERVING SYSTEM DATA INFORMATION SYSTEM
AND THE EARTH SYSTEM SCIENCE BUILDINGS

- (a) Lead Agency: NASA Goddard Space Flight Center
- (b) Proposed Action: Construction of the Earth Observing System Data Information System Building and the Earth System Science Building on 105 acres of undeveloped land on NASA property, Greenbelt, Prince George's County, Maryland.
- (c) For Further Information: Denise Fay-Dombrowski
(301) 286-3889
- (d) Designation: Environmental Assessment (EA)
- (e) Abstract: The proposed action calls for the construction of two buildings on a 105 acre site situated within the Goddard Space Flight Center property. The two facilities, Earth Observation System Data and Information Storage Facility (EOSDIS) and the Earth System Science Building (ESSB) will consolidate the Earth System Science research program in order to create a centralized environment for interdisciplinary scientific communication, collaboration, and efficiency in global change research. The EOSDIS and the ESSB facilities will be supported by 800 personnel transferred from other buildings within the Goddard complex, new hires (100), visiting scientists (100), and contractors (500) on the prime shift. In addition, the EOSDIS will have two (125) contractor shifts. The interdisciplinary research for global change in the ESSB facility will be concerned with global warming, ozone layer depletion, acid rain deposition, deforestation/desertification and draught/flooding. The EOSDIS facility will house the data acquisition and archiving of research information. The two facilities will collect and correlate the data that will allow the scientists to predict the changes that will occur over the next 25 years or more in the natural environment as well as in response to human activity.

The 105 acre proposed site is presently undeveloped and forested. No significant adverse or beneficial environmental impacts are anticipated as a result of this project.

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CHAPTER 1.0

PURPOSE AND NEED

Goddard Space Flight Center (GSFC) is one of eight NASA field centers and was the first United States laboratory devoted to the investigation and exploration of space. The primary charter for all Goddard missions and activities stems from the legislation which established NASA, the National Aeronautics and Space Act of 1958. This legislation outlines four broad objectives:

- o Expand knowledge of the earth, its environment, the solar system, and the universe;
- o Develop and promote selected civil applications of space technology;
- o Preserve United States leadership in critical aspects of space, science, applications, and technology;
- o Further United States domestic and foreign policy objectives.

The Earth Science Directorate at GSFC directs a broad program of scientific research, both theoretical and experimental, in the study of Earth Science. The program ranges from basic research to flight experiment development, mission operations and data analysis. With the expected FY 1991 new start for the Earth Observing System (EOS) and Goddard's responsibility for the Earth Probes, Goddard has become NASA's focal point for Earth Science.

The EOS program is NASA's largest research program and part of an international effort in global change research. The interdisciplinary research on global change will focus on an understanding of such critical issues as: global warming; ozone layer depletion; acid rain deposition, deforestation/desertification. This Environmental Assessment addresses the need to develop a 105 acre site at GSFC and to construct two facilities to support the EOS program. A data acquisition and archiving facility, the Earth Observing System Data Information System (EOSDIS), and a new research facility for the Earth Science Directorate, the Earth System Science Building (ESSB) are the two structures planned for completion by the 1995 timeframe.

The EOS program will support observation of the Earth from space using unmanned platforms equipped with remote sensing instruments. This data, along with data collected from other satellites and from ground-truth observations, will be used by scientists to construct and test models and theories about global environmental interactions. Information resulting from the EOS program will contribute to an understanding of the consequences of human activity on the environment, and aid in predicting the impact of man-made and natural environmental events.

The NASA portion of the EOS program has an anticipated mission duration of 15 years, during which as much as 50,000 terabytes of data will be processed and stored. Of this amount, GSFC will be responsible for in excess of 15,000 terabytes. Currently, no facility or system exists anywhere within NASA or the world scientific community that is capable of supporting data processing and storage requirements of this magnitude. Therefore, construction of a new facility for the EOSDIS is the only viable alternative for providing the required level of support. The proposed EOSDIS facility will house the personnel and equipment required to support the data processing and archiving requirement of GSFC-managed instruments. The magnitude of the facilities requirement precludes the recovery and reuse of existing GSFC space, and the costs and inefficiencies associated with leasing off-Center space for a program of this magnitude and longevity are prohibitive.

NASA's leadership role in Earth System Science requires the consolidation of research facilities for the benefit of interdisciplinary science. As the lead center for EOS, the Goddard Space Flight Center must provide the research facilities for the following major disciplines:

- o Atmospheric Science
- o Ecological/Biological Science
- o Oceanographic Science
- o Solid Earth Science
- o Hydrospheric/Cryospheric Science

True interdisciplinary science can best be accomplished by providing a dedicated research facility where all of the various Earth Science disciplines are housed in close proximity. The scientific community will greatly benefit from collaboration with NASA scientists whose expertise and facilities for space-based, remote sensing, project engineering and observing systems development are readily available. Goddard's Earth Science group is currently spread out in seven widely separated buildings, creating substantial obstacles to interdisciplinary scientific communication and collaboration, as well as efficient EOS programmatic support. The proposed ESSB building will create an environment in which interactions among the scientists are fostered and which will permit easy access to the advanced computational facilities and research tools that will be available at a single facility. Continued use and operation within existing GSFC space would be detrimental to the Earth Science mission to conduct interdisciplinary science.

NASA proposes to house all of the present Earth Science functions in the proposed ESSB facility, including: the Laboratory for Atmospheres, Laboratory for Terrestrial Physics, Laboratory for Hydrospheric Processes, and the Crustal Dynamics Project. In addition, it will house associated National Academy of Science/National Research Council and university post-doctorates, contractors, and guest investigators.

CHAPTER 2.0

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Four alternatives for providing expanded and consolidated Earth Science Directorate facilities have been considered. They include: no-action; expansion and conversion of existing space at GSFC; construction of new facilities at Sites A and B; proposed action of constructing both facilities at Site C.

2.1 No-Action

The no-action alternative would not allow the consolidation of the Earth Science Directorate staff, who are currently spread out among seven buildings at GSFC. The specialized requirements of the data acquisition and archiving facility (EOSDIS) cannot be met at any of the existing buildings at GSFC. Construction of a new facility for the EOSDIS is the only viable alternative for providing the required level of support. This "do-nothing" alternative would be detrimental to the EOS Program and to the Earth Science Directorate's expanded mission to conduct interdisciplinary scientific research.

2.2 Expansion and Consolidation of Existing Facilities

The possibility of expanding or consolidating existing space at GSFC was considered and quickly discarded as a viable alternative. Many of the existing buildings at GSFC are between 25-35 years old and are not suitable for expansion (NASA 1988). While the campus-like setting of buildings at GSFC is open and dispersed, there is not adequate space for the magnitude of expansion needed. Parking and traffic would be significant issues for any major expansion of existing facilities as well as utilities distribution systems.

2.3 Construction of New Facilities at Sites A and B

Figure 2-1 illustrates the general locations of the alternate building sites evaluated at GSFC. Individually, both Sites A and B have insufficient building area. There would be significant engineering difficulties and expense in providing utilities to Sites A and B. Selection of this alternative would require separation of the two buildings which would adversely impact the interdisciplinary of the scientific research effort. Site B is located outside of NASA-owned property at GSFC, and development of this site would require purchase, lease or use-permit for the site from USDA, Beltsville Agricultural Research Center.

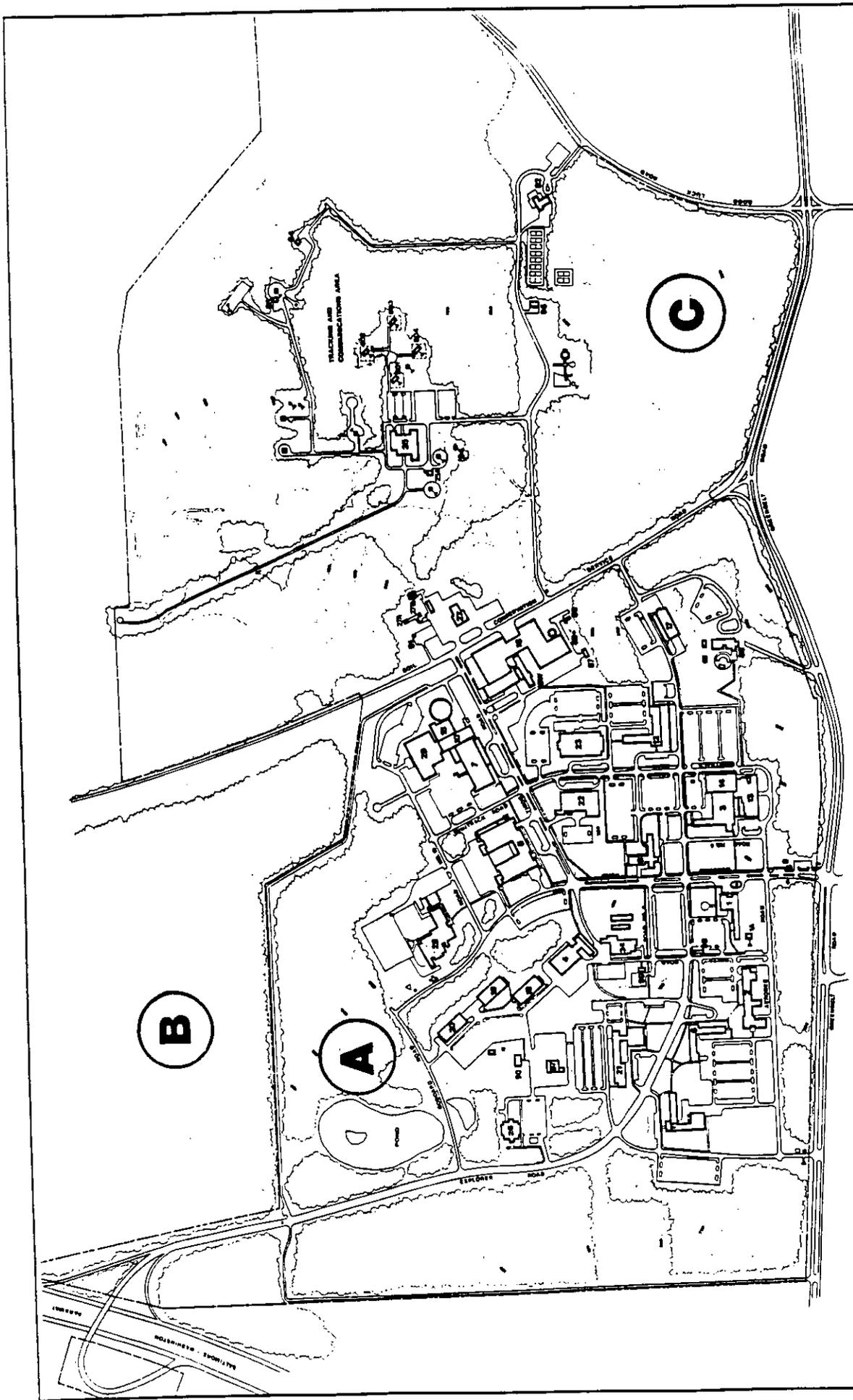


FIGURE 2-1

ALTERNATE BUILDING SITES

NASA GODDARD SPACE FLIGHT CENTER
EOS/DIS & ESSB SITE

Scale in feet
0 500' 1000'

A comparison of the environmental consequences of constructing the new facilities at Site A/B and the preferred Site C (Section 2.4) revealed comparable levels of adverse impacts. Construction of the new facilities at Site A/B would also involve clearing of mature woodland, potential wetland impacts and create comparable amounts of impervious surface. A large palustrine forested wetland connected to Beaverdam Creek separates Sites A and B and may be a potential site development constraint. Slope appears to be a more significant constraint on Site A/B than on Site C.

2.4 Proposed Action - Construction of Both Facilities at Site C

Site C provides a suitable building site for the proposed construction and consolidates the operations of both facilities in the same general area. Additional space for future expansion is available, if needed. Site C has enough buildable area for both facilities and for the extensive parking requirements necessary for large scientific conferences. The consolidation of 1,520 personnel at Site C will reduce traffic and parking problems on the main campus of GSFC. Site C will contain its own power and chilled water plant and would not require extensive expansion and upgrade to the existing plant at Building 24 (Figure 2-1).

The approximately 105 acre, wooded site is presently undeveloped. The EOSDIS and ESSB buildings will straddle an intermittent stream which bisects Site C. The site plan allows for considerable wooded buffers to Soil Conservation Service Road, Maryland (MD) Route 193, and Good Luck Road.

Four alternative building concepts were prepared for the ESSB building and at least three concepts prepared for the EOSDIS facility. While the alternative concepts differed in the building layout and orientation, the alternatives were not significantly different in area disturbed nor their general environmental consequences. The alternative concepts for the EOSDIS and ESSB facilities do not significantly differ in their environmental impacts owing to the uniformness of the project site. The preferred site plan for both facilities is illustrated in Figure 2-2.

The ESSB will consist of four floors of office and laboratory space and will house approximately 950 people. The first floor of the complex will contain conference rooms, a cafeteria and auditorium as well as other shared common spaces to meet the needs of NASA employees, contractors, and visiting scientists. The ESSB will contain approximately 270,000 square

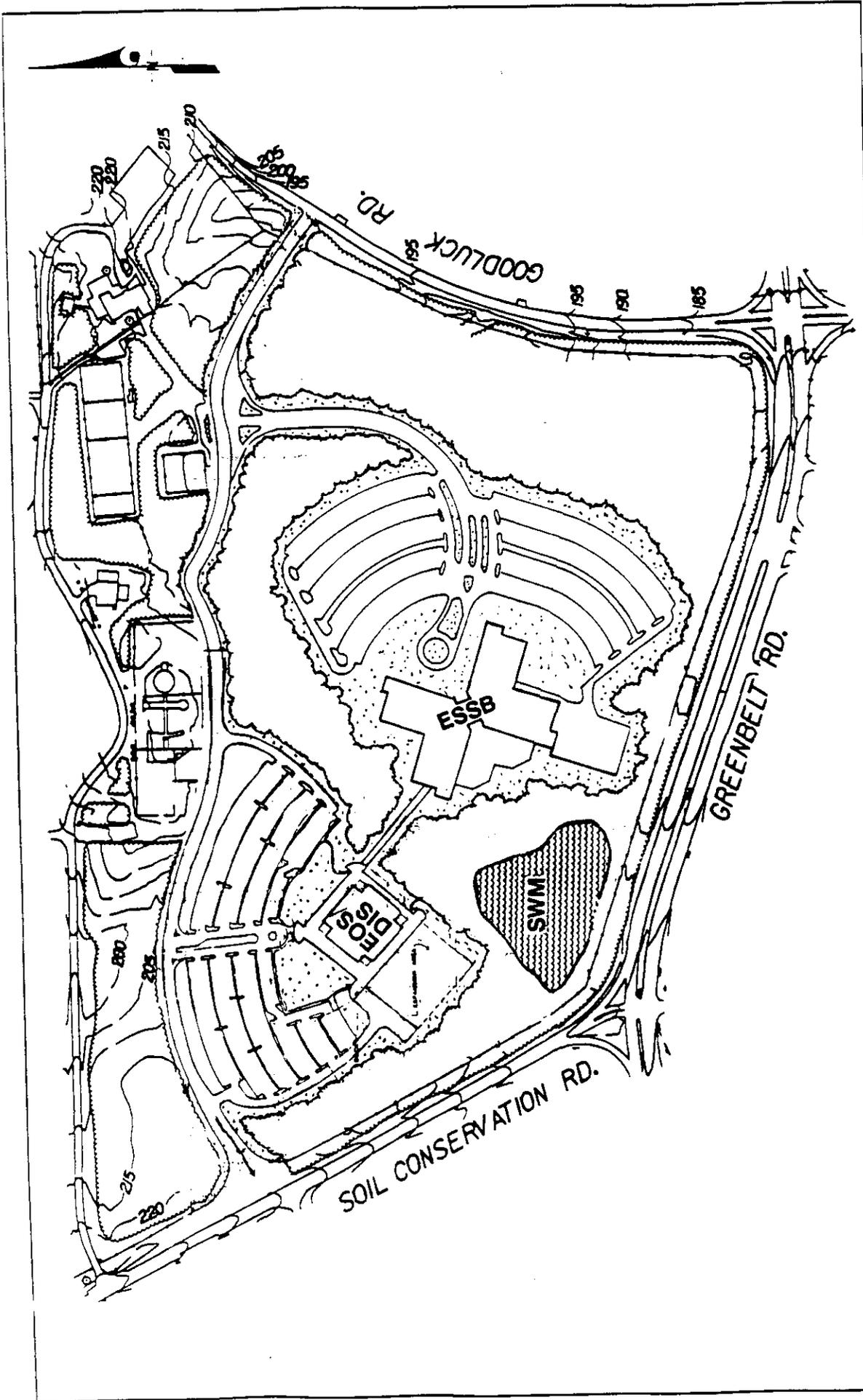


FIGURE 2-2



SITE PLAN

NASA GODDARD
SPACE FLIGHT CENTER
EOS/DIS & ESSB SITE

feet of usable floor space. The height of the building will be in close proximity to the average treeline which is approximately 70 feet above grade.

In addition, the two facilities will be serviced by a central chilled water plant and electrical substation. Electrical power will be extended from an existing substation on the west campus, along with other services including communication duct banks, steam and domestic water services. Distribution of these services to the two facilities will be provided by an underground utility tunnel which runs from the power plant, southwest to the EOSDIS facility and then eastward to the ESSB facility, crossing the intermittent stream under the pedestrian walkway.

The EOSDIS facility will be a unique structure designed to house a series of sophisticated computer areas, data storage and archiving space, and associated work areas, offices, and conference rooms. The data-archiving area will use robotic technology to access, transport and manipulate data-storage tapes.

Approximately 1,520 contractor and civil service employees are anticipated during the main shift. Another 125 personnel are expected on each of the two other shifts.

CHAPTER 3.0

EXISTING ENVIRONMENT OF THE PROJECT AREA

3.1 Description of the Project Area

The proposed project site is 105 acres and is located east of Soil Conservation Service Road near its intersection with Greenbelt Road in the greater Washington D.C. metropolitan area, Greenbelt, Maryland. Primary commuter access to the site is along Greenbelt Road which intersects Interstate 95 approximately 2.4 miles west of the site, and the Baltimore-Washington Parkway which is approximately 1.9 miles west of the site (Figure 3-1).

The site is part of a large tract of Federally owned land primarily used by GSFC and the Beltsville Agricultural Research Center. A high school is located south of the site across Greenbelt Road adjacent to a single-family development. Multi-family housing is located east of the site. A condo office complex is located southeast of the site. The existing GSFC complex is located immediately west of the site across Soil Conservation Service Road.

The site for the facility is wooded with common deciduous trees and native shrubs. The area to the north of the site is used for recreation and there are archery ranges located on the northern edge of the project site. A maintenance and storage compound is located to the north and the Goddard Employees Welfare Association (GEWA) recreation center is located to the northeast.

Topographically, the project area is situated on a ridge top between the Patuxent and Potomac drainages. Three intermittent streams cross the site, with the largest crossing the site in a southwesterly direction. The headwater reach of the major stream is associated with a forested wetland that receives stormwater runoff from surrounding developed areas. Wetlands are also associated with the intermittent stream systems.

3.2 Land Use

The southern property boundary of the proposed project site fronts on Greenbelt Road. The eastern property boundary abuts Good Luck Road, while the western boundary abuts Soil Conservation Service Road. The property immediately north of the site is predominately undeveloped; however, there are several isolated NASA testing facilities.

The proposed project site is located in an area of mixed land uses (Figure 3-2). To the south of Greenbelt Road is Duval Senior High School, Catherine T. Reed Elementary School, and Robert Goddard Junior High School. Adjacent to the school complex is Presley Woods, a community of single-family dwellings, and Cipriano Springs Shopping Center. To the east of the site is Countryside, a community of multi-family dwellings and a combination of commercial, office, and retail space. To the north is Beltsville Agricultural Research Center and open agricultural research land. Additionally, to the west of the site is agricultural land owned by the Research Center and the main complex of NASA, with the Baltimore-Washington Parkway adjacent to the complex.

3.3 Socioeconomic Characteristics

As a major Federal research center, GSFC has a significant impact on Prince George's County. The complex distributes approximately \$568,100,000 (FY 85) into the regional economy in payroll, construction of facilities, operations, and research and development. The facility is a major employer within the County, providing over 7,000 jobs. The GSFC is a popular tourist attraction drawing nearly 50,000 visitors annually.

While GSFC's employees represent all socioeconomic groups, the majority of the work-force personnel maintain a higher-than-average income. Approximately 49 percent of the work force earns an annual salary of more than \$40,000. The average annual median salary for civil service employees within GSFC is approximately \$36,029. The average annual household income for Prince George's County is approximately \$23,398 (NASA 1986).

As of mid-September 1989, approximately 3,636 civil service employees, 3,269 contract personnel and 432 other (visiting scientists, etc.) personnel were employed at NASA. The GSFC Master Plan expects the civil service personnel to remain relatively stable. Additional contractor personnel will be retained to perform on-site support services to NASA.

Approximately 800 employees will be transferred to the proposed facilities from other buildings within the NASA complex. The ESSB and the EOSDIS facilities will obtain 730 and 70 transferred employees, respectively. The prime shift at the EOSDIS and ESSB facilities will be 1,520 civil service employees and contractors. The ESSB will operate on eight-hour shifts, Monday through Friday, while the EOSDIS facility will operate on three eight-hour shifts, seven days per week. Immediate office

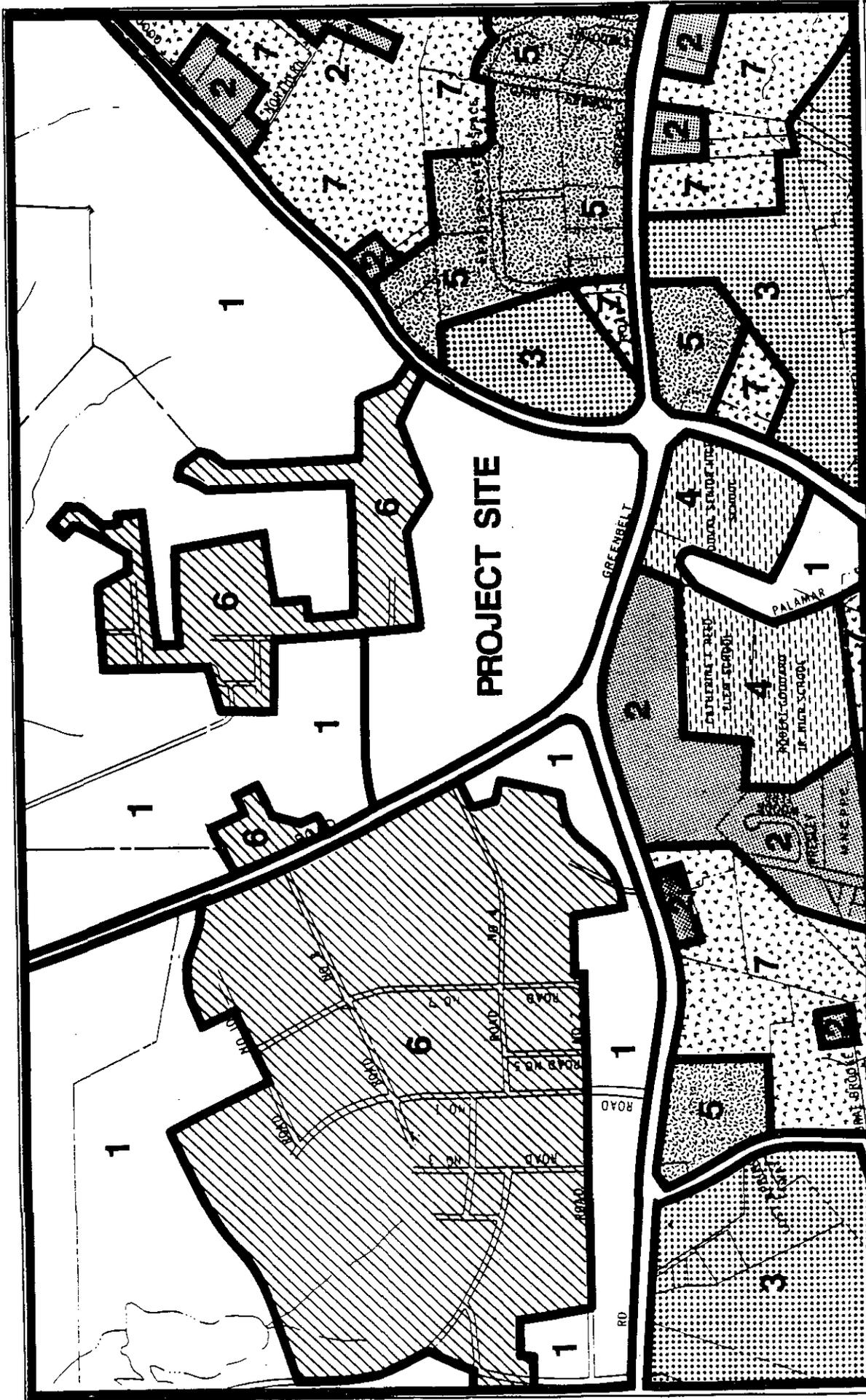


FIGURE 3-2



EXISTING LAND USE

LEGEND

- 1 Undeveloped (Public Lands)
- 2 Residential, SFD
- 3 Residential, MF
- 4 Institutional
- 5 Commercial
- 6 GSFC
- 7 Vacant (Private)

NASA GODDARD SPACE FLIGHT CENTER

EOS/DIS & ESSB SITE

vacancies will result from the transfer of employees and it is anticipated that the available space will be occupied by off-site contracting personnel and to assist in alleviating the current overcrowding at the Center. The timing and number of employees that will be phased into the vacant office space at GSFC is not precisely known at this time; however, the best estimate by GSFC staff is 600 including 300 new hires, 140 off-site contractors and 160 employees currently housed in trailers at GSFC. For the entire center, including the ESSB and EOSDIS facilities, it is estimated that by 1995, an additional 1,160 employees and contractors will be added to the GSFC.

The surrounding area of the NASA proposed site offers some commercial developments providing retail stores and restaurant alternatives for the employees of NASA. However, it appears that approximately half of the GSFC employees eat lunch within the complex and do very little retail shopping in the study area. Based on this information, the economic multiplier is assumed to be low.

Planning Areas (PA) of Prince George's County have been established by The Maryland-National Capital Park and Planning Commission. Master plans are developed, then adopted and approved by the County Council for each Planning Area. The Planning Areas are further separated into Policy Analysis Zones (PAZ) as represented in Table 3-1 and Figure 3-3. These zones are planned geographical areas delineated by major physical or environmental restrictions, such as roadway systems or streams, within the Planning Area. Section A of Table 3-1 presents the percentage of representative land use within the Planning Area. Section B represents the number of dwelling units and the population based on the dwelling units by the Planning Areas. The total dwelling units and population of the PAZs immediately surrounding the GSFC are represented as Section C of Table 3-1.

The main campus of GSFC situated west of Soil Conservation Service Road is located in Greenbelt, PA 67. The proposed ESSB and the EOSDIS site is located in PA 64. The Planning Area that is impacted the most by the proposed action is the Glen Dale, Seabrook and Lanham Planning Area (PA 70) consisting of mainly single-family and multi-family residential communities, in addition to some commercial and retail development. The Beltsville Agricultural Research Center is primarily agricultural lands

TABLE 3-1
 PRINCE GEORGE'S COUNTY LAND USE INVENTORY BY PLANNING AREA

A. Planning Area	Percent of acreage by major land use categories ²					Total Acres
	Residential	Commercial and Industrial ³	Public Service	Recreational and Cultural	Vacant ⁴	
64	.1%	.2%	60.0%	29.0%	10.0%	6,693
67	20.0%	5.0%	53.0%	2.0%	20.0%	6,549
70	35.0%	9.0%	8.0%	9.0%	39.0%	7,622

B. Planning Area	Existing Dwelling Units - Jan. 1989			Population - Jan. 1989		
	Single Family	Multi-family	Total Units	Single Family	Multi-family	Total
64	27	0	27	85	0	85
67	5,599	8,338	13,937	14,965	15,767	30,958
70	6,757	2,137	8,894	20,860	4,785	25,918
C. Total of Surrounding PAZs	3,591	4,820	8,411	10,395	9,746	37,062

² Information received Statistical Reference, Prince George's County, 1989, Maryland National Capital Park and Planning Commission, Upper Marlboro, Maryland.

³ Includes manufacturing, transportation, communication, utilities, trade, services, agriculture, mining and other resource production uses.

⁴ Vacant land represents properties that carry \$0 improvement values. Land may be in use in some form such as dedicated open space in residential areas, some farms, public properties and parks.

⁵ Group Quarters, institutional population, ie., hospitals, jails and nursing homes.

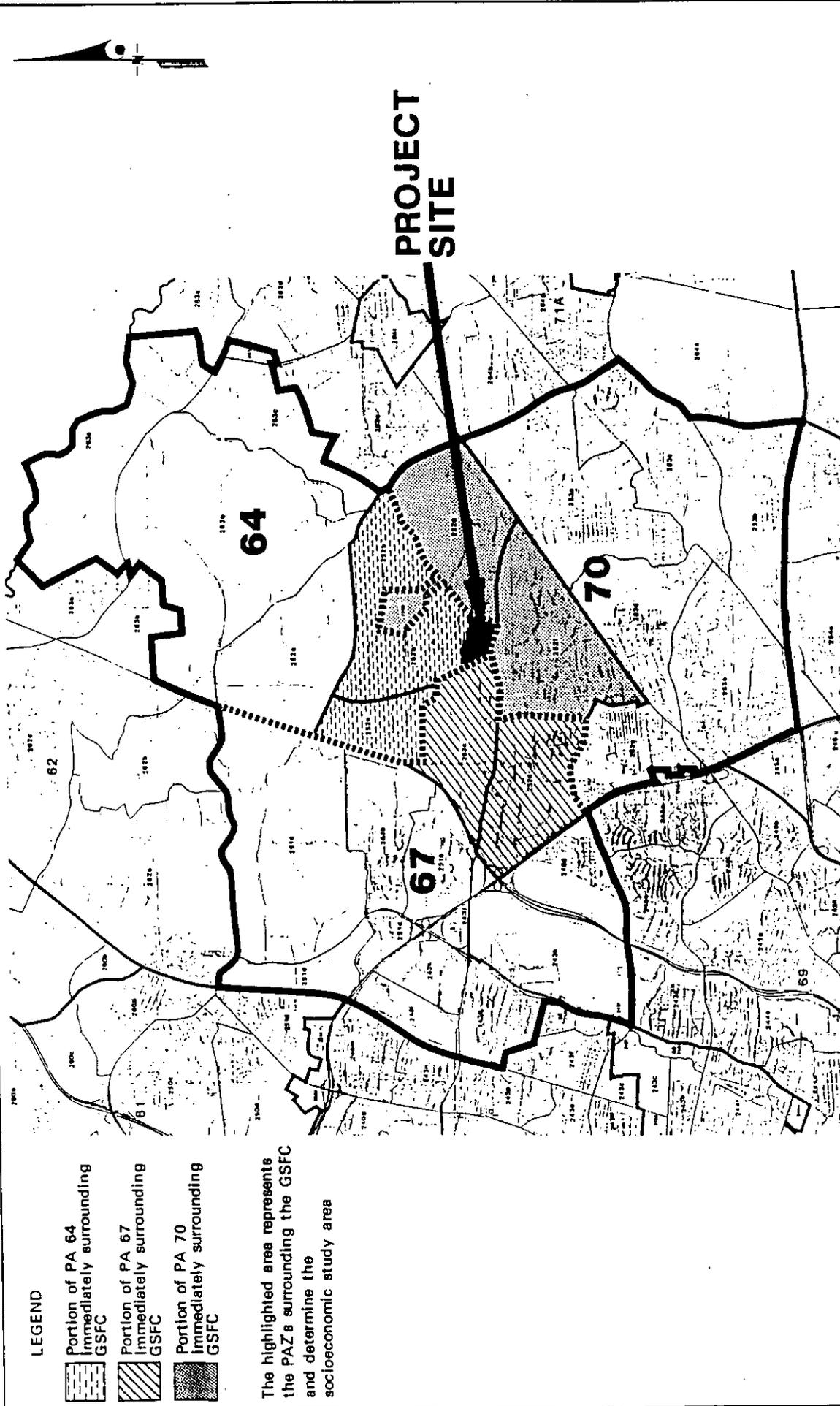


FIGURE 3-3

NOT TO SCALE

PLANNING AREAS AND POLICY ANALYSIS ZONES

NASA GODDARD
SPACE FLIGHT CENTER
EOS/DIS & ESSB SITE

north of the site located in the same Planning Area (PA 64) as the proposed project site.

Over the next 20 years, a slow to moderate growth in dwelling units and household population is expected to occur throughout the County. The immediate surrounding PAZs, as illustrated on Figure 3-3, are close to their maximum development potential. It is unlikely that any extensive infill development, other than additional research facilities at the Beltsville Agricultural Research Center will occur in PA 64 and 70.

3.4 Transportation

The Goddard Space Flight Center consists of approximately 1,270 acres. The Main Center is located along the north side of MD Route 193, east of the Baltimore-Washington Parkway, south of the Beltsville Agricultural Research Center, and primarily west of Soil Conservation Service Road. The total number of employees, both civil service and contractor, at the Main Center is approximately 8,000.

Access to the Main Center is provided at four locations: the Main Gate at MD Route 193, Gate No. 3 at the Baltimore-Washington Parkway, and Gate Nos. 4 and 5 on Soil Conservation Service Road. Gate No. 7 allows access to Building No. 25, east of Soil Conservation Service Road.

As part of a comprehensive traffic study for GSFC (Greenhorne & O'Mara, Inc.), the following intersections were analyzed under existing conditions:

- o MD Route 193 at Main Gate
- o Goddard Road at Explorer Road
- o Explorer Road at IUE Road
- o Goddard Road at Delta Road
- o Minitrack Road at Tiros Road
- o Soil Conservation at Gate No. 7
- o MD Route 193 at Cipriano Road
- o Goddard Road at Aerobee Road
- o Explorer Road at Delta Road
- o Explorer Road at Goddard Road
- o Goddard Road at Tiros Road
- o Soil Conservation at Gate No. 4
- o MD Route 193 at Soil Conservation
- o MD Route 193 at Good Luck Road

Each of the 14 intersections analyzed currently operate at an adequate level of service (LOS). The intersection of Soil Conservation Service Road and Gate No. 4, analyzed as an unsignalized intersection, indicated that the side street reserve capacity during the P.M. peak hour is only three vehicles. A reserve capacity of less than zero is considered inadequate. It is likely, given the fluctuation in daily traffic volumes, that the

intersection does, at times, fail. This means, that at peak hours some delays may be expected for traffic exiting GSFC onto Soil Conservation Service Road.

3.5 Physical Environment

3.5.1 Physiography

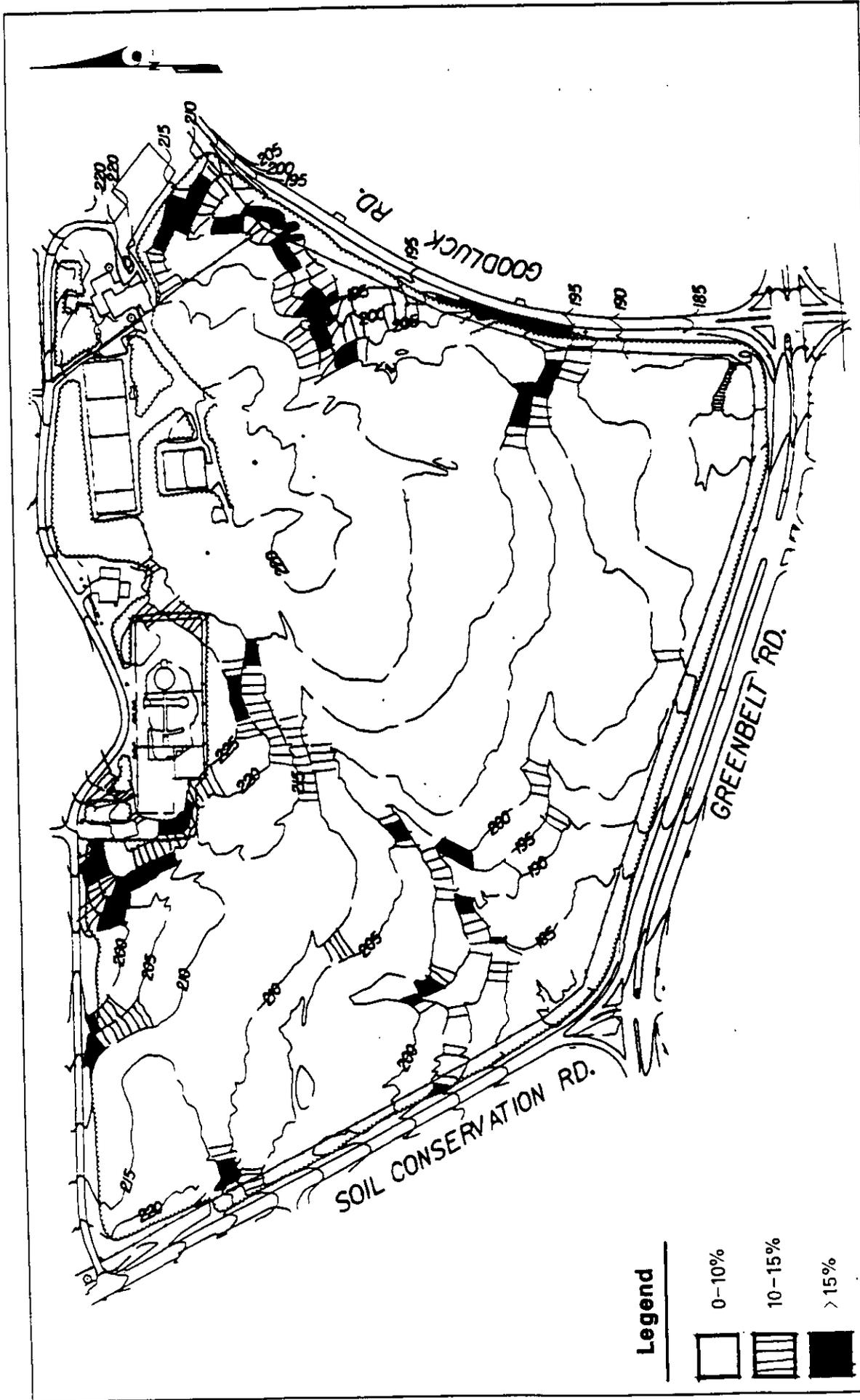
The project area is located in the Atlantic Coastal Plain Physiographic Province, which developed from marine sediments. This province is composed of gently seaward-dipping beds of unconsolidated sand and clay, with smaller amounts of underlying gravel and marl deposits. Elevations in the Coastal Plain increase in a westward direction and range from sea level in the east to several hundred feet above mean sea level in the west. Topography is characteristically flat in the east, and becoming gently rolling in the west. Coastal Plain watercourses typically have low gradients and tend to follow meandering channels; however, in some headwater areas, the stream channels are characterized by steep, v-shaped valleys. Coastal Plain soils tend to be easily eroded, which is often evidenced by extensive sediment build-up in local waterways.

Elevations at the project site range from approximately 180 feet above mean sea level to slightly over 214 feet. The area is located on a broad hilltop with gently rolling topography, characteristic of western portions of the Coastal Plain Physiographic Province. The site has gentle slopes with only a few areas adjacent to stream channels showing slopes greater than 15 percent (Figure 3-4).

A major drainage course crosses the site in a southwesterly direction. Intermittent streams on the northern section of the site flow to the northwest into tributaries of Beaver Dam Creek, which in turn drains into Indian Creek, the Anacostia River, and eventually to the Potomac River southeast of Washington, D.C. The southern portion of the site drains to the southeast into a tributary of the Western Branch and ultimately to the Patuxent River. These watercourses have a low gradient, typical of those located in the Coastal Plain Physiographic Province.

3.5.2 Geology

The site is located in the Coastal Plain Physiographic Province which is an eastward thickening wedge of unconsolidated or semi-consolidated sediments of Cretaceous to recent age. The Coastal Physiographic Province unconformably overlies a basement of crystalline igneous rock of



Legend

- 0-10%
- 10-15%
- > 15%

FIGURE 3-4

Scale in feet
 0 200' 400'

SLOPE MAP

**NASA GODDARD
 SPACE FLIGHT CENTER
 EOS/DIS & ESSB SITE**

Precambrian or Early Paleozoic age. The depth to the bedrock is in excess of 200 feet. The site is underlain by sediments of the Lower Potomac Group which include alluvial deposits of predominantly sand with layers of silty clay with some clay lenses. Due to the depositional environment which characterize these deposits, bedding tends to be discontinuous, forming lenticular masses.

Groundwater is generally encountered at depths below 45 feet; however, perched groundwater is encountered at shallower depths due to impermeable clay lenses and/or fragipan. In these areas perched groundwater may be encountered at depths as shallow as 9 feet.

Coastal Plain mineral resources are primarily clay, sand and gravel, which are used by the construction industry. These materials are extracted from numerous locations throughout Prince George's County. The sand and gravel strata are the major water-bearing units in the unconsolidated deposits. The major groundwater aquifer formations in the area are the Patuxent and Patapsco formations. While these formations are capable of yielding significant quantities of good quality water, they are not extensively used in the area. Public water supplies are predominately from surface sources.

3.5.3 Soils

Soils are important determinants of the suitability of a particular site for development. Of the six soils series identified on the GSFC tract and depicted in Figure 3-5, only four soil series are located within the proposed development envelope for the EOSDIS and ESSB buildings and accessory uses. These are the Beltsville, Christiana, Elkton, and Sunnyside soil series. These soils belong to the Christiana-Sunnyside-Beltsville Association which are generally characterized as deep, level to steep sloping, well-drained, sandy, and clayey soils or level to steep sloping, moderately deep, moderately well-drained soils that have a compact subsoil.

Table 3-2 lists the soil characteristics useful in evaluating soil constraints to development. The majority of the development envelope for the two facilities overlies three phases of the Beltsville soil series (B1A, B1B2, and B1C2). The Beltsville series are moderately well-drained soils developed in silty to sandy materials that were probably developed over old alluvium consisting of sand and gravel. These soils occur mainly

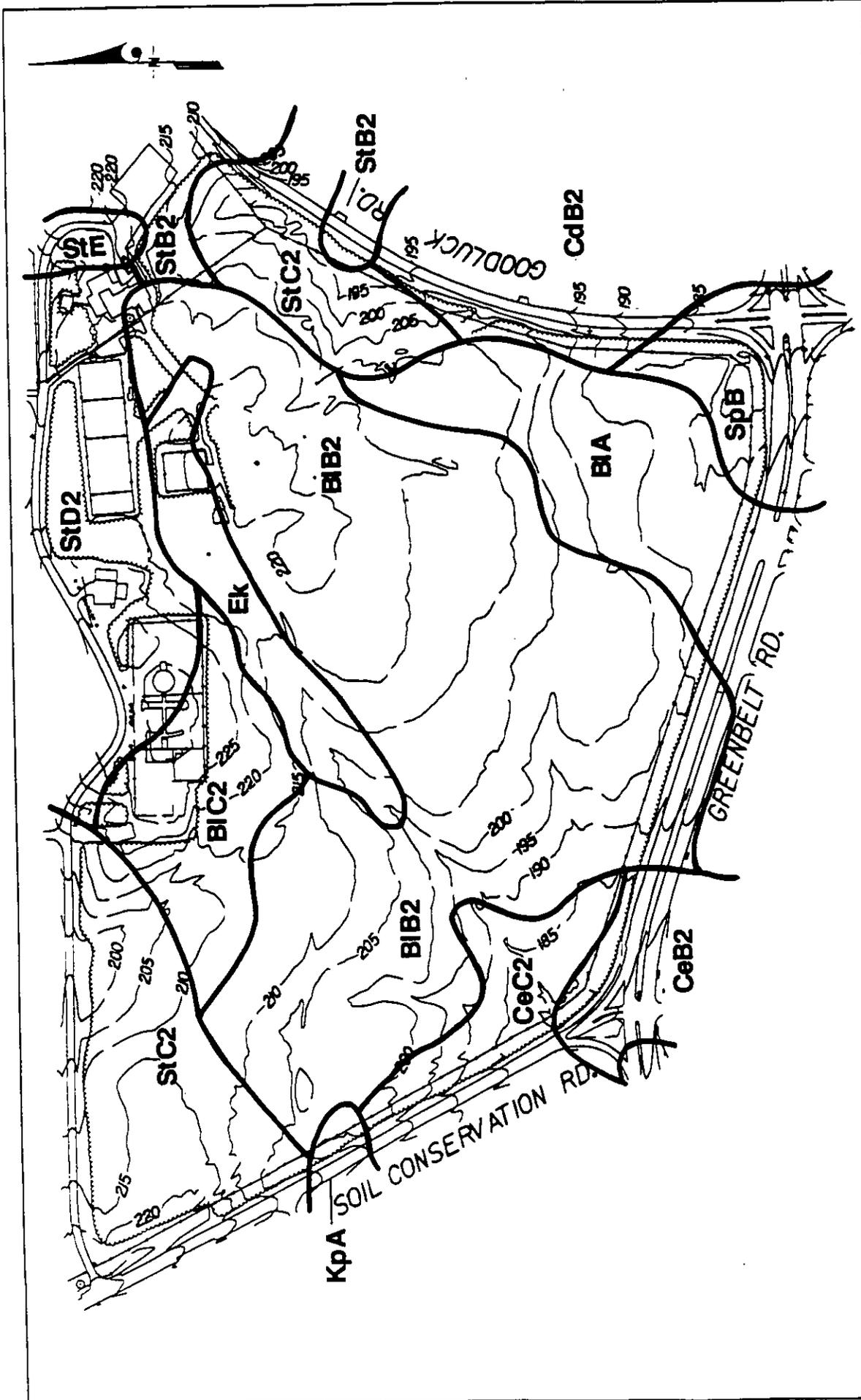


FIGURE 3-5

SOILS MAP

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EOS/DIS & ESSB SITE

TABLE 3-2
SOIL CHARACTERISTICS

Series	Phase ¹ Envelope	Within Development to Water Table ²	Depth	Hydric Soil	Hydrologic Group	Drainage Class	Erodibility	Suitability for Structures
Beltsville	B1A	*	1-2	Inclusions	C	Mod. well drained	Severe	Moderate
	B1B2	*	1-2	Inclusions	C	Mod. well drained	Moderate	Moderate
	B1C2	*	1-2	Inclusions	C	Mod. well drained	Moderate	Moderate
Christiana	CdB2		>5	---	C	Well drained	Slight	Severe
	CeB2		>5	---	C	Well drained	Slight	Severe
	CeC2	*	>5	---	C	Well drained	Moderate	Severe
Elkton	Ek	*	0-1	Hydric	D	Poorly drained	Slight	Severe
Keyport	KpA		1-2	Inclusions	C	Mod. well drained	Slight	Moderate
Silty & Clayey Land	SpB		NA	NA	NA	NA	Slight	Severe
	StB2	*	>5	---	B	Well drained	Slight	Slight
	StC2	*	>5	---	B	Well drained	Moderate	Slight
	StD2	*	>5	---	B	Well drained	Moderate	Moderate
	StE		>5	B	----	Well drained	Severe	Moderate

1 Third digit indicates slope class: A = 0-2%; B = 2-5%; C = 5-10%; D = 10-15%; E = 15-30%
The 2 shown in fourth digit indicates that soil phase is moderately eroded by past land use activities

2 Water table may be perched

on level to gently sloping uplands and have a thick, compact fragipan in the subsoil. The dense, non-cemented fragipan often leads to the presence of a perched water table.

The Christiana silty loam is a deep, well-drained soil with a surface layer of silty loam overlying a clayey subsoil. These soils, derived from thick beds of very old red clay, present severe constraints to development owing to the high shrink-swell potential of the clayey subsoil.

The Sunnyside series present only slight constraints to development. The Sunnyside fine sandy loam is a deep, well-drained soil which developed in fine sandy sediments and may contain a considerable amount of reddish clay.

The Elkton series is found along the major intermittent stream on the property and is a poorly drained soil with a gray, highly clayey subsoil, through which water infiltrates very slowly. Elkton soils have a high water table (0-1 ft) and are identified by Prince George's County and the U.S. Army Corps of Engineers as a hydric soil. These soils are often associated with nontidal wetlands. Elkton soils present severe constraints to development.

3.5.4 Hydrology and Flood Hazard

A major drainage divide crosses the northwest corner of the EOSDIS and ESSB site. The majority of the site is located within the Patuxent River Watershed, however, the northwest portion of site drains to Beaver Dam Creek, a component of the Potomac River Watershed. A subbasin boundary of the Patuxent drainage bisects the site running generally north to south. Runoff from the eastern half contributes to the Folly Branch Basin and runoff from the western half contributes to the Bald Hill Basin (Figure 3-6). These subbasins have existing outfalls in the form of cross drains discharging off site.

The Federal Emergency Management Agency (FEMA) floodplain map for the area does not include the GSFC property. Inspection of the FEMA maps do not indicate any encroachment of a mapped 100-year floodplain on adjacent parcels. While no detailed hydrology has been conducted for the intermittent streams, it can be assumed that the existing 100-year floodplain is confined to a narrow corridor along the stream channel.

In 1989, Greenhorne & O'Mara, Inc. designed a stormwater management pond for Greenbelt Woods which is just south of Greenbelt Road and directly

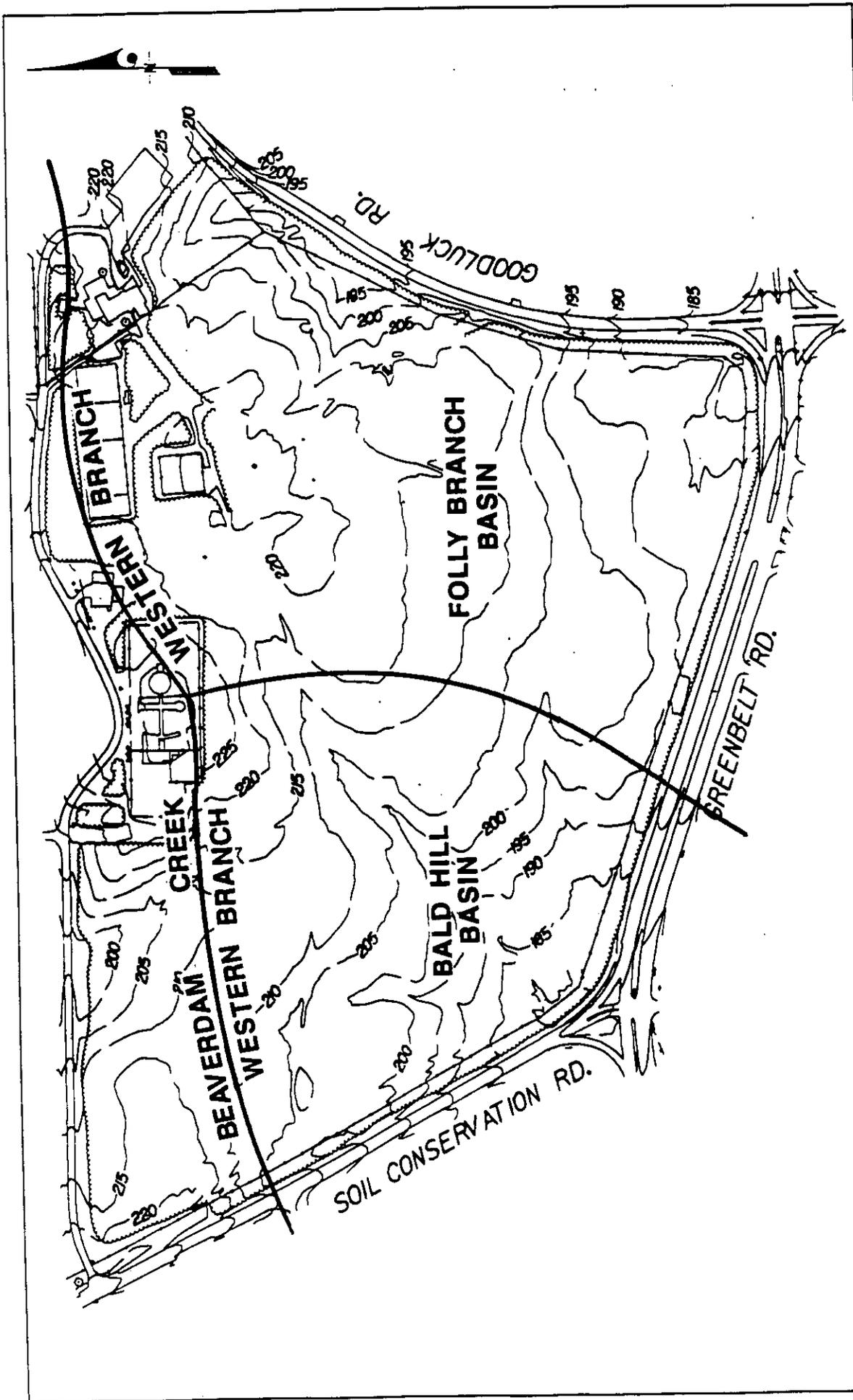


FIGURE 3-6

Scale in feet
 0' 200' 400'

SITE DRAINAGE MAP

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 SPACE FLIGHT CENTER
 EOS/DIS & ESSB SITE**

downstream of the EOSDIS and ESSB site. The pond was designed as an interim basin. In the future, a regional facility, designed by Walter B. Satterthwaite, Inc. for Washington Suburban Sanitary Commission, will be constructed to reduce 100-year discharges to the two-year flow. The majority of catchment area draining to this facility is NASA property and future development of the catchment area have been incorporated into the regional pond design.

3.5.5 Air Quality

The project site is located within the Washington metropolitan area (Area IV) of the State of Maryland air quality control areas and includes Prince George's and Montgomery Counties. Ambient Air Quality standards are in effect in Maryland for sulfur oxides, particulate matter, carbon monoxide, nitrogen dioxide, ozone, and lead.

The Washington metropolitan region does not meet the primary ambient air quality standards for carbon monoxide and ozone. Since 1983, the carbon monoxide levels have been steadily decreasing. At the Bladensburg air quality monitoring station, violations of the eight-hour standard have decreased from ten exceedences in 1983 to two exceedences in 1987. In recent years, ozone levels have fluctuated in the Maryland portion of the Washington metropolitan area, decreasing from 19 violation days of exceedence in 1983 to four days in 1986, but increasing to 12 days in 1987.

3.5.6 Noise

Noise at the site originates from off-site sources as the site is presently undeveloped. The primary off-site source of noise is from traffic along Greenbelt Road which abuts the southern portion of the site. The secondary sources of noise are from Soil Conservation Service Road which abuts the western portion of the site and from intermittent recreational activities at the Prince George's School complex which is located south of the site, immediately across Greenbelt Road. Noises generated at the site are mostly of natural origin (bird and insect sounds).

3.6 Natural Environment

3.6.1 Terrestrial Ecology

A field reconnaissance was conducted on March 23, 1990 to gather information on the terrestrial ecology of the site. Results of the survey indicate that the forest cover creates a near complete tree canopy. The

dominate canopy species are white oak (Quercus alba), back gum (Nyssa sylvatica), and red oak (Quercus rubra). Other members of the canopy include: Virginia pine (Pinus virginiana), hickory (Carya sp.), red maple (Acer rubrum), sweet gum (Liquidambar styraciflua) and tulip poplar (Liriodendron tulipifera). The understory consists primarily of rhododendron (Rhododendron nudiflorum), flowering dogwood (Cornus florida), American holly (Ilex opaca), sassafras (Sassafras albidum) and young canopy species. The dominant ground cover is blueberry (Vaccinium sp.) with localized areas of greenbrier (Smilax sp.), multiflora rose (Rosa multiflora) and Virginia creeper (Parthenocissus quinquefolia).

Although the upland hardwoods dominate the tract, several drainage swales and low/moist areas have a different dominance pattern favoring hydrophytic species are also found. The typical wetland indicators, in order of frequency of occurrence, are black gum, red maple, sweet gum, willow oak (Quercus phellos) and river birch (Betula nigra). The wetlands found on site are described in Section 3.6.3.

Widely spaced Virginia pines are scattered throughout the tract and in some nearly pure stands. These isolated stands of pines are located on the higher elevations and along the northern edge of the tract. The Virginia pines and young hardwoods are of little commercial value. The mature hardwoods, however, contain many trees of marketable size and quality. Some of the mature oaks, however, have recently been killed by stressed conditions induced from previous gypsy moth damage. The tree stand density is approximately 420 hardwood trees per acre.

Because the majority of the site consists of an upland hardwood forest, wildlife identified on the site included typical upland species. Birds were identified by sight and/or song, mammals were identified by sight, tracks, and other evidence such as scat. Species identified included gray squirrel (Sciurus carolinensis), northern catbird (Dumetella carolinensis), northern flicker (Colaptes auratus), eastern chipmunk (Tamias striatus), black-capped chickadee (Parus atricapillus), mourning dove (Zenaidura macroura), and white-tail deer (Odocoileus virginianus).

The Environmental Resources Document for the GSFC lists other mammals as inhabiting the area including red fox, gray fox, skunk, woodchuck, opossum, rabbit, and red squirrel (NASA 1986). The report documents as many as 89 species of breeding birds on the GSFC property.

3.6.2 Aquatic Ecology

No perennial streams or ponds are located on-site and the intermittent streams do not hold water long enough to support an aquatic ecosystem.

The site is located in the Potomac River and Patuxent River drainage basins. Waters in this area of the Potomac basin are classified by the state as Class III waters (non-tidal). This portion of the Potomac River does not support a trout fishery, and there are no drinking-water intakes in the vicinity of the site.

3.6.3 Wetlands

Two types of wetlands are located on the site (Figure 3-7). The first type of wetland is palustrine forested deciduous with a temporary water regime (PF01B), and is approximately 80 feet in diameter. This wetland is located in the central portion of the site at approximately 205 feet elevation. This forested wetland had approximately six inches of standing water at the time of the field visit (March 23, 1990). Subsequent site visits during late summer revealed no standing water. The predominant vegetation is black gum, sweet gum and red maple. This type of wetland is also referred to as vernal pool, meaning that it has standing water during the spring, but is usually dry throughout the summer and fall. The pool will occasionally have standing water for brief periods immediately following rainfall. Vernal pools generally occur as a result of poorly drained subsoils as evidenced by soil samples which displayed hydric characteristics of gleying and mottling.

The other type of wetland on the site is riverine (R4SB4), associated with the drainage swales and intermittent stream system that crosses the site in a southwesterly direction. Although the riverine wetland classification is not dominated by hydrophytic vegetation or necessarily the presence of hydric soils, the U.S. Army Corps of Engineers has jurisdiction of these wetlands and these intermittent streams are considered waters of the United States. The upper portion of this system receives stormwater from the surrounding built environment which has expanded the riverine wetland into a palustrine forested wetland (PF01A) consisting of a young, dense stand of red maple, sweetgum, tulip poplar, and willow oak. Based upon our experience, the U.S. Army Corps of Engineers would assert jurisdiction over at least one of the swales, as well as the intermittent streams and the isolated wetland.

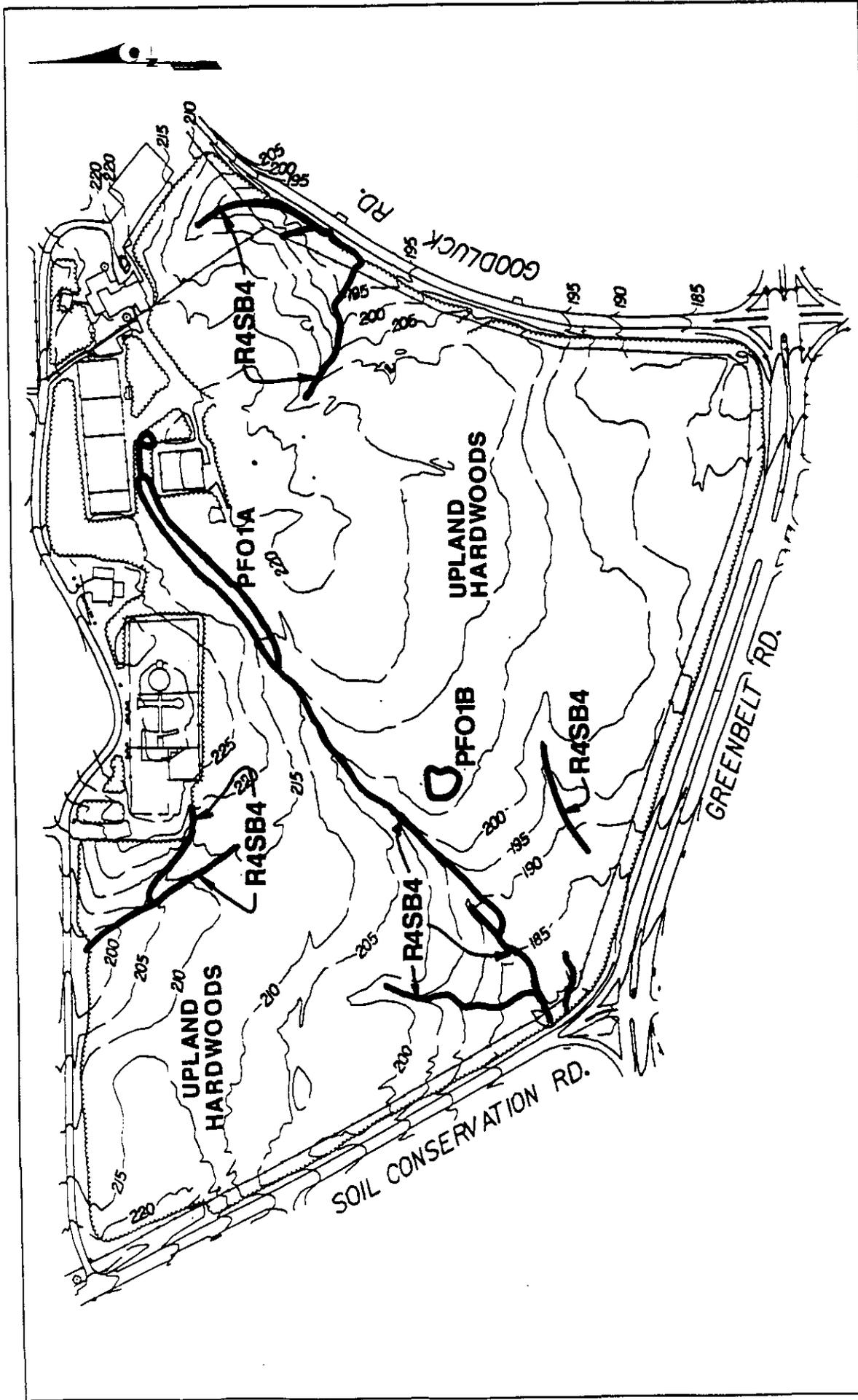


FIGURE 3-7

Scale in feet
 0 200 400

VEGETATION TYPES AND WETLAND CLASSIFICATIONS

NASA GODDARD SPACE FLIGHT CENTER
 EOS/DIS & ESSB SITE

Wetlands were identified through aerial photointerpretation, supplemented by field-estimation techniques. The wetlands were located by estimating distances from observable structures (road, fences, etc.) and topographic features.

3.6.4 Rare, Threatened, or Endangered Species

Coordination with the U.S. Fish and Wildlife Service and the Maryland Natural Heritage Program (Maryland Department of Natural Resources) has determined that no Federal or state designated rare, threatened or endangered species exist within the study area. No rare, threatened or endangered species were identified during field reconnaissance.

3.7 Cultural Resources

No historic standing structures and no known archeological sites exist on the proposed project site. An assessment of potential for archeological resources, based on a review of published and unpublished sources and the files of the State Historic Preservation Office (SHPO), at the Maryland Historical Trust, determined that the project area would have a high potential for prehistoric and/or historic archeological sites (Greenhorne & O'Mara 1991). The SHPO concurred with G&O's preliminary assessment that the project site has high potential for archeological resources (Maryland Historical Trust 1990).

The site's location on a ridge between the Patuxent and Patuxent watersheds would have been important in prehistoric times for travel between these two drainages. In addition, areas of well-drained soils on the hilltop or adjacent to wetlands at the headwaters of streams, or along Good Luck Road, which is an historic road, would have a high potential for prehistoric and historic archeological sites.

3.8 Hazardous Waste

A site inspection was conducted to identify and evaluate any areas which exhibited conditions suggesting that environmental contamination may have occurred. Examples of such conditions would include active or former refuse dump sites, unusual excavated or filled areas, areas exhibiting discolored soils and/or vegetative stress, discolored surface water, areas exhibiting noticeable odors, and unusual discarded containers or other suspicious materials.

The site inspection, conducted on October 5, 1990, did not reveal the presence of any such indicators as referenced above. Only scattered cans,

bottles and tires were observed on the site. The site is entirely covered by a growth of mixed hardwoods and pines in excess of 50 years, as judged by their trunk diameters and crown heights, indicating that the site has not been significantly disturbed for at least that amount of time. Remnants of several haul roads, possibly remaining from earlier logging on site, were observed throughout the site, as were existing unpaved roads and trails associated with the GEWA archery range on the site. None of the roads appeared to be heavily or regularly used. A chain link fence surrounds the site on the east, south and west sides, effectively preventing any unauthorized access or dumping.

Adjacent land uses consist of apartment dwellings to the east, schools and single-family dwellings to the south, and additional wooded land to the north. A maintenance facility, auto hobby shop, tennis courts and a recreation center are located directly adjacent to the site along its northern perimeter. Nothing was observed at any of these facilities which has or may potentially contaminate the site.

The U.S. EPA's National Priority List (NPL) of known, uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program, and the Comprehensive Environmental Response Compensation Liability Information System (CERCLIS) were reviewed to identify any such sites on or near the site in order to assess any potential impact to the project area as a result of the migration of contaminants. Results of that review revealed no NPL or CERCLIS sites are located within a one mile radius of the site.

Some laboratory spaces within the proposed ESSB building will require the use of hazardous materials. A separate hazardous material study is underway and should be complete prior to the start of the design. The intent is that quantities of these substances will only be stored in this facility within the limits and requirements allowable in tables 9-A and 9-B of the Uniform Building Code. The facility will be designed to provide area separations between the mixed uses as required by the code. Construction of the facility will meet the requirements of Type I Fire-Resistive Construction which allows unlimited floor areas and building height for the occupancies contained in this facility.

CHAPTER 4.0

ENVIRONMENTAL CONSEQUENCES

4.1 Direct Effects and Their Significance

4.1.1 Land Use

The proposed project site is located on Federal lands within the Goddard Space Flight Center. The proposed project site is forested and some mature second growth woodland would be lost as a result of this project. The only existing land use that would be displaced is recreational; an archery range is located on the northeastern portion of the project site. No changes to surrounding land use are anticipated. Therefore, no significant direct adverse or beneficial impacts to land use would result from this project.

4.1.2 Socioeconomic

Approximately one-half of employees and contractors who will be housed in the EOSDIS and ESSB facilities are currently housed at other building within the GSFC (800 employees and contractors). The increase in the number of employees at GSFC as a result of this project is 750.

The 750 new hires (civil service, contractors, and visiting scientists) expected from the construction of the two facilities will have a minimal impact on the Washington metropolitan economy. Based upon GSFC data on the existing work force, the new hires will locate throughout the greater metropolitan area (NASA 1986). That study showed that 53 percent of the 1985 work force lived in Prince George's County, 20 percent in Montgomery and Ann Arundel Counties, and an additional 27 percent distributed throughout the greater Washington area, including Virginia. Although the economic multiplier for the GSFC is assumed to be low, some beneficial impact to the surrounding restaurants and stores is anticipated. No significant direct adverse or beneficial socioeconomic impacts are anticipated as a result of this project notwithstanding the beneficial economic effects of project construction on the local economy.

4.1.3 Transportation and Infrastructure

Traffic impacts directly and indirectly related to the construction of the EOSDIS and ESSB facilities represent a substantial adverse impact. Direct effects relate to the relocation of 800 personnel to the new facilities east of Soil Conservation Service Road and the impact on the surrounding road network. Indirect effects relate to additional vehicular

trips generated by personnel that may utilize the vacated space at GSFC in the future (an additional 440 civil service employees and contractors). Both are described in this subsection.

A recent traffic analysis investigated the impact of short-range expansion of GSFC on both internal and external intersections including the development of the EOSDIS and ESSB facilities east of Soil Conservation Service Road (Greenhorne & O'Mara, Inc. 1990). Other development projects within the study area, capital improvement projects by state and local agencies, and regional growth outside the immediate study area were also considered. In addition to the 14 intersections analyzed under existing conditions, the 1995 analysis considered the intersection of Soil Conservation Service Road at Gate No. 5 (existing entrance to Visitor Center) and Good Luck Road and the proposed new gate location.

There are no state or county projects funded for construction, i.e., those that would be in place by 1995, that would impact traffic conditions in the vicinity of GSFC. While there is no capital improvement program for the Baltimore-Washington Parkway, there are several projects in progress that will likely be completed by 1995. They include mainline Parkway safety improvements and the relocation of the northbound off-on ramp at MD Route 193. This will improve traffic conditions in Greenbelt by reducing peak hours delays through the interchange and improve levels of service along MD Route 193. In addition to including traffic expected to be generated by approved development in the area, a growth rate was applied to existing traffic to represent regional growth outside of the immediate study area. Based on historical trends, a 2 percent annual rate was applied from 1990 through 1995.

Expansion projects at GSFC including the EOSDIS and ESSB facilities expected to be in place by 1995, will increase the number of overall employees and require the relocation of approximately 1,780 employees and contractors. The 1995 traffic analysis utilized a conservative assumption that the estimated 1,550 employees of the EOSDIS and ESSB Facilities, many who currently occupy existing GSFC space, will be replaced by additional employees and contractors by 1995. The additional trip generation east of Soil Conservation Service Road will require that the intersection of Soil Conservation Service Road and Gate No. 5 (Explorer Road/Loop Road) be constructed with separate right, left, and through lanes. It is also

possible that as through traffic also increases, a traffic signal would be necessary to facilitate the turning movements.

Acceptable Level of Service (LOS) for intersections were determined using Prince George's County criteria which defines "acceptable" as LOS D or better for signalized intersections and E or better for unsignalized side street intersections. Each critical intersection operates at an acceptable LOS (see Table 4-1) after the development of the EOSDIS and ESSB with the exception of the following:

- o MD Route 193 at Main Gate
- o Soil Conservation Service Road at Gate No. 4
- o Soil Conservation Service Road at Gate No. 5
- o MD Route 193 at Soil Conservation Service Road
- o MD Route 193 at Good Luck Road
- o PM peak hour - LOS E
- o PM peak hour - LOS F (unsignalized)
- o PM peak hour - LOS F
- o PM peak hour - LOS F
- o PM peak hour - LOS F

Table 4-1

Level of Service (LOS) Definitions

<u>Level of Service</u>	<u>Description of Conditions for Intersections</u>
A	Free and unobstructed flow, no delays and all signal phases sufficient in duration to clear all approaching vehicles.
B	Stable flow, very little delay, a few phases are unable to handle all approaching vehicles.
C	Stable flow, delays are low to moderate, full use of peak direction signal phase(s) is experienced.
D	Approaching unstable flow, delays are moderate to heavy, significant signal time deficiencies are experienced for short durations during the peak traffic period.
E	Unstable flow, delays are significant, signal phase timing is generally insufficient, congestion exists for extended duration throughout the peak period.
F	Forced flow, in urban area flow may cease or approach "grid-lock."

The improvements necessary to provide adequate LOS (levels D or better) at these signalized intersections were determined and are described below.

Soil Conservation Service Road at Gate No. 4

The existing signal at this intersection should be turned from flashing to full-phase operation. The existing reserve capacity is low enough that the signal will likely have to be activated by 1995 as development occurs. Following planned improvements, this intersection will operate at LOS D or better.

Soil Conservation Service Road at Gate No. 5

After the completion of the EOSDIS and ESSB facilities and the extension of Explorer Road to Good Luck Road, the traffic will increase at this location such that a traffic signal may be necessary to obtain an adequate LOS. Depending upon the schedule for the two new facilities, it should be installed and operational by the year 1995. Following planned improvements, this intersection will operate at LOS D or better.

MD Route 193 at Main Gate

The exit from the Center should be expanded to accommodate an additional left turn lane to eastbound MD Route 193 by the year 1995. Following planned improvements, this intersection will operate at LOS D or better.

MD Route 193 at Soil Conservation Service Road

The southbound approach of Soil Conservation Service Road should be expanded to accommodate an additional left turn lane to eastbound MD Route 193. This should be provided by the year 1993. Following planned improvements, this intersection will operate at LOS D or better.

MD Route 193 at Good Luck Road

The Greenbelt Woods development has been approved by the county conditioned upon providing some improvements to this intersection. They must construct an additional eastbound through lane along MD Route 193 as well as provide an additional westbound left turn lane to southbound Good Luck Road. Further improvements at this intersection will not be necessary to support continuing expansion at GSFC through the year 1995. Following planned improvements, this intersection will operate at LOS D or better.

4.1.4 Physical Environment

4.1.4.1 Geology and Soils

The proposed project will not interrupt any existing or projected future uses of geologic or soil resources at the project site. There are no prime or unique soils at the site.

While no geotechnical hazards have been identified at the proposed building locations, the soils found on-site do present some potential development constraints. The proposed site plan for the EOS buildings avoids development on the soil types with severe development constraints (Christiana, Elkton, and silty and clayey land). These constraints relate to shrink-swell problems and drainage problems associated with a perched water table. The majority of the development envelope is located on Beltsville soils which show moderate development constraints owing to a dense fragipan which may impede drainage.

A preliminary geotechnical study of the proposed project site supported the soil survey information and found that standard engineering design practices for foundations, basements and pavement are suitable for this site (Century Engineering 1989). No groundwater was encountered except in boring B5 where groundwater was encountered at a depth of nine feet. The groundwater encountered is considered to be a localized, perched water table attributable to the presence of clay layers and site topography. A wet stormwater management pond is proposed in this low lying portion of the site and the subsurface conditions present may well be an asset in designing a permanent pool of water. Additional geotechnical investigations will be needed at the final design stage.

4.1.4.2 Hydrology and Flooding

The proposed project will not require construction within or over a waterway. No critical facilities are known downstream of the project site.

No portion of the project site is contained within a designated 100-year floodplain or floodway. No detailed hydrology has been conducted for existing or future site conditions; however, the size of the drainage basin contributing to the major intermittent stream on-site leads to the assumption that no mass grading will occur within the existing 100-year floodplain.

The stormwater management concept calls for the required on-site stormwater quantity and quality treatment through the use of a retention

pond (wet). The stormwater management pond will be located in the southwestern portion of the site and will be designed in accordance with Maryland Department of the Environment Stormwater Management Guidelines for State and Federal Projects.

4.1.4.3 Air Quality

The site will experience short-term, localized air-quality degradation during construction of the EOS facilities. This will result from wind erosion of disturbed soils and from operation of vehicles and heavy construction equipment. These emission sources will be temporary and are not expected to be significant. The proposed site is a considerable distance (approximately 1,500 feet) from the closest sensitive receptors.

Once the EOSDIS and ESSB facilities are completed, an additional 10 percent in vehicular traffic is anticipated (without ride-sharing). This increase in vehicular traffic will have a corresponding increase in emissions, however, when viewed in context to the surrounding Washington metropolitan area, will not have a significant impact on air quality.

4.1.4.4 Noise

The site will experience short-term localized increases in noise levels during construction of the EOS facilities. This is not expected to affect other operations at GSFC or the surrounding community. The isolated location of the proposed project site and the considerable wooded buffer proposed around the two buildings, will attenuate construction noise emanating from the site. The adjacent GSFC recreational facilities including tennis courts and recreation center will be most effected by construction-related noise. The proposed buildings are a considerable distance (greater than 1,500 feet) from residential and institutional receptors.

Once the facility is operational, its principle noise sources will be increased vehicular traffic and facility maintenance operations which are not expected to generate significant noise levels.

4.1.5 Natural Environment

4.1.5.1 Terrestrial Ecology

The construction of the EOSDIS and ESSB facilities and accessory uses will necessitate the clearing of approximately 43 acres of mature forest. This estimate of the disturbance envelope for both buildings, access road, and accessory uses is based on the following information: grading plan for

ESSB site; preliminary grading analysis for EOSDIS facility; assumption that a 3 acre pond will be needed for stormwater management; and, the disturbance of 0.65 acre estimated for physical plant building, to be located just north of EOSDIS facility. About 47 acres around the perimeter of the site will remain in its predominately wooded condition.

The proposed project will replace the mature, second growth forest habitat with a developed land use. While edge habitat between forest and field will be increased by the development, edge habitat is not limiting in surrounding urban environment. The proposed development may adversely impact forest interior dwelling bird habitat. Wildlife associated with the proposed development envelope is expected to be displaced. While some song birds and small mammals may be expected to continue to utilize the buffer area, larger mammals including fox, racoon and deer inhabiting the project area will be displaced.

Overall, the proposed project will reduce an island of terrestrial habitat to a small fringe area, effectively altering the character of the site's terrestrial ecosystem. Since the site is not strongly linked to a larger terrestrial system, no regional ecosystem is expected to be disrupted by the project.

4.1.5.2 Aquatic Ecology

The proposed project will not adversely affect any on-site or adjacent aquatic environment.

4.1.5.3 Wetlands

The construction of the EOSDIS and ESSB facilities will require filling of less than one acre of nontidal wetlands and the wetlands impacts should be eligible for a Nationwide Permit under the U.S. Army Corps of Engineers Section 404 permit guidelines. The wetlands impacted include palustrine forested and several intermittent channels (waters of the United States).

The site planning process for the two facilities included concerted efforts to avoid wetland impacts. The layout of the two facilities straddles the major riverine and palustrine wetland that bisects the site. While adjustments to the orientation of the ESSB building could have avoided direct impact to the isolated forested wetland, it was impossible to preserve the drainage basin that provided the hydrology necessary to support the forested wetland. Minimization techniques were incorporated into the site design to restrict wetland impacts to necessary road

crossings, stormwater management and minor lot fill. There were no practicable alternatives to the wetland fills, which total much less than one acre.

These unavoidable wetland impacts will require mitigation, preferably through creation of forested wetlands on-site. Wetland mitigation may be integrated with the proposed stormwater management facility or at a utility crossing on the major intermittent stream (between the EOSDIS and ESSB buildings). Current U.S. Army Corps of Engineers' policies will most likely require a mitigation ratio of 2 to 1 for forested wetlands. These wetland impacts are based on estimated wetland boundaries and conceptual plans. Wetland impacts and mitigation design will be refined during final engineering design.

4.1.5.4 Threatened and Endangered Species

Coordination with the U.S. Fish and Wildlife Service and the Maryland Forest, Park, and Wildlife Service shows that no rare, threatened or endangered species are present on the project site. Therefore, no direct impacts to any Federal- or state-listed species will result from the proposed project.

4.1.6 Cultural Resources

The assessment of archeological potential for the project area concluded that portions of the project area on well-drained land on the hilltop, or adjacent to wetlands and the headwaters of streams, or along historic Good Luck Road would have a high potential for prehistoric or historic archeological sites. Under the National Environmental Protection Act and the National Historic Preservation Act, the State Historic Preservation Officer (SHPO) has required that a Phase I archeological survey be conducted to identify any archeological sites that may be impacted by this project (Maryland Historic Trust 1990). The Maryland Historic Trust has concurred with the proposed scope of services to investigate the archeological potential of the site (Phase I Survey).

A Phase I archeological investigation was conducted of the entire project area. This investigation identified no cultural resources potentially eligible to the National Register of Historic Places. The report presenting the results of this investigation has been submitted to the Maryland State Historic Preservation Office at the Maryland Historical Trust together with a letter requesting their concurrence that no further archeological is warranted for this project.

4.2 Indirect Effects and Their Significance

4.2.1 Land Use

The project is not anticipated to generate any significant housing or commercial development in the surrounding community. An analysis of recent employee housing preferences indicates that 53 percent of the civil work force reside in Prince George's County, 30 percent in neighboring Montgomery and Anne Arundel Counties and the remaining 17 percent reside elsewhere in the greater Washington metropolitan area (NASA 1986). Indirect effects on land use are primarily residential in nature, resulting from additional contractors reutilizing vacated space from civil service employees transferred to the new ESSB and EOSDIS facilities. While an accurate projection is not available at this time, the best estimate is an additional 440 contractors and new hires by 1995. The additional work force can be readily absorbed into the greater Washington housing market.

4.2.2 Socioeconomics

No significant indirect socioeconomic consequences are anticipated as a result of the proposed action. An additional new 440 employees or contractors are anticipated to fill the vacated space at the main campus. While the economic multiplier for the Center is assumed to be low, the additional work force will provide some economic benefit to the surrounding community. The increase is not large enough to generate a need for additional commercial services in the surrounding communities. Many of the potential job openings will be in specialized research areas and some non-technical support positions will be filled by residents in the surrounding community.

4.2.3 Transportation and Infrastructure

Indirect impacts on traffic are described in Section 4.1.3.

4.2.4 Physical Environment

The proposed project is not expected to have significant indirect effects on the physical environment. The EOSDIS and ESSB site is located outside of the electromagnetic, optical, laser, and explosion hazard buffers required for GSFC testing facilities north and northeast of the project site (GSFC Facilities Master Plan 1988). However, consideration of potential sources of electromagnetic interference which could affect the Earth Station facilities and the Propagation and Test facility should be incorporated into the engineering design state. The proposed height of the

EOS facilities should not interfere with the "viewing window" for many of the antenna systems located in the nearby Network Training and Test Facility (NTTF).

4.2.5 Natural Environment

The proposed project is not expected to have significant indirect effects on the natural environment.

4.2.6 Cultural Resources

The proposed project is not expected to have significant indirect effects on cultural resources.

4.3 Possible Conflicts Between the Proposed Action and the Objectives of Federal, State, Regional and Local Policies.

The proposed action is consistent with the GSFC Facilities Master Plan. The proposed action is not in conflict with Prince George's County's comprehensive planning objectives, nor is the proposed action in conflict with any other known regional, state, or federal policies.

4.4 Comparison of the Environmental Effects of Alternatives Including the Proposed Action.

Two actions were evaluated as viable alternatives for the expanded mission of the Earth Sciences Directorate, NASA. There are (1) construction of the EOSDIS and ESSB buildings at the preferred site at GSFC (the proposed action) and (2) no-action. Two additional alternatives to the proposed action were evaluated and dropped from further consideration as viable alternatives owing to site constraints, engineering difficulties, infrastructure requirements and adjacency requirements. The following presents a comparison of the proposed action and no-action alternative.

Compared with the no-action alternative, the proposed action will have some limited effects on the physical and biological conditions at the proposed project site and minimal cumulative effects on the surrounding region. The project will require minor grading of the site and will commit the on-site soils to an urban land use. The project will not disrupt any existing or projected resource extraction nor are on-site soils considered a special resource (i.e., prime or unique farmland soils). Noise levels are projected to increase during the construction phase and operational noise levels are not anticipated to adversely affect off-site areas.

The proposed development will increase the impervious surface at the site leading to increased stormwater runoff. The proposed stormwater management concept for the site will offset increased runoff and, in

addition, provide some water-quality benefits. Several small first-order stream channels will be filled by the mass-grading of the site. These channels are considered waters of the United States and unavoidable impacts to these channels will require mitigation.

The proposed action will result in the loss of approximately 43 acres of mixed deciduous forest and associated wildlife habitat. Songbirds and small mammals will be lost from the proposed project site. The proposed project will not affect any aquatic habitat. The proposed action will result in the unavoidable loss of less than one acre of nontidal wetlands. Mitigation for wetland lost is required and should be provided on-site, if possible.

The no-build alternative would not provide any economic benefits to the local economy in terms of construction, operations and additional employment opportunities.

4.5 Any Irreversible and Irretrievable Commitments of Resources that Would be Involved if the Proposed Action is Implemented.

One irreversible and irretrievable commitment of resources associated with this project is the loss of less than one acre of nontidal wetlands. This wetland loss can be mitigated by creating new wetlands; however, the art and science of wetland creation cannot duplicate the complexity and full-functional value of naturally occurring wetlands. The conversion of the on-site soils to an urban land use is another irreversible and irretrievable commitment of resources associated with the proposed action.

4.6 Any Probable Adverse Environmental Effects Which Cannot be Avoided Should Proposal be Implemented.

The proposed project will result in the lost of approximately 43 acres of forest habitat and its associated wildlife.

Elevated noise levels will be an unavoidable consequence of project construction and operation. Construction noise will be temporary, and operational noise will result from facility traffic and maintenance operations. Neither of these are expected to adversely affect land uses in the surrounding area.

4.7 Means to Mitigate Adverse Environmental Impacts.

There are several opportunities to mitigate the adverse environmental impacts associated with this project. One recommendation is to minimize forest cover removal. Wooded buffers should be left undisturbed surrounding the two building sites and bordering Soil Conservation Service

Road, MD Route 193 and Good Luck Road. Within the development envelope and in areas where little cut or fill is proposed, it is recommended that specimen trees be preserved. When final engineering plans are developed, selected trees, especially in the parking areas, should be surveyed, and where appropriate, their preservation incorporated into landscaping plans.

Wetland mitigation will be necessary for the fill associated with the palustrine forested wetlands and riverine wetlands (intermittent channels). These wetland impacts represent unavoidable impacts. Road access dictates one of the wetland fills and modifications to the site plan could not eliminate the direct or indirect impacts to the isolated forested wetland located on the ESSB Site. Riverine impacts are minimal and are necessitated by the grading plans which will require filling several first-order intermittent stream channels.

The proposed stormwater management facility for the project provides an ideal opportunity for a multipurpose pond. A wet pond can be designed which incorporates wetland creation, water-quality protection, wildlife habitat enhancement, and creates a visual amenity for the two facilities while also providing the water-quantity controls required by the state's stormwater management program. Forested wetland mitigation can be incorporated in to the area adjacent to the stormwater management facility creating a diverse set of habitats in close proximity. Wetland and adjacent upland areas can be planted with a mix of plant species selected to provide improved wildlife habitat.

Efforts could be undertaken to increase the percentage of ride-sharing at the Center in an effort to save energy and reduce automobile emissions.

CHAPTER 5.0

AGENCY COORDINATION

During the preparation of this environmental assessment, the following agencies were contacted:

1. Maryland Department of Natural Resources, Forest, Park and Wildlife Service.
2. Maryland National Capital Park and Planning Commission.
3. Maryland State Historic Preservation Office (Maryland Historical Trust).
4. Prince George's County Office of Planning.
5. Prince George's County Soil Conservation Service.
6. U.S. Fish and Wildlife Service.

CHAPTER 6.0
LIST OF PREPARERS

<u>Name and Degree</u>	<u>Expertise Applied to EA</u>	<u>Experience</u>
NASA		
Denise Fay-Dombrowski, Registered Architect BArch, MA	NASA Planning Section Facilities Engineering Division	Thirteen years' architectural and project planning experience
Greenhorne & O'Mara, Inc.		
Kathy Fitzpatrick, M.A.	Environmental Project Management	Eleven years' experience in natural resource management and NEPA document preparation.
Pieter De Jong	Project Coordination	Fourteen years' experience in environmental planning, resource management and environmental assessments
Jody Hopkins, PhD.	Cultural Resources	Twenty-seven years' experience in prehistoric and historic cultural resource surveys.
Debra Walker, B.S.	Land Use; Socio- economics	Fifteen years' experience in environmental management and agency coordination.
John Murosko, M.S.	Geology; Hazardous Waste Site Assessment	Six years' experience in geological investigations and two years' experience in hazardous waste investigation and site audits.

Jeff Tyburski	Geology; Hazardous Waste Site Assessment	Four years' experience in hazardous waste investigation, industrial hygiene and site audits.
James Ingram	Wetlands	Two years' wetland investigation and mitigation design.
Joel Smith	Wetlands	Fifteen years' experience in wetland investigation, research and mitigation design.
Carey Yates	Water Resources	Four years' experience in water resource planning, engineering and permitting.
Matt Storck	Transportation	Nine and a half years' experience in transportation planning and engineering.
Dennis Plouff	Site Planning	Eighteen years' experience in site engineering and planning.
Julie Liptak	Graphic Illustrations	Twelve years' experience in technical and scientific document illustrations.

CHAPTER 7.0

REFERENCES

- Greenhorne & O'Mara, Inc. July 1990. Engineering Corporation. Goddard Space Flight Center Traffic Study Phase I. Greenbelt, Maryland.
- Greenhorne & O'Mara, Inc. December 1990. Cultural Resources Assessment, Greenbelt, Maryland.
- HTB, Inc. Architects, Engineers, Planners. December 1989. Earth Observation System Data and Information Storage Facility. Greenbelt, Maryland.
- Maryland Department of the Environment. May 1988. Air Management Administration Data Report. Quarterly Report of Air Pollution Measurements in Maryland, January, February, and March 1988. Baltimore, Maryland.
- Maryland Department of the Environment, Air Management Administration. 1987. Maryland Air Quality Data Report. Baltimore, Maryland.
- Maryland Historic Trust. October 1990. Letter to Denise Fay-Dombrowski, NASA. (See Appendix)
- Maryland-National Capital Park and Planning Commission. March 1988. Forecasts of Growth in Prince George's County, Maryland. Upper Marlboro, Maryland.
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- National Aeronautics and Space Administration. January 1986. Environmental Resource Dowment. Goddard Space Flight Center.
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- National Aeronautics and Space Administration. May 1982. Facilities Engineering Handbook.
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- National Aeronautics and Space Administration. April 1980. Implementing the Provisions of the National Environmental Policy Act.

APPENDIX



United States Department of the Interior

FISH AND WILDLIFE SERVICE
DIVISION OF ECOLOGICAL SERVICES
1825 VIRGINIA STREET
ANNAPOLIS, MARYLAND 21401

August 30, 1990

Mr. Jeffrey B. Tyburski
Environmental Geologist
Greenhorne and O'Mara, Inc.
9001 Edmonston Road
Greenbelt, MD 20770

RE: NASA Earth Observation
System
Data Information Storage
Facility

Dear Mr. Tyburski:

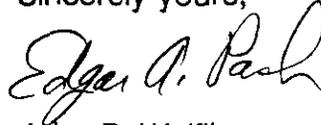
This responds to your August 27, 1990, request for information on the presence of species which are Federally listed or proposed for listing as endangered or threatened within the area affected by construction of the cited facility in Greenbelt, Maryland. We have reviewed the information you enclosed and are providing comments in accordance with Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 Consultation is required with the Fish and Wildlife Service. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

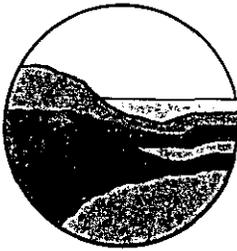
This response relates only to endangered species under our jurisdiction. It does not address other Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other legislation.

Thank you for your interest in endangered species. If you have any questions or need further assistance, please contact Andy Moser of our Endangered Species staff at (301) 269-5448.

Sincerely yours,

A handwritten signature in cursive script that reads "Edgar A. Pash".

For John P. Wolflin
Supervisor
Annapolis Field Office



Maryland Department of Natural Resources

Forest, Park and Wildlife Service

Tawes State Office Building
Annapolis, Maryland 21401

William Donald Schaefer
Governor

Torrey C. Brown, M.D.
Secretary

Donald E. MacLauchlan
Assistant Secretary

September 21, 1990

Mr. Jeffrey B. Tyburski
GREENHORNE & O'MARA, INC.
9001 Edmonston Road
Greenbelt, MD 20770

RE: Earth Observation System Data and
Information Storage Facility -
Goddard Flight Space Center

Dear Mr. Tyburski:

This is in response to your request for information regarding the above referenced project. There are no known Federal or State threatened or endangered plant or wildlife species present at this project site.

The forested areas on the project site may be utilized as breeding areas by Forest Interior Dwelling Birds. The habitat of these birds is rapidly disappearing in Maryland. Conservation of this habitat is not mandated outside of the Chesapeake Bay Critical Area, but we will assist those interested in voluntarily protecting it.

If you have any questions regarding this please contact Bill Gates at (301) 827-8612.

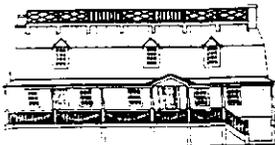
Sincerely,

James Burtis, Jr.
Director, Planning and Program Development

JB:dec

cc: Bill Gates
Lynn Davidson
Bill Bond
ER# 90.08.619

MARYLAND
HISTORICAL



TRUST

William Donald Schaefer
Governor

Jacqueline H. Rogers
Secretary, DHCD

October 17, 1990

Ms. Denise Fay-Dombrowski, Architect
Goddard Space Flight Center, NASA
Mail Code 272.1
Greenbelt, Maryland 20771

Re: Proposed Earth Observing
System Facilities
Prince George's County, Maryland

Dear Ms. Fay-Dombrowski:

Thank you for sending us the detailed description, plans and preliminary environmental assessment for the proposed Earth Observing System (EOS) Facilities. Based on the materials submitted with your letter (dated 11 September 1990 and received by the Trust on 20 September 1990), we concur that the 88 acre project area has a good potential for containing prehistoric and/or historic archeological resources.

Therefore, this office recommends that an archeological survey be conducted of the project area well in advance of the proposed new construction. The purpose of the survey is to identify and evaluate any archeological resources that may be impacted by the new EOS facilities. The survey should be performed by a qualified professional archeologist and conducted in accordance with the enclosed "Guidelines for Archeological Investigations in Maryland" (McNamara 1981) and the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (1983). Based on the survey results, we will be able to determine whether or not significant archeological resources will be affected by the project and make appropriate recommendations. Our office is available to provide guidance and technical assistance on the recommended investigations, if desired. We encourage NASA to complete the survey early in project planning stages, in order to allow adequate time to resolve any archeological concerns in advance of construction.

Maryland

Division of Historical and Cultural Programs
Department of Housing and Community Development
Shaw House, 21 State Circle, Annapolis, Maryland 21401 (301) 974-5004

Ms. Denise Fay-Dombrowski
October 17, 1990
Page 2

The proposed construction will have no effect on historic standing structures listed in or eligible for the National Register of Historic Places.

If you have questions or require further information, please call Ms. Lauren Bowlin (for structures) or me (for archeology) at (301) 974-5007.

Thank you for your cooperation and assistance.

Sincerely,



Elizabeth J. Cole
Administrator
Archeological Services
Office of Preservation Services

Enclosures (2)

EJC/LLB/lld

cc: Mr. Donald Creveling
Mr. Joseph McNamara
Mr. Dale Manty
Ms. Gail Rothrock