1. NAME OF PROPERTY

Historic Name: General Motors Technical Center

Other Name/Site Number: N/A

2. LOCATION

Street & Number: Bounded by 12 Mile, Mound and Chicago roads Not for publication: N/A

City/Town: Warren Vicinity: N/A

State: Michigan County: Macomb Code: 099 Zip Code: 48090

3. CLASSIFICATION

Ownership of Property		Category of Property	
Private:	X	Building(s):	___
Public-Local:	___	District:	X
Public-State:	___	Site:	___
Public-Federal:	___	Structure:	___
		Object:	___

Number of Resources within Property

Contributing	Noncontributing	
13	5	buildings
1	___	sites
7	3	structures
3	___	objects
24	7	Total

Number of Contributing Resources Previously Listed in the National Register: 24

Name of Related Multiple Property Listing: N/A

DRAFT

4. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ____ nomination ____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ____ meets ____ does not meet the National Register Criteria.

Signature of Certifying Official Date

State or Federal Agency and Bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria.

Signature of Commenting or Other Official Date

State or Federal Agency and Bureau

5. NATIONAL PARK SERVICE CERTIFICATION

I hereby certify that this property is:

___ Entered in the National Register
___ Determined eligible for the National Register
___ Determined not eligible for the National Register
___ Removed from the National Register
___ Other (explain): _____

Signature of Keeper Date of Action

6. FUNCTION OR USE

Historic:	INDUSTRY/PROCESSING/EXTRACTION	Sub:	Other (research facility)
	LANDSCAPE	Sub:	Other (corporate estate park)
Current:	Same	Sub:	Same

7. DESCRIPTION

ARCHITECTURAL CLASSIFICATION: Modern Movement: International Style

MATERIALS:

Foundation:	concrete
Roof:	asphalt
Walls:	steel, glass, neoprene
Other:	

SUMMARY

The General Motors Technical Center (hereafter the Technical Center) is nationally significant as one of the most important works of architect Eero Saarinen (1910-1961). The Technical Center represents several key aspects of this renowned architect's career. The first of these is that the Technical Center marks his emergence onto the international stage as an important designer independent of his work with his father Eliel, first bringing him to wide national attention and acclaim. The Technical Center project was embraced around the world as the embodiment of the spirit of the post-World War II age in America and of the prosperity and modernity of the nation and its people. The second of these is that this campus represents Saarinen's work not just as a creator of buildings, but as the planner/designer of total environments. At the Technical Center, Saarinen worked with and orchestrated key collaborators on the campus's buildings and their material details, construction methods, landscape, furniture and furnishings, and artwork, creating a design totality unparalleled in the period that established a key working method for the architect. Finally, the Technical Center is also significant as the first of four influential Saarinen suburban corporate campuses (along with later projects for IBM, Bell Laboratories, and John Deere), that set the design standard for this important post-World War II landscape and architectural type that represented a sea change in American business facilities.

While the Technical Center is also associated with a number of other nationally significant individuals, including automobile and industrial designer Harley Earl and General Motors executives Alfred P. Sloan and Charles F. Kettering, the Technical Center illustrates neither the areas of significance of these individuals nor, more importantly, the period in which the nationally significant achievements of these men were made. Further, while the nationally significant landscape architect Thomas Church was involved in the design of the Technical Center, it cannot be considered to be a signature design by Church. In contrast to the domestic projects for which Church is most widely known and recognized, and on which he himself wrote influentially for a large American audience, Church contributed aspects of the landscape to the Technical Center, but was not the design leader for it. The project is undoubtedly characterized by a degree of technical and artistic collaboration, but under the principal design aegis and direction of Eero Saarinen.

Describe Present and Historic Physical Appearance.

INTRODUCTION

The General Motors Technical Center in Warren, Michigan, is a suburban corporate research campus located in the northern suburbs of Detroit. The form of the campus today represents several phases of work and the collaboration of the Saarinen firms with a number of important partner firms and individuals. Initial planning, design, and preparatory site work for the project took place in 1944-45, with Saarinen and Swanson as architects and Eliel Saarinen as the design leader. After a hiatus in the project caused by material and cash shortages and GM's preoccupation with a significant United Auto Workers strike, the principal phase of the project was begun in 1949 under a new agreement with Saarinen and Saarinen under the design leadership of Eero Saarinen working with his father before the elder Saarinen's death in 1950. After Eliel Saarinen's death, his son changed the name of the firm, and continued the project under Eero Saarinen and Associates.

Although the Saarinen firm, particularly Eero Saarinen, was the design leader for the overall project, other design firms and General Motors itself played key collaborative roles beyond the conventional roles of the client and subcontractors. The participants included architects and engineers at Smith, Hinchman & Grylls, who served not just as project engineer, but also as the firm that produced project specifications and working drawings. The Saarinen firm worked with California landscape architect Thomas D. Church primarily in a consultant capacity to develop a planting plan for the site and Detroit landscape architect Edward Eichstedt developed specific planting lists and supervised the landscape development. GM's in-house architect and real

estate arm, Argonaut Realty, handled construction supervision and took the lead on the buildings whose purpose was most technical, with the Saarinen office acting as consultants. The Saarinen office also worked collaboratively with GM's Styling Section designers to develop the details of interiors in a number of locations. Other GM divisions provided technical expertise with regard to developing special glazes for exterior brick, neoprene gaskets for windows, and sandwich-panel insulated walls.

Construction for the main phase was complete in 1956, and the Technical Center was dedicated in May of that year. Beginning in 1957, additions were made to several of the building groups either by the Saarinen office or by Argonaut, continuing the form and materials of the main phase and not adversely affecting the design of the whole and thus its integrity. The buildings and the components of the landscape setting of the Technical Center Campus range from fair to excellent condition.

SETTING

The historic Eero Saarinen-designed Technical Center campus is located on the western half of a large parcel in Warren, Michigan owned by General Motors and bounded by Mound Road on the west, Van Dyke Avenue on the east, Twelve Mile Road on the South, and Chicago Road on the north. This large property and its surroundings are marked by relatively flat topography and is roughly bifurcated by a railroad line (historically the Michigan Central Railroad) that runs north-south. The General Motors contiguous landholdings in Warren also include a smaller parcel on the south side of Twelve Mile Road.

Today, the entire GM property in Warren is often referred to as the Technical Center. A multitude of period documents contemporary with the completion of the Technical Center make clear, however, that in 1956, when the campus opened, its boundary stopped at the rail line on the east; the eastern portion of the GM property beyond this boundary held other GM facilities (Fisher Body Central Engineering and General Administration; GM Photographic; and Chevrolet Engineering). These facilities were considered to be separate from the Technical Center and its essential research purposes even though these were, generally speaking, contemporary with the main period of construction of the Technical Center and the Saarinen office served as design consultant to Argonaut realty for the earliest buildings. While the eastern portion of the site in Warren shares some details with the Technical Center in that its buildings also reflect an orientation to the cardinal points, rectilinearity, and in some cases share a material palette with the Saarinen Technical Center campus, however, the eastern half lacks the landscape details and sense of overall focus and organization that the Saarinen design conception gives to the Technical Center campus.

On the west side of the Technical Center, Mound Road, a six-lane, divided road with no shoulder, provides a clear perimeter to the Technical Center and serves to separate the property from the surrounding, low-density, low-rise commercial development that grew up around Technical Center after the completion of its initial phase of construction.

CAMPUS ORGANIZATION AND DESIGN PRINCIPLES AND MATERIALS

The Technical Center campus is organized through underlying Modernist principles of modularity, horizontality, planarity, rectilinearity and orthogonality that unite the buildings and their landscape setting as a design whole. The landscape elements and buildings each share a unified vocabulary of materials and design details and an underlying sense of grid geometry in which linear elements of varying scales are arranged in balanced but not symmetrical compositions, in effect taking the Miesian modernist principle of floating planes to the scale of an entire campus. Both the landscape elements and the buildings' volumes were carefully arranged in plan in order to suggest a shifted or off-set arrangement of linear forms that are oriented to the cardinal points. Throughout the campus, planar, rectangular prismatic volumes of the buildings and linear elements in the landscape, particularly single and double rows of trees, are calculatedly off-set with respect to

each other so that through-axes and more traditional allées are eschewed except at key points of emphasis. Vertical and curvilinear elements in the campus provide other points of emphasis and dramatic contrast to the repeated rectangular and linear forms. Historic site lighting is provided throughout the site by standard "mushroom" downlight painted steel fixtures. Broad, historic concrete walkways are located around the perimeter of the central lake and provide pedestrian connection between and around buildings.

Overall, the Technical Center campus is oriented north-south, and is organized in two main zones. The primary zone consists of five major building groups associated with the historic research discipline divisions brought together for the first time at the campus (Research, Styling, Engineering, Process Development, and Service), as well as the facility's Central Restaurant. These building groups are arrayed in an orthogonal pattern on three sides (north, east and south) of a central, rectangular-plan artificial lake that provides the Technical Center campus with its main point of visual focus and emphasizes the horizontality and large, automobile scale of the design. The main entrance is located through a gate house on Mound Road on the west side of the lake. The primary zone has two axes: the principal axis is created by the lake and the two building groups on its north and south, and is reinforced by the campus main roads which run north-south on the east and west of the lake. The eastern road leads to the secondary historic entrance to the campus on the south from Twelve Mile Road. On the north of the lake stands the Research Group and on its south the Styling Group, which, by their placement on this axis, take up a higher status in the implied campus hierarchy. The main campus secondary axis is created by the lawn area and double road on the east of the main entrance, and is continued by the lawn fronting the Central Restaurant on the east. A smaller, quadrangle space is created by the two administration volumes of the Engineering and Process Development Groups, on the south and north, respectively, of the lawn area, and the restaurant.

The next layer outside of the main building groups in this primary zone is occupied by rectilinear-plan parking areas found further away from the lake. A rectangular perimeter road forms an exterior circulation circuit. On the southern and western side of the main zone, gridded tree "forest" (the designers' term) plantings form a buffer screen from Mound Road and Twelve Mile Road.

The southeastern portion of the Technical Center is the former location of the Water Pumping Plant and Sewage Treatment Plant facility for the campus. This area has recently been changed by the removal of these buildings and the construction of a new parking deck in their former location, and by the introduction of a traffic rotary north of the Twelve Mile Road entrance.

The eastern border of the historic Technical Center is formed by the Check Road, which was created as part of the initial period of construction and used for various types of vehicle testing. The Check Road terminates in a loop at the north that retains its historic banking. The Technical Center is divided from the rest of the GM property on the east by the rail line.

To the north of the perimeter road is found the second main campus zone, where historically three smaller specialized testing and research buildings (Isotope Laboratory, Gas Turbine Building, and the Wind Tunnel) were located in a small quadrangle-like composition. The three original testing and research buildings were disposed to form a small quadrangle in this portion of the campus. Two later buildings (Research, Safety, Health and Environmental Building and the Facilities Operations Building) have been added to this portion of the Technical Center campus. A secondary, service entrance to the campus is located on Chicago Road. This entrance was established after the realignment of Chicago Road in the late 1970s.

LANDSCAPE (1 contributing site) AND ASSOCIATED RESOURCES

The Technical Center landscape is unified by the approach to geometry noted above, through landscape features that emphasize linearity and floating planes in the grid in walks, roadways and parking lots, in plantings of trees and shrubs, in water features and fountains, and in roadways and parking lots. Materials including river stones used in planting beds, around the buildings, and at the edges of the lake and reflecting pools, further unify the design. As is true for the buildings, the palette of materials and approaches to design in the landscape represents a relatively restricted and tightly controlled range. The grid and line geometry that predominate throughout mark the modernist approach manifest in the landscape. The tree plantings parallel the building volumes as linear, sculptural forms in the landscape. Because of the flat topography of the site overall, the lawn areas, the lake and reflecting pools, and the parking lots all serve as a varied palette of rectangular fields of the ground plane. The orthogonal roadway system serves visually as borders to these rectangular fields.

Planting

The original scheme for the Technical Center planting defined the planting of trees in two different approaches – the "forest" perimeter and more general tree planting—the use of evergreen screen plantings, the installation of ground covers, hedges, and other incidental plantings (mostly evergreen), and the establishment of lawn areas. Although individual trees have been lost in a number of locations, these four planting approaches remain those seen in the landscape to the present.

Trees

The "forest" trees planted in a grid pattern along the western and southern perimeter of the Technical Center campus and between the western side of the central lake and the parking areas on the northwest part of the lake form one character-defining historic element of the landscape design, and corresponded to the bulk of the original planting in the formerly open agricultural landscape that preceded the establishment of the Technical Center campus. This planting of mixed deciduous species on a 15' center grid survives in these original locations. In the rest of the campus, tree planting was done in two main ways. The first of these consists of single or double rows of regularly spaced trees of single species and varieties, mostly along the roadways, at the edges of the parking lots, in the islands within the parking lots, and in lawn areas to provide accents. The double rows were planted in a carefully staggered arrangement to suggest two slightly off-set planes rather than a partial grid. A character-defining feature of these row plantings, and what differentiates the way they were planted from more traditional allées of trees or rows along roadways, is that they represent asymmetrically disposed, linear "floating plane" features in the campus landscape oriented either north-south or east-west.

The second principal mode was the planting of individual specimens. Historic photographs and documentation indicate that some 300 large specimens were planted as part of the project, many of which were planted in rows. Tree species historically consisted of flowering smaller trees, including cherry and crabapple trees, a number of specimens of which survive on the campus today, and taller, deciduous shade trees.

Shrubs

The largest number of shrubs planted for the project were evergreens of two species: yews and juniper. The yews planted for the project were mostly of the species and variety Taxus media "Hatfieldii" (Hatfield yew). Today, historic trimmed yew hedges can be found at the edges of parking lots and in long rows flanking the main entrance on Mound Road. Pfitzer junipers, planted in rectangular-plan beds of river stones, were character-defining foundation plantings around many of the buildings and survive and/or have been replaced in kind in a number of locations.

Water Features and Fountains (3 contributing structures and 2 contributing objects)
The Technical Center campus's water features and fountains are among the most important elements of the landscape. In addition to the twenty-two-acre, rectangular-plan, central lake, two large reflecting pools, also rectangular in plan, are points of focus for the Engineering Group (Global Portfolio Development Center) and the Styling Group. All three of these artificial bodies of water were constructed with shallowly-sloped embankments of river stone and concrete curbs surrounding the river stones.

The central lake also features four asymmetrically disposed, partial-width, linear-plan islands that represent another manifestation of the floating plane motif, that were historically all covered in the river stone of the embankments, and which project into the lake off-center from all four sides. The river stone of some of the islands has been obscured by naturally occurring compost and sedimentation. All of the islands are close to, but separated from the embankment except the north island (peninsula), which is close to the eastern end of the walkway canopy that extends from the lobby volume of the Research Group (Research Center). These islands historically were planted in a staggered, double row of weeping willow trees, which survive to a varied extent.

The central lake also features two fountains. The southern fountain consists of a staggered, double-row of thin vertical jets on axis with the main entrance on Mound Road. The second fountain, at the northwestern corner of the lake, was designed by sculptor Alexander Calder and plays in a variety of patterned sequences named "Fantails," "Seven Sisters," "Plops," and "Scissors."

The eastern reflecting pool, oriented north-south like the central lake, has neither a fountain nor islands. The 1980 addition to the Shop volume of the Engineering Group (Global Portfolio Development Center) led to a relatively small reduction of the lake on its eastern side. The southern reflecting pool, framed by the Styling Group (Design Center), is oriented east-west. It features a fountain in its western portion with jets that project out to form an outer circle and central jets that shoot upward.

Water Tower (1 contributing structure)
One of the most striking features of the campus is the stainless steel-clad water tower located on the northeast corner of the central lake. This water tower, built in the summer of 1954, supplies pressure for emergency uses. It functions visually as the counterpoint to the aluminum-clad dome of the Styling Auditorium building at the southwest corner of the lake. These two shining, light-colored metal elements provide key curvilinear moments in the predominantly rectilinear geometry of the campus.

Antoine Pevsner *Bird in Flight* (1 contributing object)
One of the character-defining features of the exterior of the Styling Group (Design Center) on the south side of the central lake is the abstract, bronze sculpture by sculptor Antoine Pevsner. This sculpture, *Bird in Flight*, stands in its historic location to the west of the entrance canopy of this building.

System of Circulation: Roads, Sidewalks, and Parking Lots (1 contributing structure and 2 noncontributing structures)
Devised for an automobile company and constructed on a vast scale, the Technical Center campus predictably accommodates driving and parking in a cohesive system of roads and parking lots. Pedestrian circulation via sidewalks and walkways predominantly parallels the roadways and is contained within the overarching orthogonality of the site's disposition and layout. A perimeter road encircles the entire central portion of the Technical Center—the buildings of the five principal divisions arrayed around the lake and the parking lots behind these building groups—with only one short interruption to the east of the Central Restaurant. Between 2003 and 2005 the small parking area to the east of the Central Restaurant and the adjacent segment of the

perimeter road were turned into lawn. The perimeter roadway has also been altered at the southeast corner of the campus with the addition of a traffic rotary (noncontributing) at the Twelve Mile Road entrance in 2002-03, intended to improve traffic flow between the entrance, the perimeter road, and the principal north-south orthogonal roadway. The North and South Campuses were historically and presently located outside the bounds of the perimeter road.

Except for the parking lots to the northwest of the central lake, which are screened by the "forest" trees, parking lots in a variety of sizes and configurations nearly encircle the campus on what might be considered the "back" side of the buildings comprising the five division groups. The parking lots are historic with the exception of a lot (noncontributing) added around 2000 on the north side of Styling Group Auditorium, which is hidden from main entrance roadway at Mound Road by berming on the parking lot's north. The lots are lighted with single and double clamshell standards typical of the period of development.

BUILDINGS

The buildings of the five historic groups of the campus around the central lake consist of both buildings of connected volumes and separate (often single-volume) buildings. Historically, both the connected volumes of different functions and the separate buildings have been referred to by name as "buildings." For the sake of consistency and in order to categorize resources appropriately, the following description refers to historically linked masses of a single building as "volumes" and historically separate constructions as "buildings."

Exteriors

The buildings of the Technical Center consist of asymmetrical compositions of low-rise, rectangular prismatic, flat-roofed volumes. Broadly speaking, these volumes fall into two categories – administration and technical – that relate both to their historic uses and functions and to their construction methods and configurations. Historically, each building group (except the Central Restaurant) consisted of at least one building with one administration and one technical volume each; these volumes were linked by a connector, either a volume or enclosed walkway. All the historic groups have had additions (either volumes or buildings or both) except for the Central Restaurant. The larger building groups, the Research Group and the Styling Group, each have added specialized volumes and secondary buildings relating to the group's function.

Each building group historically had, and retains today, its projecting entrance canopy volume which either faces north or south. These projecting volumes, glazed in full-height glass panels, some of which are moveable in order to let cars into these volumes for display, contain the main lobby spaces of the building or open directly into them.

With the exception of some of the smaller, specialized testing and research technical buildings, which have partitions or sections of reinforced concrete, the buildings are of steel frame, curtain wall construction. The bay dimensions of the structural steel frame are based on a multiplier of an approximately five-foot module most visibly manifested in the sandwich panel wall system. The bay dimension of the steel varies from one building to the next and can vary within different parts of the same building depending on plan and interior arrangement. In most buildings, the structural bay dimension varies between five and thirty feet. The interior structure is either a steel frame or truss system depending on the presence or absence of large internal clear-span spaces in each of the building volumes. The technical volumes and buildings tend to be built on either fifteen- or thirty-foot frame modules in order to allow for clear-span, open shop plans, while the administration volumes and buildings tend to be built on smaller frame modules reflecting the smaller subdivisions of office spaces and common corridors.

The exteriors of the buildings are clad in two primary material systems, glazing and glazed brick, which vary in treatment by whether the volume or building is either administrative or technical. The original administrative volumes, which are all oriented east-west, and therefore have long facades on the north and south elevations, are clad on these long elevations in a sandwich panel system of prefabricated parts on the five-foot module. The structural steel frame is expressed in several dimensional variations on the exterior. This panel system consists of an aluminum frame in which is set a double-glazed, main window section in which the glass (greenish-blue tinted on the exterior, colorless on the interior) is set in neoprene gaskets. The glazing is flanked above and below by porcelain enameled steel panels, which are doubled on the interior on the lower panels, with insulation between the panels. The exterior porcelain enamel panels vary in color in a palette of grays and tans, with the colors forming rows across the elevations. In some locations on some elevations, the porcelain enamel panels fill what are glazing bays in most locations. The end of the administration volumes (east and west elevations) are clad in the double-glazed brick in one of nine colors (red, dark red, tangerine, orange, yellow, light blue, dark blue, gray, and black) used on the project. The double-glazed brick used on the exterior has a high-gloss finish, and the colors vary slightly in range within the fields of the individual elevations, creating an overall mottled effect on each of these elevations, and are consistently laid with a 3/16" mortar joint.

The technical volumes are predominantly clad in a combination of the glazed brick fields, often set into the expressed steel frame (Photograph 25), and glazed curtain wall grids of fixed lights, often with awning lights on the bottom row for ventilation and fixed porcelain enamel metal panels at the base. The added volumes throughout the Technical Center campus continue the palette of exterior materials established by the original construction.

Interiors

The interiors of the buildings vary in configuration but share a consistent palette of materials and details throughout. The lobby spaces' rich, minimally treated palette of materials includes white travertine floors. Three colors of brick were generally used at the interior: muted gray-green single-glazed brick, and double-glazed black and white brick with specialized colors in some locations including light blue in the Research Group Administration and Laboratory volume cafeteria. Historically the lobbies featured Saarinen-designed seating and custom desks, which survive or have been replicated in most locations. Paintings and sculpture purchased as part of the original project to ornament lobby and office suite spaces survive in a number of locations.

One of the most important character-defining features of the interiors of the Technical Center buildings is a series of unique, carefully-designed, dramatically sculptural staircases. These feature open, masonry treads in either black or white, and polished metal details.

In addition to the lobbies and stairs, office suites and dining areas in the Research Center, the Styling Center, and in the Central Restaurant itself were key, character-defining elements of the design of the Tech Center. Most of these survive with few alterations, although original textiles including drapery, upholstery and rugs have been lost and recreated in many locations.

Throughout the administration volumes and in a number of spaces in the technical volumes and buildings, the interior is marked by the original integrated luminescent ceiling system, which extends the exterior five-foot module into the interior. The modular ceiling grid incorporates lighting, heating, ventilation, air conditioning and fire suppression, and conceals plumbing and electrical systems in the space above.

The ceiling system provides even interior lighting without casting shadows, in addition to integrated heating and cooling and fire suppression. Interior flexibility in the spaces is expressed through the use of a prefabricated Hauserman panel system based on the five-foot module of the ceiling grid. The kit-of-parts of the demountable

partitions, which include solid wall panels as well as panels with integrated doors and glazing panels, allow the rearrangement of work areas, conference rooms, and research areas to be defined by the changing users in a number of spaces. Fixed interior partitions are typically done in matte finish brick in a range of gray-green, off-white, and black tones (without color variation in partitions in contrast to the exterior brick), with the same 3/16" mortar joint as the exterior, porcelain enameled-metal, glass, and wood.

Central Core Groups

***Research Group (Research Center) and Fuel Blend Building* (2 contributing buildings)**
The Research Group, currently known as the Research Center, frames the northern end of the central lake and includes eight major volumes, connected by at-grade and raised links, in addition to the freestanding Fuel Blend Building to the north. All of the volumes have a rectangular footprint, with the exception of the Research Mechanical volume (Research Engineering Laboratory), which has a U-shaped footprint.

The original design of the Research Group by the Saarinen office (1950-1955) included the three-story Administration and Laboratory (Research Administration) volume forming the southern boundary and defining the east and west limits of the Group. Immediately north of the Administration and Laboratory are two volumes, the two-story Metallurgical volume and the one-story Research Processing (Research Services) volume, each aligning with the east and west limits of the Administration and Laboratory respectively. The Metallurgical volume is oriented north-south, and includes a raised central clerestory along the spine of the volume. The Research Processing volume has a significantly larger footprint, and is oriented in the east-west direction, with its width approximating the length of the Metallurgical volume. The Research Mechanical volume is centrally located north of the Research Processing volume, and consists of a two-story primary block at the south with separate one-story wings at the east and west projecting to the north. The detached, one-story Fuel Blend Building is located north of the Research Mechanical volume. The original Saarinen-designed volumes are connected by second-floor level raised walkway links, and the Administration and Laboratory volume and Research Processing volume are also connected by a two-story link that houses the Auditorium at the first floor level and a large enclosed open space above, which was a later addition to the structure.

The first expansion of the Research Group was the three-story Research Engineering volume completed by the Saarinen office in 1961. The Research Engineering volume has a rectangular plan with an east-west orientation, and is located east of the Research Mechanical volume and north of the Metallurgical volume, with their east walls in alignment. Duplicating the design of the Research Engineering volume, the eastern half of the Analysis building was constructed by Argonaut immediately to the north in 1968, with the western half, duplicating the footprint of the Research Engineering volume, being completed in 1973. Continuing north, Argonaut again replicated the design for the Research Engineering and Analysis volumes for the Mechanical volume in 1974. When the Mechanical volume was completed, the Research Group included three identical, evenly spaced volumes, connected to each other and the Research Mechanical volume to the north and south, by at-grade, one-story, enclosed corridor links.

In addition to the construction of major volumes, there were also minor additions constructed at the Research Group. In 1970, a small addition was made to the northwest corner of the Research Processing volume; and in 1973, a small extension was added to the west side of the Fuel Blend Building.

Exterior
The north and south walls of the Administration and Laboratory volume are constructed of the sandwich panel wall system with the structural frame system expressed on a ten-foot module. The typical vertical arrangement of the wall system at each of the three floors is panel-window-panel. The east and west walls of the

Administration volume are clad with red-glazed brick. The south elevation of the Administration and Laboratory volume features a projecting lobby towards the west, composed of a flat overhanging concrete roof with fully glazed exterior walls, the top of which is currently utilized as a roof deck. A canopy, supported by metal posts, is located south of the lobby, extending to east and west, and covers the walkway bordering the north side of the central lake.

The exterior walls of the Research Processing volume are comprised of a metal curtain wall system with the structural steel frame expressed at the exterior of the building on a thirty-foot module. There are six rows and six columns of panels located within each of the structural bays, and the bottom row is generally paneled while upper rows are glazed. There is some variation at the north and south elevations and three large, glazed, overhead doors at the west elevation. The later addition, located at the western end of the north addition, continues the design of the thirty-foot module at the west elevation, changing to a twenty-five-foot module at the north elevation.

The east and west walls of the Metallurgical volume are comprised of a metal curtain wall system with the structural steel frame expressed at the exterior of the building on a thirty-foot module (Photograph 25). The structural steel frame is expressed at north and south elevations with the two outer bays on a thirty-foot module, and the two central bays on a twenty-five foot module that pierces the roof to form the clerestory. The panel configuration at the east, south and west elevations is similar, with a narrow band of windows at each the first and second floors, and clerestory windows at the east and west elevations. The central clerestory section at the north elevation has a glazed curtain wall system above entry and garage doors, which is flanked by solid, orange glazed brick walls.

The south and north elevations of the two-story block of the Research Mechanical volume are comprised of a glazed curtain wall system with a structural steel frame expressed at the exterior of the volume on a thirty-foot module, while the east and west elevations are clad in yellow glazed brick. The one-story projecting blocks have the structural steel frame expressed at the exterior of the building in a twenty-foot module at each of the east and west elevations, with four glazed panels at the first floor topped by blue-glazed brick. The north walls at each of the one-story volumes have a central, narrow glazed metal curtain wall flanked by blue-glazed brick. The south walls of each of the one story blocks, which extend east and west of the two-story block, include a glazed metal curtain wall.

The structural steel frame is expressed at the exterior of the Fuel Blend building on a twenty-foot module, which is largely clad in red-glazed brick. The north elevation includes a row of clerestory windows while the east elevation is solid and the southern bay of the west elevation, which is part of the later addition, includes a glazed curtain wall. The south elevation of the Fuel Blend building has full-width openings topped by panels at each of the original structural bays, and a sandwich-panel wall system at the west addition. The large equipment tower protruding from the roof is concealed by metal cladding.

The Research Engineering volume, Analysis volume and the Mechanical volume are essentially identical. The north and south walls of each volume are constructed of the sandwich panel wall system with the structural frame system expressed on a ten-foot module. The typical vertical arrangement of the wall system at each of the three floors is panel-window-panel. A small, projecting entrance lobby is located at the south elevation of the Mechanical volume. The east and west walls of each volume are constructed with red-glazed brick.

The volumes of the Research Group are typically connected with a series of glazed enclosed corridors, some raised at the second-floor level. A wider corridor link is located between the Research Engineering and Analysis volumes along their eastern edge. The link between the Administration and Laboratory volume and

the Research Processing volume includes a second-floor level volume with fully glazed east and west walls extending beyond the walls of the auditorium below.

Interior

The interior of the Administration and Laboratory volume is generally organized around a double-loaded corridor with an east-west orientation down the central spine of the building. The entrance lobby, located towards the western end of the building, provides an internal separation between functions at the east and west ends of the volume. The eastern end of the volume generally contains office and laboratory spaces. The western end of the volume includes more specialized spaces such as the lower level cafeteria; first floor offices; the second floor executive office suite with an open seating area above the entrance lobby; and the former library at the third floor. The entrance lobby also establishes the axial link to the Research Processing volume to the north and includes the auditorium at the first floor, more corridors and utilitarian spaces at the basement level, and a large linking space at the second floor.

The principal floor levels are connected by three stairs. A sculptural, monumental spiral stair is located at the northern end of the entrance lobby, while three additional stairs and elevators are located towards the center, east and west ends of the volume.

The principal lobby is a broad, deep rectangular space that encompasses a projecting entrance and visually continues to the rear (north) wall of the Administration and Laboratory volume, with its focal point at the monumental spiral stair. Two rows of freestanding, interior, black-painted metal posts extend from the projecting lobby to the north side of the monumental stair. The south portion of the lobby is at grade, with four full-width travertine stairs providing access to the raised first floor level approaching the monumental stair. The exterior walls of the projecting lobby are completely glazed, with three entrance doors at the west bay of the exterior southern wall and corresponding glazed vestibule space. Within the Administration and Laboratory volume, the north, east and west walls of the lobby are gray-green brick. The modular ceiling, with a circular motif, has a wood veneer finish and integrated lighting. The added glazed security wall, with paired central doors, that separates the north and south portions of the lobby is transparent and does not extend to the height of the ceiling, allowing the entire lobby to be perceived as a single space. The lower lobby includes several original or reproduction furnishings based on historic features, including the security desk (which is original to the building although relocated with the installation of the security wall); the seating and table; and a purple, acrylic, vertical louvered screen that modulates light immediately within the east and west walls of the lobby projection.

The visual centerpiece of the lobby is the monumental spiral stair that pierces through a circular opening to the second floor level. The black granite treads are individually suspended by vertical polished metal rods at the perimeter of the circular second floor opening connecting the outside of each tread. The interior of each tread is held in place by polished metal tension rods attached together at the center of the second floor ceiling, and connected to a central circular plate mounted at the first floor. Each of the rods includes turnbuckles that allow adjustments. A simple, round, wood rail is located at the outside and interior of the treads, connected to the suspension rods. The monumental stair extends up to the second floor lobby, where the wood handrail continues around the circular floor opening. The second floor lobby has the luminescent ceiling panel system, and vinyl tile flooring that complements the grey-green bricks at the east and west walls. The south wall is fully glazed with a central door leading to the roof deck above the projecting lobby. The center of the north wall includes a stair to a short enclosed corridor leading to the space preceding the Research Processing volume. Similar to the lower lobby, the second floor lobby includes period appropriate furnishings in the seating area.

The secondary stairs are similar in design and materials to other Administration volume stairs with walls of muted grey-green brick, black metal stringers with cream colored open treads and a simple tubular, polished metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails. The underside of the stair has a painted plaster finish.

The office and laboratory spaces at each of the first, second and third floors of the east end of the volume include a central corridor flanked by the Hauserman movable partition system, with doors painted a variety of colors. The corridor ceiling in the eastern portion of the volume is plaster, while the flanking labs and offices have luminescent ceiling panels. The floors of the corridors and offices are generally carpeted and the laboratory spaces and offices have vinyl tile flooring. Mechanical shafts accessed by paired flush metal doors line the central hall at regular intervals. The restrooms include gray tile floors, white tile walls, plaster ceilings with perimeter strip lighting and gray toilet room fixtures. The basement level of the east end of the volume is utilitarian and includes a central corridor with tiled walls and an open ceiling, exposing mechanical, electrical and plumbing equipment.

At the west end of the basement level is the former cafeteria space. Although the furnishings have been removed to allow the room to be utilized for other functions, the space includes light blue-glazed brick walls to the north and south and a wood screen, reportedly with twenty-one different types of wood, separating the dining and food preparation areas. The ceiling features a gold-colored suspended screen that conceals lighting and mechanical, electrical and plumbing equipment.

The executive office suite has a series of individual office and conference rooms and a central restroom “core,” with plaster ceilings at the corridor and waiting area and the luminescent panel ceiling in the office and conference spaces. The corridor and office dividing walls are constructed with gray-green brick and the Hauserman movable wall panels, with a wood veneer finish or fully glazed. The floors throughout are carpeted. The executive office suite includes many built-in original features, including wood-veneer credenzas, built-in shelving, sliding blackboards and storage closets. Many of the original furnishings, or period-appropriate reproductions, remain in the offices including the furniture and textiles such as the interior drapes.

At the third floor, the west is occupied by the Research Center library, a large open space with movable office partitions. The original furnishings have been removed from the space.

The auditorium is located between the Administration and Laboratory volume and the Research Processing volume to the north. The auditorium is accessed through the main lobby of the Administration and Laboratory volume, by two doors flanking the monumental spiral stair. The auditorium has a central seating area, flanked by stairs that lead down to the raised stage platform. The walls of the auditorium have highly polished wood panels that conform to the width of the steps and the changing wall height. The rear wall of the space includes a projection booth, and the stage, which dominates the north wall, has a rotating platform on a lift that allows cars to be displayed to the audience (the cars are brought in through a basement level tunnel from the Research Processing volume.) The ceiling is plaster and the floors are carpeted. The second floor level of the connector was part of a later building renovation; it includes an open lounge with interior, metal decorative partition screen and a conference room.

The raised walkways connecting the buildings of the Research Group generally include exterior glazed walls with concrete floors. The original plaster ceilings have been removed, exposing the structural steel frame and roof decking. The at-grade walkways are similar, with glazed partitions, linoleum flooring, and a plaster ceiling with linear perimeter lighting.

The interior of the Research Processing volume is a full-height open shop structure, with movable shop equipment and office partitions. A long corridor runs north along the full length of the volume, extending from the Administration and Laboratory volume to the Research Mechanical volume. The only remaining visible historic fabric within the Research Processing volume is portions of the original gray-green brick walls. The main north-south corridor is a full-height space, with the original gray-green brick wall visible at the south side. The north side of the corridor is now separated from the Shop with temporary plywood partitions and plastic barriers. Throughout the Research Processing volume, portions of the original gray-glazed brick walls remain, interspersed with new concrete-block full-height partition walls.

The interior of the Metallurgical volume includes a large, open workshop space occupying the tall center section, with secondary spaces in the lower flanking sections.

The two-story southern entry block of the Research Mechanical volume contains an entry volume with yellow glazed brick walls and exposed steel structure, and a full-height open space with moveable office/shop partitions. The two projecting wings each contain a full-height double-loaded corridor with flanking dynamometer test cells and engine-testing laboratories. The corridors include terra cotta tile flooring and acoustic tile ceilings with surface-mounted lighting and a panel wall system. The tile flooring continues into the individual testing labs, which also include acoustic tile ceilings with surface-mounted lighting and a paneled wall system with built-in cabinets and work surfaces.

The Research Engineering Building, Analysis Building, and Mechanical Building are very similar in internal layout. Each was historically comprised mainly of flexible office partitions, which have been removed and replaced with open office space. Each building includes two vertical circulation cores, each with a stair and elevator, located at the east and west ends of each building.

Service Section Group (Manufacturing 'B' and 'C') **(1 contributing building)**
The Service Section Group, currently known as Manufacturing 'B' and 'C', is located at the northeast corner of the Lake, east of the Research Center and north of Process Development Group (Manufacturing 'A'). The Service Section Group includes: the Administration volume; a Shop; a Steam Plant; the Environmental Staff volume (North Administration); a Chilled Water Plant; the Coatings Lab; and several connector links. The overall plan organization is irregular and includes the rectangular-plan Shop, oriented north-south, connected by links to the east-west oriented Administration and Environmental Staff volumes, with the Steam Plant linked to the north of the Shop Volume, the Chilled Water Plant linked to the north elevation of the Steam Plant, and the Coatings Lab to the south of the Shop volume.

The original design of the complex by the Saarinen office (1950-1954) included the two-story southern Administration volume, the one-story Shop to the north, the three-story Steam Plant to the west of the Shop, and one-story connector link between the Administration volume and the Shop volume which included a three-story tower. In 1970 there was a significant expansion of the Service Section Group by Argonaut that included the extension of the Shop volume to the north, and the construction of the Environmental Staff volume, and a small addition to the west elevation connector link between the Administration volume and the Shop volume. A 1975 expansion by Argonaut included the widening of the connector link between the Shop volume and the Steam Plant, and the construction of the Chilled Water Plant, connected by a one-story link to the north elevation of the Steam Plant. The last significant addition to the Service Section Group (Manufacturing 'B' and 'C') was the Coatings Lab (built 1975), which spans approximately half the length of the east wall of the Shop volume, along both the Saarinen and Argonaut designed sections, and includes a large one-story rooftop projection at its northeast corner.

Exterior
The north and south walls of the Administration volume include the sandwich panel wall system with the structural steel frame expressed at the exterior in a five-foot module. The typical vertical arrangement of the wall system at each floor is panel-window-panel. The principal building entrance is marked by a canopy supported by a single black metal post, located towards the west of the south elevation. The east and west walls of the Administration volume are constructed of dark blue glazed brick.

The walls of the original Shop volume and its expansion express the module of the steel frame, which is visible on the exterior of each of the elevations. The module of the steel frame at the Shop volume varies at each elevation and includes a twenty-foot module at the south elevation; a fifteen-foot module at the east elevation of the Saarinen-designed Shop; a thirty-foot module at the Argonaut designed expansion; and a thirty-foot module at both the Saarinen and Argonaut designed portions of the Shop at the west elevation. Within each bay, the bottom panels tend to be solid with glazed panels above.

The north and south walls of the Environmental Staff volume include the sandwich panel wall system with the structural steel frame expressed at the exterior in a ten-foot module. The typical vertical arrangement of the curtain wall at each floor is panel-window-panel, although there is some variation at the south elevation. The east and west walls of the Environmental Staff volume are constructed of light blue glazed brick. The central, one-story, projecting entrance lobby at the north elevation includes a flat, overhanging concrete roof with a fully glazed exterior wall system and an entrance canopy supported by metal posts.

The one-story connector links between the Administration and Environmental Staff volumes to the Shop have the sandwich panel wall systems at the west elevations and yellow-glazed brick walls at the west elevations. The rooftop projection at the south connector link is clad in orange-glazed brick.

The exterior walls of the Steam Plant are largely solid, clad with red-glazed brick. The two outer bays of both the east and west elevations include full-height openings in the masonry wall, with entry doors and louvers below a large curtain wall, with five columns and eight rows of glazing. The link between the Steam Plant and Shop volume has the sandwich panel wall system. The exterior of the Chilled Water Plant is similar in aesthetic to the Steam Plant, and largely clad in red-glazed brick with narrow, full-height openings in the masonry walls that include entry doors and louvers below glazed curtain wall. Two openings are located at the outer bays of the west elevation, a single opening at the southern bay of the east elevation, and a wider bay with a service door towards the center of the north elevation. The narrow, enclosed corridor link between the Steam Plant and the Chilled Water Plant has a sandwich panel wall system at the west elevation and a solid wall at the east elevation.

The Coatings Lab includes a curtain wall system with the structural steel frame expressed at the exterior in a thirty-foot module, complementing the Saarinen and Argonaut-designed volumes (Photograph 50). The majority of the panels are solid, with glazed panels limited to a single row in two bays at each the north and east elevations and service doors at the south elevation. The rooftop projection has a solid wall cladding.

Interior
The interior of the south Administration volume historically consisted of a double-loaded corridor, running east-west at each floor, flanked by a series of work and support spaces. The first floor has been significantly modified, especially at the east end of the volume. The second floor has been entirely reconfigured as open office space. The first floor includes a central entrance lobby with an open, monumental, historic stair to the second floor. A second stair is located at the north side of the central corridor, just to the east of the cross corridor leading into the Shop volume.

The entrance lobby includes gray-green brick walls at the east and west, and a new glazed security wall to the north with a central revolving door and an entrance door to the east. The travertine floors, plaster ceilings and gray-green brick walls extend past the security wall, an addition, to the main central stair hall. The free-standing, wrapping stair is a sculptural object located in front of a fully glazed, double-height wall system to the north (Photograph 30). The open travertine stair treads are supported by a central, white painted stringer and flanked by a polished metal railing with vertical support posts at the rear of each tread. A similar railing is located along the second floor level overlooking the stair hall. The secondary stair is similar in design and materials to other Administration volume stairs with walls of muted grey-green brick, black metal stringers with cream colored treads and a simple tubular, polished metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails. The underside of the stair has a painted plaster finish.

The original spaces within the Shop and the connector volumes have been entirely reconfigured as office space using contemporary office partition systems, a carpeted floor and acoustic tile ceiling, although the original connector corridor remains.

The interiors of the north Administration volume have been significantly altered and converted to open office space. The first floor includes the original entrance lobby, central stair, and service stairs at the southeast and southwest corners of the volume.

Process Development Group (Manufacturing 'A') **(1 contributing building)**
The Process Development Group, currently known as Manufacturing 'A', is located on the east side of the central Lake, between the Engineering Group (Global Portfolio Development) to the south and the Service Section Group (Manufacturing 'B' and 'C'). It remains essentially as built by the Saarinen office (1953-1954), and consists of two major volumes: the Administration volume and the Shop volume. The three-story Administration volume is located at the south end of the building, with a large rectangular-plan, one-story Shop volume to the north. The two are linked by a rectangular-plan single-story connector. Two large, rectangular clerestory projections are located at both the north and south ends of the Shop volume; the north clerestory includes a tall, rooftop projection towards the east end. A small addition was made to the southeast corner of the Shop at some time prior to 1971.

Exterior
The north and south walls of the Administration volume are constructed of the sandwich panel wall system with the structural frame system expressed on a five-foot module. The typical vertical arrangement of the wall system at each of the three floors is panel-window-panel. The east and west walls of the Administration volumes (north and south) are light blue glazed brick. The south elevation of the Administration volume features a projecting lobby volume to the west, composed of a flat overhanging concrete roof with fully glazed exterior walls.

The exterior walls of the Shop volume are comprised of a metal curtain wall system with a structural steel frame system expressed at the exterior of the building on a thirty-foot module. There are six rows and six columns of panels located within each of the structural bays; the bottom row is paneled and upper rows are glazed. The exterior of the connector link consists of glazed curtain wall and the projection above the north clerestory is clad in metal panels.

Interior
The Administration volume historically consisted of office space with movable partitions on the first, second and third floors. The second and third floors have been entirely reconfigured as open office space. The first floor and basement maintain the original arrangement, with a double-loaded corridor running east-west, flanked by a series of work and support spaces. The first floor includes a projecting central entrance lobby. Two staircases connect all three floors, one located to the north of the entrance, adjacent to an elevator lobby, and the other located to the east, north of the central corridor. A 230-seat auditorium, entered through a large, open-plan lobby, is located at the east end of the Administration volume.

The projecting entrance lobby is entered at grade, and includes a travertine floor, glazed walls and a plaster ceiling. Travertine-clad planters demarcate the lobby floor level and the raised first floor level to the north. The structural steel frame is expressed on the north wall of the entrance lobby, defining the outer wall of the Administration volume, and includes five central solid black panels flanked by glazed entrances to the east and west. Open-tread, travertine steps are located at the eastern bay and a double-wide ramp is located at the western two bays which include a paired door opening. Free-standing metal posts centered at each of the north solid wall panels provide support for framed art.

The first floor includes grey-green brick along the corridor and the Hauserman modular wall panel system defining office and work spaces with an acoustic tile ceiling and carpeted floor. The restrooms include tile floors and walls, and solid panels with the structural steel frame at the exterior of the building envelope.

The walls of the wrapping stair are clad in the muted grey-green brick, and accessed through a glazed wall system. The stair includes exposed, black metal stringers with open cream colored treads and a simple tubular, polished metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails. Three vertical metal rods span three levels within the width of each of the stair landings.

The auditorium lobby spans almost the full width of the building and has gray-green brick walls and modular wall panels, a travertine floor, and an acoustic tile ceiling. The auditorium, located east of the auditorium lobby, is accessed through doors to the north and south, flanking a central projection booth. The floor level of the auditorium slopes down towards the slightly raised stage. The central seating is flanked by two outside aisles aligning with the access doors, with the north aisle including a wood handrail supported by widely spaced metal posts along the steps. The segmented wood rear wall of the stage visually folds to form the sculptural ceiling that continues to the area of the auditorium over the central seating area. The walls of the auditorium are covered with blue fabric, the ceiling of the room above the wood sculptural shell has acoustic tiles and the floor is carpeted.

The interior of the Shop volume consists of full-height open workshop space, along with several smaller offices, workrooms and corridors.

Central Restaurant **(1 contributing building)**
The Central Restaurant is located to the east side of the Lake, between the Engineering Center (Global Portfolio Development) and the Process Development Group (Manufacturing ‘A’), set back from the east road behind a grass plaza, and slightly offset from the axis of the Main Gate House on Mound Road. Designed by the Saarinen office (1953), it consists of a single rectangular-plan volume, with a metal ventilation volume on the roof. A loading dock is located at the southeast corner of the building.

Exterior
The exterior of the Central Restaurant is divided into bays by structural columns on a 20' module, expressed on the exterior with curtain wall within each of the structural bays. It is the only campus building (with the exception of the Mound Road Gate House) with a deep roof overhang. At the west entrance elevation, the curtain wall panels are fully glazed, while the panels at the cafeteria area are infilled with solid panels below the raised floor level. At the east elevation, six of the bays are infilled with black glazed brick, and three bays are infilled with a metal curtain wall system. There are deep overhanging metal-clad eaves at the north, south and west elevations. The north and south elevations each have a projecting black glazed-brick wall.

Interior
The interior of the Central Restaurant consists of an open entrance lobby spanning the full width of the building, with a sloped plaster ceiling and travertine floors. The south wall of the lobby is finished with wood-veneer panels and includes a Hauserman movable panel assembly with a solid metal door and side panel, topped by a louvered transom.

A simple, aluminum frame and glass vestibule has been added to the interior at the west entry doors. Three stairs – one each at the center, north, and south – connect the lobby with the raised dining/food service area, located approximately three feet above the lobby floor level. The stairs each have simple wood railings supported by metal posts. An accessible ramp has been added near the center of the lobby, and includes a similar handrail design. The south lobby stair continues down to the basement, which includes service areas and restrooms.

The dining/food service area, which spans the full width of the central portion of the building, has been reconfigured and modified for the addition of recent food-service vendors. A row of structural columns separate the raised dining area from the lobby, with an original decorative metal screen designed by Harry Bertoia, within two of the southern bays. The dining area itself has been reconfigured for the addition of new food-service vendors, with new furniture, partitions, and counters; it maintains the original black terrazzo floor. A north-south wood-paneled wall separates the dining area from the kitchen/service area to the east.

Engineering Group (Global Portfolio Development Center) and
***Fuel Blend Building* (2 contributing buildings)**
The Engineering Group, currently known as the Global Portfolio Development Center, is located at the southeast corner of the Lake and consists of six major volumes: the Administration volume to the north; the Shop volume; the South Administration volume; the Dynamometer volume; the Vehicle Emission volume (IS&S Integration Center); and a large, later office addition to the west. It also includes the small, detached single-story Fuel Blend Building, north of the Dynamometer volume, and a reflecting pool.

The Engineering Group, designed by Eero Saarinen and constructed in 1949-1951, consisted of the three-story Administration volume to the north, with a one-and-a-half story, high-bay Shop volume extending to the south, connected by a taller three-story stair block. It also included the two-story Dynomometer volume, which extends east from the north portion of the Shop, and the reflecting pool, which is framed by the Administration and Shop volumes. Within the decade following the original construction, the Engineering Group was greatly expanded, with several additions designed by Eero Saarinen. In 1952, the detached Fuel Blend Building was added to the Engineering Group, located immediately to the north of and serving the Dynamometer volume. In 1956, the Dynamometer volume was extended to the east, continuing the original Saarinen design. The Saarinen-designed Shop volume expansion to the south and the three-story South Administration volume, oriented east-west, was added to the south end of the Shop, both constructed in 1957-1959 and linked by a one-story connecting volume to the east and a one-story enclosed corridor to the west.

In 1973, the Argonaut-designed Vehicle Emission volume was added to the south of the Dynamometer volume, linked to the Shop by a one-story connector. In 1980, a large three-story addition was constructed at the west elevation of the southern portion of the Shop, between the reflecting pool and the South Administration volume. A later one-story volume extends along the west elevation of the Shop volume.

Exterior
The north and south elevations of the Administration and South Administration volumes are constructed with the sandwich panel wall system with the structural steel frame system expressed on a five-foot module. The east and west walls of the Administration and South Administration volumes are clad in red-glazed brick. Each of the Administration volumes features a lobby extension outside the rectangular footprint, located towards the eastern end of the volumes, with the lobby of the Administration volume extending to the north, and that of the South Administration volume extending to the south. The lobby extensions include flat overhanging concrete roofs with fully glazed exterior walls.

The exterior of the Shop volume is comprised of a metal curtain wall system with a structural steel frame system expressed at the exterior of the building on a thirty-foot module. There are six rows and six columns of panels located within each of the structural bays, with the bottom row of metal panels and upper rows glazed. The three-story circulation block connecting the north Administration and Shop volumes is clad in blue-glazed brick.

The exterior of the Dynamometer volume is mainly constructed with the sandwich panel wall system, with the structural steel frame system expressed at the exterior of the building on a twenty-foot module and including an expressed top beam. There are seven rows and four columns of panels located within each of the structural bays, with the second and third rows from the bottom being glazed, and the remainder being solid. The north and south elevations each have thirteen cylindrical exhaust stacks – arranged in pairs, with the exception of the easternmost bays, which each have a single exhaust stack – located immediately beyond the exterior walls. The outer bays of the east elevation of the Dynamometer volume are clad with orange glazed brick, while the larger center bay is divided into eight vertical sections and filled with solid-panel metal curtain wall.

The exterior of the Fuel Blend Building is constructed with an exposed black structural steel framework. The north and south elevations are clad with a metal curtain wall system with solid panels and some red brick infill above door locations. The east and west elevations are clad in red-glazed brick.

The exterior of the Vehicle Emission volume is comprised of a metal curtain wall system with the structural steel frame system expressed at the exterior of the building on a thirty-foot module with an exposed top beam. The east elevation is clad with orange glazed brick. At the north and south elevations, each of the thirty-foot modules is infilled with the sandwich panel wall system with a typical configuration of panel-window-panel at each floor. The three-story, Argonaut-designed addition to the Shop volumes has a curtain wall slightly different from that found at the Saarinen-designed Administration volumes, and has blue-glazed brick on the central portion of the east elevation where it extends above the original Shop volume.

Interior
The Administration volume at the north end of the Engineering Group is generally organized around a double-loaded corridor running east-west at each floor, flanked by a series of smaller office spaces and conference rooms. The first floor includes a central projecting entrance vestibule connected to an interior lobby. Two staircases are located south of the central corridor to the east and west of the lobby. On the first floor, a perpendicular corridor extends south from the interior lobby and connects with the Shop volume.

The projecting entrance vestibule is accessed at grade and includes a travertine floor and fully glazed wall system. A security desk, located in the northeast corner of the space, is a replacement. The vestibule is separated from the interior lobby by a fully-glazed security wall, a later addition, which includes a central pair of revolving doors flanked by swinging doors. The east and west walls of the interior lobby are solid brick in the muted grey-green tone that wraps to the east stair and west corridor walls. The travertine floor of the entrance vestibule continues into the lobby and includes four full-width steps up to the first floor level in addition to a later accessible ramp with a glazed rail system. The raised floor of the interior lobby has been carpeted and the ceiling is covered by acoustic ceiling tiles. A modular wall system with a variety of mostly solid panels and doors is located at the south wall of the interior lobby.

The walls of the principal stair, separated from the southeast corner interior lobby by a glazed wall system, are clad in the muted grey-green brick of the interior lobby. The stair includes exposed, black metal stringers with open black treads and a simple tubular, polished metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails.

The first, second and third floor corridors include a combination of the grey-green brick and the Hauserman modular wall panel system defining office and work spaces. The floor has been largely carpeted and the modular luminescent ceiling panels replaced or modified to include a combination of acoustic ceiling tiles, florescent light boxes and mechanical air vents.

The South Administration volume has a central, double-loaded corridor at the first floor level and open office space at the second and third floor levels. Two staircases connect all three floors. One stair is located just to the north of the central lobby, and the other is located in the west portion of the volume, on the north side of the central corridor.

The South Administration volume is principally accessed through a projecting glazed vestibule, a later enclosure, with a concrete floor and plaster ceiling. Four travertine steps span the central four bays, with an accessible ramp addition to the west. The vestibule is separated from the interior lobby by a glazed wall system and a pair of central doors with surrounding sidelights and transoms, flanked by large glazed panels. The interior lobby includes a travertine floor, acoustic tile ceiling and painted gypsum board walls to the east and west. A glazed security wall with a central revolving door flanked by security doors has been added to the north.

The walls of the stair, separated from the southeast corner interior lobby by a glazed wall system, are clad in the muted grey-green brick of the interior lobby. The stair includes exposed, black metal stringers with open cream colored treads and a simple tubular, polished metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails.

The first floor corridor is similar in arrangement to the Administration volume and includes grey-green brick and the Hauserman modular wall panel system defining office and work spaces. Acoustic tiles are located at the ceilings and the floors are carpeted.

The Shop volume consists of an irregular arrangement of corridors of varying dimension – some sized for vehicular traffic and loading machinery – connecting several work areas of offices and conference rooms. A large portion of the original north section of the Shop volume has been reconfigured as a Design Studio. There are no remaining significant historic spaces within the shop volume.

The internal organization of the Dynamometer volume includes a central service corridor with individual test cells on either side. The basement and attic floors contain the mechanical and ventilation equipment that services the test cells. The central service corridor includes gray-green brick walls, a terra cotta tile floor and acoustic-tile ceilings. The tile floor continues into the test cells. Many of the original control consoles and furnishings remain, although the spaces have been abandoned and are used for storage.

Styling Group (Design Center) and Design Auditorium **(2 contributing buildings)**
The Styling Group, currently known as the Design Center, extends along the south end of the central lake and consists of three major volumes, each with an east-west orientation, connected by lower masses and corridors as well as the free-standing Design Auditorium to the west. The northern and central volumes, designed by the Saarinen office (1953-1955), include the three-story Administrative volume and the two-story Studio and Shop volume (Design Studio and Engineering), respectively. The Studio and Shop volume extends west of the Administration volume, and the two volumes, in addition to the Design Auditorium and display courtyard to the west, frame a rectangular reflecting pool.

A large, one-story garage connects the Administration volume and Studio and Shop volume at the first floor, and above the garage at the second floor level, they are joined by two narrow links. Adjacent to the western link is the reconstructed Color Studio, a circular volume with links to the Administration volume, Studio and Shop volume and western link; it replaced the original Color Studio that was destroyed by fire in 1979. South of the Studio and Shop volume is the Design Fabrication volume, designed by Argonaut (built 1968). The Fabrication volume is a large, rectangular, one-and-a-half story volume, linked to the center of the south elevation of the Studio and Shop Building. The free-standing Design Auditorium, designed by the Saarinen office (1953-1955), in conjunction with the enclosed display courtyard, defines the southwest corner of the Lake. The Design Auditorium is connected by an underground tunnel to the remainder of the Styling Group.

Exterior
The exterior of the Administration volume is clad in the sandwich panel wall system. The exposed black, structural metal framework is visible between the first and second floors, at thirty-foot intervals along the north and south elevations of the first floors, and at the full height of the building at each of the four corners. The structural framework is concealed behind the sandwich panel wall system at the second and third stories. The western three bays, or ninety feet, of the framework are open at the first floor, and the second and third stories of the Administration Building are elevated above grade and resting on the piloti, framing a circular driveway and creating a porte cochère to the north entrance of the lobby. The porte cochère has a wrapping glazed curtain wall to the north, and black glazed brick matching the interior lobby finish to the south. The principal access to the lobby is marked by a free-standing, flat-roofed, aluminum-clad canopy, supported by six aluminum-clad posts, located at the north side of the building, offset slightly from the center of the central lake.

The east and west elevations of the link between the Administration volume and the Studio and Shop volume continue the structural steel grid system at the first floor, clad with a large-panel curtain wall and garage door system at the first floor and a yellow-glazed brick wall at the second story.

The Studio and Shop volume has the exposed black, structural metal framework at the north and south elevations, extending two stories in height expressed on a ten-foot module. It is clad in the sandwich panel wall system, with double-height glazing at the second floor. The east and west walls of the volume are orange-glazed brick.

The one-and-a-half story, Argonaut-designed Fabrication volume, located to the south of the Studio and Shop volume, has a wall system slightly different from that found at the Eero Saarinen designed portions of the

Styling Group, and includes yellow-glazed brick at the north and east elevations of the garage bay projection to the east.

The link between the Administration volume and Studio and Shop volume includes the reconstructed, circular Color Studio at the second floor level, which is surrounded by a rooftop garden. The Color Studio is clad with a similar curtain wall system as found at the exterior building elevations and includes an off-center, circular roof projection with clerestory windows.

The Studio and Shop volume features a wide central corridor at the first and second floors, flanked by studios. A library is located at the second floor and is accessed along the west connector between the Administration volume and the central corridor of the Studio and Shop volume.

The free-standing Design Auditorium is an aluminum-clad domed volume that rests upon a one-story, sandwich panel wall system base that is largely glazed. The dome is located within a courtyard surrounded by a one-story, mottled gray glazed brick walls with perimeter landscaping, that serves as a concealed exterior area to view automobiles in natural light, and includes hexagonal pavers and a perimeter planting of evenly spaced, pleached trees.

Interior
The interior layout of the three floors of the Administration volume is based on a double-loaded corridor arrangement with larger public spaces towards the center of each floor that open the central spine to the north, providing views of the central lake. The three principal public spaces include the primary entrance lobby at the first floor, the second floor stair lobby, and the cafeteria at the third floor. In addition to the central stacked spaces, the movable partition system at the east end of the first floor has been configured to provide a large exhibit space.

With the exception of some of the offices and conference areas of the second floor executive offices located to the west, the central double-loaded corridors and workspaces utilize the standardized Hauserman movable partition system to define the workspaces based upon the five-foot luminescent celling panel system utilized throughout the Technical Center campus. One of the notable differences of the Styling Group Administration volume versus the other Administration volumes is the interior use of black-glazed brick to define corridors and cream (white) brick to define vertical circulation of stairs and the escalator. The vertical circulation includes the monumental stair between the first and second floor lobbies, a private secondary stair and elevator that are located at the southwest corner of the first floor connecting to the executive office offices above, and an escalator to the south of the central corridor near the center of the volume that extends from the second to the third floor.

The Administrative volume is entered at grade through glazed revolving and swinging doors into the first floor lobby. The lobby is a broad, rectangular space, which includes a monumental suspended stair to the second floor at the south wall in front of the entry doors, and a seating area, vehicle display area and secondary entrance under the porte cochère to the west. The flooring through the lobby is travertine and the ceiling has the luminescent panel system. The north wall, facing the lake, is fully glazed and wraps to the secondary entrance to the west side. The south wall adjacent to the stair is clad in black glazed brick, and includes some Hauserman door panels to provide access to the central corridor and executive office stair and elevator beyond. The east wall of the lobby, behind the reception desk, has an etched metal wall covering with an abstracted recreation of the original Buell Mullen design. The monumental switchback stair floats over a rectangular pool and has travertine treads and an intermediate landing, each vertically suspended by polished metal rods from the second floor ceiling with similar tension extending into the pool below. The stair ceiling has rectangular

acoustic tile panels. The stair is flanked by a rectangular profiled wood handrail that extends around the second floor stair opening. The pool below the stair has water jets on the west end, with the hard surfaces of the lobby reflecting the sounds of the moving water. The lobby includes original or period-appropriate reproduction furnishings including the reproduction "teacup" reception desk, located east of the entrance, and the seating furnishings. The second floor stair lobby includes the luminescent panel ceiling, a terrazzo floor, and a wood veneered Hauserman movable partition system, with fully glazed paired doors at each the east and west walls to access the corridors beyond. The north wall is fully glazed, and overlooks the lake; the black glazed brick south wall includes a door opening to the Color Lab over the connector link to the south.

The secondary stairs include exposed, black metal stringers with cream colored terrazzo treads and a simple tubular, painted metal, wrapping rail system with the top handrail and an intermediate rail running parallel to the stair, and widely spaced vertical rails. The walls of the stairs are cream brick and the underside of the stair has a painted plaster finish. The escalator space, extending from the second to third floors, includes two polished-metal finished escalators that fill the width of the space, one traveling in each direction. Similar to the stairs, it has cream brick walls and terrazzo flooring at the top and bottom landings. The center of the sloped ceiling above the escalator has acoustic tiles flanked by a light cove that illuminates the brick walls.

The workspace corridors, with the exception of the executive suite, utilize the standardized Hauserman movable partition system, including doors, and solid and glazed panels, in addition to black-glazed brick walls. The floors are generally travertine and ceilings have a central acoustic tile field flanked by recessed light strips. The general office and workspaces are defined by the Hauserman panel wall system, terrazzo and carpeted flooring, and the luminescent ceiling panels. The executive office suite includes similar components to the remainder of the offices and workspaces with more customized finishes and room plans. The corridors include the Hauserman movable partition system with a wood veneer finish and built-in storage closets, carpeted floors and ceilings with a central acoustic tile field flanked by recessed light strips. Along the north wall of the executive suite corridor are two wall mounted planters, supported by polished metal rods that extend from the ceiling to the floor, and illuminated by spaced pendant lights. The individual offices and workspaces include the luminescent ceiling panels and reproduction, period-appropriate furnishings.

The third floor cafeteria is essentially "T"-shaped in plan and includes a long dining area along the north wall, overlooking the lake on the north and a central food service area on the south. The north wall of the dining area is glazed, the east and west walls include the Hauserman wall system with a wood veneer finish, and the south wall, separating the dining area from food service, is black glazed brick. The dining area ceiling is the luminescent panel system, and the flooring is orange and cream colored vinyl tile, laid in a rectangular pattern with gray borders. The dining area includes several built-in furnishings, including orange banquettes with integral planters along the north, east and west walls, and a freestanding linear and four-part circular banquette to the south. In the center third of the north wall is a metal frame screen with clear, gray and light blue acrylic panels. The executive dining room, located west of the cafeteria, has a royal blue palette that includes variegated blue plastic, louvered wall paneling at the east and west walls, blue fabric on the south wall, and windows overlooking the lake to the north. The ceiling is finished with hexagonal wood tiles with metal trim. Period furnishings include a central hexagonal wood table with a circular, rotating "lazy Susan" and a wood banquette on the east wall.

The second floor level connector between the executive suite of the Administration and Studio and Shop volumes includes a single-loaded corridor to the west, with a fully glazed wall overlooking the rooftop garden and the reconstructed Color Studio to the east. The west wall includes the Hauserman modular wall system for the offices and workspaces, with a terrazzo floor and an acoustic tile ceiling which includes a recessed light strip to the west.

The Studio and Shop volume includes a wide, main east-west corridor on each of the first and second floors, extending the full length of the volume, to allow the passage of vehicles and large models. The corridor has white brick walls, a white tile floor and acoustic tile ceiling. Three stairs are spaced along the south side of the corridor, at the center, east and west. A large vehicle lift is located at the east end of the volume. Arranged along the north and south sides of the corridors on each floor are the large, open design studios and a series of smaller secondary office spaces. The studios were designed to include wide entrance doors and are approximately fifty feet deep, with a movable partition system. The east and west walls include tackable surfaces that can be raised and lowered, with largely glazed exterior walls. The luminous ceiling with molded pans is arranged in a grid that varies from the five-foot modular design of the Administration volume.

The second floor of the Studio and Shop volume includes a design library, located at the north side, accessed off the north-south connector corridor to the executive office suite of the Administrative volume. The double-height library includes a mezzanine along the south wall, with a wrapping stair with open wood treads and minimal metal railing. A glazed panel system with an entrance door is located at the east wall, with wood-veneered panels above. Similar double-height panels are located on the west wall. Built-in bookshelves are located under the mezzanine to the south with a solid panel railing above, as well as on the south wall of the mezzanine and eastern portion of the north wall. The area under the mezzanine houses administrative offices. The western portion of the north wall is glazed and overlooks the Administration volume. The ceiling has a luminous ceiling with molded pans arranged in a grid that varies from the five-foot modular design of the Administration volume and the floor is carpeted.

The interior of the Design Fabrication volume consists of a large, full-height open shop space.

The Design Auditorium is entered from the east or west through a small, one-story square entry vestibule. The interior of the Design Auditorium consists of a large, circular open area with a domed ceiling, open stages to the north and south, and open lobbies to the east and west. The central area is ringed by small offices, conference rooms, restrooms, and storage areas. A stairway at the east side of the central area leads down to the tunnels that connect to the remainder of the Styling Group.

The wedge-shaped Design Auditorium lobbies are accessed through the east and west vestibules and feature a wave-shaped acoustic tile ceiling with cove lighting along the east and west ends. The north and south walls are finished wood veneer panels and the floor is carpeted. The central domed display area is located approximately two feet below the level of the lobbies. A light cove surrounds the perimeter of the space and the cove up-lighting and central suspended ring of studio lighting allow the vehicles to be displayed without shadows. The walls of the Auditorium display area are covered with vertical wood slats, and the dark floor is highly polished. The offices and conference rooms around the central dome include the Hauserman modular wall system in a painted and wood veneer finish, acoustic tile ceilings and carpeted floors. The restrooms include tile floors and walls, plaster ceilings, and gray-green fixtures.

The stairs down to the tunnel system that connects the Design Auditorium to the remainder of the Styling Group have white tiled walls, a plaster ceiling and a black terrazzo stair with a simple polished metal railing. The tunnel system includes a main corridor, wide enough for vehicles, with an adjacent mechanical space. The corridor has a tile wall on one side with an acoustic-panel wall on the opposite side, separating it from the mechanical space. Square “porthole” light fixtures and ventilation grilles are inserted in the acoustic-panel wall at regular intervals. The tunnel floor is polished concrete.

Gate Houses

Main Gate House and Associated Parking Lots and Helipad
(1 contributing building, 2 contributing structures, and 1 noncontributing structure)
The Main Gate House is located to the west of the Lake, at the primary entrance to the Technical Center campus from Mound Road. It was designed by the Saarinen office (1954), and consists of single rectangular volume, with a flat concrete roof with deep overhangs.

Exterior
The enclosed portion of the Main Gate House is clad in fully glazed panels. The roof is supported by six exterior structural posts, and extends over the inbound and outbound traffic roadways to the north and south of the enclosed central volume.

Interior
The interior of the Main Gate House consists of a single open space, with a stair leading down to the lower level. All of the historic furniture and fixtures of the interior of the Main Gate House have been removed, although the original planter boxes remain. It has a plaster ceiling with recessed lighting, and travertine floors.

The Main Gate House is approached by a two-lane entrance drive separated by a grass median. There are two rectangular parking lots to the north and the south of this short drive. While the lot on the north is about one-third the length of the one to the south, both are the same width and similarly articulated, being slightly depressed from the surrounding lawn and bordered by hedges.

A paved helipad is located just inside this gate at the northeast corner of the intersection of the entrance road, which remains divided by a median inside the gate, and the perimeter road (on the lawn to the north of the entrance road). The helipad was constructed after the end date of the period of significance and is noncontributing.

Twelve Mile Road Gate House **(1 contributing building)**
The Twelve Mile Road Gate House is located at the south end of the Technical Center, at the entrance to the campus from Twelve Mile Road. As originally designed by the Saarinen office (1951), it consisted of a flat concrete canopy and a simple glass-and-metal booth separate from the structure above. The original booth enclosure has been removed. The canopy, which remains intact, is supported by six steel structural posts, with solid red-glazed brick walls at the east and west ends.

North Campus Zone

The portion of the Technical Center campus north of the perimeter road contains three relatively small, historic technical research buildings: the Wind Tunnel, Isotope Laboratory (Research Chemical Lab), and Turbine Test (Research Engineering Lab North) buildings. These are arranged to form the west, north, and east sides, respectively, of an implied quadrangle open on the south. Because of the highly specialized technical research original purpose of these buildings, their design was primarily the responsibility of Argonaut, with Saarinen providing some styling detail. They have been considered part of the Technical Center from their construction. Since the period of original construction, two service buildings have been added to this area of the Technical Center campus. The Facilities Operations Building stands to the northwest of the historic group, close to Chicago Road. The Research, Safety, Health and Environmental Building is located adjacent to and on the north of the Turbine Test Building.

Wind Tunnel **(1 noncontributing building)**
The current configuration of the one-story, irregular-plan Wind Tunnel dates to 1997, when the original, reinforced concrete building, completed in 1954, was enclosed and added onto on the west by an aluminum panel exterior, steel-frame structure. The building has lost integrity due to this alteration.

Isotope Laboratory (current Research Chemical Laboratory) **(1 contributing building)**
The Research Chemical Laboratory is a low, one-story, H-plan, steel frame building oriented east-west and clad on the exterior in prefabricated concrete panels with a horizontal band of windows. The northern portion of the building was constructed in 1954-1955; the southern volume was added in 1969.

Turbine Test Building (current Research Engineering Laboratory North) **(1 contributing building)**
The Turbine Test Building is a one-story, C-plan, technical, steel frame building oriented north-south, completed in 1952. It is clad on the exterior in concrete and industrial metal sash. On the east side, the building is marked by a set of exhaust stacks for the test cells that rise above the roofline.

Research, Safety, Health and Environmental Building **(1 noncontributing building)**
The Research, Safety, Health and Environmental Building was designed by Argonaut and built in 1977. It is a 1-story, irregular plan, concrete exterior building constructed in two main volumes with overhanging eaves and banded windows and a projecting, off-center entrance canopy on the northern portion of the west elevation.

Facilities Operations Building **(1 noncontributing building)**
The Facilities Operations Building is the northernmost building of the Technical Center. It is rectangular in plan overall, with a two story volume on the northern (front) portion of the building and a one story portion on the rear (south). An off-center, one-story projecting entrance canopy is located in the western portion of the north elevation. The building, designed and constructed by Argonaut in 1969, is detailed in a utilitarian version of the Saarinen campus vocabulary.

South Campus Zone
The southern zone of the campus was historically the location of parking lots, the southern forest buffer perimeter, and of the sewage treatment plant for the Technical Center campus. The Aerodynamics Laboratory and a parking deck structure are now located in this zone.

Aerodynamics Laboratory **(1 noncontributing building)**
The Aerodynamics Laboratory is a technical building designed and constructed by Argonaut in 1979. It is oriented east-west and located to the south of the Design Group that consists of reinforced concrete wind tunnels linked to and located on the east, south, and west of a three-story office volume on the building's north side. The office volume is clad on the exposed portions of its east and west elevations in cobalt blue-glazed brick. The north elevation is clad in a version of the Saarinen sandwich panel wall system.

Parking Deck **(1 noncontributing building)**
The Parking Deck is a free-standing, three-story, reinforced concrete parking structure that stands to the northeast of the Mound Road Gate House. It was built between 2000 and 2002 on the site of the Technical Center's historic Water Pumping Plant and Sewage Treatment Plant.

INTEGRITY
The General Motors Technical Center campus retains the requisite "high degree" of integrity for NHL listing. Although there have been additions to the campus since its dedication in 1956, the Technical Center maintains the character-defining features of its Eero Saarinen design as an innovative corporate research campus design

that convey its significance. While there has been construction in the adjacent setting of the Technical Center in Warren, Michigan, which was relatively open land at the time of its construction, none is of a scale to have made a significant visual change in the viewshed from the Technical Center and the historic "forest" tree planting buffer remains intact.

Historic documents indicate that the organizational scheme and palette of materials of the Technical Center's buildings, which differentiated the administrative volumes from the technical ones, was intended to be an expandable system that would allow for additions to the complex as needed. Many added building volumes were completed with the involvement of the Saarinen office. The added volumes continued the fundamental vocabulary of materials established by the original design without exception in the core campus area around the lake, and, because of the scale of the design overall, the experience of the campus as a whole remains what it was at the time of the dedication, particularly since the facades most visible in the central core have not received changes that significantly change historic vistas. Historic exterior finish materials survive on almost all of the campus buildings, including the original, highly-colored, double-glazed brick, the original glazing, and sandwich panel walls. Signature spaces and features such as the lobbies, executive office suites, cafeterias and Central Restaurant, the sculptural stairs, auditoria, double-loaded corridors, interior gray-green brick walls, Hauserman panel systems, and integrated ceiling grids all survive without significant loss of historic fabric or major alterations.

Within the landscape, character-defining features also survive essentially unaltered throughout: historic roadways, walkways, parking lots, lawn areas, the signature water tower, the gridded tree "forest" perimeter, historic gate houses and entrances, fountains, lakes, and reflecting pools. The signature lake islands, river stone embankments, and concrete paving edges all survive. While there have been some losses in rows and specimen planting of shade trees, the principle of these key features remain legible throughout in important locations. The original conception for shrubs – foundation plantings of Pfitzer junipers and hedge plantings of Hatfield yews – also survives throughout. The Technical Center thus retains a high degree of integrity in location, design, setting, materials and workmanship, feeling and association.

8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties:
Nationally: X Statewide: _ Locally:

Applicable National Register Criteria:	A_ B_ C_X_ D
Criteria Considerations (Exceptions):	A_ B_ C_ D_ E_ F_ G
NHL Criteria:	4
NHL Criteria Exceptions:	N/A
NHL Theme(s):	III. Expressing Cultural Values 5. Architecture, landscape architecture and urban design
Areas of Significance:	Architecture
Period(s) of Significance:	1949-1961
Significant Dates:	N/A
Significant Person(s):	N/A
Cultural Affiliation:	N/A
Architect/Builder:	Saarinen and Saarinen; Eero Saarinen and Associates
Historic Contexts:	XVI. Architecture Z. Modern

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.

Introduction

Architectural historian Alice Friedman has noted in her recent *American Glamor and the Evolution of Modern Architecture* that, in his career cut short by his sudden death from a brain tumor in 1961, Eero Saarinen achieved an astounding amount of national success in his practice. As she further remarks, this success rested on a series of "corporate headquarters and campus-like research centers for many of the household names of American industry and manufacturing" as well as "plum government jobs." Friedman accurately notes that these projects "put a very public stamp of approval on Saarinen's distinctive approach to architecture, handing him the lion's share of responsibility for creating a new American style for the postwar age."[1] In contrast to other architects revered by their peers but relatively unknown to the American public, Saarinen's acclaim reached a broad audience through these projects. This acclaim was established by the General Motors Technical Center, which marked the point when Saarinen's career diverged from his collaboration with his father Eliel Saarinen. Eero had been leading certain design projects within the firm of Saarinen, Swanson and Saarinen before the Technical Center, and had been engaged in such important independent endeavors as his experiments in chair, structure, and house design with Charles Eames of the late 1930s and early 1940s, but his practice remained essentially subsidiary to Eliel's until the father's death in 1950. The Technical Center project allowed Eero's practice not merely to survive his father's death, but also to grow significantly beyond it, establishing a highly public, separate, independent identity. This identity was one that was recognized much more broadly than Eliel's own substantial professional reputation, beginning with, and thanks to the Technical Center project, along with the Jefferson Memorial project, which was begun at the same time.

As a number of authors have noted, Saarinen's collaborative approach with his clients was a key to the success of his projects with them: as Friedman puts it - "communicating the identity and meaning of the individual project," by taking his cues from the corporate culture and identity of his clients.[2] This collaborative method and tendency to vary his approach to style to express the nature of the project and the client, as opposed to the autocratic imposition of form in a project, was one that would later lead to mixed critical reception for Saarinen, although the reception of the Technical Center itself was almost universally laudatory. As his widow Aline remarked after the architect had died, "the critics punished him often." The architect Robert Venturi, who worked in the Saarinen office during the Technical Center project, encapsulated one key aspect of the objections to his methods in a critique of the firm soon after he left it, saying that Saarinen "did not have a singular approach," which Venturi took "as a sign of weakness."[3] Saarinen's approach to clients such as GM was seen as pandering by some: for example, Manfredo Tafuri, the noted Italian architect, historian, theoretician and critic, derided Saarinen's approach as "corporate advertising" and the influential historian, author, and Yale University professor Vincent Scully was at best lukewarm about Saarinen's approach, believing that Louis I. Kahn and Robert Venturi "offered a much better way toward a reasonable future for architecture" than Saarinen's more eclectic strategy did. [4] Despite this divided critical response to Saarinen's corporate work in his lifetime, the architect's collaborative and expressive method unquestionably made the architect one of, if not the most important designer in the American public imagination in the period: he was the architect who both captured and enormously influenced the post-war culture. The Technical Center was the project that created Saarinen's broad American stature and working method, and was deeply rooted in GM's

[1] Alice Friedman, *American Glamor and the Evolution of Modern Architecture* (New Haven: Yale University Press, 2010), 109.
[2] Friedman, *American Glamor*, 112.
[3] Jayne Merkel, *Eero Saarinen* (New York: Phaidon Press, 2005), 75.
[4] On the mixed critical response to Saarinen's work, see Friedman, *American Glamor*, 112-14, and Vincent Scully, "Rethinking Saarinen," in *Eero Saarinen: Shaping the Future*, Eeva-Liisa Pelkonen and Donald Albrecht, eds. (New Haven: Yale University Press), 13-14.

own culture. In essence, it made Saarinen famous. It also caused his office to grow from a small staff to one of forty people, many of whom, including Gunnar Birkerts, Kevin Roche, John Dinkeloo, Cesar Pelli, Anthony Lumsden, Joseph Lacy, J. Henderson Barr, Olav Hammerström, and Venturi, went on to have extremely important careers as modernists. The Technical Center established Eero's identity as an independent, world class designer in his own right. It thus took his career beyond its early phase of its association with his father – in which Eero always stood to a certain extent in Eliel's shadow – to a nationally significant career ended prematurely in 1961.

The origin of the Technical Center can be traced to an idea developed in 1942 or 1943 by GM staff to improve the facilities for key research and design divisions of the company that were then dispersed in different locations.[5] Chairman of the Board and CEO Alfred P. Sloan described the situation in his memoir *My Years with General Motors*: "the inadequacy of our previous facilities was obvious even before the end of World War II. Our different staff operations were then scattered all over the Detroit area, in a wide variety of rather makeshift quarters."[6]

These staffs were a product of Sloan's remaking of GM between the two world wars. In discussing the need for the Technical Center in his memoir, Sloan put particular emphasis on one particular division. He noted that during the war he was "especially struck by the unhappy situation of the Styling Staff." As the unit most closely allied with design, the Styling Section (as it would ultimately be named) would be particularly important in Saarinen's design for the Technical Center. One might argue, in fact, that Saarinen took his cue to evoke the culture of his corporate client from the expressive design culture of that client, which invented such allusive features as the tail fin in post-World War II automobile design. This detail both evoked jet fighter planes and "gave the consumer a 'visible premium' for the money spent" on the post-war Cadillac, an elite status symbol, thus celebrating American post-war prosperity, "supremacy and democracy with chrome and flash."[7] The Technical Center would ultimately be seen broadly by the American public as conveying many of the same key post-war values as GM's cars.

GM Staff Groups and the Origin of the Technical Center Concept and First Design

The man providing these cues to Saarinen was the enormously influential and charismatic leader of the Styling Section, designer Harley J. Earl (1893-1969). He had been hired by Sloan as a consultant in 1926 to introduce styling into mass-market automobile production, the first time this had been attempted (Sloan termed this approach the "mass-class market").[8] This strategy was closely linked to another concept introduced by Sloan in the period, the annual model, and was, in a sense, the antithesis of Ford's approach of "any color so long as it's black."[9] In the wake of the resulting success of Earl's work on the 1927 Cadillac LaSalle, the Art and Colour Section was created under Earl in 1927, renamed the Styling Section in 1937. As the success of the LaSalle suggests, from the point that Earl joined GM he began work that would make him one of, if not the most important automobile stylists in the industry. Under his leadership of Art and Colour, the control over the

[5] A promotional brochure published by GM's Public Relations department, *Where Today Meets Tomorrow: General Motors Technical Center* (Detroit, MI: General Motors Corporation, 1956), n.p., dates the decision to create GM Tech to the spring of 1942. A sheet of "General Information," part of a package of press release materials issued at the time of the completion of GM Tech dated the inception of planning to 1943. Photocopy, Folder 1, Box 3, J. Robert Swanson and Pipsan Saarinen Swanson Papers, Cranbrook Archives, Bloomfield Hills, MI (hereafter Cranbrook Archives).

[6] Alfred P. Sloan, Jr., *My Years with General Motors*, John McDonald and Catharine Stevens, eds. (1963; reprint; New York: Anchor Books, 1972), 300.

[7] Shelley Nickles, "More is Better: Mass Consumption, Gender, and Class Identity in Postwar America," *American Quarterly* 54 (Dec. 2002): 589; Sarah S. Lochlann Jain, "'Dangerous Instrumentality': The Bystander as Subject in Automobility," *Cultural Anthropology* 19, no. 1 (Feb. 2004): 78.

[8] Sloan, *My Years with General Motors*, 172.

[9] Ibid.; Sally Clarke, "Managing Design: the Art and Colour Section at General Motors, 1927-1941," *Journal of Design History* 12 (1999): 65.

external body appearance of the mass-produced automobile would be moved from the engineer to the stylist as an industry norm. Working with Sloan, Earl was arguably the primary force in moving styling from the custom, luxury market (which is how Earl started his career in his father's coachbuilding business in Hollywood, California) into assembly-line automobiles such as those GM produced.

In the 1930s, Earl moved car design increasingly toward a long, low, unified and streamlined profile, making such influential changes as removing external features such as the running board and the attached spare tire; among his other innovations were the introduction of an internal luggage compartment, and two-tone paint schemes. In 1938, Earl introduced the industry's first "concept car." The experimental Buick "Y-Job" both tested the public's appetite and fired its imagination for new design ideas when Earl used it as his well-publicized personal transportation. Earl was named a vice president of GM in 1940.[10]

One of Earl's most important innovations in automobile design was fully developed in GM's Styling Section in the period after World War II. Earl's car stylings of the 1930s captured, through their streamlined aesthetics, a sense of futurism that both expressed and capitalized on Americans' hopes for brighter times to come beyond the Great Depression, thus allowing GM to compete successfully for the relatively small number of consumer dollars spent on automobile purchases in the period. Earl's designs, along with the model year concept, engendered a level of interest in automobile style in popular American culture that was previously unknown. The expressive nature of Earl's designs and the popularity of GM's cars (and other consumer goods including those manufactured by Frigidaire, a GM division) reached unprecedented levels in the period after World War II through such signature details as the tail fin.

Another important contribution to GM's post-war dominance on Earl's part was the recognition of women as crucial consumers of GM products, not just cars but also Frigidaire appliances. GM executives, particularly Harley Earl, "understood that in a consumer-driven economy" of the post-war period, women were "decision-makers in the home."[11] Earl not only hired female designers, his "damsels of design," but posed with them in promotional photographs, thus connecting to female consumers of GM automobiles and appliances. In a 1954 *New York Times* article, Earl was quoted as stating that in "65 per cent of the cases it is the distaff side who decides what color the family car should be."[12] It is no coincidence that the Technical Center would ultimately be both promoted and understood as the domain of both men and women, even though it was a predominantly male work environment.

While Styling was initially being developed under Earl's direction, other divisions that would find their home at the Technical Center campus were also being formulated and growing in the interwar period. Between 1920, when GM was in considerable financial difficulty, and the advent of World War II, Sloan restructured and built GM up to the point where Chevrolet held 40% of the total American automobile market in 1940.[13] In this same period between the wars, GM (again in contrast to Ford) developed a substantial research staff of chemists, physicists, and engineers of different specializations, working on innovations to "every aspect of a vehicle's design," ranging from "braking, cooling and suspension systems" to "quick-drying colours in shades other than black."[14] This emphasis on research was part of Sloan's program to create decentralized, semi-autonomous divisions, one of the keys to GM's success. The key individual in GM's research program was engineer and inventor Charles F. Kettering, whom Sloan placed in charge of a newly created corporate research laboratory as part of the post-World War I reorganization.

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[10] "Knudsen Resigns All AMC Offices," *New York Times* 4 Sep. 1940.
[11] Friedman, *American Glamor*, 130.
[12] Foster Hailey, "Women a Factor in Rainbow Autos," *New York Times*, 14 Nov. 1954: 64.
[13] Clarke, "Managing Design," 67.
[14] Ibid.

In March, 1944, Sloan wrote to Kettering with a scheme to not only maintain the "marvelous balance" the two had achieved "between the scientific side and the engineering side" but also to push GM's program of research "much more into the scientific area than it is now" into "problems . . . related directly . . . or perhaps indirectly" to existing areas of interest. Further, Sloan envisioned the establishment of a new position – a vice president for engineering – who would direct "a properly accredited central engineering activity to deal with the car as a whole." Finally, Sloan related to Kettering that he saw this "activity to consist of a set-up close to, but outside, the City of Detroit," that would "reduce the time element in bringing into our products, advanced research work." Kettering responded to Sloan's concept with a plan for expanding research facilities "and moving all of them" to a new location that would resolve the fact that the research department's "present facilities are not inadequate but poorly located for the result that we must have." Sloan dubbed the new concept the "General Motors Technical Center," and saw it comprising "an expanded Research activity as defined by Mr. Kettering; and Engineering activity which would comprise Harley Earl's body design, correlated with the broadened product activity such as we are now conducting in Detroit."[15]

Near the end of 1944, the Administration Committee of GM's Board of Directors approved the creation of the Technical Center according to Sloan's proposal. Other geographical desiderata were developed in committee discussion: that the new facility should be "outside of highly congested areas, near a railroad, twenty-five to thirty minutes from the General Motors Building, and adjacent to residential areas." Also, crucially for the ultimate form of the Technical Center, it was also resolved that "each activity should retain its individual identity." A large parcel of agricultural land (a small portion of which had been surveyed for residential development) was located in Warren Township north of Detroit that matched the desired characteristics and, in November 1944, the company "proceeded to option most of the West Half of Section 9," thus agreeing conditionally to purchase the approximately 326-acre tract. [16] In 1950-51 additional purchases led to a total of approximately 813 acres held by GM in Warren Township.[17]

Harley Earl urged Sloan to "engage an architect of stature" for the project, although both Sloan and GM board member Lammot du Pont (who had immediately preceded Sloan as president of the GM board) had misgivings about such a move, fearing that "any emphasis on high aesthetic standards might be detrimental to the practical operations of the center." Du Pont specifically questioned whether "the matter of appearance was of any importance in a project of this kind, the sole object being to get technical results." Sloan's conservative opinion – the project would have been completed instead by GM's in-house architects, Argonaut – was changed by a visit to the Detroit laboratories of the Ethyl Corporation, a company established by GM and Standard Oil to produce leaded gasoline after Kettering's development of this product. Ethyl's "handsome facilities [designed by Albert Kahn] made an excellent impression" on Sloan. Sloan then delegated the task of identifying the designer for the project to Earl, who, upon making inquiries, found that "the Saarinens" were recommended virtually universally. Sloan termed their selection "not a difficult choice."[18]

Between the GM board's approval at the end of 1944 and July, 1945, the Saarinen office produced the first scheme for the Technical Center.[19] During the time this first design was produced, the office, Saarinen and Swanson, consisted of Eero's father Eliel and J. Robert F. Swanson, Eliel's son-in-law (husband of Eero's sister Pipsan). Eero was in Washington, D. C. at the time, having volunteered for service in the OSS (Office of

[15] Sloan, *My Years with General Motors*, 301-03.
[16] Ibid., 304.
[17] "A History of the Development and Construction of the General Motors Technical Center, Warren Township, Macomb County, Michigan," 30 Jul. 1954, Collection General Motors Heritage Center, 1.
[18] Sloan, *My Years with General Motors*, 304-05.
[19] The Saarinen office was not under formal contract until September 19, 1945. "A History of the Development and Construction of the General Motors Technical Center," 2.

Strategic Services, the precursor to the CIA), for whom he served as a consultant to the Special Exhibitions Section to produce scale models "to equip the [White House] situation room," and enhance the OSS's visual presentation and communication capacity. One of his notable products from this period was the "invention of the three-dimensional organization chart," which proved effective "in presenting problems of procedure and work-flow through various parts of an organization."[20] Exposure to this level of efficiency and large-scale organizational thinking would serve him well in the realization of the Technical Center and other future large-scale projects. Since Eero was in Washington much of the time, this 1945 design for the Technical Center was led by his father and brother-in-law.[21]

As would be typical of the visibility of the project from the point of completion of this initial design, the Technical Center burst onto the public scene, thanks to the corporation's public relations, with great fanfare, hyperbole, and a considerable dose of carefully calculated rhetoric, both verbal and visual. The first scheme was presented at a luncheon at the Waldorf-Astoria Hotel in New York City, where the themes "more jobs through research," "meeting tomorrow's needs," and "more and better things" positioned the Technical Center as key to GM's role in American post-war prosperity, consumer satisfaction, and employment.[22] A display at the luncheon by the architects presented the scheme for the project through a model and dramatic renderings by Hugh Ferris. Photographs of the architects and GM executives posed to appear to be examining and discussing these were distributed to the press.[23]

The design professional press published the scheme as well. An article published in the September, 1945 issue of *Pencil Points* (soon to be renamed *Progressive Architecture*) was followed by one in the November issue of *Architectural Record* in the same year. This second piece, accompanied by reproductions of the Ferris renderings and images of the model, noted that "the much-heralded World of Tomorrow seems a bit less ephemeral with this vision of what one corporation promises in the way of research."[24] The use of the phrase "World of Tomorrow" linked the design to the theme of the 1939 World's Fair in New York City, and more specifically to the GM-sponsored "Futurama" exhibit at the fair, which envisioned a "suburbanized metropolitan region in the year 1960," and which was the most popular exhibit at the fair.[25] Thus, the concept of GM as shaping both American destiny and landscape through its corporate image and practices was carried forward from the 1939 fair into the post-war period through the way that the Technical Center was both presented to and received by the press.

Several essential facts of the first scheme for the Technical Center were carried through to its ultimate built form. The first of these was the overall organization of separate buildings for each section, as had been decided in 1944, around an oblong lake with perimeter roadways, with the Styling Group located on the south, the Research Group on the north (the two largest buildings), Process Development (originally termed "Process

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[20] Mina Marefat, "Washinton [*sic*] DC, USA – Revealed: Eero Saarinen's secret wartime role in the White House," 25 Oct. 2010, http://www.architectural-review.com/view/washinton-dc-usa-revealed-eero-saarinens-secret-wartime-role-in-the-white-house/8607195.article, accessed July 9, 2012. The specific sources for the information in this article by the curator of a travelling exhibition on Saarinen's work are not given and therefore have not been verified.

[21] Both project records and publications from 1945 give the firm name as Saarinen and Swanson. See, for example, "General Motors Technical Center to Unite Science with its Application," *Architectural Record* 98 (Nov. 1945): 98-103.

[22] Bert Pierce, "General Motors Speeds Research," *New York Times*, 25 Jul. 1945: 23.

[23] Folder 291, Box 139, Series IV, Eero Saarinen Collection, Yale University (collection hereafter cited as Yale Collection).

[24] "General Motors Technical Center to Unite Science with its Application," 99.

[25] Nancy Ann Miller, "Eero Saarinen on the Frontier of the Future: Building Corporate Image in the American Suburban Landscape, 1939-1961," Ph.D. diss., University of Pennsylvania, 1999, 21-22. The connection between the Futurama and the Technical Center is evident in many period documents as part of GM's overall agenda. Miller was the first scholar to make this link in an extended study and devotes a chapter of this dissertation to the Futurama as laying the background for Saarinen's corporate campus work, and particularly the Technical Center. See also Louise A. Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (Cambridge, MA: MIT Press, 2011), 74-75.

Engineering," and the only staff group newly created for the Technical Center) on the northeast portion of the lake, Advanced Engineering on the southeast, and the main entrance from Mount Road. In contrast to the later, built scheme, the Service Group was to be placed on the southeast of the lake in roughly the position that would be occupied by the sewage treatment plant in the ultimate design, and a large administration building was to straddle the entrance at Mound Road.[26] While important organizational principles remained constant throughout the project, the original scheme had several key differences from the ultimate designed and built form of the Technical Center. Key among these was the overall aesthetic of the scheme: the roof of the Research Group, the Styling Auditorium, and the plan of the lake itself were to have been based on swooping, curved, streamlined forms much more Moderne in feel than the ultimate design, and thus belonging more to modern design before the war than after it.[27] Further, the original scheme called for a grade separation of automobile below pedestrian circulation, the latter to have been accommodated on a continuous, raised walkway around the lake linking the buildings. This grade separation scheme corresponded closely with the configuration of the ideal intersection presented to visitors at the 1939 GM World's Fair pavilion.[28]

Work continued on the project into 1946. Construction documents were completed for site preparation by September 1945, with Hubbell, Roth & Clark serving as site engineers.[29] GM's architectural division, Argonaut Realy, sold the existing agricultural and residential buildings on the property at auction in August, 1945, and site clearing, general grading, the installation of water and sewer systems, and excavation for the planned lake took place in the fall of 1945 through the summer of 1946.[30] Eero Saarinen, returned from Washington, became more engaged with the project, preparing several perspectives that suggest a move toward a Miesian International Modern approach, and more extensive drawings were developed for the Styling Group building. The project came to a halt in October, 1946, when several factors converged to leave GM with insufficient cash to continue the project. A United Auto Workers strike against GM that lasted 113 days began in 1945, and combined with rampant inflation, post-war steel and other materials' shortages, led GM to stop any projects that were not specifically related to automobile production. The Saarinen contract was terminated, but GM's Engineering Staff continued to work on the requirements for their portion of the project while the Technical Center undertaking was on hold.[31]

The Creation of the Final Design

Redesign of the Technical Center: Eero Takes Over

In 1947, Eliel and Eero parted ways with Robert Swanson: Swanson had reached his limit in tolerating Eero's habit of missing design deadlines, which "significantly eroded the firm's profits."[32] Swanson established his own office and father and son continued their firm as Saarinen and Saarinen. Late in 1948, GM had again amassed sufficient capital to resume the Technical Center project and the Saarinens were re-engaged, along with Smith, Hinchman & Grylls (SHG), as "architect-engineer" in the collaborative relationship in which the Saarinen office produced design drawings and SHG was responsible for construction documents.[33] Instead of continuing with the original scheme, however, the project for the Technical Center was rethought at Eero's insistence and he assumed the role of design leader. Site work completed to date limited the complete

[26] Photographs of model with keyed overlays, Folder 278, Box 138, Series IV, Yale Collection.
[27] This retardataire aspect of the first scheme has been previously observed by several authors.
[28] Miller, "Eero Saarinen," 26.
[29] Site preparation blueprint set, Facilities Department, General Motors Technical Center, Warren, MI; "A History of the Development and Construction of the General Motors Technical Center," 2.
[30] Clipping from unidentified newspaper, August 1945, Folder 1, Box 3, J. Robert Swanson and Pipsan Saarinen Swanson Papers; "A History of the Development and Construction of the General Motors Technical Center," 2-3.
[31] "A History of the Development and Construction of the General Motors Technical Center," 3, 6.
[32] Mark Coir, "The Cranbrook Factor," in *Eero Saarinen: Shaping the Future*, Pelkonen and Albrecht, eds., 39.
[33] "A History of the Development and Construction of the General Motors Technical Center," 4.

rethinking of the project. In addition to introducing a more Miesian sensibility in the design's increased rectilinearity and approach to the treatment of exterior steel and glass, both Eliel and Eero wanted to make the new design more colorful and shiny in order to relate to automobile design and in contrast to the original vision for the project in which gray concrete would have predominated.[34] Eero would later write that he felt that the design should be "based on steel – the metal of the automobile."[35]

A full set of presentation perspectives and site preparation drawings for the parts of the property to be developed first were complete for the revised design in the spring of 1949, and the new scheme was quickly published in *Architectural Forum* in July of that year.[36] This article publicly established Eero as the primary author of the project; his approach was explicitly contrasted with his father's, albeit only on a relatively small detail.[37] In contrast to the 1945-6 design, the newer version embodied most of the character-defining features of the built Technical Center: a series of buildings composed of low, long, rectangular prismatic volumes oriented either north-south or east-west arrayed around a rectangular-plan lake with a water tower at its northeast corner. The first version of the revised concept carried over the plan to include a general administration building that had been part of the 1945-6 design. While the earlier design envisioned this building to straddle the roadway entrance near Mound Road, the revised version saw this building, which would have been far taller than the rest of the buildings of the Technical Center, placed on axis with the Mound Road entrance, and rising out of the central lake. The *Architectural Forum* article identified the administration building's place in the design as "not yet definite," and it was, in fact, removed from the design by the time the article reached the public, since the final scheme for the overall plan without the administration building and the fully developed drawings for the Engineering Staff quarters were complete by July, 1949, when excavations began for this first building group of the Technical Center.[38] Eero later recounted that once the administration building concept had been removed from the program that "we sought vertical focal points in other ways"; principally through the introduction of the "great fountain" in the same location, and in the water tower.[39]

The 1949 *Architectural Forum* article began what was to be almost undiluted praise in the reception for the Technical Center on the part of the professional and popular press. Even before construction had begun, the Technical Center was characterized as a "forward leap," that "managed to translate everyday ordinary industrial buildings – no trimmings, no special shapes – into architectural eloquence."[40]

As part of the 1949 project, Eero put together a team of professionals that would lead to an efficient and effective scheme for completion of the Technical Center. Within the Saarinen office, Eero established bonus incentive agreements in the spring of 1949 with both Henderson Barr and Joseph Lacy (both would become partners in the firm during the course of the Technical Center project) that put a premium on the rapid completion of design drawings to meet production deadlines. The design drawings were then passed on to SHG. As Joseph Lacy recalled, the collaborative arrangement with SHG extended to the point where "a few of their men came into [the Saarinen] office to do design drawings under our direction so they would be familiar with the project and could follow through when they returned to their office."[41] SHG's role in the project, and

[34] Joseph Lacy, "Memoirs of Joseph N. Lacy," n.d., p. 4, by permission of the family of Joseph N. Lacy, courtesy Cranbrook Archives.

[35] Aline Saarinen, *Eero Saarinen on his Work* (New Haven: Yale University Press, 1962), 24.

[36] "G.M. Technical Center," *Architectural Forum* 91 (Jul. 1949): 70-78.

[37] Ibid., 73.

[38] "Technical Center History," Press Kit package, General Motors Public Relations, 1956, Folder 253, Box 136, Series IV, Yale Collection (hereafter Press Kit).

[39] Saarinen, *Eero Saarinen on his Work*, 28.

[40] "G.M. Technical Center," *Architectural Forum* (1949), 71.

[41] Lacy, "Memoir," 6.

the level of collaboration between the firms was derived from the friendship and mutual respect between Saarinen and Minoru Yamasaki, who served as head of design of SHG at the time:

> when Saarinen was trying to decide which professional firm to use, he called Yamasaki to ask his opinion on whether SH& G would be the best firm to carry out his design. Yamasaki told him that he felt Saarinen could not have picked a more able organization than SH&G, they had all of the skills that would be needed on this big new project and so the arrangement was concluded.[42]

The firm of Bryant and Detwiler served as the project's general contractors from the point of their engagement in May, 1949.[43] GM's Argonaut Realty division, the company's architecture arm, supervised construction and led design for the buildings with the most technical programs, such as the Wind Tunnel. The design process early in the project included the construction of full-scale mock-ups of the exterior curtain wall and the integrated ceiling system that includes diffuse lighting and high-velocity Caldwell system air conditioning.[44]

Collaborative Design

One of the hallmarks of the project was the collaborative relationships that led to its creation, its expressiveness, and its technical innovations. For the Technical Center, Eero Saarinen played roles analogous to composer, orchestrator, conductor, and even orchestra member, leading and working collaboratively with the project team, which included not only SHG and others, but also, and perhaps most significantly, his client. Saarinen's role in this project was thus similar to the role that Harley Earl held at GM in working with disparate fields to create technically innovative, functional, glamorous, and evocative products. This role for the architect would become a hallmark of his future projects, and the Technical Center marks the period when this approach was developed.[45] While all architectural commissions represent collaborations between disciplines and professionals to some degree, the extent to which this was the case with the Technical Center was unusual at the time, and marked the beginning of a key aspect of Saarinen's working style, one that would garner him multiple high-profile corporate commissions. Saarinen's approach to collaboration grew out of, and was an extension of the collaborations at Cranbrook that he had been exposed to and participated in from an early age, and in a sense, mirrored the creation of the Cranbrook Academy's campus itself.[46] His clients would ultimately include many American corporate giants, all attracted to Saarinen because of the Technical Center. At the Technical Center, Saarinen remained in overall control of the project, yet significant parts of its design and production were contributed by or delegated to others. Saarinen considered his clients "co-creators," especially corporate clients, of which GM was the first, in which the culture of the organization became grist to the Saarinen design mill, as his use of steel as a reflection of the metal of the automobile indicates.[47] As noted, this relationship to corporate clients was seen by some contemporary critics as a kind of pandering, although it led to a relatively small amount of criticism in the professional architectural literature and almost none in the popular press. This positive approach was to garner him a series of significant corporate projects, including a group of suburban campuses as well as urban buildings.[48]

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[42] Thomas J. Hollerman, and James P. Gallagher, *Smith, Hinchman & Grylls: 125 Years of Architecture and Engineering 1853 - 1978* (Detroit: Wayne State University Press, 1978).

[43] "A History of the Development and Construction of the General Motors Technical Center," 6.

[44] "Establishment of G. M. Technical Center to Provide Vitally Needed Postwar Facilities," *Michigan Manufacturer and Financial Record* 86, no. 3 (September 1950): 18; "Caldwell Air Conditioning Controversial New System Uses Many Special Devices to Get Hurricane Speeds and Kinetic Energy Diffusion," *Architectural Forum* 93, no. 1 (July 1950): 114-117.

[45] These collaborations as partially addressed in Rosamond Fletcher, "The General Motors Technical Center: A Collaborative Enterprise," in *Eero Saarinen: Shaping the Future*, Eeva-Liisa Pelkonen and Donald Albrecht, eds. (New Haven: Yale University Press), pp. 231-235.

[46] See Coir, "The Cranbrook Factor," passim.

[47] Donald Albrecht, "The Clients and their Architect," in *Eero Saarinen: Shaping the Future*, 46.

[48] See Vincent Scully, "Rethinking Saarinen," in *Eero Saarinen: Shaping the Future*, 13-14. On the campuses, see Miller, "Eero Saarinen on the Frontier of the Future."

The collaborative relationship with GM went beyond the important role that Argonaut played in both creating the Technical Center's buildings and supervising construction. Not surprisingly, GM's Styling staff worked directly with the Saarinen office. Agreements essentially in operation beginning in 1951, but not memorialized in a written contract until 1953, describe an arrangement whereby GM and the Saarinen office would "work in cooperation" so that

> for certain areas of the project the architect will be the principal designer with the Styling Section serving as a consultant to the Architect; for certain areas of the project the Styling Section will be the principal designer and the Architect will act as the consultant to the Styling Section; and for certain areas of the project the work will be performed as a joint effort, all as directed by [GM].

In general, the work was to be divided so that the Styling Section was to be the "principal designer on Executive Office Areas and Executive Dining Areas"; the architect would be in charge of lobbies, "Restaurant areas," and auditoriums, and the two design entities were to "work jointly on Typical Offices, Libraries, and other areas." Further, Saarinen was to provide "special furniture items," and "all necessary sketches, layouts and selections of stock furniture, upholstery fabrics, drapery materials, rugs, etc., for all areas for which the Architect is the principal designer. [49]

The most visible outcome of this collaboration was the creation of a key office suite occupied by Harley Earl and the highest members of his team in the Styling Group building. Saarinen prepared models for the irregular-plan rooms there and designs for custom furniture for Earl's office. Earl's private dining room, including a hexagonal plan teak table outfitted with "a special control panel at Earl's place for music, overhead and table lighting, draperies, and waitress," was detailed by Styling Section staff member Carl Benkert.[50] The Styling Group's executive office area décor also included sculptural wall pieces by female Styling staff members Gere Kavanaugh and Gwen Lux. [51] In addition to stock furniture designed by Saarinen that was produced by Knoll that can be found throughout the campus, the architect's office produced a number of unique desks for the Technical Center's lobbies under this agreement, most of which survive.

This relatively straightforward cooperative arrangement between Saarinen and GM's Styling staff also resulted, for example, in the plastic panel ceiling light system that was to create a shadowless, daylight effect indoors with an average of 110-foot candlepower in studio areas.[52] Beyond this collaboration with GM's personnel, Saarinen used key facets of GM's corporate culture to both enable and inform crucial elements of his design for the Technical Center. In this, he borrowed both processes and products of automobile manufacturing, translating them into architectural and landscape form, thus conveying GM's identity in this built work. Like the unusually cooperative agreement with Styling, the use of new materials in architecture arose out of the strongly collaborative working relationship Saarinen had with this particular client.

This adaptation of automobile manufacturing materials and processes is most tangibly manifested, if not prominently displayed, in three aspects of the Technical Center's exterior detailing: neoprene window gaskets, porcelain-enameled sandwich wall panels, and the double-glazed, ceramic-glazed bricks used on the buildings' exterior and on certain interior spaces. Leakage around the windows and wall sandwich panels was reported to

[49] Agreements between GM and Eero Saarinen and Associates, Folder 293, Box 103, Series IV, Yale Collection.
[50] "Interiors of the Styling Building in GM's Technical Center," *Contract Interiors* 116 (1957): 86.
[51] Kavanaugh's mixed media mural *Variation on a Theme* was installed on a wall near the escalator on the second floor of Styling Group building and Lux's metal sculpture *Power and Direction* was located near the top of the stairway from the lobby in the same building. Folder 265, Box 137, Series IV, Yale Collection.
[52] "General Information," Cranbrook Archives.

be "severe" in the first buildings to completed, the Engineering Group. As a response, Saarinen's office worked with GM staff to develop a solution: a gasket that would ultimately both resemble and function like those of automobile windshields. Most of the initial technical research for the project was conducted by Joseph Lacy of Saarinen's office, and Lacy arranged with GM's Inland Manufacturing Division to supply a rubber gasket. After rubber proved problematic when it was sheared by the window glass during installation, unidentified GM personnel recommended neoprene, which was the material ultimately used.[53] At the time, neither porcelain enamel panels, nor, more particularly, sandwich-panel unified wall systems using exterior porcelain enamel panels, were widely used in conventional architectural applications. Therefore, they were not readily available (although porcelain enamel panels had been used in commercial buildings related to road travel, including White Castle restaurants, diners, and gas stations). Joseph Lacy found that Chrysler Motor Corporation had made the sort of insulated panel that Saarinen was interested in using during World War II in Alaska, and GM was able to copy its competitor's process initially to manufacture porcelain enamel steel panels for the project.[54] Lacy's technical research with ceramics experts in GM's AC Spark Plug division in Flint, Michigan, resulted in specifications for the appropriate brick to obtain a permanent glaze for the highly colored, double-glazed exterior masonry.[55] Lacy and Saarinen worked with Cranbrook-based ceramicist Maija Grotell to develop the brightly-colored, high-sheen glazing for the buildings' end walls and selected lobby spaces, and GM financed the construction of special kilns for the final product.[56]

All of these, as well as the integrated wall sandwich panel and ceiling systems, were seen as important technical innovations in architecture from the point when the first portion of the Technical Center was completed in 1951.[57] Further, these innovations arose out of Saarinen's drive to find "everything new – whole different concepts" for products.[58] Gunnar Birkerts, who joined the Saarinen office in 1951 to work on the Technical Center, recalled that Eero was "stabbing for the unknown" in the project.[59] Thus, crucially, Saarinen translated not only automobile-related products into architecture, but also the mission of the Technical Center itself. After Saarinen's death, his friend and collaborator on earlier design work Charles Eames described this connection between the mission of the Technical Center, the architect's approach to his work, and the Technical Center's design in this way:

> Industrial research vocabulary and procedures accorded in many ways with Eero's fondness for testing by models, both abstract and concrete; innovative building elements were tested at full scale, in real conditions, over time. Energy and experience from each stage of construction were fed back to the successive ones, to upgrade the details and materials. . . . By the time the center was completed, Eero had become a master of the feedback principle; he had found confirmation of his natural commitment to systems.

Eames concluded by summarizing how his interactions with GM would inform future projects: "he retained from then on the capacity to sit down and really communicate with engineers and businessmen."[60]
Less tangible, but no less crucial, was the sense of standard industrial production evoked by the modular patterns, dimensions, systems, and interchangeability of elements of the complex. While modular design in

[53] Wesley Janz interview with William Jarratt, 1992, and Janz Interview with Joseph Lacy #1, 1992, Wesley Janz Collection of Oral History Transcripts, copies in Cranbrook Archives, courtesy the University of Michigan; "A History of the Development and Construction of the General Motors Technical Center," 14-15.
[54] Lacy, "Memoir," 4.
[55] Ibid., 5; "A History of the Development and Construction of the General Motors Technical Center," 16.
[56] Lacy, "Memoir," 5. "A History of the Development and Construction of the General Motors Technical Center," 16.
[57] See, for example, "General Motors Technical Center," *Architectural Forum* 95 (Nov. 1951): 111-23.
[58] Janz Interview with Jarratt, Janz Interviews.
[59] Janz Interview with Birkerts, 1992, Janz Interviews.
[60] Charles Eames, "General Motors Revisited," *Architectural Forum* 134 (Jun. 1971): 25-26.

modern architecture was a well-established approach before the creation of the Technical Center (for example, in the Usonian designs of Frank Lloyd Wright) Saarinen applied and integrated it throughout the project in multiple manifestations in ways that unified the design, and therefore placed special, and key emphasis on this aspect of it. Assembly line-like regularity and repetition were inherent in the five-foot module of the steel frame and in the wall and ceiling systems and material detailing, in the floating plane and grid planting motifs of the tree plantings, in the repeated forms of the buildings and in the consistent orientations of their individual volumes, and in the consistent typology of administrative and technical volumes repeated for each of the Technical Center's buildings. This aspect of the design was noted in the professional press from 1949 with the first *Architectural Forum* article on the project, which remarked the architects' creation of "uniform and interchangeable standards wherever possible."[61] In 1951, one of the first commentators on the Technical Center remarked more evocatively that "when you first see the buildings in the new General Motors Technical Center . . . they don't look like buildings, as we know them. [They] . . . look more like an exalted industrial product."[62] Saarinen would later write that "General Motors . . . is a precision industry; it is a mass-production industry . . . [and] these things should, in a sense, be expressed in the architecture of the Technical Center."[63] Promotional materials produced by GM make it clear that this was not a fixed, unresponsive industrial product. Instead, and like the flexibility and responsiveness inherent in the variety of GM's product lines, Saarinen exploited the Miesian, International Modernist concept of universal space to meet the client's requirement for "drastic flexibility" in "industrial research projects where vastly different kinds of experiments follow each other in rapid succession, requiring radical changes in space and function in offices, drafting rooms, shops and laboratories."[64] Thus, the Technical Center could be seen as analogous to a self-regulating, industrial process as much as a modern, industrial product.

Lacy and Saarinen's work with Grotell indicates another, more conventional way in which others contributed to the Technical Center project as sub-contractors or suppliers: important artists and designers, many associated with Cranbrook, supplied furnishings, sculptures, paintings, and other key features. Saarinen thus drew on Cranbrook not just for connections to artists as suppliers but also in the creation of a total environment at the Technical Center that represented the work of different artists and designers in different media. In addition to developing the brick glazing, Grotell supplied custom ceramic items for many interiors, including Harley Earl's office suite.[65] Another Cranbrook-associated artist, Marianne Strengell (wife of architect Olav Hammarström who worked on the project in Saarinen's office), designed rugs, draperies, and other fabrics throughout the Technical Center.[66] Harry Bertoia, whom Saarinen also knew through Cranbrook, and who was then relatively unknown, received the first big commission of his career in the design for the monumental decorative metal screen that adorns the Central Restaurant. Sculptor Antoine Pevsner's work provided an important element of the Styling Group exterior, and was balanced by the sculptural play sequence of the fountain designed by Alexander Calder adjacent to the Research Group. The oil paintings that Saarinen selected for lobby spaces included a commissioned work by Charles Sheeler for the Research Group Administration Building Lobby, *GM*, which was an interpretation of the dramatically suspended spiral staircase there. Laudatory contemporary articles on the Technical Center by John McAndrew, who had served as the head of the architecture department at the Museum of Modern Art in New York City, make it clear that these details were part of the overall image of the campus as a work of art itself, and that, this image furthered the notion that GM produced artistic products.[67]

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[61] "G.M. Technical Center," *Architectural Forum* (1949), 71.

[62] "General Motors Technical Center," *Architectural Forum* (1951), 112.

[63] Saarinen, *Eero Saarinen on his Work*, 24.

[64] "Summary of the Architecture of General Motors Technical Center," n.d., Collection General Motors Heritage Center, 3.

[65] "Interiors of the Styling Building in GM's Technical Center," *Contract Interiors* 116 (1957): 80-89.

[66] Fran Maier, "For Men and Women of Industry, Contemporary Design, Tech. Center," *The Birmingham Eccentric* 17 May 1956.

[67] See John McAndrew, "First Look at the General Motors Technical Center," *Art in America* 44 (1956): 26-33 and McAndrew,

One of the most important collaborations of the project was with the team's landscape architects: Thomas D. Church and Edward Eichstedt, the latter of whom also was connected to and had worked at Cranbrook. It would be logical to assume a conventional division of labor in which the Saarinen office as architects designed the buildings and Church's office as landscape architect designed the campus around them for the Technical Center. This was not, however, the way that the landscape approach was developed, and the Technical Center cannot, therefore, be considered to be a signature design by Church. In contrast to the domestic projects for which Church is nationally significant, most widely known and recognized (the most famous is arguably the Donnell garden in Sonoma, California), and on which he himself wrote influentially for a large American audience, Church contributed aspects of the landscape to the Technical Center, but was not the design leader for it.[68]

The specific roles of the participating designers with respect to the landscape were succinctly summarized by Eichstadt himself, in the only article contemporary with the construction of the Technical Center to be published on the landscape design specifically.[69] In this article, Eichstedt stated that "the landscape design [of the Technical Center] is by Saarinen, Saarinen and Associates, and Thomas D. Church of San Francisco," thus placing the contribution of the Saarinen office first. Church's role was one more of consultant, which is precisely how he was described in a summary of the project produced by GM.[70] Documentary evidence indicates that Eichstedt provided all of the specific site supervision, planting lists, and ordering for the project.[71] A crucial, undated drawing by Olav Hammerstrom of the quadrangle west of the Technical Center Restaurant shows a fully developed planting scheme, complete with the signature Technical Center staggered rows of trees and botanical names, strongly suggesting that the Saarinen office developed many, if not most of the main concepts for the project.[72] Notably, this would become one of the main motifs of the landscape design by Daniel Urban Kiley for the Irwin Miller House in Columbus, Indiana (1953-57). Kiley, whom Saarinen had met in Washington and with whom he had worked in the OSS, had in fact been Saarinen's first choice for the landscape for the Technical Center, but Kiley was in Nuremburg, Germany at the time that the Technical Center project began and thus unavailable.[73] Church's widow, Elizabeth, née Roberts, later recalled the resemblance of the Technical Center landscape to the work of Alvar Aalto, further suggesting Saarinen's primary responsibility.[74] This collaborative relationship with an architect on a project was not unique for Church; in fact, it was the way he often worked on projects with architects, generously providing assistance and leaving specific planting detailing to local nurseries or local practitioners.[75] This approach was later recalled by Jack Wagstaff, campus architect for the University of California, Santa Cruz, with whom Church worked on campus planning. Wagstaff recalled Church as "very modest in the way he put things forward, but he would sometimes take a sketch and say, 'Have you thought of trying this?' Or, 'Maybe this would be an interesting possibility too.'"[76]

"Our Architecture Is Our Portrait," *New York Times*, 18 Jan. 1953.

[68] Scholarly publications on Church and his work make clear that his significance rests primarily on these domestic commissions. See, for example, Marc Treib, ed., *Thomas Church: Landscape Architect, Designing the California Landscape* (San Francisco: William Stout, 2003).

[69] Edward A. Eichstedt, "Current Work in Progress: Landscape at the General Motors Technical Center," *Landscape Architecture* 42 (Jul. 1952): 166.

[70] "Summary of the Architecture of General Motors Technical Center," 14.

[71] Folder 246, Box 136, Series IV, Yale Collection.

[72] Undated drawing, accession number AD.15.546, Cranbrook Archives.

[73] Dan Kiley and Jane Amidon, *Dan Kiley: The Complete Works of America's Master Landscape Architect* (Boston: Little, Brown and Company, 1999), 202; author interview with Marc Treib, 19 Apr. 2012.

[74] Suzanne B. Reiss, interview with Elizabeth Roberts Church, in *Thomas D. Church Oral History Project* (Berkeley: Regional Oral History office, University of California, 1978), 515.

[75] Author interview with Marc Treib, 19 Apr. 2012.

[76] Reiss, interview with Jack Wagstaff, *Church Oral History*, 631.

The Technical Center and the Suburban Landscape of the Future

When the Technical Center was dedicated on May 16, 1956, a crowd of over 5,000 "leaders in science, industry, education and government" was in attendance. The ceremony on site, as well as an address by President Eisenhower from the White House, was transmitted through a closed circuit television network to over 20,000 GM executives and guests in the U. S. and Canada.[77] Although the acclaim the Technical Center was accorded began with the publication of the revised design in 1949, one of the most important aspects of the national significance of the Technical Center can be gauged by the remarkable reception that it received from both the popular and professional press after the May 1956 dedication. Within months of the dedication, the Technical Center was judged by a panel of architects and scholars brought together by *Architectural Record* as one of the most significant administration and research buildings of the past 100 years in the United States. Writing for the panel, architect Max Abromovitz (of Harrison and Abromovitz) pronounced it "one of the great 20th Century compositions born out of the sense of civic responsibility of a great corporation." In the same article, John Dinwiddie declared it "the first and best complete collaboration of industry, architects and landscape architect." He went on to characterize it as "a truly American melding of the best from Europe, with native American feeling: a much-needed demonstration that these sources can be improved for our consumption" and "a healthy use of Mies' influence too rarely seen." [78] In one of the most often repeated analogies for the Technical Center, *Architectural Forum* pronounced the Technical Center an "Industrial Versailles," that was "a historic symbol of today's industrial progress, [and] also of tomorrow's ambition."[79]

The concept that the Technical Center embodied a foray across the chronological frontier into the future (fulfilling the promise of the 1939 Futurama) was, of course, one of the key messages given out by GM as the purpose of the facility. This was one of the key points of emphases of the dedication speech by then GM President Harlowe Curtice, which was heartily embraced in the popular press. For example, an article published in the *Christian Science Monitor*, which notably characterized the Technical Center as an "Industrial Disneyland," stated it simply: "ask the man on the street corner [in Warren] the time of day, but don't be surprised if you get the answer: 'it is just about 5 to 10 years later than you think.'"[80] Saarinen accomplished this by adapting the modernist vocabulary of Mies, which was widely read by the general public as being of the modern age, if not the future. His achievement was to "Americanize" it by adding vivid, shiny, yet visibly variable and thus seemingly handcrafted color in the form of the glazed end walls, and by maintaining a sense of horizontality, and thus a kind of anti-monumentality and democratic equality. The role of color at the Technical Center in "Americanizing" the design (and, of course, allying it with GM and its consumer goods) was remarked by many at the time. The "Industrial Versailles" was thus not one that represented an autocratic ruler's might but the power of the American post-war culture, its prosperity, and the corporation that served to enable this lifestyle. The link between Saarinen, his design for the Technical Center, and contemporary American values was both recognized and cemented by the appearance of Saarinen's face superimposed on an image of the plan of the Technical Center on the cover of *Time* on July 2, 1956.

The Technical Center also embodied a foray into the post-war physical new frontier and domain of the automobile: the suburban landscape. As Nancy Miller has noted, "the dedication of the Technical Center culminated nearly 30 years of an aggressive campaign on the part of General Motors to promote and create a national, automobile-based, suburban landscape."[81] At the time that Alfred P. Sloan made the decision to create

[77] Damon Stetson, "Curtice Bids U. S. Spur Technology," *New York Times* 17 May 1956: 1.
[78] "One Hundred Years of Significant Buildings: Administration and Research Buildings," *Architectural Record* 120 (Jul. 1956): 203-04.
[79] "GM's Industrial Versailles," *Architectural Forum* 104 (May 1956): 123.
[80] W. Clifford Harvey, "An Industrial Disneyland," *Christian Science Monitor*, 11 May 1956.
[81] Miller, "Eero Saarinen," 117. It should also be noted that Miller's principal subject is Saarinen's suburban corporate campuses.

a suburban research campus, he was not the only corporate leader to develop such a facility. In fact, precedents for the practice of locating American corporate offices and research facilities in a suburban, park-like setting can be traced to the establishment of manufacturing plants outside of city centers as early as the first decade of the twentieth century. In the period leading up to World War II, "suburban factories constructed in the two decades prior to World War II provided the essential model for the layout and design of the postwar suburban management facility."[82] Before the war, corporate management and research facilities were generally located in more urban settings, just as GM's had been in Detroit before the creation of the Technical Center. After the war, "a significant set of companies chose the suburbs for new, consolidated management offices."[83] Suburban corporate manufacturing, management, and research campuses were being created by large organizations increasingly in the post-War period, while manufacturing itself was on the rise. A number of large corporations that chose to remain in urban settings created grand, new headquarters, of which Saarinen's Columbia Broadcasting System, Inc. (CBS) building in New York (1960-65) is a notable example. The companies that left the city, however, were moving into the suburban landscape at the same time as Americans increasingly chose the same area, where automobile transportation was crucial, for their residence. As Louise Mozingo has noted, "corporations adopted a pastoral landscape not simply because they moved to the suburbs; they moved to the suburbs to replace themselves within a pastoral landscape."

While the move of many organizations' management offices out of the city was an important contemporary trend relevant to the creation of the Technical Center, more germane was the development of a new type of suburban corporate facility: the research campus. GM informational materials contemporary with the creation of the Technical Center explicitly call it a "tree-studded campus," and a "human environment."[84] The corporate campus blended the typologies of the college or university campus, the suburban factory, and the private residential estate, and was intended to "attract scientists from academia" and "reconceptualize research management."[85] The most important forerunner to the Technical Center was the AT&T Bell Telephone Laboratories campus, which opened in 1942 in northern New Jersey near Summit, and was heralded by *Fortune* as the model for this type of suburban corporate facility.

Bell Labs was designed by the architecture firm of Voorhees, Walker, Foley, and Smith, working with the Olmsted Brothers landscape architecture firm. Although smaller than the Technical Center, the Bell Labs campus featured buildings whose volumes were arranged orthogonally to create the sense of an implied grid, just as the Technical Center's would be later. In contrast to the modernist landscape of the Technical Center, the Olmsted firm supplied a more traditional treatment, with irregularly spaced trees arranged along the entrance drive and around the buildings.

The Bell Labs campus was followed by two other similar facilities of particular note that serve as precedents for the Technical Center. General Electric created its Electronics Park to research television and vacuum tubes on 191 acres of former agricultural land near Syracuse, New York beginning in 1945. The campus landscape included a large lake created by damming an existing stream. Electronics Park was followed by the 93-acre Johns-Manville's Research Center in Bound Brook in central New Jersey, completed in 1949.[86]

These precedent campuses share a fundamentally orthogonal organization and an overall sense of horizontality in the ratio of height to breadth in their buildings, and such features as an artificial lake and reflecting pools with the later form of the Technical Center. None of these corporate facilities were as progressive or inventive

[82] Mozingo, *Pastoral Capitalism*, 31.
[83] Ibid., 20.
[84] "Summary of the Architecture of General Motors Technical Center," 1, 7, 8.
[85] Mozingo, *Pastoral Capitalism*, 46.
[86] On these precedent corporate research campuses, see Mozingo, *Pastoral Capitalism*, chapter 3.

in their modernist styling and use of materials as Saarinen would be in the Technical Center project. Further, just as in the design of its buildings, the Technical Center landscape "transformed the precepts of the corporate campus into an emblem of American business," and became the image of what a suburban corporate landscape should be.[87]

The ways that the landscape was described and presented suggest ways in which the Technical Center succeeded as a whole with the public, and also one of the reasons it was seen by major businesses as a model post-war suburban corporate campus in the sense that it furthered GM's brand and promotional agenda. While, on the one hand, the landscape created the grandeur of the "Industrial Versailles" that epitomized American post-war prosperity and global industrial supremacy, on the other hand it also reflected important aspects of the post-war domestic suburban landscape. These evocations, both visual and verbal, linked the Technical Center, and by extension, GM and its products, to that landscape. They also made the connection to a glamorous lifestyle in that new American frontier, the land of the tract house and the subdivision where automobiles and up-to-date appliances, such as those produced by Frigidaire, were key to that lifestyle. Despite the fact that the Technical Center, like most corporate research facilities, was a predominantly male environment, it was described and depicted in ways that were intended to appeal to both men and women, and to link it to the domestic suburban landscape. The Technical Center thus was, as a strong corporate image of the company and therefore linked to GM's products, intended to be appealing not only to male but also to female audiences: it was to be understood as a "human environment."

This is most clearly evinced by publicity and fashion photography that dates to the time of the opening of the campus that show men and women together in the Technical Center's spaces, often emphasizing their social interaction. As part of the press kit issued by GM at the time of the opening, publicity photographs showed men and women working together in the Styling Group's Color Studio, and standing in conversation on the signature lobby stairs in this building.[88] In another notable example, *Look* magazine presented the Technical Center as fantasy glamorous realm of work, home, and play in a photo essay called "A Boy and his Dream," which depicted Thomas Greene, who had won a college scholarship by entering a model car in GM's Fisher Body Craftsman's Guild annual contest. "Tom" is shown in the article being "helped" by "Hungarian model, Iby Korody, who acted as Tom's chauffeur, secretary and laboratory assistant." In addition to showing Tom clad in a gray smock working on a clay model of a hood ornament with GM sculptor Sam Cashwan, the article's photographs show Tom and Iby as a couple dining in evening dress in the cafeteria of the Styling Group, a bucket with a bottle of champagne on the table and the Engineering Group brilliantly lit up in the night view behind them, and dancing in front of the Harry Bertoia screen in the Restaurant in the same elegant clothes.[89]

Not too surprisingly, women were not particularly visible to the public as employees of GM groups other than Styling that found their new home at the Technical Center. The campus was described, however, in terms of the home garden and the new subdivision suburban landscape. The important *Architectural Forum* article of 1949, asserting that the Technical Center design "in all its essentials . . . depends on qualities of perception, of insight, of human spirit" was purportedly to be driven "not by a standard of 'foot-candles at desk level' but by the desire that the innermost draftsman be aware of the leaves of the trees."[90] W. Clifford Harvey, writing for a general audience in the *Christian Science Monitor* at the time of the dedication of the Technical Center, commented that "the natural beauty of the center is symbolic of the modern business trend: to bring the relaxed atmosphere of home into the office and factory."[91] Project landscape architect Edward Eichstedt, writing about the landscape

[87] Mozingo, *Pastoral Capitalism*, 72.
[88] GM Public Relations, Press Kit, Folder 254, Box 136, Series IV, Yale Collection.
[89] "A Boy and His Dream," *Look*, 26 May 1956.
[90] "G.M. Technical Center," *Architectural Forum*, 71.
[91] Harvey, "An Industrial Disneyland," *Christian Science Monitor* 11 May 1956.

in 1952, described the internal roadways in the terms of a suburban housing development as "streets . . . lined with shade trees." Further, Eichstedt noted that design had no "axial construction [and] no monumental allées."[92]

The secure place in the American imagination, and the strong place forged by the Technical Center (if not GM itself) in American post-war culture was summarized briefly in an article in *House & Garden.* In this, it was noted that the Technical Center was "much more" than a "workshop of GM's research scientists, engineers and artists." Instead, the Technical Center's "limitless ideas for houses of the future," and "fresh concepts of design and color will find expression . . . across the United States."[93] The Technical Center was thus presented to the public as a special place within the new American landscape, not one divorced from American, post-war life.

Conclusion

Through the close collaboration between Saarinen and GM in both the design for and meanings of the Technical Center, this project was significant for a broad American audience, who accepted GM's messages of its important role in the creating a better world through the quality of its consumer products and scientific advances. This message was supported by the glamorous public image of the Technical Center. The Technical Center first brought Eero Saarinen into the public limelight and to national fame and influence, and represented one of the most nationally significant industrial facilities of its period. This project set the tone for and led to a number of equally prominent corporate commissions that followed in his short career, including key projects for Bell Laboratories, the Columbia Broadcasting System, Inc. (CBS), John Deere, International Business Machines (IBM), Time, Inc., and Trans World Airlines. These projects both expressed and shaped the sensibility of the post-war age.[94]

[92] Eichstedt, "Current Work in Progress," 167.

[93] "Inspiration from a Grand Design," *House & Garden* (Jun. 1956): 94-96.

[94] For an extended discussion of all of Saarinen's suburban corporate campuses as a group of commissions of this type, see Miller, "Eero Saarinen."

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__ Preliminary Determination of Individual Listing (36 CFR 67) has been requested.
X Previously Listed in the National Register.
__ Previously Determined Eligible by the National Register.
__ Designated a National Historic Landmark.
__ Recorded by Historic American Buildings Survey: #
__ Recorded by Historic American Engineering Record: #

Primary Location of Additional Data:

X State Historic Preservation Office
__ Other State Agency
__ Federal Agency
__ Local Government
__ University
X Other (Specify Repository): Saarinen Collection, Yale University

10. GEOGRAPHICAL DATA

Acreage of Property: approximately 400 acres

UTM References	**Zone**	**Easting**	**Northing**
A	17	331822	4710075
B	17	332611	4710067
C	17	332632	4707957
D	17	331860	4707964

Verbal Boundary Description: Beginning at the southwesternmost point of the General Motors property in Warren, Michigan on the northeast side of the intersection of Mound Road and East Twelve Mile Road, proceeding north along the eastern edge of Mound Road approximately one mile to the southeastern side of the intersection of Chicago Road and Mound Road, following the southeastern side of Chicago Road along its curvilinear path in a northeasterly direction, and then east along the south side of the Chicago Road from the point that it straightens approximately 840 feet to the western edge of the former Michigan Central Railroad bed, then south along the western edge of that railroad bed approximately one and a quarter miles to the northeastern corner of the intersection of the western edge of the railroad bed and E. Twelve Mile Road, then west along the northern edge of E. Twelve Mile Road approximately one-half mile to the point of beginning.

Boundary Justification: This boundary encompasses the limits of the original General Motors Technical Center as it was designed by the firm of Saarinen and Saarinen (Eero Saarinen and Associates from 1950).

11. FORM PREPARED BY

Name/Title: Emily T. Cooperman, Dominique Hawkins, John M. Evans, George C. Skarmeas

Address: Preservation Design Partnership
One South Broad Street, Suite 1702
Philadelphia, PA 19107

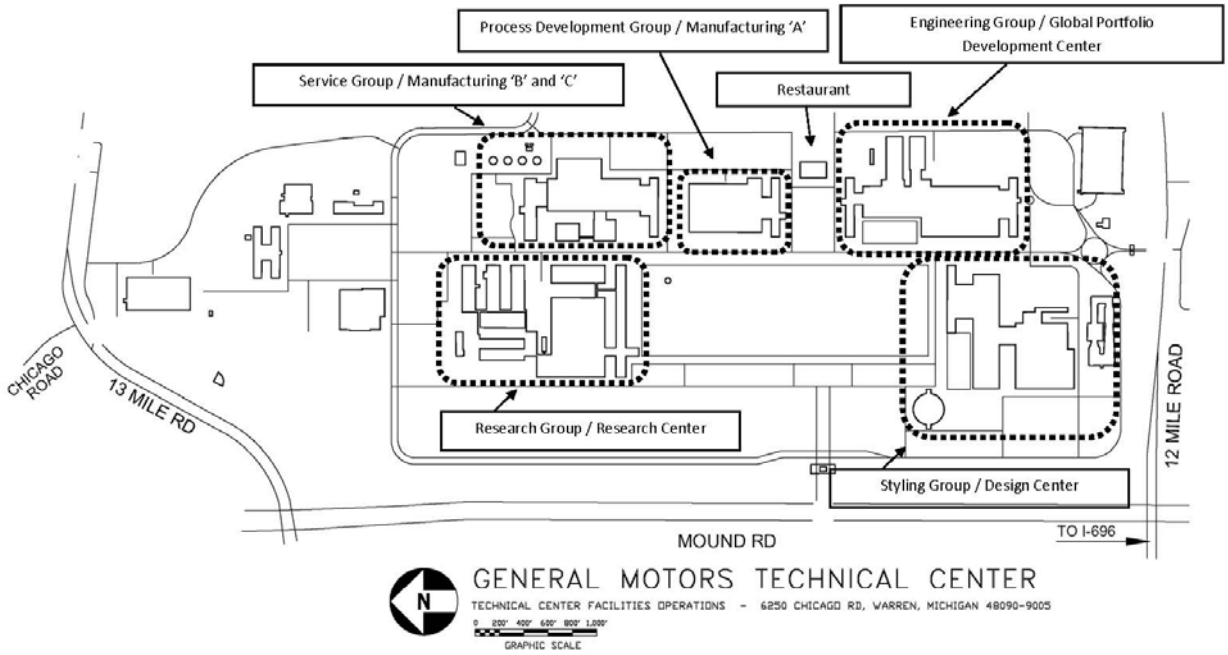
Telephone: (215) 842-3388

Date: May 2013

Edited by: James A. Jacobs, Historian
National Park Service
National Historic Landmarks Program
Historic American Buildings Survey
1201 Eye Street NW, 7th Floor
Washington, DC 20005

Telephone: (202) 354-2184

NATIONAL HISTORIC LANDMARKS PROGRAM
October 17, 2013



General Motors Technical Center, site plan indicating the major groups of buildings.
Emily T. Cooperman, 2013

Mound Road gate house, looking southeast
Emily T. Cooperman, photographer, 2012

General Motors Technical Center campus from southwest corner of the central lake.
Emily T. Cooperman, photographer, 2012

Staggered double row of trees at the north central lake peninsula, looking west.
Emily T. Cooperman, photographer, 2012

Main lake fountain with staggered, protruding water jets, looking northeast.
George C. Skarmeas, photographer, 2012

Reflecting pool at the Engineering Group, looking northeast.
John M. Evans, photographer, 2012

Reflecting pool at the Styling Group, looking southwest.
John M. Evans, photographer, 2012

Styling Group Administration Volume, detail of northwest corner.
John M. Evans, photographer, 2012

Service Group Administration Volume, looking northeast from eastern perimeter road.
John M. Evans, photographer, 2012

Stainless steel water tower, northeast corner of the central lake.
John M. Evans, photographer, 2012

Styling Group Administration Volume, lobby with suspended stair.
John M. Evans, photographer, 2012

Styling Group Studio Volume, second-floor library.
John M. Evans, photographer, 2012

Styling Group Administration Volume, second-floor executive suite corridor.
John M. Evans, photographer, 2012

Styling Group, third-floor cafeteria.
John M. Evans, photographer, 2012

Research Group Administration and Laboratory Volume,
lobby with spiral stair and auditorium door to the right.
John M. Evans, photographer, 2012

Research Group Administration and Laboratory Volume, auditorium with wood paneled walls.
John M. Evans, photographer, 2012

Process Development Group Administration Volume, first-floor corridor.
John M. Evans, photographer, 2012

Process Development Group Shop Volume, interior view.
John M. Evans, photographer, 2012

Central Restaurant and entrance plaza, looking east from quadrangle.
George C. Skarmeas, photographer, 2012

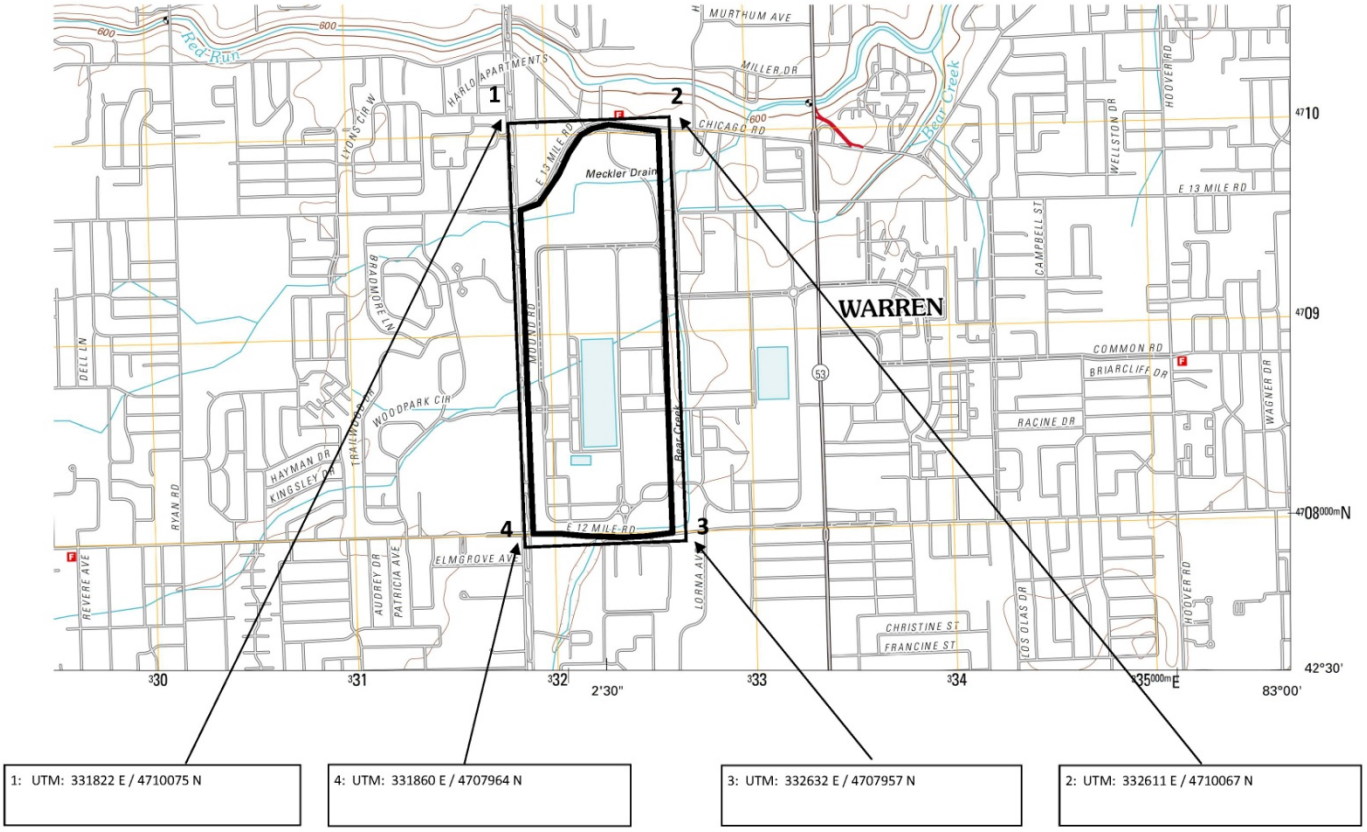
Central Restaurant, entrance lobby with Harry Bertoia decorative metal screen on right.
John M. Evans, photographer, 2012

Processing Develpoment Group Shop Volume, looking northwest across parking lot toward water tower.
John M. Evans, photographer, 2012

Service Section Group Adminstration Volume (left), connector,
and Shop Volume (right), looking west toward water tower.
John M. Evans, photographer, 2012

Styling Group Auditorium with aluminum-clad domed roof atop brick base
John M. Evans, photographer, 2012

Styling Group Auditorium display area.
John M. Evans, photographer, 2012



Detail, USGS Warren Quadrangle, Michigan, 7.5 Minute Series, 2011, North American Datum of 1988, Showing **General Motors Technical Center** Boundaries

General Motors Technical Center, NHL boundary and USGS coordinates
Emily T. Cooperman, 2013