Facility Expansion Report

- Space Needs Study
- Schematic Design Report

Metro Transit
Madison, Wisconsin

November 2005

Submitted by

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Executive Summary

Executive Summary

In 2005, Metro Transit obtained Common Council approval to contract with a Study Team led by RNL Design *(Denver, Colorado)* and Maintenance Design Group (*Houston, Texas*), and supported by Arnold and O'Sheridan (Madison, Wisconsin), to provide comprehensive planning and Schematic design services for upgrades and expansions to Metro Transit's East Washington Facility. This facility has gone through various remodeling and changes due to Metro's growth. Because of the building additions, and continued fleet growth, Metro's site parking, circulation, and efficiency have been compromised.

Review of Existing Facility

The conclusions based on the visual analysis of Metro's operations and the analysis of utilization at Metro Transit maintenance and support facilities are as follows. There is sufficient supporting evidence that a new Bus Maintenance Facility is needed to effectively support Metro's operations in the future. The following is a list of supporting factors for a new Bus Maintenance Facility:

- Traffic relief at the Intersection of East Washington Avenue and Ingersoll Street
- Redevelopment of current site that encompasses Administration, Maintenance, Operations, Bus Storage, and employee parking in an efficient manner
- Separate Bus Storage from the Maintenance Facility to aid in efficiency and work flow.
- Additional building capacity to handle future fleet growth and to regroup all Metro staff back into one facility
- State-of-the-industry facilities to provide more efficient and safer working conditions, including the correction of poor mechanical and electrical systems throughout the facilities
- A need for comprehensive Shared Support Facilities to serve all Metro Transit operations

Needs Assessment

Metro Transit wishes to enhance and improve the current facilities by making improvements and remodeling the existing building. Before any planning could occur, a comprehensive needs program assessment and space needs program was needed. Any new or remodeled facility will include areas for support and welfare, bus maintenance, parts storage, support shops, fare recovery, fueling and bus wash, Building and Grounds Maintenance and Warehouse, training and support areas, and employee/staff parking areas.

Staffing

The following table is a summary of the projected staffing levels for each group within Metro Transit used in the programming effort. These staffing levels were taken directly from data collected during interview sessions from organization charts, and internal projections. *See Section Two-Basis of Design* for a more detailed breakdown of each group's employees.

Exhibit ES.A Staff Summary

Position	Existing Conditions	Concept Plan Program @ 285 Buses
Transit Administration	36.75	51.00
Transit Operations	344.50	490.00
Bus Maintenance	76.75	103.50
Building and Grounds Maintenance	9.00	11.00
Total	**466.00**	**654.50**

Vehicles

The vehicles listed in the following tables are the vehicles that will be stored at the expanded Metro Transit Facility. The projected vehicle numbers for Existing and Program were obtained directly from inventories provided by Metro Transit staff to the Study Team and questionnaires during interview sessions.

Exhibit ES.B Non-Revenue Vehicle Summary

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Historical Non-Revenue Buses	5	5
Administrative Vehicles	2	2
Supervisor Vehicles	8	9
Relief Vehicles	12	13
Maintenance Vehicles	5	6
Buildings and Grounds Vehicles	8	9
Total	**40**	**44**

Exhibit ES.C Revenue Vehicle Summary

Buses	Existing Count	Projection @ 285 Buses
Orion 5.501 40 ft. Transit Bus	57	57
Gillig Phantom 40 ft. Transit Bus	36	36
New Flyer 40 ft. Transit Bus	76	76
Gillig Low Floor 40 ft. Transit Bus	30	91
Glaval Paratransit Bus (Large)	16	20
ELF Paratransit Bus (Medium)	3	5
Total	**218**	**285**

Space Needs Program Summary

The Space Needs Program Summary for the Metro Transit Facility expansion is based on the data collected during interviews with Metro Transit Staff and the evaluation of the existing facility. This summary includes all building and site areas including Maintenance Areas with above employee Parking Structure, Administration Areas, and Operation Areas, Bus Storage Area, and other site areas. Site circulation, setbacks, and landscaping requirements are also shown. See Exhibit ES.D for the Space Needs Program Summary

Exhibit ES.D Metro Transit Space Needs Program Summary

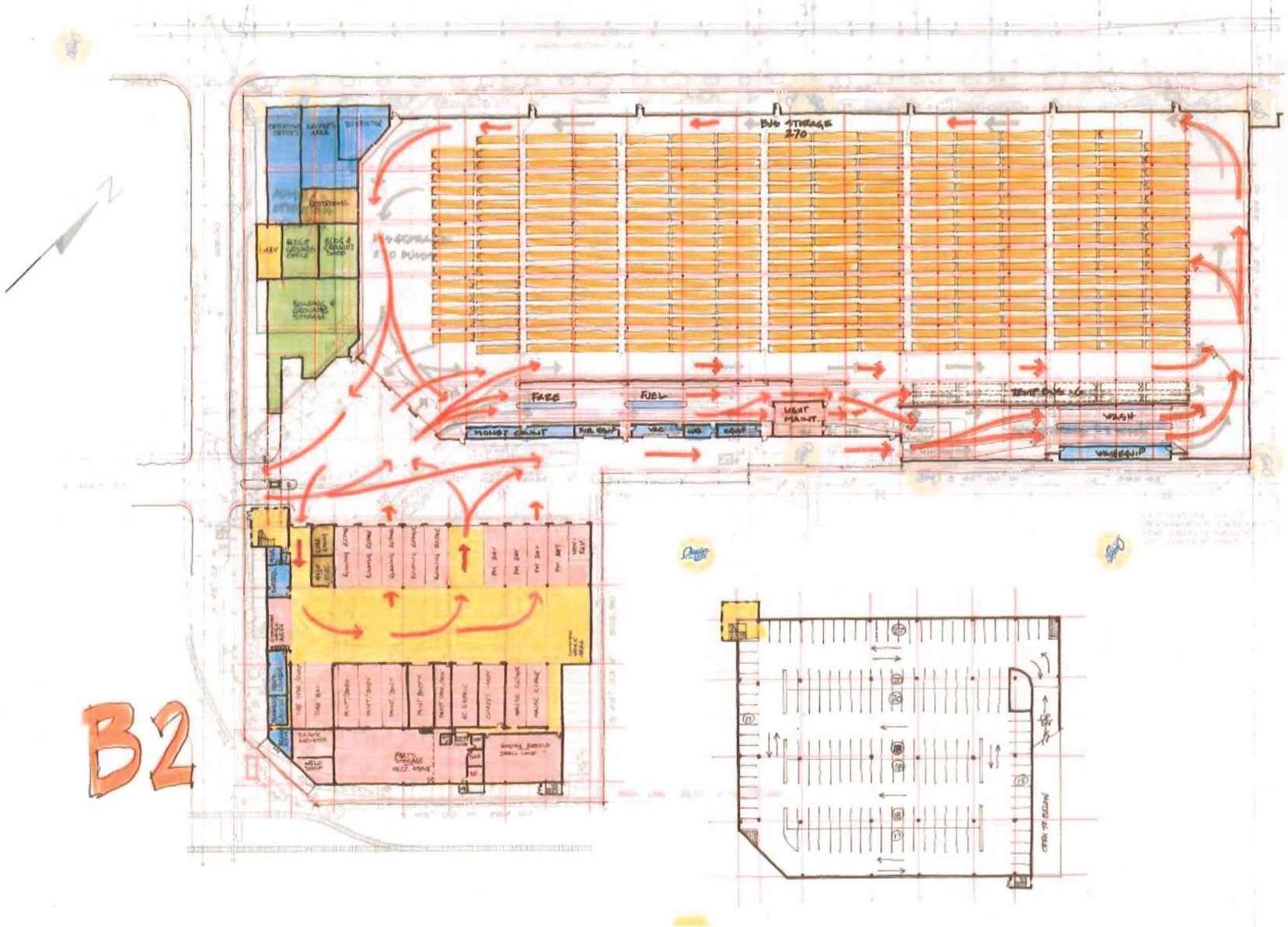
Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Summary											
Total Admin Office & Support Areas	35.75		4,148	2964			47.00			11,101	
Total Transit Operations	344.00		3,855	382			491.00			15,596	
Total Maintenance Office & Support Areas	10.00		2,707	0			10.00			5,283	
Total Maintenance - Shop & Bay Areas	53.00		59,004	0			72.50			91,599	
Total Service Facility	13.75		10,156	0			19.00			21,045	
Total Building & Grounds	9.00		10,651	0			9.00			9,024	
Total Bus Parking/Storage/Circulation	0.00		150,209	0			0.00			268,717	
Total Building Requirements:	**466**		**314,695**	**3,346**			**649**			**422,364**	
Total Exterior Areas			84,616	0						51,661	
Sub-total:			**399,311**	**6692**						**474,025**	
Site Circulation	12%		53,713	Actual		25%				118,506	
Site Landscaping			incl.			10%				47,403	
Site Setbacks			incl.			5%				23,701	
Total Site Requirements:			**453,024**	**6,692**		**sf**				**663,636**	
			10.4	0.2		**acre**				15.2	

Master Plan and Conceptual Design

RNL Design and Maintenance Design Group conducted a Site Master Plan and Concept Planning design charrette for the Metro Transit Facility expansion on May 9 through May 13, 2005. The goal for this session was to develop concept site and building alternatives for Metro Transit to improve the safety, appearance, performance and efficiency of the entire facility and operation and to accommodate the current fleet size of 219 as well as a future fleet size of 285 buses. Concepts were developed for the current Metro Transit site of approximately 10.4 acres located at 1101 East Washington Avenue in Madison. The selected concept is to be located entirely within the existing site utilizing as much of the site as possible and allowable by the City of Madison. The site re-development is to start at the southwest corner and work its way to the north and east.

Concept alternatives developed during the charrette process were presented at daily review meetings to all interested Metro staff personnel. The purpose of these review meetings was to interactively discuss the merits and deficiencies of each concept, with the end product being a concept that most completely fulfills the goals of all Metro Transit Staff.

Exhibit 6.A
Selected Site Concept Plan



The Selected Site Concept Plan, Exhibits 6.A through Exhibit 6.G starting on 6.25, illustrates the complete build out of the site. For comparison, the Study Team included Appendix E which depicts various Concept Plans for Metro Transit that illustrates the different site and facility designs that could be implemented.

Opinion of Probable Cost

The Conceptual Project Budget for the new Metro Transit Facility Expansion includes two elements: hard costs, soft costs.

- Hard costs are those related to construction.
- Soft costs are administrative costs supporting the design and management of the project.

The conceptual estimate presented in **Appendix F** was prepared by **M. Lee Corporation, Construction Cost Consultants.** The values are derived from information in the program document, onsite drawings, and supplemental information given to a cost-estimating consultant of the design team. An architectural narrative of the project is included in Section Six and has been the basis for the estimate.

Exhibit ES.J is a summary of the costs for the Selected Concept Plan. The figures in the summary tables have been rounded to the nearest thousand. For the detailed data of the cost summary, reference **Appendix F** Opinion of Probable Cost Detail.

Exhibit ES.J – Conceptual Project Budget Summary

Cost Item	Selected Concept Plan
Site Work	$1,268,000
Maintenance and Parking Structure	$14,280,000
Administration and Ops Building	$7,653,000
Bus Storage	$9,587,000
Special Equipment (per MDG)	$4,449,000
Hard Cost Fees	$0
Soft Costs	$16,682,000
Cost Escalation 12%	$4,468,000
Hard Cost Total	**$58,387,000**

Costs include prorated portions of escalation figures calculated in addition to Total Costs.

Implementation Plan

The purpose of the Implementation Plan is to develop a go-forward strategy and a funding strategy for the new Metro

Transit Facility. To accomplish the objectives identified in this Space Needs Study existing and potential sources that are viable funding possibilities for this project must be sought.

To achieve the complete utilization and redevelopment of the current Metro Transit property phasing will have to take place, which has been proposed to happen in three parts. The Phasing Concept in Section Six on page 6.16 was compiled by the Study Team in order to demonstrate to Metro Staff the basic phasing needed in order to start construction of new facilities on the existing site.

Schematic Design Report

The Schematic Design Report portion of the Final Report includes a detail Design Narrative. This narrative is a summary of the resulting design solutions produced from a multi-day schematic design charrette session between RNL, MDG, and Metro. These sessions led to the development of schematic level floor plans, sections, elevations and a final site plan, to improve the safety, appearance, performance and efficiency of Metro Transit's existing facilities concurrently planning for future growth. Also included in Section Eight of the report are descriptions of the Structural Framing Systems, Electrical Systems, Plumbing Systems, HVAC Systems and Special Maintenance Equipment.

During a second on-site charrette the Schematic Designs, Master Plans, and Conceptual Designs were refined resulting in a selected design solution. The Schematic Design drawings are printed in Section Nine and represent the refinement of the selected design solution.

Sustainable solutions for the redevelopment of Metro Transit's facilities were identified and implemented during the conceptual and schematic design phase. Section Ten is a summary of strategies that have been incorporated into the schematic design solution. They are based on the LEED certification system for sustainable design of buildings and will be developed further as the design process gets more detailed.

In Section Eleven is the revised good faith estimate of the probable cost to complete the modifications and new construction identified in the Schematic Design for the Metro Transit's facilities as determined by RNL and MDG during the schematic design phase.

Exhibit ES.K is a summary of the costs for the Selected Schematic Design. The figures in the summary tables have been rounded to the nearest thousand. For the detailed data of the cost summary, reference **Appendix J** *Schematic* Opinion of Probable Construction Cost Detail.

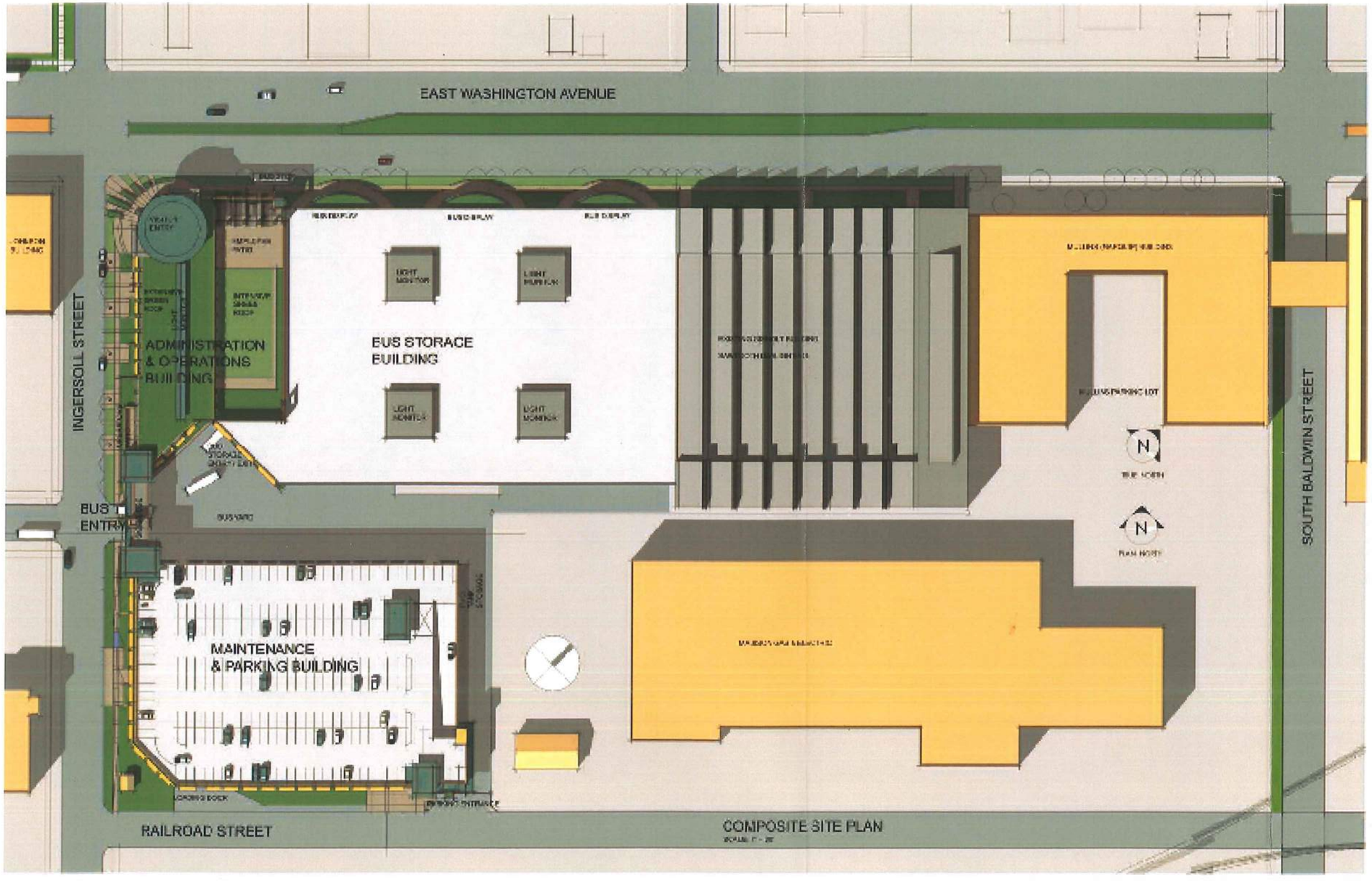
Exhibit ES.K – Schematic Opinion of Probable Construction Cost

Cost Item	Selected Concept Plan
Site Work	$1,317,000
Maintenance and Parking Structure	$14,697,000
Administration and Ops Building	$8,789,000
Bus Storage	$11,201,000
Special Equipment (per MDG)	$5,314,000
Hard Cost Fees	$0
Soft Costs	$14,565,000
Cost Escalation 17.5%	$7,231,000
Hard Cost Total	**$63,114,000**

Costs include prorated portions of escalation figures calculated in addition to Total Costs.

A strategy has been developed to implement the facility improvements outlined in the Schematic Design while maintaining operations. Section Twelve is a description of the phases including all associated demolition and new construction that will ultimately lead to full build out of the Schematic Design. Ideally these phases occur one after another in a seamless construction sequence. Each phase represents a level of implementation that will allow Metro Transit to reach a milestone in the construction build out and continue operations.

Schematic Design Model
Metro Transit Facility



Conclusion

The information documented throughout this report clearly supports the need for a new facility to support the existing Metro Transit System and the projected growth in that system. The Study Team determined the amount of space that is required for a new facility, and with the help of Metro Staff, evaluated the existing site to determine the appropriate program and necessary assessment of the current property for the selected Concept Plan to work. Furthermore, based on the estimated budgets developed to construct this new facility, the Study Team recommends the following: Metro should proceed with the necessary steps to secure the funding, and then proceed with the design process of the new facility as indicated in section six.

Space Needs Study

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Madison, Wisconsin

June 2005

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Section One
Introduction

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Introduction

In the State of Wisconsin, DOT Performance Audits performed in 1993 and again in 2004, the City of Madison was requested to perform a Needs Analysis for capital improvements to the Metro Transit Maintenance and Administration Facility located at 1101 East Washington Avenue in Madison. The Performance Audits, required under State Statute, noted severe overcrowding in bus storage capacity, very inadequate maintenance and operations space, and limited office facilities.

In 2005, Metro Transit obtained Common Council approval to contract with a Study Team led by RNL Design *(Denver, Colorado)* and Maintenance Design Group (*Houston, Texas*), and supported by Arnold and O'Sheridan (Madison, Wisconsin), to provide comprehensive planning and design services for the upgrades to the facility.

As a part of an overall plan to improve transit facilities and service to the citizens of Madison, Metro Transit (Metro) intends to utilize federal (80%) and local (20%) funding resources to remodel and expand the current facility located at 1101 East Washington Avenue in Madison. This updated facility will accommodate new Administration areas, Operations areas, Bus Storage, and Maintenance / Service facility needs. The goal is a comprehensive complex that will include all elements of the current facilities and the accommodation of several other functions in the most efficient way possible utilizing creative design solutions.

As a part of the planning process, this Space Needs Study Report is developed to document assumptions, planning theory, planning ratios, and space needs pertaining specifically to the unique functions and equipment required at the facility.

The existing Metro Transit Maintenance and Administration Facility at 1101 East Washington Avenue is centrally located on the isthmus near the downtown area of Madison on 10.4 acres. Administrative, Operations, Maintenance, and Bus Storage functions are located in a structure completed during two phases in the early 1980's. This facility has had numerous interior and exterior modifications to try to correct facility inadequacies. Additional administration space for Marketing and Customer Services, Planning and Scheduling, is leased in a facility referred to as the Annex, across Ingersoll

Street in the Johnson Building. The Annex space is limited in size and offers no suitable room for expansion.

Purpose and Use

The purpose of this Space Needs Study/Concept Plan is to define functional requirements and space needs, which will serve as a general basis for planning and design of the new or remodeled facilities. This document is generally intended for Study Team use and coordination efforts, but it is also a very helpful tool and encourages the user's involvement in the review and verification of data and assumptions.

Methodology

Some of the best facility design projects begin with the Study Team gaining an understanding of the daily functions and specific operations to be performed within the facility. To obtain this understanding, the Study Team began this project with staff questionnaires, staff interviews, facility tours, data collection, observations, and listening. This approach provided the Team with valuable insight and direction that otherwise may not have been related to the Team utilizing more traditional programming and design methods.

This level of interaction will continue throughout the planning and concept design process through the use of the on-site design charrette and comprehensive workaround planning workshops. The information provided and gathered during the initial on-site session is documented herein and will be utilized to develop the facility concept designs.

Technical Approach

A Work Plan was developed by RNL Design and Maintenance Design Group (MDG) in response to the Request for Qualifications for the Metro Transit Space Needs Study. The Work Plan is based upon the firms' combined experience in planning and designing similar transit administration, operations, bus storage, and maintenance facilities, and understanding of the issues specific to these types of facilities. The work plan has been refined to reflect the project scope and goals during discussions held with Metro Transit on January 6, 2005 following the original proposal submission.

Document Organization

Space Needs Study

Section One - Introduction: Gives a brief introduction to the project and to the purpose of this report. This section also includes a short description of this report and the Study Team methodology and technical approach.

Section Two - Basis for Design: Documents the on-site observations, interviews, and data collected during the initial on-site programming session. A write-up for each functional group is presented with tables documenting staffing, space occupancies, and vehicles. Affinities and Key Planning Issues are also included.

Section Three - Space Needs Program: Presents the Space Needs Program developed from the data collected and provided by the Metro Transit staff. This program also documents the utilization of the current facilities for comparative purposes.

Section Four - Facility Assessment: Presents the Study Team's findings related to the Facility Assessment of the special needs, requirements, and equipment for each type of space within the facility. Understanding the facility's opportunities and shortcomings is paramount to a successful planning effort.

Section Five - Sustainable Design Strategy: Presents the strategy to be utilized by the Study Team during the development of the Concept Plan and Conceptual Design alternatives.

Section Six - Site Concept Plan and Conceptual Design: Presents the selected Site Concept Plan and Concept Plans developed for the Metro Transit Facility during the on-site design charrette session held from May 9 through 13, 2005.

Section Seven - Opinion of Probable Cost: Presents the estimated costs of the proposed modifications and construction outlined in the Site Concept Plan and Conceptual Design alternatives.

Schematic Design

Section Eight - Schematic Design Narrative: Presents is a summary of the resulting schematic design solution from the on-site charrette.

Section Nine - Schematic Design: Presents Schematic Design drawings which represent the refinement of the selected design solution from the second on-site charrette.

Section Ten - Recommendations For Sustainable Design: Presents a summary of the recommendations for Sustainable Design that have been incorporated into the Schematic Design.

Section Eleven - Schematic Opinion of Probable Construction Cost: Presents a good faith estimate of the probable cost to complete the modifications and new construction identified in the Schematic Design for Metro Transit Facility Expansion.

Section Twelve - Implementation and Phasing Plan: Presents a description of the phases including all associated demolition and new construction that will ultimately lead to full build out of the Master Plan.

Appendices: provide other necessary supporting data, calculations, analyses, and details required by the Study Team.

- **Appendix A:** Staffing Data
- **Appendix B:** Existing Facility Space Allocation Take-Offs
- **Appendix C:** Metro Transit Fleet Design Data
- **Appendix D:** 135/150 Bus Split Program and No Parking Structure Program
- **Appendix E:** Site Concept Plans and Conceptual Design Alternatives
- **Appendix F:** Opinion of Probable Cost Detail
- **Appendix G:** Property Information
- **Appendix H:** Utility and Easement Base Maps
- **Appendix I:** Preliminary Environmental Assessment Report
- **Appendix J:** Schematic Opinion of Probable Construction Cost
- **Appendix K:** Preliminary Equipment list

Acknowledgements

The Study Team would like to acknowledge the efforts and contribution of the Metro Transit staff during the data collection, programming, and planning efforts. It is this continued enthusiastic participation that will ensure the realization of the best Space Needs Study possible.

Section Two
Basis for Design

Section Two
Basis for Design

Introduction

Metro Transit (Metro) is a Division of the City of Madison. This Division functions as an Enterprise Agency from the City perspective, and as a metropolitan transit system from a community perspective. Local transit policy and general oversight is provided by the Madison Transit and Parking Commission. Appointments to this commission are made by the Mayor, with the approval of the Common Council.

System Parameters

Metro currently operates a Monday through Sunday, fare-based, 47-route full-service transit system. All buses depart from the East Washington Avenue Maintenance and Administration Facility, travel to routes of service for duration of service or operator shift, then return back to the East Washington Avenue Facility. Most transfers are made during the "Pulse" (the period of time when routes meet) at the North, South, East, and West Transfer Point locations. This Pulse-based route transfer system allows maximum opportunity for customers to access / connect with route services throughout the 60-square-mile metropolitan service area.

The transit fleet used to serve this system is a mix of 1989, 1992, and 1994 Orion 5.501s; 1995, 1996, and 1997 Gillig Phantoms; 2000, 2001, 2002, and 2003 New Flyers; and 2004 and 2005 Gillig low-floor transit coaches. Metro has a routine fleet replacement program, replacing 15 of its oldest buses each year. All buses are diesel powered and are equipped with wheelchair lifts or ramps and bike racks. (See Appendix C for detailed Fleet Design Data).

In addition to fixed route bus service, Metro also provides ADA paratransit service. Metro directly operates approximately 27% of its paratransit service, and contracts out the balance of service to local providers of paratransit and taxi service. The Paratransit vehicles owned, operated, and maintained by Metro are 21-foot Glaval buses and 26-foot ELF buses.

System Growth

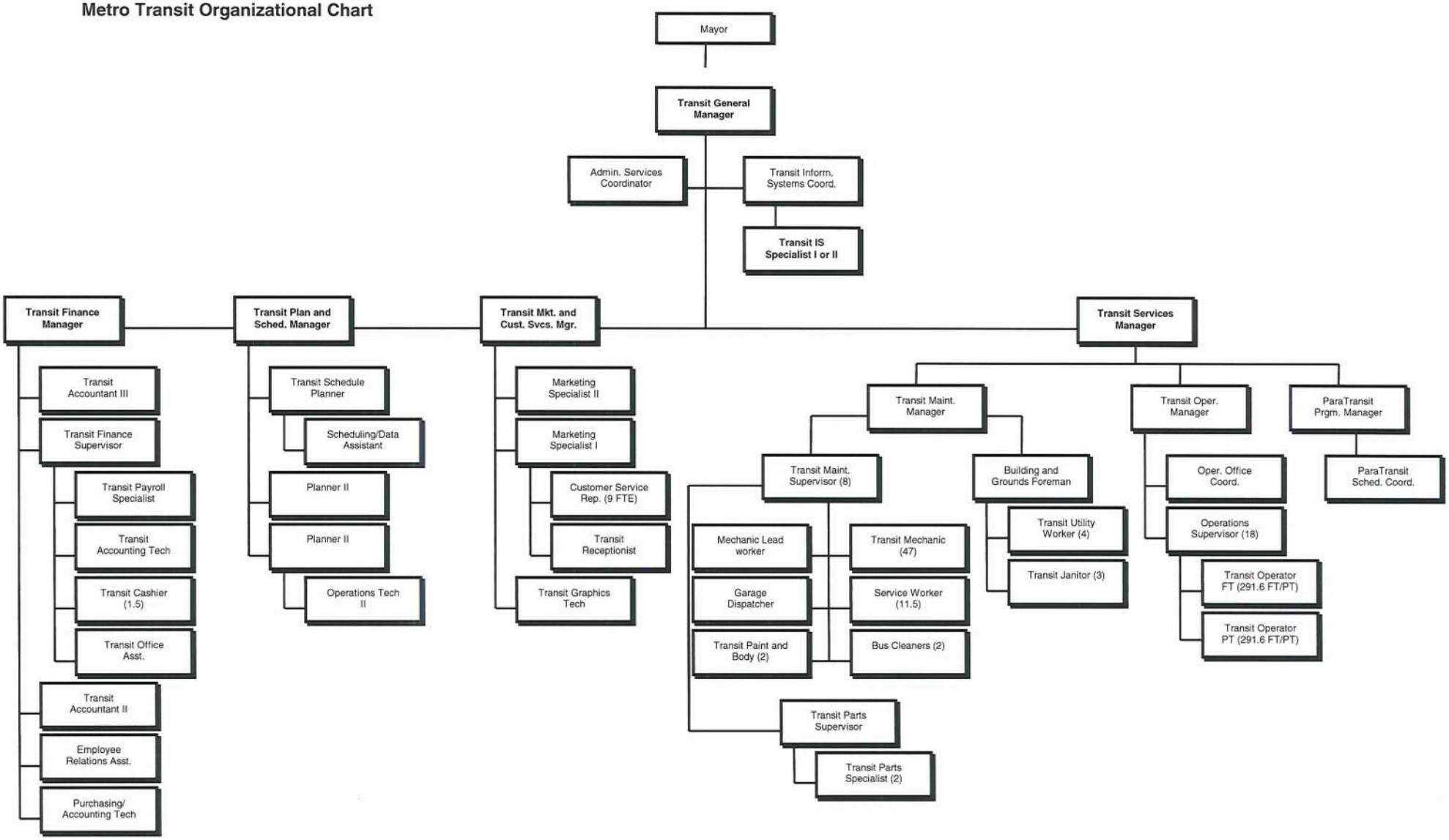
Metro is preparing for growth in service to meet the metropolitan area's needs as the population continues to grow. The City of Madison is expanding rapidly through annexations. Current transit services in Middleton and Fitchburg are expected to expand to meet the commercial, retail, and residential growth needs in those communities. Metro is currently working with the Cities of Verona and Sun Prairie to design services for those communities. Expansion

needs to other communities have been documented in the MPO's Five-Year Transportation Development Plan, the MPO Long-Range Transportation Plan, the Transport 2020 Study, and in community and regional Comprehensive Plans.

Metro Transit Organizational Chart

The following organizational chart (Exhibit 2.A) depicts existing staffing levels and job position title.

Exhibit 2.A
Metro Transit Organizational Chart



Operational and Functional Characteristics

This section summarizes the information gathered during extensive on-site interviews with the Metro Transit staff from April 4 through 7, 2005. The on-site interviews included a review of programming questionnaires completed by the staff and in depth discussions with each group. The functional groups within Metro Transit are as follows:

- Administration (including the needs of the Metro General Administration, Finance, Marketing and Customer Services, Planning and Scheduling, Information Systems, and Paratransit Program Management)
- Transit Operations
- Bus Maintenance
- Facilities Maintenance (Buildings and Grounds)

The purpose of this section is to document and define the functional and operational characteristics of each group necessary to developing the requirements and space needs for the new facilities. The understanding gained by the Study Team will influence design and construction decisions made concerning scale, orientation, organization, and structures at the site. A summary of each group's operational and functional characteristics follows.

Administration

Function

The General Manager is responsible for general management and oversight of Metro Transit and serves as liaison to the Transit and Parking Commission, the Mayor's Office, and other Department/Division Heads in the City of Madison. Key Metro staff include the Transit Service Manager, who functions as an Assistant General Manager and directly supervises Operations and Maintenance Managers; the Transit Finance Manager; Planning and Scheduling Manager; Marketing and Customer Services Manager; Information Services Coordinator; and Paratransit Program Manager.

Customer Service handles telephone, website, and public information functions. Customers are greeted at the Reception lobby located at the main Metro Transit Facility.

A Service Development Committee, chaired by the General Manager, and composed of Planning, Marketing, and Operations personnel, plan the direction of service development.

In conjunction with the General Manager, the Finance Unit has responsibility for Metro's budget and day-to-day administration of payroll, accounts payable and receivable, purchasing, and revenue receipts.

Information Systems Staff, using state-of-the art Intelligent Transportation System (ITS) and other computer technology, enable all units within Metro to work together and communicate in an efficient manner and also allows Operations to integrate and perform daily duties.

Hours of Operation

Administration currently conducts business between 8:00 a.m. to 4:30 p.m., Monday through Friday, with actual staff office hours varying between 7:30 a.m. – 5:15 p.m. with after hours access necessary for key management personnel.

Staff

For programming and planning purposes, identification of all staff and possible future staff growth is necessary. **Existing Conditions** and projected "**Concept Plan Program**" Administration staff is as follows:

Administrative Management Staff

Position	Existing Conditions	Staff Ratio @ 218 Buses	Concept Plan Program @ 285 Buses
Transit General Manager	1.00	-	1.00
Admin. Services Coord.	1.00	-	1.00
Information Services Coord.	1.00	-	1.00
Finance Manager	1.00	-	1.00
Planning and Scheduling Manager	1.00	-	1.00
Marketing and Customer Services Manager	1.00	-	1.00
Transit Service Manager	1.00	-	1.00
Total	**7.00**		**7.00**

Administration Staff

Position	Existing Conditions	Staff Ratio @ 218 Buses	Concept Plan Program @ 285 Buses
IS Specialist I or II	1.00	-	2.00
Finance Accountant III	2.00	-	2.00
Finance Supervisor	1.00	-	1.00
Payroll Specialist	1.00	-	1.00
Cashier	1.50	-	2.00
Finance Office Assistant	1.00	-	1.00
Accounting Technician	1.00	-	1.00
Employee Relation Assistant	1.00	-	1.00
Accountant Tech/ Purchasing	1.00	-	1.00
Aspire/Intern	0.50	-	1.00
Transit Schedule Planner	1.00	-	1.00
Scheduling/Data Assistant	1.00	-	2.00
Planner I and II	2.00	-	3.00
Operations Tech II	1.00	-	2.00
Transit Marketing Specialist II	1.00	-	1.00
Marketing Specialist I	1.00	-	2.00
Customer Service Supervisor	0.00	-	1.00
Customer Service Representative	8.75	24.91	13.00
Receptionist	1.00	-	1.00
Graphics Tech	1.00	-	2.00
Total	**28.75**		**41.00**

Note: Staffing levels and growth information was derived from staff interviews.
[1] Projection based on the ratios of staff to the existing bus fleet.

Vehicles

The vehicles in the following table are utilized by the Administrative staff in running errands at city offices in downtown Madison. These vehicles are included in forecasts for parking needs.

Administration Vehicles

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Sedans	2	2
Total	**2**	**2**

Affinities and Functional Relationships

The following functional relationships should be provided in the plan layout.

- The Transit General Manager's office should be located in the same general areas as the Administrative Services Coordinator, the Transit Service Manager, and conference areas.
- Administration offices should be physically separate from general site traffic flow.

- Administration offices should be adjacent to the administrative support areas.
- Administration offices should be secure, yet accessible by visitors.
- Information Systems should be centrally located.

Key Planning Issues

The following list of planning issues was compiled for consideration during Study Team planning and design efforts.

- Building security should be considered a priority issue during design efforts.
- Visitors Reception/Lobby should provide a secure space for the Receptionist to sell fare media and for people to collect Lost and Found items. Receptionist should control entry by visitors to any/all parts of the facility from the public entrance.
- Private office for Transit General Manager to accommodate space for a conference table with four chairs and adjacent to a larger administration conference room for up to 15 people with access from the Lobby/Reception areas.
- Private office for the Administrative Services Coordinator adjacent to the clerical support workstations and the Transit General Manager and in a "gate-keeper" location.
- Private office for the Employee Relations Coordinator located in an area easily accessible to all personnel and with space to accommodate up to four people at a small table and file cabinets.
- Private office for future administrative position or Intern.
- Plan to group offices in a suite configuration per administrative unit.

- Provide private offices with operable windows to the outside to the greatest extent possible.
- Provide a Copy/File/Small Conference/Workroom to include a library for Senior Management team use.
- Provide fireproof archive records storage room.
- Provide Printer/Copier Alcoves as necessary common to most office spaces.
- Provide private offices for Information Systems personnel.
- Provide an Administration Coffee Bar/Break Area with space for a kitchenette.
- Provide restroom facilities for the Administrative staff
- Provide a Public Conference/Training Room with audio/visual capability to accommodate a meeting or special function of up to 120 persons. Space to have movable partitions allowing space to be divided into smaller training rooms and conference space. The Multi-Purpose Room should be in a location such that after-hour

use can be facilitated and administrative areas can be secured after hours. Room configuration shall allow easy setup of academic classroom seating and table configuration.

- Provide a table, chair, and A/V storage rooms adjacent to the Multi- Purpose and Conference/Training Rooms.
- Provide a Coffee Bar Area adjacent to the Multi- Purpose and Conference/Training Rooms.
- Provide restroom facilities for use by the public without entering secure areas. Restrooms must be within area outside administration areas that will be secured after hours.
- Provide parking for eight visitors and four handicap accessible.
- Marketing and Customer Service should be relocated back within the Administrative Core to include private offices, computer workstations, and storage areas with the other included administrative support areas.
- A large, clean storage space is needed for palletized marketing materials. This area would likely be near a loading dock.
- Finance shall have private office spaces and office workstation cubicles for Finance support staff.
- A secured storage room is necessary for confidential financial file storage as well as for tickets, passes, etc.
- Office areas for planning personnel are required with close proximity to Operations personnel.
- Relocation and combination of all administrative functions allows for the shared used of common space needs throughout the facility.

Transit Operations

Function

Transit Operations is responsible for recruiting, hiring, training, and managing the transit bus drivers. Other Operations functions include dispatch, providing drivers with detour and route information, work assignments, and filling daily operator vacancies. Operations Management schedules, supervises, and computes payroll and related benefits for 265 full-time fixed route Operators, 20 Paratransit Operators, and 37 part-time fixed route Operators. Operations staff researches and responds to customer feedback, accident investigation, discipline issues, operator run and vacation picks, counseling, and performance reviews.

Hours of Operation

Transit Operations currently provides service to the Metro Transit system between 4:00 a.m. to 3:15 a.m., Monday

through Friday, with varying levels of route service on Saturdays, Sundays and holidays.

Staff

For planning and programming purposes, identification of all staff and possible future staff growth is necessary. **Existing Conditions** and projected "**Concept Plan Program**" Transit Operations staff is as follows:

Transit Operations Staff

Position	Existing Conditions	Staff Ratio @ 218 Buses	Concept Plan Program @ 285 Buses
Transit Service Manager	Incl.	-	Incl.
Operations Manager	1.00	-	1.00
Operations Supervisors	19.00	12.11	28.00
Operations Office Coord.	1.50	-	2.00
Paratransit Program Manager	1.00	-	1.00
Operations Technician	0.00	-	2.00
Paratransit Scheduler	1.00	-	1.00
Drivers (Full Time)	261.00	.76	349.00
Drivers (Part Time)	41.00	.76	82.00
Drivers (Paratransit)	19.00	.76	25.00
Total	**344.50**		**491.00**

Note: Staffing levels and growth information was derived from staff interviews and projection made based on a 285 bus fleet. Number of Drivers based on projected fleet growth and existing ratio of drivers to buses.

Vehicles

The vehicles in the following table are utilized by the Transit Operations staff. These vehicles are included in forecasts for parking needs.

Transit Operations Vehicles

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Sedans	16	17
Vans/Trucks	4	5
Total	**20**	**22**

Note: Transit Operations shares staff vehicles with Administration.

Transit Operations Buses

Buses	Existing Count	Projection @ 285 Buses
Orion 5.501 40 ft. Transit Bus	57	57
Gillig Phantom 40 ft. Transit Bus	36	36
New Flyer 40 ft. Transit Bus	76	76
Gillig Low Floor 40 ft. Transit Bus	30	91
Glaval Paratransit Bus (Large)	16	20
ELF Paratransit Bus (Medium)	3	5
Total	**218**	**285**

1. Vehicle quantities for Move-In Program and Concept Plan program are based on projections developed by MDG.
2. Metro Transit also has five historic buses not counted in the overall fleet count and projection.

Affinities and Functional Relationships

The following functional relationships should be provided in the plan layout.

- Transit Operations Manager must be within the Dispatch Center.
- Route Supervisors must be included within the Dispatch Center.
- Coordinator office should be adjacent to or within the Dispatch Center.
- Paratransit Operations Staff shall be relocated from its current off-site administration location to within the Operations Dispatch Center.
- The Dispatch area must be adjacent to or near to the Operators' Common Area.
- The Operators' Area shall include TV Room, Quiet Room, Smoking Lounge, Restroom/Showers, Locker Alcove, and the Dispatch Center.

Key Planning Issues

The following list of planning issues was compiled for consideration during future planning and design efforts.

- Provisions shall be made for Facility and departmental security with controlled access.
- Provisions for updated Information Systems Technology shall be made for Operations and integration with the rest of Metro Transit for communication, services, and support.
- Provide secure enclosed storage area for all transit buses.
- Private office for the Transit Operations Manager.
- A Dispatch Center with workstations for the AM and PM Dispatchers within the Dispatch Center. Workstations shall include radio equipment, computer, CCTV monitors, and lockable file drawers, and have direct Operator access.

- Dispatch Center must be adjacent to Operators' Area and have visual control of both areas while allowing the Operators' Room to remain private.
- Private offices for Route Supervisors and future Route Supervisors.
- Separate offices for Customer Services Supervisor and Risk Management Supervisor.
- Administrative Office for the Operations Office Coordinator with walk-up window access for Operators to interface with Coordinator.
- Private office space with small conference area for Paratransit Manager.
- Workstation space for Paratransit personnel, possibly within Operation Dispatch.
- Private office for the Paratransit Program Coordinator.
- Provide clerical workstations for the Paratransit Clerk and the Clerk II positions. Location shall allow easy access to reception, filing, copy/workroom, and other common areas.
- Separate Administrative Office for Paratransit Coordinator with walk-up window access separate from fixed route operations for Operators to interface with Paratransit coordinator.
- Common office space with desk for Operations Secretary with close proximity to Operations Manager and Dispatch.
- Small Conference Room is needed for training, supervisor meetings, and Management/Operator mediation.
- Radio Room for equipment and storage is needed.
- Operator Staging Area adjacent to Dispatch Center for driver assignment, mail, and announcement distribution.
- Large Conference/Training Room for up to 120 people. This space is the shared large Conference/Training Room located within Administration.
- Provide an enclosed, sound-abated Operators Area for operators to watch TV during breaks, lunch, and split shift downtime.
- Provide an enclosed, sound-abated Quiet Room for operators to rest, sleep, or read during breaks, lunch, and split shift downtime.

Bus Maintenance

Function

Bus Maintenance is responsible for the repair and maintenance of all Metro Transit's buses and vehicles, including Paratransit Vehicles owned and operated by Metro. It is their responsibility to ensure that every fleet vehicle is reliable, safe, clean and attractive, efficient, and comfortable. This responsibility includes all types of maintenance from general, unscheduled running repair, to scheduled inspections and preventative maintenance, tire repair and replacement, brake repair and replacement, engine and transmission rebuild, and on-vehicle fabrication of components.

This unit is also responsible for the Fueling Service Cycle operation. This includes Service Workers and Bus Cleaners responsible for fueling, washing, vacuuming, and cleaning each bus after shift pull-ins.

Bus Maintenance also maintains an inventory of spare parts and materials. Maintenance staff is responsible for the inventory and control of all parts.

Bus Maintenance maintains the high standard of these services by keeping a well-documented and supervised preventive maintenance program, efficient handling of trouble calls, servicing and repairing fleet coaches in a timely manner, servicing and repairing service and support vehicles and equipment in a timely manner, and doing so cost effectively.

Hours of Operation

Bus Maintenance Mechanics currently provide service 24 hours per day, seven days per week with shifts broken into three shifts. Maintenance Service Manager and Supervisors work business hours of 7:00 a.m. to 3:30 p.m. Parts Service Specialists work regular eight-hour shifts Monday through Friday.

Staff

For planning and programming purposes, identification of all staff and possible future staff growth is necessary. **Existing Conditions** and projected **"Concept Plan Program"** Bus Maintenance staff is as follows:

Bus Maintenance Staff

Position	Existing Conditions	Staff Ratio @ 218 Buses	Concept Plan Program @ 285 Buses
Transit Maintenance Manager	1.00		1.00
Transit Maintenance Supervisor	8.00		8.00
A-Mechanics	13.00	16.77	18.50
B-Mechanics	15.00	14.53	21.00
C-Mechanics	19.00[1]	11.47	27.00
Garage Dispatcher	1.00		1.00
Mechanic Lead Worker	1.00		1.00
Paint and Body	2.00		3.00
Transit Service Worker	11.50	18.96	16.00
Bus Cleaner	2.25		3.00
Parts Supervisor	1.00		1.00
Parts Specialist	2.00		3.00
Total	**76.75**		**103.50**

Note: Staffing levels and growth information was derived from staff interviews. Number of mechanics based on projected fleet growth and existing ratio of mechanics to buses.

Vehicles

The vehicles in the following table are utilized by the Bus Maintenance Repair staff. These vehicles are included in forecasts for parking needs.

Bus Maintenance Vehicles

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Shop Trucks	2	3
Fork Lifts	3	3
Total	**5**	**6**

Vehicles/Equipment Maintained

The vehicles and equipment accounted for in the following table include all "rolling stock" maintained by the Bus Maintenance staff. The Study Team must account for these vehicles and equipment items in order to provide proper planning and programming. Reference *Appendix C - Metro Transit Fleet Design Data* for a comprehensive Vehicle and Equipment Inventory provided by Metro Transit and utilized to determine required maintenance space, site parking requirements, and other planning ratios.

Bus Maintenance, Vehicles Maintained

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Revenue Service Buses	199	265
Paratransit Buses	19	20
Historical Non-Revenue Buses	5	5
Administrative Vehicles	2	2
Supervisor Vehicles	8	9
Relief Vehicles	12	13
Maintenance Vehicles	5	6
Buildings and Grounds Vehicles	8	9
Total	**258**	**330**

Note: Vehicle quantities for Concept Plan Program are based on projections provided by MDG.

Affinities and Functional Relationships

The following functional relationships should be provided in the plan layout.

- Security and Safety of this portion of the facility is a top priority and needs to be addressed.
- Private office for Transit Maintenance Manager adjacent to Supervisors and Maintenance Shop.
- The Supervisor's offices must be adjacent to the Maintenance and Shop Areas.
- Supervisor must be accessible to the Maintenance staff.
- Maintenance Bays and Shops should be adjacent to Parts Storage, Tool Crib, and Portable Equipment Storage Areas.
- Tire Shop should be adjacent to Tire Storage and to a Repair Bay equipped with a lift.
- Fabrication/Body Shop should be adjacent to a Fabrication Materials Storage Area.
- Fabrication/Body areas should be accessible but physically separate from other maintenance areas for code reasons.
- Service Lanes shall be separated away from the Maintenance portion of the facility.

Key Planning Issues

The following list of planning issues was compiled for consideration during future planning and design efforts.

- Space for conferences/meetings are needed for Bus Maintenance staff and shall include a manuals library and be large enough to accommodate file/record storage/ archives.
- Areas such as Restrooms/Lockers/Showers, Break Room, Quiet Room, etc. are located via facility Common Areas

and shall be sized to accommodate Maintenance Workers as well as the other staff of the departments at Metro Transit.

- Provide office areas on the Maintenance floor for scheduling.
- Provide a small office located near bus entry/exit for parking.
- Provide a private office for the Parts Supervisor located adjacent to Parts Storage for Parts Specialists; Supervisor to remain in Maintenance Office Suite.
- Private office at Fuel/Wash Service Lanes for Service Supervisor.
- Provide drive-through maintenance bays, if possible.
- Bay sizes should be standardized for the most flexibility.
- Bay size should be 20 by 58 feet.
- Provide at least two dedicated PM/Inspection Bays within the facility.
- Provide centrally-distributed lubricants and fluids from a Compressor/Lubrication Room to all maintenance bays.
- Maintenance Bays to be flat floor with adequate height to accommodate a 40-foot transit bus with bike racks (42 feet) (10 to 11.5-feet tall) on portable or floor mounted lift with lifting height of minimum of 60 inches.
- Provide more vehicle lifts as required per industry standards with at least one three-post in-ground lift for articulated buses.
- Provide common work area(s).
- Provide portable equipment storage area(s).
- Provide a centrally-located, secure/lockable Parts Storage and Tool Crib.
- Provide overhead reel type vehicle exhaust system individually vented at each reel.
- Provide Bus Maintenance with a Training Room. This room will be shared with other Metro Transit staff as required.
- Provide Tire Shop and Storage areas.
- Provide engine oil, automatic transmission fluid, and engine antifreeze/coolant reels at Service Lanes.
- Provide adequate space in a new storage room for storage of signs, shelters, and ad materials.
- Provide new Bus Interior Vacuum Cleaning System at Fuel/Wash Service Lanes.
- Provide area on site for snow stacking and storage.
- Security measures to be taken to prevent accidental entry into Maintenance and Bus Parking Areas by private vehicles and pedestrians.
- Provide data and voice cabling at each bay for future connection to fleet management work order system.

- Relocate the Quick Fix/Day Clean Lane or Area in Bus Storage, preferably near Service Island.
- Provide two Fuel/Wash Service Lanes with diesel fuel and lubricant reels.
- Fare Boxes will be probed and pulled at Service Lanes. Provide secure Fare Retrieval Room/Money Room within close proximity to Service Lanes.
- Fare Boxes to be emptied directly into Money Room, if possible.
- Bus Washer type to be reviewed. Gantry type was suggested by Bus Maintenance Staff.
- Facilities (Building and Grounds) Maintenance storage should be located within or near the Parts Storage Room and shop areas (storage warehouse).
- Loading Dock/Receiving shall be located so that deliveries are made into the Bays Parts Storage Area.
- Parts Storage shall be located adjacent to Maintenance Bays Floor and all related Shop Areas.
- Parts Storage issues that need to be addressed include: security, access control, and inventory control. These are especially important after normal business hours when Parts Staff is not present.

Building and Grounds Maintenance

Function

The Building and Grounds Maintenance is responsible for a broad range of maintenance and repair activities for Metro Transit facilities. These activities include general building and grounds maintenance, electrical, plumbing, carpentry, painting, and related mechanical repair work. Facility security is also an emphasis of the Building and Grounds Department to make sure that the facility is physically secure.

Hours of Operation

Building and Grounds Maintenance operates between 5:00 a.m. to 7:00 p.m., seven days per week, split between Utility Worker Staff.

Staff

For planning purposes, identification of all staff and possible future staff growth is necessary. **Existing Conditions** and projected "**Concept Plan Program**" staff is as follows:

Building and Grounds Maintenance Staff

Position	Existing Conditions	Staff Ratio @ 218 Buses	Concept Plan Program @ 285 Buses
Maintenance Manager	Incl.		Incl.
Building and Grounds Foreman	1.00		1.00
Utility Worker	6.00		7.00[1]
Janitor	2.00		3.00
Total	**9.00**		**11.00**

Note: Staffing levels and growth information was derived from staff interviews. Number of workers based on projected property and facility growth and existing ratio of workers to buses.

[1] ***The Building and Grounds Foreman projected growth up to 10 workers for a 285-bus facility creating a discrepancy between department figures and the Transit General Manager's projection.***

Vehicles

The vehicles in the following table are utilized by the Buildings and Grounds Maintenance staff. These vehicles are included in forecast for parking needs.

Buildings and Grounds Maintenance Vehicles

Vehicles	Existing Count	Concept Plan Program @ 285 Buses
Utility Trucks	3	3
Trailers	2	2
B and G Equipment	5	6
Total	**10**	**11**

Affinities

The following functional relationships should be provided in the plan layout.

- Private Foreman office shall be located near the Building and Grounds Maintenance shops.
- Shop space for Building and Grounds crew can be located in adjacency to the Maintenance Shops or entirely separated in its own area.
- The Building and Grounds Shop needs to be located near storage areas. A dedicated storage warehouse is a required.

Key Planning Issues

The following list of planning issues was compiled for consideration during planning and design efforts.

- Large workshop for up to eight utility workers with space for toolboxes, workbenches, and a large fabrication area.
- A Parts Storage Room for small electrical, plumbing, and various small shelf supplies is required for Buildings and Grounds Maintenance staff.

- A private office with two computer workstations is required for Building and Grounds Maintenance staff.
- Large Storage Warehouse is required for the efficient storage and operation of Building and Grounds maintenance; this storage warehouse may be combined with other Transit Departmental needs.
- Easy access shall be provided between maintenance staff and the rest of the Metro Transit Facility.
- Common Restroom/Locker/Shower Areas and Training Areas within the Metro Transit Facility shall be sized accordingly to accommodate the Building and Grounds Staff.

General Facility Needs

In an effort to improve the overall conditions and operations of the Metro Transit Facility, various observations were made leading to conclusions of the conditions and operations of the current facility. Key planning issues were formulated to continue to help in the planning process for remodeling the current facility or for a new Metro Transit Facility.

Key Planning Issues

The following planning issues were compiled for consideration during planning and design efforts

- Overall site and facility security is a priority.
- Facility ventilation systems are inadequate and quickly need to be corrected.
- Correction of vehicle circulation patterns is required for the Parking/Storage Facility to a left-hand turn, counter clockwise pattern from the current right-hand turn, clockwise pattern. This will facilitate safer maneuvering within the buildings
- Bus Storage Areas shall not be accessed via or crossing main vehicular circulation patterns.
- Provide outside fenced storage areas for material storage.
- Provide outdoor staging areas for 10 to12 buses prior to entering the facility.
- More employee and visitor parking spaces are required for Metro Transit's current level of staffing.
- Visitor Parking should be near "Front Door".
- Provide a visible, recognizable front entry and lobby.

Section Three
Space Needs Program

Section Three
Space Needs Program

Introduction

This section presents the Space Needs Program developed for Metro Transit Maintenance and Operations Facility. The detailed program, located at the end of this section, presents the functional requirements of a 285-bus operation. The program quantities presented in this section are summarized totals. This macro level review of space needs allows the Study Team to proceed efficiently without becoming "bogged down" with overly detailed information. Eventually, the program detail will be refined to further develop more detailed concepts for the various site elements and implementation plans for the facility.

The Space Needs Program summary in this section includes building square footages that are subtotaled into net square footages. For projected needs, a factor is then added to account for building walls, mechanical systems, structural columns, and electrical chases. Exterior parking areas and the various service areas are also included as line items. Site circulation, setbacks, and landscaping requirements are calculated at 100% of the total square footage of all other areas and then added to the total.

Also included in this section are the Study Team's methods of identifying space needs, programming techniques, calculations, and space standards utilized to develop the Space Needs Program. It is important for Metro Transit Staff to understand and agree with these methods and calculations since the Concept Plan and Concept Design of the facility will be based directly upon this program.

Staff Summary

Facility staffing levels are crucial to the Study Team when determining the number of parking spaces and the size of support facilities and developing occupancy levels. The following table is a summary of the projected staffing levels for each department as they are currently organized. These staffing levels were developed using three sources of data:

- The 5 year staffing plan (2003).
- The staff interviews during the programming On-site sessions.
- Concept Plan Programs from staffing ratios.

Staffing Summary

Position	Existing Conditions	Concept Plan Program @ 285 Buses
Transit Administration	36.75	51.00
Transit Operations	344.50	490.00
Bus Maintenance	76.75[1]	103.50[1]
Building and Grounds Maintenance	9.00	11.00
Total	**466.00**	**654.50**

[1]These numbers represented are in discrepancy between reported and projected staffing levels of the Department listed and that given by Metro Transit General Manager (2003 Staffing Plan).

Site Parking Summary

Vehicle and equipment quantities are essential to the Study Team when determining the number of parking spaces and the size of support facilities. The following chart is a summary of the **Existing Count**, and **Concept Plan Program at 285 Buses** vehicle and equipment count, which are utilized at the Maintenance and Operations Facility. The numbers were obtained directly from the interviews.

Effort must be made to ensure that adequate employee parking is provided for in the Space Needs Program. Using a 9' x 18' standard sized parking space and including a 100% circulation factor calculates to 324 square feet per parking space, which will help resize any existing parking to maximize the number of spaces that can be provided.

There is currently inadequate employee parking available on the current site; it will be the goal of the Study Team to increase the number of parking spaces for the Metro Transit Operation. Parking spaces will also be provided for visitors and those requiring handicap accessibility.

The following page contains an On-site Parking Summary providing figures for each department based on staffing levels and other needs.

On-site Parking Requirements Summary

Vehicle Type	Administration		Transit Operations		Bus Maintenance		Buildings and Grounds		Total	
	Existing Count	Concept Plan Program @ 285 Buses	Existing Count	Concept Plan Program @ 285 Buses	Existing Count	Concept Plan Program @ 285 Buses	Existing Count	Concept Plan Program @ 285 Buses	Existing Count	Concept Plan Program @ 285 Buses
Non-Revenue Vehicles	2	2	25	27	5	6	8	9	**40**	**44**
Buses	0	0	Incl.	Incl.	218	285	0	0	**218**	**285**
Employee	17	45	149	370	29	45	5	9	**200**	**469**
Visitors and HC	10	10	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	**10**	**10**
Total	**29**	**57**	**174**	**397**	**272**	**358**	**15**	**20**	**490**	**832**

Bus = 12' x 42', Medium (Non-Revenue) = 10' x 20', Small (Non-Revenue) = 8' x 10', Employee = 9' x 18', HC = 13' x 18'.

Space Standards

Space standards were applied to the Space Needs Program. Area requirements for office, administrative, shops, and storage areas were derived from functional requirements and equipment space needs. The space standards listed below are examples of those utilized to develop the facility program.

Office Areas

Transit General Manager	224 square feet (14' x 16')
Transit Services Coordinator	168 square feet (12' x 14')
Transit Service Manager	168 square feet (12' x 14')
Private Office	150 square feet (10' x 15')
Workstation (Medium)	100 square feet (10' x 10')
Workstation (Small)	48 square feet (6' x 8')

Bus Maintenance Areas

Standard Running Repair Bay	1,160 square feet (20' x 58')
Standard PM/Inspection Bay	1,160 square feet (20' x 58')
Tire Repair Bay	1,160 square feet (20' x 58')
Chassis Wash Bay	1,450 square feet (25' x 58')

Bus Service Areas

Drive-Through Wash Bay	1,600 square feet (20' x 80')
Fare Recovery Lanes	850 square feet (17' x 50')
Fuel/Interior Cleaning Lanes	850 square feet (17' x 50')

Vehicle/Equipment Parking

Standard Non-Rev. Sedan or Van	200 square feet (10' x 20')
Standard 40' Transit Bus	504 square feet (12' x 42')
Employee/Visitor Parking	162 square feet (9' x 18')
Disability Accessible Parking	234 square feet (13' x 18')

Comparative Data

Another method used by the Study Team compares the Madison Transit maintenance situation with an industry standard. To effectively make this comparison, the Study Team utilized data on a number of similar transit systems. This data was then analyzed to produce industry standard relationships of maintenance space to fleet size.

Data used for comparison came from a variety of sources. In the case of the maintenance capacity analysis, MDG selected data from previously published facility data, MDG project files, APTA data, and FTA data on facilities across the nation. The results of this comparison are shown in the following table.

Comparative Data and Averages for Maintenance Garages

Facility Location and Identity	Design Fleet Size	Running Repair		Inspection		Tire		Chassis Wash	
		# Bays	Buses/Bay	# Bays	Buses/Bay	# Bays	Buses/Bay	# Bays	Buses/Bay
Ann Arbor, MI Ann Arbor Transit	100	7	14.29	2	50.00	1	100.00	1	100.00
Boston, MA Cabot Facility	150	9	16.67	2	75.00	1	150.00	1	150.00
Denver, CO RTD East Metro	250	12	20.83	6	41.67	1	250.00	1	250.00
Denver, CO RTD Platte	250	12	20.83	5	50.00	1	250.00	1	250.00
Des Moines, IA Admin, Ops, and Maint	100	9	11.11	2	50.00	1	100.00	1	100.00
Green Bay, WI GBT Facility	91	6	15.17	1	91	0	---	1	91
Kenosha, WI Kenosha Transit	65	4	16.25	2	32.50	0	---	1	65
Lyndhurst, NJ NJT Meadowlands	220	13	16.92	0*	N/A	1	220.00	1	220.00
Minneapolis, MN Snelling Facility	183	12	15.30	4	45.80	1	183	1	183
Minneapolis, MN Ruter Facility	186.5	7	26.60	3	62.20	1	186.5	1	186.5
Minneapolis, MN South Facility	185	10	18.50	3	61.70	1	185	1	185
Minneapolis, MN Heywood Facility	261	13	20.80	3	87.00	1	261	1	261
Minneapolis, MN Nicollet Facility	186	7	26.60	3	62.00	1	186	1	186
Minneapolis, MN East Metro Facility	198	13	15.20	5	39.60	1	198	1	198
Average	**173.25**	**9.57**	**18.22**	**2.93**	**53.46**	**.86**	**162.11**	**1.00**	**173.25**
Madison, WI Metro Transit (EXISTING)	218	10	21.80	2	109	0	---	1	218
Madison, WI Metro Transit (PROGRAM)	285	14	20.36	6	47.5	2	142.5	2	142.5

*Space quantities of zero were not included in the averages. *Data Source: MDG Project Files and APTA.*

Planning Ratios

The size and quantity of the maintenance and shop areas provided in the Space Needs Program were calculated using both "Rule of Thumb" planning ratios and the aforementioned Comparative Analysis. These methods have been proven as an effective way to calculate maintenance space needs and bay quantities. These ratios are derived from data and space utilization information gathered from numerous other successful facilities analyzed throughout the country by Maintenance Design Group and its staff over a 20-year period. The resulting planning ratios are as follows:

Maintenance Bays

Standard Running Repair Bay	1 Bay for every 15 to 17 Buses
Standard PM/Inspection Bay	1 Bay for every 50 Buses

Note: Madison Transit at 285 buses will require 6 PM/Inspection Bays. Final concept design may vary based on Metro's practice of three full maintenance shifts.

Service Lanes

Fueling Positions	1 Lane for every 75 to 90 Buses
Bus Wash	1 Lane for every 150 Buses

Note: Number of fueling lanes is dependent on available fuel/service window.

Circulation and MEP Factors (used in the Program)

Administration	30%
Operations	30%
Maintenance and Shops	28%
Building and Ground	20%
Bus Storage	92%
Service Areas	50%

Program Summary

A Program Summary for each major site element is provided below. Included are totals for **Existing Conditions,** and the **285 Bus Fleet** projected space needs. These summaries are for all areas including Office/Support Areas, Shop Areas, Storage Areas, Exterior Areas, and Common Areas. Site circulation, setbacks, landscaping requirements (at 100% of the total areas), and total acres required are also shown.

Existing Facility Conditions were carefully derived from an initial assessment of the Metro Transit Facility during the interviewing on-site and from scaled drawings provided by Metro. For a worksheet of detailed existing conditions and space take offs for the facility see **Appendix B** Existing Facility Space Allocation Take-Offs.

Space Needs Program Summary

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Summary											
Total Admin Office & Support Areas	35.75		4,148	2964			47.00			11,101	
Total Transit Operations	344.00		3,855	382			491.00			15,596	
Total Maintenance Office & Support Areas	10.00		2,707	0			10.00			5,283	
Total Maintenance - Shop & Bay Areas	53.00		59,004	0			72.50			91,599	
Total Service Facility	13.75		10,156	0			19.00			21,045	
Total Building & Grounds	9.00		10,651	0			9.00			9,024	
Total Bus Parking/Storage/Circulation	0.00		150,209	0			0.00			268,717	
Total Building Requirements:	**466**		**314,695**	**3,346**			**649**			**422,364**	
Total Exterior Areas			84,616	0						51,661	
Sub-total:			**399,311**	**6692**						**474,025**	
Site Circulation	12%		53,713	Actual		25%				118,506	
Site Landscaping			incl.			10%				47,403	
Site Setbacks			incl.			5%				23,701	
Total Site Requirements:			**453,024** 10.4	**6,692** 0.2		**sf** **acre**				**663,636** 15.2	

Space Needs Program

The Space Needs Program Detail and begins with the identification of each space by name, and a **Space Standard** (if applicable). The 285 Bus Fleet heading represents spaces required to fulfill a facility to accommodate the prescribed growth.

Within each heading there is a **Quantity** column identifying both the number of Staff, Space or Bay count required, an **Area** column listing the amount of area in square feet (sf), and a **Remarks** column listing relevant notes about each space.

The space requirements shown for each function are net usable area. A Circulation/Mechanical/Electrical/ Structural (CMES) factor has been applied to the total net usable area to arrive at gross square footage requirements. In addition to circulation (hallways, stairs, and elevators), the factor also provides for spaces such as mechanical/electrical rooms and custodial closets. CMES figures for existing spaces are either actual or calculated as shown on the program.

The program presented on the following pages reflects the space needs calculated for a facility that incorporates the use of a parking structure.

Space Needs Program Summary

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Administration Office & Support Areas											
General Administration											
Transit General Manager	1.00		259		Private Office with Conference Table	14 x 16	1.00			224	Private office
Transit Service Manager	1.00		196		Private Office	12 x 14	1.00			168	Private Office adjacent to GM
Administrative Services Coordinator	1.00		92		Private off near Lobby	12 x 14	1.00			168	
Aaspire Intern Workstation	0.50		incl.		No permanent workstation assigned	6 x 8	1.00			48	
Information System Coordinator	1.00		119		2nd Floor	10 x 15	1.00			150	
Information System Tech.	1.00		82		2nd Floor	10 x 10	2.00	4		400	Work Stations
Information Systems Work Areas			incl.			10 x 10		2		200	
Finance											
Finance Manager	1.00		201			12 x 14	1.00			168	
Finance Supervisor	1.00					10 x 15	1.00			150	
Employee Relations Assistant	1.00		196			10 x 15	1.00			150	
Transit Accountant (Grants)	1.00		200			10 x 15	1.00			150	
Transit Accountant	1.00		152			10 x 15	1.00			150	
Payroll Specialist	1.00		112			10 x 10	1.00			100	
Purchasing Tech.	1.00		112			10 x 10	1.00			100	
Accounting Tech	1.00		112			10 x 10	1.00			100	
Cashier/Inventory Clerk	1.50		166		2 x 91 sf	10 x 10	2.00			200	
Office Assistant	1.00		83			10 x 10	1.00			100	
Planning											
Planning & Scheduling Manager	1.00			184	Located in the Johnson Building	12 x 14	1.00			168	Private Office
Transit Schedule Planner	1.00			236		10 x 15	1.00			150	Private Office
Transit Planner 1	1.00			169		10 x 15	1.00			150	Private Office
Transit Planner 2	1.00			139		10 x 15	3.00			450	Private Office
Scheduling/Data Assistant	1.00			incl.		10 x 10	1.00			100	Workstation
Operations Technician	1.00			138		10 x 10	1.00			100	Workstation
Marketing											
Marketing and Customer Service Manager	1.00			159		12 x 14	1.00			168	Workstation
Marketing Specialist 2	1.00			126		10 x 15	1.00			150	
Graphics Technician	1.00			153	Includes plotter	10 x 15	2.00			300	
Marketing Specialist 1	1.00			159		10 x 10	2.00			200	
Customer Service Supervisor	incl.			incl.		10 x 15	1.00			150	
Customer Service Reps (Telephone)	8.75			477	2 areas 223 sf and 254 sf in Johnson Bldg.	6 x 8	13.00			624	
Receptionist	1.00			incl.	See General Admin	6 x 8	1.00			48	
Administration Support Areas											
Lobby			126							400	
Reception Office/Workstation			259							incl.	
Copy/Supply Storage/Work Room			190	20	3 areas of 99 sf and 91 sf and 20 sf in Johnson Bldg.					250	Copier, fax, work surface, storage
IT Network Systems Room			incl.	incl.	included in Janitorial Storage Room at Johnson Building	15 x 15		1		225	
IT Technician Storage Room			0	0		10 x 15		1		150	
General Storage Room			107	0	2 areas of 83 and 24 sf					200	
Conference Room - Medium			0	0						300	12 to 14 people
Conference Room - Small			0	0					2	360	6 to 8 people
Centralize File Storage Room			0	72	located in Johnson Building					250	
Central Reference Library			0	0						150	
Paratransit Interview/Evaluation Room			0	0		10 x 10		1		100	Conference style for 4 persons
Drug Screening Room			0	0						100	Seating for 10 people
Drug Screening Room Toilet			0	0						80	Dedicated to Drug Screening Program
Coffee Bar/Break Area			incl.	168	Located in Johnson Building					150	
Men's Restroom			98	77	2 areas - 98 sf and 77 sf in Johnson Bldg.					120	2 urinals & 2 WC
Women's Restroom			131	77	2 areas - 131 sf and 77 sf in Johnson Bldg.					120	3 WC
Janitorial Supply Storage			65	40	Also used as Coffee Bar					100	
Sub-total	**35.75**		**3,058**	**2,394**			**47.00**			**8,539**	
Circulation & MEP			1,090	570		30%				2,562	
Total Admin Office & Support Areas			**4,148**	**2,964**						**11,101**	

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Transit Operations											
Office Areas											
Operations Manager	1.00		incl.		Private office in Dispatch Suite	12 x 14	1.00			168	Private Office adjacent to Dispatch
Operations Supervisors	19.00		incl.			6 x 8	28.00			1,344	Workstations, 6 w/ 28 rolling file cabinets
Display Area						5 x 13		1		65	
Accident Safety Supervisor	incl.		120		2nd Floor Office	10 x 12		1		120	Private Office
Security Coordinator						10 x 12	1.00			120	Private Office
Operations Office Coordinators	1.00		incl.			8 x 10	2.00			120	Shared office
Mens Restroom										120	
Womens Restroom										120	
Unisex Restroom										64	
File Storage			incl.							200	
Operations Storage										400	
Security Storage										200	
Conference Room - Medium			0							300	12 to 14 people
Conference Room - Small										120	
Copy/Work Room			incl.							100	
Lost and Found Storage Room			incl.	0						150	
Paratransit Operations											
Paratransit program Manager	1.00			156		12 x 14	1.00			168	
Pararansit Scheduling	1.00			138		10 x 10	1.00			100	
Paratransit Ops Technician	0.00			0		10 x 10	1.00			100	
Dispatch Areas			1,270								
Dispatch Workstations			incl.			6 x 8		6		288	Workstations
Widow Dispatch Position			incl.			10 x 10		1		100	
Radio Dispatch Position			incl.			8 x 10		1		80	
Paratransit Dispatch Window/Office			incl.			10 x 25		1		250	
Dispatch Vestibule			incl.							200	
Radio Equipment Storage			incl.							50	
Dispatch Secure Storage			incl.							100	
Mail Box Area			incl.			10 x 14				80	Access to load from inside dispatch
Copy/Work Room			incl.							100	Within Dispatch Suite
Operators' Support Areas											
Operator's Lounge	321.00		720		2nd Floor		456.00	1		1,500	Central Open Area Adjacent to Other Operator areas
TV Alcove			incl.					1		250	Alcove off of Operators' Room
Quite Room			0					1		250	Enclosed Room
Vending/Kitchenette/Lunchroom			incl.			10 x 20				150	Galley Arrangement
Operators' Lockers (Alcove)			incl.		included in Restroom and hallways	1.5		500		750	
Men's Restroom/Shower			880		2nd Floor Area			1		1,000	1 toilet for every 25 staff and 1 urinal for every 75
Women's Restroom//Shower			324		2nd Floor Area			1		600	1 toilet for every 25 staff
Custodial Room			36					1		150	
Wellness Center			0					1		300	
Training											
Training Room			385		2nd Floor Area			1		1,000	Total based on 50 drivers per session
Training Supervisor Office	incl.		120		2nd Floor Office	10 x 12	incl.	1		220	Adjacent to Training Room
Shared Instructor Office			0							200	Sized for 3 workstation in shred office area
Table/Chair Storage			0					1		200	
Reference/Video Room			0					1		100	
Sub-total:	**344.00**		**3,855**	**294**			**491.00**			**11,997**	
Circulation & MEP:			incl.	**88**		**30%**				3,599	
Total Transit Operations			**3,855**	**382**						**15,596**	

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Maintenance - Office & Support Areas											
Office Areas											
Maintenance Manager	1.00		72			10 x 15	1.00			150	Private Office
Maintenance Supervisors	8.00		776			10 x 10	8.00			800	Shared Office
Garage Dispatcher	1.00		40			8 x 8	1.00			64	Enclosed Work Station
File Storage			incl.							200	
Conference Room - Medium			0							300	12 to 14 people
Copy/Work Room			incl.							100	
Maintenance Training Room		1	0							350	
Maintenance Foreman Counter		1	incl.		On Shop Floor			1		150	On Shop Floor
Manual Library			0		Adjacent to Shop Floor					100	Adjacent to Shop Floor
Support Areas											
Uniform Lockers		1	incl.		Included in hallways	10 x 20				200	Dedicated Area adjacent to Locker Rooms
Men's Restroom/Shower/Lockers			455					1		800	
Women's Restroom//Shower/Lockers			290					1		450	
Men's Restroom/Shower/Lockers			544		Maintenance B						Previously Maintenance B
Women's Restroom//Shower/Lockers			240		Maintenance B						Previously Maintenance B
Maintenance Break Room		1	290			10 x 10				400	
Sub-total:	10.00		2,707	0			10.00			4,064	
Circulation & MEP:			incl.	0	See clr for Maint. Shops & Bay Areas	30%				1,219	
Total Maintenance Office & Support Areas			2,707	0						5,283	

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Maintenance - Shop & Bay Areas											
Running Repair Bays											
Repair Bays 3, 4, & 5	50.00	3	3,810			20 x 58	69.50	9.50	10	11,600	Bus to Bay Ratio 15:1
Repair Bays 6, 7, & 8		3	3,810								
Repair Bays 12		1	1,563								
Non-Rev/Light Vehicle Repair		1	Incl.		Shared space with Bay 12	16 X 35			1	560	Dedicated Bay with Lift
Major Repair Bay											
Repair Bays 9,10, &11		3	3,810			20 x 58		2.85	3	3,480	Bus to Bay Ratio 15:1
Other Bays and Bay Support Shops											
PM/Inspection Bay 1 & 2		2	3,810			20 x 58		5.70	6	6,960	Bus to Bay Ratio 50:1
A/C Repair Bay		1	1,250		Former Dyno Bay	20 x 58		1.43	1	1,160	Bus to Bay Ratio 200:1
Tire Bay		0	0			20 x 58		1.90	2	2,320	Bus to Bay Ratio 150:1
Tire Shop/Storage		1	619		Secure Area with Exterior Access					1,100	
Brake Shop		1	619		Shared with Tire Shop					500	
Radiator Shop			322							300	
Engine/Trans Rebuild Workstations			2,380							2,500	
Small Component Rebuild			968							1,000	
Common Work Area		1	incl.							1,000	2 areas
Paint Booth		1	1,250			30 x 65			1	1,950	Sized for modern operation
Paint Storage/Mixing		1	625			10 x 15		2		300	Programmed for 2 separate Self Contained Rooms
Paint/Body Bays		4	8,151		Maintenance B	20 x 58			4	4,640	
Welding Shop		1	576		Maintenance B			1		576	
Steam Clean Room		1	304		Maintenance B			1		304	
Chassis Wash		1	0			25 x 58		1.90	2	2,900	Bus to Bay Ratio 150:1
Detail Cleaning Bay		2	incl.		In circulation/bus storage area	20 x 58			1	1,100	
Support Areas											
Battery Room		1	350							200	Enclosed Room
Detail Cleaning Storage		1	0			10 x 15		6		900	
Portable Equipment Storage		2	557		2 areas in Maintenance B					1,200	Divided into 3 areas
Tool Box Storage			incl.			25		64		1,600	Divided into 3 separate secured areas
Lube/Compressor Room		1	incl.							800	Above ground fluid tanks
Mechanical Room		1	192		Maintenance B - Second Level					200	
Electrical Room		1	576		Maintenance B					600	
Storage Mezzanine			1,504		Maintenance B						
Parts Room											
Parts Office	1.00		incl.			10 x 12	1.00			120	
Parts Counter	2.00	1	incl.			10 x 10	2.00	1		100	
Tool Crib		1	incl.			10 x 15		1		150	
Parts Storage Areas		1	4,068		Plus 2,000 SF mezz. for slow moving items	15		285		4,275	Based on 15sf per bus
Parts Storage Mezzanine		1	3,941					1		3,900	Mezzanine Area
Shipping Area		1	313			15 x 20		1		300	
Receiving Area/Loading Dock		1	825		Separate from Parts Room	15 x 20		1		300	
Sub-total:	**53.00**		**46,193**		**7,320**		**72.50**		**31**	**71,561**	
Circulation & MEP:			12,811	Actual	**2177 + drive aisle at 10634**	**28%**				20,037	21.88%
Total Maintenance - Shop & Bay Areas			**59,004**		**21.71%**					**91,599**	

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Service Facility											
Revenue Recovery											
Vault Pull Lanes		2	3,127			17 x 50		1.73	2	1,700	
Money/Counting Room		1	625		Clean room environment	20 x 35		1		700	
Fueling Lanes											
Fueling Positions		2	3,127			17 x 50		3.25	2	1,700	
Vacuum Equipment Area		1	incl.		Separator/Vac Producer for Point Extraction	15 x 20		1		300	
Service Storage Room		1	150			10 x 15		1		150	
Service Supervisor Office	1.00		0			10 x 15	1.00	1		150	
Service Facility Restroom	12.75	1	0			8 x 10	18.00	1		80	
Custodial Closet		1	0			5 x 10		1		50	
Bus Washer											
Vehicle Washers		2	3,127		Drive-thru washers	20 x 80		1.73	2	3,200	
Vehicle Washer Equipment		1	Incl.		Soap storage included	15 x 20		1		300	
Water Reclaim Equipment		1				10 x 20		1		200	
Support											
Mechanical Room(s)		1								600	
Electrical Room(s)		1								400	
Telecommunication Room(s)		1								200	
Advertising Storage		1								400	
Trash Bins		1								500	
Service Separation Area			0			17 x 50			2	1,700	
Service Queue Positions			Incl.			17 x 50			2	1,700	
Sub-total:	13.75		10,156	0			19.00			14,030	
Circulation & MEP:			0	0						7,015	
Total Service Facility			10,156	0		50%				21,045	

Space Name	EXISTING CONDITIONS Qty. Staff	Qty. Space	Main Area (SF)	Johnson Area (SF)	Remarks	285 Bus Fleet Space Standard	Program Qty. Staff	Qty. Space	Qty. Bay	Area (SF)	Remarks
Buildings & Grounds											
Building Maintenance Shop	9.00	1	0				9.00	1		1,000	
2 Track Storage			4,375							500	
Enclosed Storage			5,754		2 Track Storage Area			1		5,000	
Storage Shed			522							500	
Parking										320	
Truck		2	incl.			12 x 25		2		200	
Equipment											
Sub-total:	**9.00**		**10,651**				**9.00**			**7,520**	
Circulation & MEP:			0							1,504	
Total Building & Grounds			**10,651**			**20%**				**9,024**	
Bus Parking/Storage/Circulation											
											285
Standard 40' buses		199	75,321		345.5 sf per bus	12 x 42		260		131,040	
Small Bus		19	incl.			12 x 32		25		9,600	
Parade Historic buses		5	incl.			12 x 42		5		2,520	
Transit Operations Non-Rev Fleet		20	4,000			10 x 20		20		4,000	
Maintenance Support Vehicles		5	1,000		145,209	10 x 20		5		1,000	251,597
Interior Bus Circulation			69,888		92.79%					*120,557*	92.00%
Sub-total:			**150,209**							**268,717**	
Circulation & MEP:			0							0	
Total Bus Parking/Storage/Circulation			**150,209**		See Circulation Line	**0%**				**268,717**	
Exterior Areas											
Employee Parking		200	40,000			10 x 20		469		23,431	
Visitor Parking		6	972			9 x 18		12		486	
Disabled Parking		4	936			13 x 18		6		351	
Patio			0							800	
Unleaded Fuel Tank		1	200							200	
Loading Dock - Truck Maneuvering Area		1	200			15 x 150		1		563	
Sub-total:			**42,308**							**25,831**	
Circulation & MEP:	**100%**		42,308							25,831	
Total Exterior Areas			**84,616**	**0**						**51,661**	Assumes 4 levels of parking

Section Four
Facility Assessment

Section Four
Facility Assessment

Introduction

The Study Team reviewed the existing Metro Transit Facility and developed this general assessment of the facilities function, architecture, structure, electrical systems, HVAC systems, and plumbing system.

Functional Assessment

Transit Administration

- The Administrative functions are separated into multiple areas of two buildings. This separation creates ineffective communication during daily activities. The ability to share resources, materials and support staff is impacted by the separation.

- Metro Transit staff indicated a need for Metro Transit to be more prominently oriented to the public and the customers they serve on a daily basis. Reception and ticket sales are important aspects of Customer Service and Marketing and, as such, should be visible and accessible to the public.

- Office space in the facility is grossly inadequate for the number of staff currently utilized. Office size, function of occupant, communications, and accessibility to other operations.

- Support spaces are inadequate and as a result under-utilized. A modern, facility would integrate all the required shared support areas in a manner that would encourage shared use and efficiency. Several smaller remote locations may be necessary; however, duplication in large equipment should be avoided.

- A comprehensive copy/mail/work center is currently not provided.

- A conference/training room is a not currently provided. Staff has indicated the need for this type of space for both internal training but also for public meetings and board functions.

- Large work and layout areas are needed for the Marketing group to prepare graphics and various customer information packets.

- Central file storage for all administrative entities is not being provided due to limited space in the office areas. Files are currently stored in small storage spaces or in file cabinets within offices and should be relocated to a central file storage area to facilitate shared use and control of data and files.

- Space standards for private offices and cubicle workspaces are not consistent and should be developed prior to design efforts. Currently, non-represented staff (management) are assigned offices and represented (union) staff are assigned cubicles. No regard to the functional needs of the staff member is considered.

- The Planning Group's remote location from Operations and other Administrative areas impacts its efficiency and ability to communicate. This department would benefit from a location convenient to Operations Dispatch function.

- Office spaces and workstations were observed to be dated and worn. Most workstations in these areas were not designed for intense computer related activities, and have associated ergonomic issues. Customer Service workstations are inadequate in sound attenuation, size, and wall area required for maps and other information required to be kept posted.

Transit Operations

Transit Operations occupies spaces in several parts of the facility. The dispatch function is located on the ground level near the bus entry and exit and adjacent to maintenance areas. The Drivers' Lounge is remote from Dispatch on the second level. Typical Drivers' areas are limited and in some cases not provided.

- Shared support spaces are seemingly underutilized because of this mis-location.

- The adjacency to the Drivers' Lounge is located remote (on the second level) from Dispatch and requires Dispatch to "call" driver on the phone in lounge to communicate work assignments.

- The employee access to the building requires staff to cross bus traffic and service areas. This presents a daily unsafe situation for staff.

- Transit Operations areas are now separated into three locations within the facility. This disjointed situation hinders communications and efficiencies of operations.

- The Study Team observed inadequacies of space within the Dispatch Center. These inadequacies directly impact the ability of Operation staff to communicate with drivers. A provision for a dispatch suite to create privacy and efficiencies should be made.

- The current location of the Road Supervisors work areas (remote from the Drivers Lounge) does not allow for efficient communication with Drivers. Road Supervisors need to be relocated to an area adjacent to or within the Operations Dispatch Suite along with shared support areas.

- Paratransit Administration is currently remote from operations and should be located with Operations Dispatch. This will enhance communications and efficiencies within the group.

Bus Maintenance

Bus Maintenance functions occupy space located between the administrative/operations areas and Bus Storage areas. This location causes all drivers to pass through maintenance areas to access the buses. This location also dictates that buses must often exit the facility and circulate in a clockwise motion (right hand turns) to gain access to the maintenance bays.

The existing Bus Maintenance area includes 12 back-in bays accessed from the central aisle. Workspace between bays and at the back of bays is very limited. Bus maintenance bays lack drive-through capabilities for access and efficiency.

A second remote maintenance area (Maintenance "B") serves as the Body Shop and other company work area.

- The facility is equipped with a drive in/back out Paint Booth remote from the Body Shop.

- The facility does not have a dedicated Chassis Work Area.

- Storage facilities to support the current Bus Maintenance operation were observed to be inadequate. Generally no area has been allocated for tool storage, and portable equipment storage. Tire storage, and parts/receiving

storage areas with the secure storage areas should be included in updated facilities. Toolbox storage was observed to be inadequate and mechanics are storing toolboxes in circulation areas.

- The shared access and circulation space by Bus Maintenance and the Service Lanes impacts operations and movement into these areas.

- Parts Storage and Receiving areas are not adjacent and cause service problems during deliveries. The remote location of the loading dock requires Parts Room Staff to leave the Parts Room to attend to the receiving function.

- Current office space for maintenance supervisors is inadequate in both size and configuration. Eight supervisors share the allocated areas. Additional office space and manuals library is required.

- The distance between the Bus Maintenance areas, Maintenance B, Track 2 Storage, and other Shops impacts the efficient interaction of staff and functions of these areas.

- The Team observed a general lack of maintenance training facilities (lab and classroom settings), conference rooms, and mechanic support areas.

Service Island Maintenance

The Service Island location dictates a right hand, clockwise bus circulation pattern. This pattern forces drivers and Service workers to make a right hand turn to park the vehicles instead for the safer left hand, counter clockwise turn. This location was originally chosen by the designer as part of the overall phased development. This location also limits the overall length of the Service Area. This limited length impacts the effectiveness of the washer and creates potential safety concerns. Potential safety concerns observed in the Service Area consist of the following: Potentially unsafe noise levels, narrowness of drive lanes, ventilation and zone separation, and the mixing of several service processes and staff.

Inadequacies of storage and staging space in the Service Area were observed.

Relocation of the Fare Counting Room adjacent to the Service Area would facilitate fare retrieval from the bus, adding to efficiencies of Service Function.

Building and Grounds Maintenance

Current Metro Transit facilities do not have a central warehouse for storage of materials used by Building and Grounds (B&G) staff. B&G uses multiple locations for storage. These spaces are wherever space is available. Often access to these areas is limited and the locations are not adjacent to a shop area used by B&G staff. This hinders efficiency and a lack of control on inventory.

- Aging and inadequate mechanical systems require the constant attention of the B & G staff.
- Dedicated Building and Grounds spaces such as shop space and janitorial space are very limited.
- Existing storage spaces could benefit from reorganization, and as modern shelving/racking systems.

Architectural Assessment

Overview

The existing Metro Transit facility is generally in good condition for its age as a result of the quality of maintenance the building has received. However, the design of its systems, the area available for Metro's programmatic needs, and overall functionality are inadequate. In addition, the operational flow for a modern transit operations and maintenance facility is not properly designed and organized as further described in the functional narrative.

This facility can be made more functionally efficient, operationally safe, and secure with both modification of the existing facility and the addition of administration, operations, and maintenance space.

Building Shell

The Gisholt Building is a steel framed structure designed to carry heavy loads associated with its former use as a foundry. The roof is a saw tooth that originally was used for day lighting and possibly to allow for ventilation of the space. The roof is reportedly in good condition, with no apparent leaks. The 1909 building facade has been preserved on the extreme north end of the building where it transitions to the Mullins property. It consists of translucent glazing panels set in brick veneer. Along the north and east sides, the original brick masonry has been left in place, with most of the original window openings in filled by brick.

The remainder of the building has been partially clad with horizontal metal panels. The original brick façade was left intact above the metal panels, and the window openings were

in filled with translucent glazing panels. The ends of the saw tooth roof are clad in corrugated vertical metal siding. Man doors exiting onto East Washington Avenue are articulated by brick masonry/metal clad vestibules. The overall façade treatment along East Washington Avenue will likely be an issue to be addressed as Madison progresses with the redevelopment of the East Washington corridor. Primary issues are

- lack of pedestrian scale
- neighborhood context
- building articulation

on the facade facing an important commercial artery that the City has identified for redevelopment. It can be expected that the City of Madison Planning Department approval process will require this façade to be addressed.

Exterior treatment of the 1980 building addition is the same as the retrofit of the Gisholt building in using a combination of horizontal metal panels and brick veneer. The roof of this portion is flat with a light gauge steel framed parapet. The roof is reportedly in good condition with no apparent leaks. Along the south end of the building at the bus entrance, the façade is full height brick veneer from grade. There are also portions of the building clad with Exterior Insulation and Finishing System (EIFS) stucco material along the east side of the building that are in poor condition. There are many punctures and dents in the EIFS façade and it should be removed and replaced with a more durable material for exterior grade applications.

An easily accessed, pronounced, and visible public front entry is also lacking. The current entry location is a long distance from visitor parking and there is very little architecture to identify it as the designated public entry. Visitors will typically attempt to enter the employee entrance from the visitor parking area. In addition to that security concern, visitor pedestrian traffic and bus traffic are required to cross each other, which present a potential safety concern.

Building Interiors

The interior finishes and furniture in the existing facility are poorly planned and in poor condition. Overcrowding has forced inefficiencies in the adjacency relationships of program spaces. Conferencing space is inadequate and provides limited privacy and sound separation for presentations. Offices are undersized in many instances and are discontinuous, prohibiting departments from having dedicated space for their specific teams. Additionally, some of the

administrative functions are located in the Johnson Building across Ingersoll Street, requiring that staff cross a busy intersection many times during the day to perform their responsibilities.

The telecom and network systems are grossly inadequate for the technological requirements of administration and dispatch operations of this day and age. Growth space to allow for future technological advances is nonexistent. Data cabling is laid loose on top of the ceiling system and dropped through open ceiling tiles to offices.

The proximity and lack of adequate separation between office and bus maintenance, service, and storage areas is problematic. There are serious indoor air quality problems and sound separation issues associated with the way these two functions are intermingled.

Finishes of the administration and operations areas are dated and are at the end of their average life expectancy. Window treatments, systems furniture, floor coverings, work surfaces, wall treatments, and ceiling systems are all in need of an upgrade.

Structural Systems Assessment

Overview

The existing Metro Transit facility consists of two different buildings that are connected, but the overall the facility can be looked at in thirds. At the far north end of the facility lies what is known as the Gisholt Building, formerly a foundry, which now serves as an indoor bus parking area. The remaining two-thirds of the building were constructed in two phases during the early 1980's. The southernmost third of the building was constructed first and consists of office space, parts, paint booth, physical plant, loading dock, and some maintenance areas. The remaining central portion was later constructed between the Gisholt Building and the first phase construction. This area contains additional bus storage area, additional bus maintenance space, revenue collection, and bus fueling area, as well as the bus washing equipment.

Gisholt Building: Bus Depot Area

The existing Gisholt Building, in our opinion, is in good condition. The structure was designed as an industrial building that, during its earlier years of use, had many overhead cranes and heavy machinery. Although all of the overhead bridge cranes have been removed, most of the

runway beams are still in place. The roof of the building is referred to as saw-tooth construction due to the multiple ridges along the roof. The resulting triangular sections consist of sloped roof areas and a near vertical rise that undoubtedly at one time had some portion of glazing in it to allow the infiltration of natural light. All of these penetrations have now been covered over for energy, security, and maintenance reasons.

The original building apparently had a lot of heavy concrete equipment bases and foundations. Instead of trying to remove these during conversion to its current use, the foundations were left in place. It appears that when this conversion took place, the floor was raised about two feet by constructing a new slab over engineered fill. This also permitted easier placement of new floor drains and piping since the aforementioned concrete bases and foundations could be avoided.

1980 Building Addition: Bus Maintenance and Service Areas

Overall the existing building, in our opinion, is in good physical condition. While no structural deficiencies were detected, there are some minor cosmetic and maintenance related items that could be addressed. This list includes damaged Exterior Insulation Finishing System (EIFS) and broken French Drains that have been cover plated for the interim.

From the record drawings, the existing building predominately consists of steel bar joist and steel frame construction but there are some elevated roof areas where precast concrete plank was utilized for explosion and/or fireproof considerations. Additionally, elevated floor areas were framed with precast concrete plank and, like the areas where it was used for the roof, it is bearing on concrete masonry units (CMU). All of these CMU walls are supported by concrete grade beams placed immediately below the on-grade floor level. Driven steel piles support these grade beams, as well as the roof supporting steel columns elsewhere in the building.

The combination of these load-bearing walls in the office area in conjunction with non-orthogonally oriented walls will not facilitate major remodeling work if needed. Within the maintenance area, most if not all of the lubrication and exhaust hoses are hung from the roof structure. The exterior skin of the building is primarily a combination of EIFS, CMU, brick, and metal panel. Where CMU are not present to offer lateral load resistance to the frame, diagonal structural steel framing members (as shown in the photograph to the right)

have been implemented into the design and construction and appear to be mostly located along exterior perimeter walls.

Electrical Systems Assessment

Existing Electrical Service

The existing electrical service is 1,200 Amp, 277/480 Volts fed from an on-site transformer supplied by MG&E. The main gear manufactured by ITE- Gould is located in the boiler room of the building complex. The gear is 30 years old and in fair condition; circuit breakers are no longer readily available for this equipment. It is recommended that the electrical gear be evaluated by a testing agency.

Power is distributed throughout the complex as follows: from the main gear a feed goes to a remote power distribution panel; the power distribution panel feeds a transformer to provide 120/208 Volts serving lights and receptacles. The power distribution panel also serves large loads at 480 Volts such as exhaust fans.

Most remote panels are not in dedicated electrical rooms and have been subject to environmental and physical damage. These panels are in poor to fair condition. In the locations where panels have been located there is often insufficient working clearance as required by code. It is recommended this equipment be evaluated by a testing agency.

Emergency System

The building complex is fully backed up by an emergency generator and all of the emergency gear, including the generator, is in good condition. MG&E has the ability to remove the Metro complex from their grid and allow the building to operate off the emergency generator. Emergency panels in Generator Room and the MG&E switchgear allow this capability.

Lighting

The existing lighting throughout the complex is showing its age and the harsh environmental conditions that exist. The existing fixtures are fed at 120 Volt from remote branch panels.

The current fluorescent fixtures utilize T12 technology, which is out of date and not energy efficient. It is recommended that these fixtures be replaced or at a minimum be fitted with new lenses due the accumulation of diesel soot. This would

improve the lighting throughout the office and mechanical rooms of the complex.

In large open areas of the complex where buses are parked, cleaned, and operated, the lighting is provided by lensed HPS fixtures. These fixtures also are nearing their life expectancies and at a minimum recommend that the lenses be cleaned or replaced. The replacement of the HPS lights with metal halide fixtures should be considered.

Electrical Devices

Outlets and switches are reaching their life expectancies throughout the complex. Many of the devices are extremely dirty due to the diesel fumes and should be replaced once the HVAC system has been updated.

Fire Alarm

The fire alarm is an old Johnson Control System that is serviced by a company out of Superior, Wisconsin. This system is of such an age that parts are difficult to obtain. The current system layout fails to meet current codes and if a large remodel is performed, the City of Madison will require the system to be updated or removed. It is recommended that a local supplier install a new system. There are a number of fire alarm vendors qualified for this work in the Madison area.

Paging System

The paging system has recently been updated and needs no changes at this time.

HVAC Systems

Heating System Boiler Plant

The current boiler plant consists of two Cleaver CB 200 fire tube hot water boilers. These boilers are original, about 25 years old, and appear to be in good working condition. They are dual fuel source of natural gas from municipal lines and no. 2 fuel oil with storage tanks located outside dock area. New boiler controls were recently added to improve overall heating system efficiency. Currently, one boiler handles the major heating load of the building until outdoor temperature drops to 10˚F, at which point both boilers are operational. The boiler tubes are regularly inspected every 3 years, with 8 to 10 tubes requiring replacement due to wear and tear. The boilers circulate hot water through a primary-secondary pumping system that supplies the hot water to building.

The existing boilers meet the current capacity needs of the building, but will not be sufficient to heat any further expansion of the building. While the boilers are in good condition, they should last beyond their expected life. Future replacement of

the boilers will likely be required in the next fifteen years.

Secondary Hydronic Pumps

The secondary hydronic pumps distribute hot water from the boilers to the building. The secondary pumping system is divided into three heating zones: Administration/Shop, Bus Depot area, and Perimeter Radiation system. Existing secondary pumps serving Admin/Shop and Bus Depot area have additional pumps for redundancy. These pumps are original, about 25 years old, and are in average condition. All heating zones modulate to meet various demand load of the building.

All primary and secondary pumps are in average condition based on age of equipment. The in-line pumps serving the perimeter system have inadequate clearance around electrical service for maintenance. Improving the chemical water treatment by the provision of a water filtration system is also recommended to properly maintain the hydronic system. New pump controls are also recommended to provide variable flow, thereby reducing energy consumption for pumping. These controls would incorporate variable frequency drives and sensors to modulate the water flow to meet load demand.

Hot Water Makeup Air Units

There are eleven hot water makeup air units installed on the roof. All units utilize 100% outside air for ventilation of the shop areas and portions of the bus depot area. The air is tempered by the hot water system in the units with no means of cooling the makeup air. The hot water makeup air units are 25 years old. Filters and electric damper actuators in units were recently replaced, in addition to the roof curbs of all units in the past two years.

There are four main negative aspects with the current arrangements: first, the building is experiencing a shortage of makeup air relative to the exhaust air. Second, there are a number of missing damper actuators for units HV-6, HV-7, HV-8 and HV-9. Third, there is no smoke detection for makeup air units per code. Finally, the units' overall integrity and thermal efficiency is deteriorated.

The condition of all of the makeup air systems is below average. The field observation of the units shows significant amount of rust on the units' roofs and supporting structures in addition to the interior unit insulation being damaged or missing. Exterior piping insulation for some of the units has also deteriorated. Life expectancy of these units is five to seven years at best. For energy conservation purposes, new units with high efficient motors and clean coils would enhance

the building's performance. Air balancing of the existing system is also recommended to upgrade existing deficiencies of makeup air serving the building.

Gas Fired Makeup Air Units

There are four gas fired makeup air units installed on the roof. All units utilize 100% outside air for ventilation of the paint booth and portions of the bus depot area. The air is tempered by the hot water system in the units with no means of cooling the makeup air. The gas fired makeup air units are 20 years old. Filters and electric damper actuators in units were recently replaced, in addition to the roof curbs of all units in the past two years.

There are three main negative issues with the current arrangements; first, the building is experience a shortage of makeup air relative to the exhaust air. Second, HV-12 intakes are close to vacuum system discharge which loads filters debris and diminishes indoor air quality. Finally, there is no smoke detection for makeup air units per code.

The condition of all of the gas fired makeup air systems is average. Life expectancy of these units is 7-10 years. For energy conservation purposes, new units with high efficient motors, burners and clean coils would enhance the building's performance. Air balancing of existing system is also recommended to upgrade existing deficiencies of makeup air serving the building.

Air Conditioning Unit

Gas fired rooftop air-conditioning unit, AC-1 provides air-conditioning for the administration area. This unit provides both heating and air conditioning to the spaces it serves and was replaced last year to resolve the previous cooling short falls. The gas-fired system is primary for morning warm-up cycle. Air-conditioning is provided by air cooled direct expansion refrigeration system located in the unit. Downstream of unit of AC-1, there re individual air terminals to

modulate airflow to the specific spaces controlled by local electric thermostat.

Another air-conditioning unit, HV-5, has been recently upgraded with supplemental cooling to serve Men's drivers and maintenance lockers rooms. Air-conditioning is provided by an air cooled direct expansion refrigeration system located in the discharge ductwork of the existing unit. A cooling thermostat regulates the temperature of the locker rooms. This unit is scheduled to receive a new heating coil in near future.

Air-conditioning units AC-2 and AC-3 serve Vault and Dispatch operations areas. These smaller units serve dedicated areas with individual thermostats. AC-2 is about 25 years old and is the original unit although the compressor has been replaced in the past. Furnace and air conditioning unit AC-3 is relatively new unit with no known deficiency.

The air conditioning units, except for AC-2, are in excellent shape. Life expectancies of AC-1 and AC-3 unit are 15 to 20 years. AC-2 would have a 3 to 5 year life expectancy. Electric damper controls were recently upgraded for existing air terminals boxes serving administration area by AC-1. It is recommended to complete a system balancing of existing AC-1 and HV-5 serving administration area to properly balance the two levels.

There are eleven general exhaust fans installed on the roof. The general exhaust fans serve toilets, lockers, parts rooms, welding exhaust, steamer areas, boilers rooms, battery room, hoist, and bus depot areas. All exhaust fan roof curbs were replaced to repair roof leaks. Exhaust fans are belt driven equipment except for smaller fans such as EF-7 (not shown).

The condition of all exhaust air systems is average with a life expectancy of these fans of 7 to 10 years. Hoist reels for local (CO) carbon dioxide exhaust system in maintenance areas are degraded with kinks or holes, which reduces the effectiveness in removing diesel exhaust. It is recommended to replace damaged hoist reels to improve working areas. Air balancing of the existing system is recommended to upgrade existing deficiencies of exhaust air serving the building.

Dynamometer Makeup/Exhaust Fans

The Dyno Room is served by a makeup air unit HV-16 and two exhaust fans EF-27 and EF-28. No existing information of this particular equipment was available and nor were they

surveyed as Dyno Room activity is very limited. We suspected the equipment to be 20 to 25 years old. Similar age issues will present themselves regarding the condition of the existing system. No other deficiencies were noted during the walk-through.

The makeup air system HV-6 is considered below average with a life expectancy of 5 to 7 years. For energy conservation purposes, a new unit with high efficient motor and clean coils would enhance the building's performance. Air balancing of existing system is also recommended to upgrade existing deficiencies of makeup air serving the Dyno area.

Bus Storage Exhaust Fans (No Heat Recovery)

There are four exhaust fan systems installed in the Bus Depot area. The heat recovery unit was deactivated 20 years ago due the high maintenance cost of replacing filters and washing coils. Filter life expectancies were only 3 months and cleaning coils over time became ineffective. Consequently, the coils and filters in the recovery units have been removed although the distribution piping and pumps remain in the building.

The condition of all of the exhaust air systems is average with a life expectancy of 10 to 15 years at best. For energy conservation purposes, new recovery coils with appropriate filtration and high efficiency motors would enhance the building's energy performance. Air balancing of the existing system is also recommended to improve existing makeup air deficiencies.

Temperature Controls

The existing temperature controls are electric in nature. Some of electric thermostats have been upgraded in Administration area with the replacement of air conditioning unit AC-1; however, there is no central building control system in place at this time. Manual start/stop control panels in the shop and maintenance areas operate all the airside mechanical systems.

Summary

The HVAC systems in the existing building are reasonably well maintained but are showing their age. The more recently installed systems will provide better energy efficiency and improved temperature control of facility however some existing systems are quite inefficient. Overall there are a number of mechanical issues with this facility as noted below:

- Deficiency of makeup air systems
- Existing equipment approaching life expectancy
- High energy consumption as a result of no heat recovery for exhaust systems
- Potential health issues in bus depot storage areas due to inadequate air dilution of diesel exhaust
- Limited potential for expansion of existing systems

Plumbing Systems Assessment

Sanitary Drain and Vent

The existing sanitary drain system is a gravity system. The sanitary drain lines connect to all plumbing fixtures and floor drains. The horizontal drain piping is routed to East Washington Avenue and Ingersoll Street. All of the floor drains and trench drains connect to interceptors. The interceptors are to pre-treat the wastewater to separate the oils and particles from the wastewater. The drain lines from plumbing fixtures do not flow through the interceptors. At the foundation wall there are backwater valves on the sanitary building drain.

In the bus parking storage area (Gisholt Building) the new slab was built approximately three feet above the existing slab. The existing slab and machine foundations were left in place. The sanitary drain lines for the trench drains in the bus parking are installed in the three feet lift space above the existing floor.

A sanitary vent system is provided to maintain water in the trap seals. There are vent lines connecting to each trap. The vents collect and terminate through the roof at various locations. The sanitary drain and vent system is cast iron and galvanized steel.

The sanitary drain and vent piping appeared in fine condition. The piping system will provide adequate service for several additional years.

Storm Roof Drainage

The roof over the west portion is flat, sloping to the drains in the middle of the building. Interior storm drain piping connects to the roof drains and goes vertical to below the slab. Under the slab the vertical storm conductors connect to horizontal storm drain lines. The horizontal drain lines exit through the foundation wall towards East Washington Avenue and Ingersoll Street.

The roof over the bus storage (Gisholt Building) is a saw tooth with clerestory windows that have been covered over with roofing. The roof drains are located at the bottom of the saw tooth slopes where they connect to conductors running vertically to under the slab. This roof drain system was original to the Gisholt Building. Under the slab an 18-inch cast iron storm drain running north south at the junction of the bus storage and 1980 building is likely the collector for the roof drainage in the Gisholt Building.

The roof drainage system is working fine and is in good condition. There are several conditions in the Gisholt Building that are deteriorated and in need of repair or replacement.

Domestic Water

An 8-inch combination (fire and domestic) water service that connects to the municipal water main in Ingersoll Street enters through the west wall and splits inside the building to domestic and fire services. The domestic water is metered and has a pressure-regulating valve (PRV), maintaining a pressure of 85 psi.

Domestic water is distributed horizontally in the ceiling space to connect to all plumbing fixtures and hose connections. In the Boiler Room the domestic water connects to the water softeners where it is treated to remove hardness and limit precipitation of lime in the domestic hot water system. The hot water system consists of a gas fired water heater with storage tank in the boiler room next to the softeners. Distribution is in the ceiling space parallel to the cold-water piping to supply the plumbing fixtures. The domestic hot water temperature is maintained using a hot water circulation system located next to the water heater.

Domestic cold and hot water piping is galvanized steel and copper. The larger piping is galvanized steel and the smaller branch lines are copper.

The existing domestic water piping is in good condition.

Compressed Air

Compressed air is generated at a duplex air compressor in the boiler room. Steel compressed air piping is distributed

horizontally in the ceiling space from the compressor to supply the hose connections (air bibs and hose reels) in the servicing area. The compressed air piping also connects to the lubrication pumps to distribute lubrication fluids to the hose reels in the servicing bays. There are additional air bibs located throughout the facility for building maintenance crew usage.

The existing compressed piping is in good condition.

Lubrication Fluids

There are storage tanks for lubrication fluids located next to the automatic wash bays. Each of the tanks has an air-powered piston pump. Steel distribution piping supplies lubrication fluids from the storage tanks to the hose reels in the servicing bay.

The existing lubrication fluid piping is in good condition, however a new location and dedicated room for the lubrication system is required.

Plumbing Fixtures and Equipment

Water Meter: 3-inch compound

Water Heater (Boiler Room): AO Smith, model BTR 197, gas-fired, input of 199,000 Btu/hour, 80-gallon storage, with additional 250-gallon storage tank.

Water Heater (Mezzanine): Bock model 75G, gas-fired, input of 140,000 Btu/hour, 75-gallon storage, with additional120 gallon storage, insulated and metal jacket.

Water Softener: Duplex unit, time clock-actuated regeneration.

Air Compressor: Duplex, 20-horsepower, tank mounted, reciprocating. Controller and compressors mounted on the tank.

Toilet: Vitreous china, siphon, wall mount, flushometer.

Lavatory: Vitreous china, wall mount, lever handles, wide-set style. Some faucets are manual and some faucets are meter operated.

Urinal: Vitreous china, wash down, stall, flushometer.

Trench Drains: Modular preformed and pre-sloped sections, ductile iron grate.

Condition of Existing Fixtures and Equipment

Water Meter: Controlled and changed by the local water utility.

Water Heaters: Both heaters appeared in fine condition.

Water Softener: Both regeneration units need immediate repair.

Air Compressor: Appeared in fine condition.

Toilet: Appeared in serviceable condition.

Lavatory: Appeared in serviceable condition. The meter faucets need replacement.

Urinal: Appeared in serviceable condition.

Trench Drains: Need replacement. Grates are broken and the edges of the modular sections have deteriorated. Replace with minimum 12-inch wide trench drains

Fire Protection Automatic Sprinkler

The sprinkler system for the west portion (servicing bays) is supplied from the 8-inch combination fire and domestic water service connecting to the municipal water main in Ingersoll Street. The sprinkler system is a wet-pipe system, supplying sprinkler heads in the entire servicing area. It is equipped with a double check valve backflow prevention assembly. There are no sprinkler heads in the two levels used for administrative functions.

The sprinkler system in the east portion (Gisholt Building) used for bus storage is supplied by an 8-inch water service connecting to the municipal water main in East Washington Avenue. The water service enters through the north wall where an alarm check (single) valve is provided. The 8-inch cross main is routed overhead to supply several riser valves located along the south wall. This main also supplies 2-1/2 inch fire department valves (FDV) located at interior columns. The sprinkler piping in all areas is black steel.

The existing sprinkler system appears in good condition.

Section Five
Sustainable Design

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Sustainable Design

Introduction

For years, environmental advocates have been sounding the warning alarms that our world's resources are being exhausted and the impact of our lifestyles is harming the environment around us. Construction and the operation of buildings is a major contributor to that and we must be more conscience about the way we use our environment and resources. In 1993, the United States Green Building Council established Leadership in Energy & Environmental Design (LEED) as a way of educating and encouraging the building industry to design more environmentally friendly buildings and a national standard for what constitutes a "green building." As Design Professionals we take upon ourselves the responsibility to create built spaces that address the issue and correct the mistakes the industry has made in the past.

Taking a sustainable approach to the design solution for Metro Transit sets a precedent for making design decisions that benefit the project in many ways. Buildings that utilize sustainable strategies are better for the wellbeing of building occupants. They provide adequate lighting, clean air, comfortable temperature and humidity levels, and separation from conditions that are harmful to people. These basic human needs improve the experience of occupants in the facility, increase staff retention, and reduce health related problems.

Sustainable Building Characteristics

Sustainable buildings are more energy efficient, minimizing water and energy usage, thereby reducing utility operating costs. Sunshine for lighting spaces when possible, reusing water when it's logical, and reducing cooling and heating load through appropriate building material choices are some potential methods for doing this.

Another characteristic of sustainable building is using materials that have a low environmental impact, minimizing water pollution and storm runoff, reducing the heat island effect of urban environments, and encouraging the use of alternate and public transportation in lieu of automobiles. As a public entity, this approach shows the community that Metro Transit is interested in saving our natural resources and contributing to a clean and healthy Madison.

Approach

The Study Team approach will use the LEED rating system as a framework. It identifies sustainable issues that we will consider in the design solution and criteria for measuring performance. In order to be LEED Certified, the project would have to meet the requirements established in any of the categories to attain a minimum of 26 points out of a possible 69, as shown on the following chart. As more points are achieved, the LEED rating of the building increases. To this end, the Study Team has identified initial sustainable strategies for consideration that are feasible and appropriate for this project. Through the next several phases of the design process, each issue will be reviewed and evaluated to determine whether appropriate and if it should be implemented and developed further.

The following narrative defines each LEED requirement and/or credit, and the Study Teams' strategy relative to that credit.

Metro Transit Sustainability Narrative

Sustainable site

Alternative Transportation, Public Transportation Access. - This strategy is accomplished by the nature of the site and its proximity to public transportation stops. The requirement is satisfied by the facility being within a quarter of a mile to two or more bus stops.

Alternative Transportation, Bicycle Storage & Changing Rooms – The changing rooms that are provided for the operators and for maintenance will meet part of this requirement. Additional space dedicated on the site, near employee parking or the administration/operations addition, for bicycle parking will be provided for as well to meet this goal.

Alternative Transportation, Parking Capacity – By increasing the density on the site to meet the program, parking has been limited to what is required by the City of Madison. The intent is to encourage people to carpool, use public transportation or bicycles rather than one person per one car.

Reduced Site Disturbance, Protect or Restore Site – This approach is meant to reduce the amount of hardscape area that takes away natural areas of vegetation and habitat. By increasing the amount of landscaping on the site in the concept plan rather than paving, the site will provide attractive natural spaces that enhance the aesthetic appearance of the facility.

Storm water Management, Rate and Quality – The rooftop patio is one measure taken to reduce the amount of storm water runoff that leaves the site by 25%. This area above part of the bus storage will absorb storm water from the roof through plants and the soil composition. In addition, pervious paving will be used where feasible to allow water to infiltrate into the ground and keep runoff and associated pollutants (sediment, vehicle waste, trash) out of the regional waterways.

Storm water Management, Treatment – This strategy is intended to filter surface water on the site, eliminating contaminates and increasing on-site infiltration. Pervious paving will help filter storm water on the surface of the site by allowing it to soak into the ground naturally. The increased landscape areas will also help filter storm water and associated pollutants preventing them from entering regional waterways.

Heat Island effect, Non-Roof - Heat that radiates from asphalt paving can increase the ambient temperature on a site significantly. This puts additional load on the cooling system and creates uncomfortably hot outdoor spaces in normal warm weather. Reducing the amount of radiant heat, or "heat islands" on the site is the goal of this strategy. By covering fifty percent of the parking with the maintenance/parking structure the requirements are met and exceeded when additional shading on the site from trees is taken into account.

Heat Island effect, Roof – The intent of this strategy is the same as the previous goal but deals strictly with roofs. The rooftop patio and roof materials with high level of reflectivity will accomplish the requirements. This helps to also reduce the cooling loads on the building by reflecting solar heat rather than absorbing it.

Light Pollution Reduction – Light emitting from the site effects surrounding properties and ultimately contributes to nighttime skies in urban areas never going dark at night. To be a good neighbor outdoor lighting will be adequate to illuminate the site, but the design of the fixtures and the

lighting levels will stop at the property line. This will also save energy costs by not producing excessive amounts of artificial light that is wasted.

Water efficiency

Water Efficient Landscaping, Non-irrigated - The climate in Wisconsin is such that plants need only enough watering to be established right after planting and they will be sustained without additional irrigation. These two requirements are met with no additional provisions than normal landscape design would offer in the region.

Water Use Reduction 20% - This will be accomplished by using occupancy sensors on plumbing fixtures and low flow fixtures as well as using grey water (filtered rainwater or recycled water that has not been in contact with human or food waste) for non-potable uses such as sewage conveyance and custodial uses. In addition to this the bus wash equipment will integrate a water-recycling system to greatly reduce the amount of potable water being used by the facility. The purpose of this approach is to reduce the amount of water that has been stringently treated to be safe enough for drinking, only to use it for flushing a toilet or clean a floor or bus. Reaching thirty percent reduction from the baseline standard can also attain an additional credit.

Energy and atmosphere

Optimize Energy Performance – This strategy is intended to increase the energy efficiency of the building and its systems. Systems affected include HVAC, hot water service, interior/exterior lighting, plug loads, equipment loads, and other systems that use energy during normal use of the building. Metro's new facility will be designed and modeled to apply the most cost effective measures for life cycle cost savings.

Renewable Energy – Metro will contribute to reducing pollution and burning of fossil fuels by the addition of creating energy on the site. Using photovoltaic cells on the roof and in the site to create electricity from the sun will reduce the amount of electricity being purchased from municipal power sources. To meet this goal renewable energy must account for 5% of the energy used on the site.

Ozone Depletion – All HVAC equipment will be free of HCFC and Halon, which have been proven to deplete the ozone layer.

Green Power – This strategy is intended to encourage the development of non-polluting, renewable energy by power companies to feed into the national power grid. By purchasing at least half of its power through a municipal utility provider from renewable energy sources Metro can attain this standard. Since 25% of Metro's power used is already a green energy source (wind power purchase from MG&E) the goal of 50% green energy used can easily be attained.

Materials and Resources

Building Reuse – The concept plan for the facility involves maintaining a portion of the existing building on site. If the percentage is greater than 75% of the existing structure and shell of the existing building volume the intent of this strategy will be met. Complete removal of the exterior walls at the bus storage will push the extent of reuse down and may miss the goal of 75%. This will be taken into account in schematic design for the exterior façade renovation.

Construction Waste Management – In order to divert construction waste from landfills and to capitalize on reusable material available the contractor shall implement a plan for managing waste during construction. This plan will need to separate salvageable and recyclable materials from other waste to use in other construction or return to the manufacturing industry for processing of new materials.

Resource Reuse – Similar to the credit for construction waste management, the intent of this credit is to divert construction waste from landfills by using materials that have been refurbished or salvaged. Most construction materials left over from demolition are in good condition and with minimal effort existing doors and hardware, light fixtures, conduit and cabling, and plumbing fixtures, for example, can be used in the construction of the new facilities.

Recycled Content – The intent of this approach is to increase the demand for products that contain recycled content and reduce the impacts of extraction and processing of new raw materials. Many products on the market are available that meet the criteria of this credit, which is a total of 5% recycled content in the sum of construction materials on the project.

Doubling that amount of recycled content in the project will attain an additional credit.

Local/Regional Materials – This credit is based on acquiring materials that have been harvested and/or manufactured in the region of the project. Since the Great Lakes region is nearby and many products are manufactured close to Madison this credit can be attained by using 20% of the materials for construction that have been manufactured within a 500-mile radius. If half of the material content on the project can be harvested from local sources in the same proximity an additional credit will be awarded.

Rapidly Renewable Materials – Using materials that are rapidly renewable helps to reduce the amount of finite raw materials that are consumed through construction. Metro's facilities will use materials that are harvested from plant sources with ten-year growth cycles or shorter to reach a minimum total of 5% of the total materials on the project where possible.

Certified Wood – Where wood is used on the project, certified wood products would be specified to account for at least half of these materials. This program encourages responsible forest management in the timber industry to preserve the natural resource of forests and the availability of wood as a future construction material.

Indoor environmental quality

Environmental Tobacco Smoke Control – This prerequisite strategy to LEED certification is intended to eliminate exposure to second-hand smoke from tobacco smoking. There will still be no smoking permitted in the building as it is today and any designated smoking areas will be located away from operable windows and fresh-air intakes for mechanical systems.

Carbon Dioxide Monitoring – In order to maintain indoor air quality for the occupants of the facility, carbon dioxide levels will be monitored. In this facility improved ventilation will be a very important part of changes made from the current systems. Integrated carbon dioxide sensors in the HVAC system will monitor and ventilate accordingly to maintain fresh air levels in the building.

Ventilation Effectiveness – Beyond the monitoring of carbon dioxide, the HVAC systems will be designed to provide

effective and efficient methods for distributing fresh air throughout the building while conserving energy in tempering the air.

Low-Emitting Materials – To control the amount of odorous and potentially irritating and/or harmful air contaminants in the building, materials that are identified as low volatile organic compound (VOC) content will be used exclusively. This applies to many materials including adhesives, sealants, paints, coatings, flooring and composite wood products. These often contain chemicals or particle matter that off-gas harmful compounds to the occupants of the building.

Indoor Chemical & Pollutant Source Control – The intent of this strategy is to reduce the amount of exposure of occupants to pollutants within the building. Entryway systems such as floor grates will be added to control the amount of outdoor pollution that is brought into the building by occupants. Also required is separation of areas where chemicals such as printing/copying, housekeeping and vehicle maintenance chemicals are used.

Controllability of Systems – Strategies for both perimeter and non-perimeter spaces in the building are intended to provide a high level of control to occupants for lighting, ventilation and thermal systems. Metro Staff will be able to efficiently tailor the conditions of their spaces while working with the building systems to do so and not against them.

Thermal Comfort – HVAC systems will be monitored to control the thermal comfort in the building based on occupancy. This will control humidity and temperature and will be greatly facilitated by separating incompatible uses in the concept plan. The purpose for this is to maximize comfort and productivity for the occupants of the building.

Daylight & Views – This strategy is intended to provide building occupants a connection to the outside environment and to introduce daylight into spaces to reduce interior lighting. Metro's facility will provide 75% of the occupied space with daylight and/or views to the outdoors. The administration/operations building in particular will facilitate this on its second floor as it has a shallow floor plate with the potential for glazing on all sides that will permit day lighting into most spaces.

The following table represents the number of credits that can be earned from a LEEDS Certification by category.

LEED Categories & Credits	Points to be earned
Sustainable Sites	
Erosion & Sedimentation Control Required	
This item is a pre-requisite and will be met	
1. Site Selection	***0***
Does not apply to existing site	
2. Urban Redevelopment	***0***
The immediate site is not an urban redevelopment and therefore does not qualify. If the Mullins property is utilized or built upon, it could qualify but won't be counted on at this time.	
3. Brownfield Redevelopment	***0***
The site is not a Brownfield site.	
4.1 Alternative Transportation, Public Transportation Access	***1***
This credit requires two bus routes be located within ¼ mile of the site, which is easily met on the site.	
4.2 Alternative Transportation, Bicycle Storage & Changing Rooms	***1***
Bicycle storage and showers/lockers will be provided in the facility	
4.3 Alternative Transportation, Alternative Fuel Vehicle	***0***
No alternative fuel vehicles or stations are planned for the facility	
4.4 Alternative Transportation, Parking Capacity	***1***
This credit requires that no more parking be provided than the minimum required by zoning regulations. Space on the site is limited and bus spaces are the priority over excess parking.	
5.1 Reduced Site Disturbance, Protect or Restore Site	***1***
This credit requires that 50% of the remaining site area minus the building be replaced with landscaping while still maintaining parking and bus traffic routes. This green space could also contribute to additional credits such as storm water and non-roof heat islands.	

5.2 Reduced Site Disturbance, Development Footprint ***0***

The development footprint cannot be reduced and still meet the basic functional criteria.

6.1 Storm water Management, Rate and Quality ***1***

To gain this credit, site runoff must be reduced by 25% of existing runoff through a storm water detention or retention system.

6.2 Storm water Management, Treatment1 ***1***

Impervious areas can act as a detention area that allows storm water to naturally percolate into soil.

7.1 Heat Island effect, Non-Roof ***1***

Using pervious paving on at least 50% of the paved surfaces will satisfy this credit or by 50% of total paved area receiving a light colored coating or being constructed using light colored concrete instead of asphalt.

7.2 Heat Island effect, Roof ***1***

The existing roof is in fair/good condition and could receive a coating with a higher reflectivity to achieve this credit.

8. Light Pollution Reduction ***1***

All exterior light fixtures will have cut-off light shields to prevent stray light from leaving the site. All interior lighting will be designed to maintain maximum candela value in the building.

Total Potential Sustainable Site Credits ***9***

Water Efficiency

1.1 Water Efficient Landscaping, Reduce by 50% ***1***

All landscaping will be designed to be highly water efficient.

1.2 Water Efficient Landscaping, No Potable Water Use For Irrigation or No Irrigation ***1***

It may be possible to utilize rainwater and/or reclaimed water to irrigate the landscaping, thereby reducing potable irrigation water use to zero.

2.1 Innovative Wastewater Technologies ***1***

We can earn this credit by using a water reclamation system on the bus washer. In addition, reclaimed water could be used to flush toilets and provide irrigation rather than just going down the drain.

3.1 Water Use Reduction, 20% Reduction ***1***

"Low flow fixtures" and "Waterless Urinals" can be utilized in the Administrative / Operations Building and the Maintenance Facility. Enhanced water reclamation and re-use will be utilized at the bus wash area, which should recycle at least 80% of the water to wash buses. Toilets and irrigation can be supplemented or replaced by reclaimed water.

3.2 Water Use Reduction, 30% Reduction ***1***

The same strategies used to earn the previous credit will allow us to earn this credit, as we anticipate the water use reductions will net over a 30% reduction.

Total Potential Water Efficiency Credits ***5***

Energy & Atmosphere

Fundamental Building Systems Commissioning ***Required***

This item is a pre-requisite and will be met

Minimum Energy Performance ***Required***

This item is a pre-requisite and will be met

CFC Reduction in HVAC & R Equipment ***Required***

This item is a pre-requisite and will be met

1. Optimize Energy Performance ***4***

A base model of the building energy usage will be constructed using the Energy Cost Budget Method. Energy saving designs such as variable air volume, economizer cycles, radiant heat in bus storage, point of use water heaters, energy recovery systems, efficient light fixtures, LED/electroluminescent exit signage, day lighting strategies will be investigated. Increased efficiencies in the overall building envelope will also be utilized in order to meet the 20% reduction in energy usage requirement. A higher percentage of reduction in energy use can result in as many as 10 points.

2.1 Renewable Energy, 5% ***1***

The Design Team will consider using photovoltaic panels installed on the roof of the buildings to supplement up to 5% of the total site energy consumption.

2.2 Renewable Energy, 10% ***0***

If the strategies defined in credit 2.1 are implemented to reach 10%, we may be able to also earn this credit.

2.3 Renewable Energy, 20% ***0***

If the strategies defined in credit 2.1 are implemented to reach 20%, we may be able to also earn this credit.

3. Additional Commissioning ***1***

Letters of certification by an independent Commissioning Agent will verify the tasks performed as required by the LEED rating system.

4. Ozone Depletion **1**

Qualifying for this credit will require that all existing HVAC equipment be HCFC-free or be replaced with such equipment. The use of HCFC refrigerants will be globally banned by 65% in 2010, 90% in 2015, and entirely by 2030.

5. Measurement & Verification **1**

Measurement and verification of the building's ongoing energy and water usage will be done through the building management system. Accurate cataloging of the building's baseline conditions, verification of installation and operation of new equipment and confirmation of the quantity of energy and water use will be cataloged throughout the building's life cycle.

6. Green Power **1**

In order to earn this credit, Metro would need to contract with MG&E to purchase 50% of the power used on the site from renewable sources. Wind power is the most cost effective resource available in Madison to non-renewable fuels according to MG&E.

Total Energy & Atmosphere Credits **9**

Materials & Resources

Storage & Collection of Recyclables *Required*

This item is a pre-requisite and will be met

1. Building Reuse, Maintain 75% of Existing Shell **1**

Since the project is mostly interior renovation and building addition we should qualify for this credit.

2.1 Building Reuse, Maintain 100% of Shell **0**

The solution to the space needs of Metro could result in maintaining 100% percent of the building shell, which would earn this credit.

2.2 Building Reuse, Maintain 100% Shell & 50% of Non-Shell **0**

Substantial interior remodel work will most likely be part of the solution to the program and is unlikely to maintain 50% of the interior, non-shell building material.

3.1 Construction Waste Management, Divert 50% **1**

The General Contractor will need to coordinate recycling 50% of the construction waste and would be part of the general conditions in the contractor's bid.

3.2 Construction Waste Management, Divert 75% **1**

The General Contractor will be responsible for this and may be able to recycle an additional 25% of materials, which would get this point, but will not be counted on at this point.

4.1 Resource Reuse, Specify 5% **1**

It is likely not feasible to use salvaged, refurbished or reused materials

4.2 Resource Reuse, Specify 10% **0**

It is likely not feasible to use salvaged, refurbished or reused materials

5.1 Recycled Content, Specify 5%

The Team will specify at least 5% of materials with recycled material

5.2 Recycled Content, Specify 10% **2**
The Team will should be able to specify at least 10% of materials with recycled materials.

6.1 Local/Regional Materials, 20% Manufactured Locally **1**
The Design Team will need to specify a minimum of 20% of building materials to be manufactured within 500 miles of Madison, which the Team believes is attainable due to the proximity to the Great Lakes region.

6.2 Local/Regional Materials, of 20%, 50% Harvested Locally **0**
Of the 20% locally manufactured materials, if 50% of those were manufactured with materials that were also harvested locally, then another point can be earned. This may be difficult, but the Team will attempt to specify materials that can achieve this goal.

7. Rapidly Renewable Materials **1**
The Design Team will attempt to specify enough materials (5% of all materials) that are manufactured with rapidly renewable material (10-year or less production lifecycle).

8. Certified Wood **1**
The Design Team will specify all wood cabinets, trim and other wood be constructed of Certified Wood.

Total Potential Materials & Resources Credits **9**

Indoor Environmental Quality

Minimum IAQ Performance *Required*

This item is a pre-requisite and will be met

Environmental Tobacco Smoke Control *Required*

This item is a pre-requisite and will be met

1. Carbon Dioxide Monitoring **1**
Carbon Dioxide detectors will be installed in the return air ducts of all HVAC units in the Administration/Operations areas. Programming of the units will include a carbon dioxide high limit parameter in the sequence of operations for the unit. Drawings, specifications and cut sheets will be provided along with a sequence of operations narrative. In addition, Carbon Monoxide detection will be installed in the vehicle storage and maintenance areas, which hopefully will suffice to meet this requirement. The air quality in the vehicle and occupied spaces is a major concern for this project and will be dealt with intently.

2. Ventilation Effectiveness **1**
The building systems will be upgraded to address the deficiencies of the evacuation of vehicle exhaust. A report will be generated, summarizing the test results and calculations demonstrating that the building has an air-change effectiveness of 0.9 or greater as determined by ASHRAE 129-1997.

3.1 Construction IAQ Management Plan, During Construction **1**

A construction IAQ management plan will be outlined and provided to the contractor outlining the SMACNA requirements. Construction IAQ management measures will be documented and photographed.

3.2 Construction IAQ Management Plan, Before Occupancy **0**

As the building will be occupied and operational through construction this credit will not be possible to attain.

4.1 Low-Emitting Materials, Adhesives & Sealants **1**

All Adhesives and sealants will be specified as low volatile organic compounds

4.2 Low-Emitting Materials, Paints **1**

All paints will be specified as low volatile organic compounds

4.3 Low-Emitting Materials, Carpet **1**

All carpeting will be specified as low volatile organic compounds

4.4 Low-Emitting Materials, Composite Wood **1**

All composite wood products will be specified as low volatile organic compounds

5. Indoor Chemical & Pollutant Source Control **1**

Entry way systems will be designed to capture dirt and particulates, have structural deck to deck partitions with outside exhausting, and no air re-circulation, and separation of copy/print rooms. Copy/print rooms will be kept under negative pressure with respect to adjacent spaces.

6.1 Controllability of Systems, Perimeter **1**

Operable windows and lighting controls will need to be provided for every 200 s.f. of spaces 15 feet from exterior walls. Calculations supporting the total perimeter occupied area, number of controls, and operable windows will be provided.

6.2 Controllability of Systems, Non-Perimeter **1**

Airflow and temperature control will be provided in the design. Calculations supporting the number of controls will be provided.

7.1 Thermal Comfort, Comply with ASHRAE 55-1992 **1**

A letter from the engineer shall be provided verifying compliance with ASHRAE Standard 55-1992.for thermal comfort standards including humidity control.

7.2 Thermal Comfort, Permanent Monitoring System **1**

Temperature and humidity monitoring systems will be integrated into the building management system, allowing override control of the systems.

8.1 Daylight & Views, Daylight 75% of Spaces **1**

The project has the potential to provide day lighting in many spaces, and should meet these criteria.

8.2 Daylight & Views, Views for 90% of Spaces ***0***

Retro fitting windows for 90% of occupied space will be a difficult undertaking and will most likely not be part of the design approach.

Total Potential Indoor Environmental Quality Credits ***13***

Innovation & Design Process

Innovation in Design ***1***

This credit may be earned by using sustainable cleaning fluids in the bus washer.

Innovation in Design ***1***

This credit could be earned by exceeding the water efficiency goal with the bus washer reclamation system.

LEED Accredited Professional ***1***

The following team members are LEED accredited professionals;

Steven Rolloff, Arnold & O'Sheridan - Structural Engineer

Aaron Kelly, RNL Design - Architect

Total Potential Innovation & Design Process Credits ***3***

TOTAL POTENTIAL CREDITS ***48***

This LEED based approach will form a firm foundation for decision-making strategies during the design process and help the team find a solution with synergy. A balance will be struck between initial budget, life cycle costs, operational and maintenance impact, community impact, and programmatic functionality. Our design process is rooted in sustainability not only for the sake of environmental concerns but because doing so reaps exponential benefits, as stated above, to the project and its users over the course of its lifetime on the site. The amount of time spent during the design and construction processes pales in comparison to the duration of time that Metro Transit and the Madison community will live with the decisions made during those periods. If the client team decides to pursue a LEED accreditation on this project, the design team will perform the steps necessary in that process. However, the decisions we make toward the solution, regardless of the LEED status, will have the above stated concepts in mind on all levels to deliver a design solution that is above and beyond simply meeting needs.

Section Six
On-site Design Charrette

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On-Site Design Charrette

Introduction

RNL Design and Maintenance Design Group conducted a Site Concept Planning design charrette for the Metro Transit Facility May 9 through May 13, 2005. The goal for this session was to develop concept alternatives to improve the safety, appearance, performance and efficiency of the entire facility and operation and to accommodate a future fleet size of 285 buses. Concepts were developed for the current Metro Transit site of approximately 10.4 acres located at 1101 East Washington Avenue. The selected concept is to be located entirely within the existing site utilizing as much of the site as possible and allowable by the City of Madison. The site re-development is to start at the southwest corner and work its way to the north and east.

Charrette: An interactive design session involving the Study Team and the Facility Stakeholders where concepts are developed, reviewed, evaluated, discussed, and refined to arrive at a consensus concept

Concept alternatives developed during the charrette process were presented at daily review meetings to all interested Metro staff personnel. The purpose of these review meetings was to interactively discuss the merits and deficiencies of each concept, with the end product being a concept that most completely fulfills the goals of all Metro Staff. All concept drawings developed during the charrette can be found in Appendix E - Charrette Concepts.

Interactive input from Metro Staff immediately following the review presentation

The following is a detailed description of each day's events at the charrette.

Monday May 9, 2005
Day One

Overview

The first day of the charrette served primarily as an initial working day for the Study Team. A kick-off meeting was held with key Metro Staff to gain valuable information on the direction the Study Team was to take over the next few days. Interview meetings were completed several weeks prior with key staff from Metro Transit Administration, Operations, and Maintenance Departments. These meetings were useful for the Study Team to understand Metro's requirements for the proposed facility. The Study Team also had the opportunity to take an extensive walking tour of the existing facility to review and inventory existing conditions.

Kick-off Meeting

The afternoon kick off meeting began with the formal presentation of the Programming Overview Draft Report of existing data projections of 285 buses and 135/150 bus split, explaining different ways to project program requirements using current staffing rates, existing takeoffs vs. space trades and current industry standards. Explanation of differences in existing spaces versus what is programmed was also discussed. During this time the following comments were made and questions asked by staff members who were in attendance at the meeting:

- Due to site constraints what new spaces do we try to accommodate over existing conditions?
- Maintenance is a large part of the organization where there is a great opportunity for an increase in efficiency.

- What is the cause of the increase in square footage attributed to Maintenance? The number of maintenance bays and the addition of specialty bays was the reason for a large square footage increase; PM inspection bays 2 – 6 were based on the ratio 1:50 (1 bay for every 50 buses).

Other areas of interest are those requiring large increases in square footage include:

- Larger area is projected for Parts Storage based on the ratio of more aging fleet buses to new fleet buses.
- Service Island Space needs are projected to double in square footage to gain the spaces and separation needed for an efficient Servicing Operation.
- Building Maintenance to consolidate into one space for added efficiency.

The Kick-off meeting for the week continued by asking the following questions:

- How many buses can we fit in the facility?
- How many buses will Metro Transit really grow to in the future?

In order for Metro staff to gain a better understanding of what factors lead the direction of a design charrette, explanation of Design Criteria and the Space Needs Study (Sections, Appendices, Key Planning Issues) were given. Throughout this period of discussion a wide array of topics were discussed giving the Study Team a clearer direction of what was needed throughout design. Some of the topics were:

- Current Facility shortcomings and deficiencies
- Operational and functional adjacencies
- Impact of fleet growth

One topic discussed during the Kick-off meeting that the Study Team wanted to emphasize was the impact of the Environmental Assessment. This is a key factor when planning a project to gain LEED certification. A LEED certification may have more opportunity to gain support on local and federal levels. The Study Team would like to incorporate LEED components as much as possible. It was found that potential environmental issues are not great enough on Metro's current site to warrant large expansive studies or corrective actions. However, ground and contamination issues will be dealt with as they are identified.

Another issue that was discussed was that Metro's site is already constrained by surrounding properties and streets, East Washington Avenue and Ingersoll Street. The Southwest portion of the site is constrained by railroad right-of-way and future park development. The Southeast is limited by the Madison Gas and Electric Service Facility. The Northeast is limited by the Mullen's Property that was considered a "no-purchase opportunity" however it is considered a long-term lease possibility or more likely a short-term lease during the re-development of the existing site. An initial concept was discussed to utilize the entire existing site without the use of long term leases.

In order to further utilize Metro Transit's current site and facility the setbacks and easements were carefully considered for option. In order to utilize as much of the existing site as possible relocation or burying of power utilities and relocation of the large gas line underground through the middle of the site would be required. By continuing to build on the existing site a more dense urban classification can be achieved thus allowing exterior site circulation to be reduced, creating more effective usable space on Metro's existing property.

The next topic of the kick-off meeting was Programming Efforts and Continuing Design, which brings fourth the question of: "How do we design?" A discussion lead by Maintenance Design Group helped get Metro Staff more involved in programming review and created the following questions, comments and concerns:

- Is there a possibility of starting fresh on Metro's existing site by relocating temporarily and demo current facility?
- Can we fit all functions and operations on our current site?
- What functions door can we move off-site?
- Is stacking of functions and spaces a reasonable solution to accommodate Metro Transit's space needs?
- How do we fund this project? Metro Staff and the Study Team need to make sure expenditures are not duplicated.
- Are there opportunities for joint ventures with other private entities? How will a joint venture impact federal and local funding?
- How do we design the facility to maintain more control over site access and security?

- There is concern about building up on the existing property and having the building stand out as a maintenance facility and garage structure. Any structures must be aesthetically pleasing from the surrounding streets per the City Planning Commission.

Discussion during the Kick-off meeting about East Washington Avenue, the Study Team was informed about certain criteria that must be met per the City Planning Commission as follows:

- To the East of Ingersoll, building structures must be kept to a height of between 2-5 stories.
- Metro represents 28% of employment in the East Washington Avenue corridor, an employment asset the City would like to maintain.
- There are historic restrictions along the facade facing of East Washington Avenue that must be met.

Throughout discussions during the afternoon a lot of headway was made in both the Study Team's and Metro Staff's understanding of what directions were appropriate to start assessing, however at this point there were still concerns from Metro Staff about inadequacies that they felt were apparent. The fact that the current property is already completely utilized by the facility itself and parking, the question arose: Is the Mullen's property the only means to get Metro's property to what is needed? Based on the uncertainty and unlikelihood of acquiring this property from the Mullen's Family the questions were then asked:

- Does Metro Transit simply relocate to another location?
- Should Metro Transit try to limit its growth potential in the future?
- Should a compromise between multiple facility locations be considered such as a 150/135 bus split operation or the existing 200 bus operation with a small 85 bus remote operation facility?
- When, where, why, and how would the situation of having multiple Metro Transit Operations Facilities occur?

Programmatic Concerns/Resolutions

Programmatically there were some concerns from Metro staff about space size and areas included in the presented program as follows:

- Conferencing rooms are too small in size, Metro Staff would prefer these to be larger. Program was adjusted.
- A multipurpose room shall be considered for drug testing and/or central library. A central library was provided in the program.
- Women's restrooms in general around the facility need more square footage. The program provides adequate area based on code and experience.
- Large training room to be functional for 120 people. The program reflects a large multipurpose room.
- The program is short an operations office. Program was adjusted.
- Additional office space is needed for Operations Training. Program was adjusted.
- Private space in maintenance supervisor's area for small table/chairs to seat four. A conference room was provided.
- Additional space in Building and Grounds Maintenance for Supervisor and Assistant office. The program was adjusted.
- Employee relations office needs more square footage. Office sizes were adjusted.
- Organization of Building and Grounds Maintenance to include shop space and tool storage. Program was adjusted.

Upon conclusion of the meeting the Study Team began to discuss what the proper direction to pursue. The rest of the day was spent developing initial design concepts, A, B and C.

Tuesday May 10, 2005
Day Two

Overview

A temporary design studio was set-up in the paint booth at Metro's Transit Facility. The first review meeting of the charrette began with a discussion of the 'big picture' planning issues as they pertain to the Metro Transit site and its impact on the surrounding area and if realistically the Study Team could fit the program developed onto the existing site. It was made clear by Metro Staff that the functionality of the site must be enhanced, and it was the Study Team's intention to develop ideas for these improvements that could actually

benefit Metro Transit to its fullest potential and surrounding areas.

Concepts are developed by hand allowing the team members the ability to explore dozens of options and create numerous working alternatives in a matter of hours

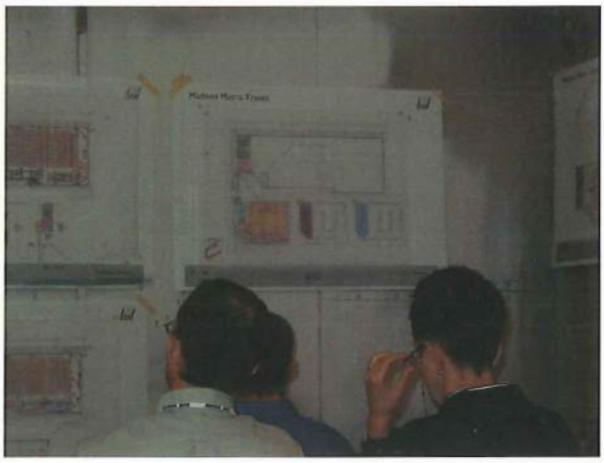
After discussion of planning related issues and the related drawings, discussion turned to the three site concepts which were developed for this meeting (Concepts A through C). Three dimensional (3D) computer modeling was used to model and document existing site conditions, landscaping standards and existing developments. Also, programming comments from Metro Administration Staff were incorporated into the working program. The following are highlights for each of the concepts.

Concept A

- Simple form, trying to leave existing facilities alone
- Use Mullen's Property as a long term lease solution for Administration and Operations Expansion
- Build a parking structure on either Metro's current property or make a deal to build a structure on the Mullen's Property, bus or passenger vehicle applicable
- Minimize demolition of the existing facilities
- Utility building for Administration and Operations

Concept B

- Relocate Bus Maintenance and Service. Bus Maintenance moves to existing paved parking lot with parking structure built above
- Servicing gets pushed to the rear of Bus Storage in the existing interior Bus Storage
- Buildings & Grounds, Administration and Operations move temporarily on a short term lease to the Mullen's Property as a new Structure is built on the corner of Ingersoll Street and East Washington Avenue.



Initial concepts are "pinned up" for Metro Staff review

Concept C

- All Metro Transit functions move to new building constructed on existing employee parking lot
- Short term lease agreement is still required with the Mullen's Property for parking purposes
- Existing structure conforms to Interior Bus Storage with provisions to accommodate Service Island if necessary.

Concept A through C: Synopsis

Upon examination of each of the concepts (see Appendix E), the primary difference between each is the location and function of the different operations of Metro Transit, expansion options, parking, building image, and the dependence on the adjoining properties, especially the Mullen's Property. They all explore the different possible relationships between the Metro Transit and the resultant development and activity that would be possible for the surrounding properties (Mullen, MG&E and proposed City Park).

Day Two: Issues Discussed

General concerns from Metro Administration included:

- Concern of moving washed, wet vehicles outside during the winter months.
- Right hand turns that create difficult maneuvering operations throughout the facility for drivers.
- Queuing from outside needs to be eliminated where possible. Operations should be located on a first floor for convenience of drivers/operators to the buses.
- Fare collections being more remotely isolated is not good and causes concern for safety.

- General layout of the facility to allow for proper turning radius for bus and other vehicle circulation in the new building layouts and the reorganization of the existing storage facility.

Detailed objective presentations of each concept allow Metro Staff to evaluate and comment on all aspects of the plan. This provides the team with ideas for the refinement of the concepts.

More specific concerns about Bus Maintenance were addressed by Jim Drekinson, the Maintenance Manager. Depending on which concept was to be further developed the question arose "How do we supervise split maintenance and service areas"? The answer to this of course was more staff, however, adding staff in any scenario was simply not permissible. Furthermore, the more remote that any one location of maintenance becomes, such as a quick fix location at the end of the Service Island areas in Bus Storage, the more problematic this becomes from an operations standpoint. Concern for the inefficiencies of mechanics retrieving buses from separate buildings was apparent. The lack of proximity to core support areas can possibly have an adverse affect on Maintenance operations. Maintenance queue aisles must also be considered to create the proper site circulation and not impact the flow of incoming buses going to Bus Storage. Through discussion, the idea of having a completely new facility versus a retrofit to the existing maintenance area was the favored concept and was to be further developed.

Other general concerns about the presented concepts were:

- The elimination of strategic structural columns in bus parking to ease certain turning constraints.
- Possibility of adding storage spaces and other space for shops and maintenance areas.

The recurring topic of how the public interacts with the facility was also a major concern. The facility needs to be designed to enhance the proximity of visitor parking and how it relates to the main entry to the new facility. The last major concern was

that the Study Team create a concept that does not rely on utilizing the Mullen's Property as a long term solution, only as an option for the phasing of Metro's current property.

With the information gathered from the review meeting of Day Two, the Study Team proceeded to refine the concepts presented and worked on providing additional concepts for review on Day Three. The team focused upon expanding the facilities into the existing employee parking area to create a new maintenance building with a parking structure above. This allows for further renovation of the current facility to accommodate Administration, Operations and Building and Grounds Maintenance to be redeveloped in the areas formally occupied by maintenance functions. A reorganization of the Bus Storage area and new Service Island can be accomplished without acquiring any property from the Mullen family.

Wednesday May 11, 2005
Day Three

Overview

During Day Two's meeting, several points were revealed that had a large impact on the concepts for Day Three, a finalized design concept was established, expansion on Concepts B and C without the use of the Mullen's Property on a long term basis usage. Tuesday's discussions with maintenance supervisors lead into design considerations for Service Island and drivers being able to go to vehicle wash before servicing or parking. Relocation of Service Island to the north side of bus storage was considered but decided against after discussions because it adds a second loop to the service cycle and adds piping material to Service. The Maintenance Building should be designed with new capabilities, but should include the various program changes. The facility should also retain internal bus circulation and include all necessary shops and support areas.

Concept B1

Concept B1 is similar to Concept B. One approach is to utilize more of a mezzanine in the existing facility footprint where Maintenance currently is for extra storage space for Building and Grounds Maintenance. Administration and Operations are relocated to a new wing constructed at the west side of the existing facility leaving only Maintenance and the parking structure to be constructed on the existing parking lot to the southwest, both connected by a bridge walkway. Reception location becomes an issue with Administration and Operations elevated to non-ground floors and will need to be designed for

with a security and Management/Operational level in mind. This concept uses Railroad Street as an access drive to the parking ramp to access the Parking Structure and to access the Shipping and Receiving dock area located towards the rear of the new maintenance building.

Concept C

Refinements were made to Concept C for further discussion with Metro Staff but it was decided that Concept C was not the desired concept plan to pursue. The following are a few of the major concerns of the Metro Staff and the Study Team:

- Difficult access from Ingersoll from the South - Northbound travel
- Offices located near railroad tracks will get some noise and vibration
- Security becomes more of an issue with proximity cards at more access points and more video surveillance
- Operations becomes too separated from where buses are stored which hinders the efficiency of Metro Transit Operations

Throughout the review meeting more general discussions about overall site and facility efficiencies were had. These discussions led to more questions and concerns. The following questions and concerns lead to changes that were to be made for the following day:

- Are there efficiencies in parking and allowing row assignments based on route needs in Bus Storage?
- Concern over a touchless wash system not being able to completely wash/clean ice, slush and road grime off the buses during the winter months, a hybrid system is the compromise.
- Servicing was located in the Bus Storage facility on the south wall of the building. The question arose on how does the Service Area get laid out? Does either configuration determine wash, vacuum or fueling equipment?
- The exterior image and aesthetics of the building are a concern to Metro Staff knowing that these will be major areas of concern to the City Planning Commission. The buildings exterior facades must have a relation to 19th century architecture with a reflection of 20th century materials and technology.
- Overall site security has been an issue in the past and must be corrected in the Concept Plan design. The

planned upgrade is to have security gates and a security guard post at the entrance to the facility.
- Sensitive design approach must be given to the East Washington Avenue facade as major architecture
- Continuous building facade design must be maintained to eliminate poor element connectivity; a continuous facade and landscaping to be determined.
- Windows on East Washington Avenue need to be glazed, translucent or vertical blind effect especially if warehousing and shops are to be shifted within the building to the East Washington Avenue side, which might be a hard sell to the City Planning Commission.

With all concepts explored there were drawbacks and trade offs that had to be considered and dealt with including:

- Air quality conditions needed to be resolved and with the construction of new facilities this task is made easier.
- Without trying to adjoin the new Administration/Operations building with the existing bus storage garage the mixing of different air qualities will also be avoided.
- The convenience of Operations being next to Bus Storage on the ground floor is now a huge advantage of efficiency over other various locations that had been considered.
- A side main entrance to the facility on Ingersoll Street as opposed to a more desirable corner entrance on East Washington Avenue; however a compromise had to be made to reduce the separation of visitor parking and the main facility entrance.
- An Emergency Exit was to be added to the east end of the building for Bus Storage. (At this time it is still undetermined as to which side, north or south that this exit will occur because of facade and rear property space design complications.)

Concept B1 & C: Synopsis

Upon examination of each of the concepts (see Appendix E), the primary difference between each is the location of the Administration and Operations divisions located in the new maintenance building in Concept C as opposed to in concept B1 space is utilized on the west edge of the property on Ingersoll Street in a newly constructed three story building adjacent to the Bus Storage. Both concepts do however

utilize the Mullen's Property for short term leases during phased development.

Regardless of the details for the rest of the design concept for the new Maintenance Facility/Parking Structure on the existing employee parking lot site, utilities and legal property modifications will be necessary to construct the full concept. Currently, there are underground natural gas lines and overhead electrical lines running down the alley in line with Main Street (Reference - Appendix G and H). These will need to be rerouted in order to construct the new maintenance/parking structure and sky bridge. The electrical lines will need to be buried, which will require that they transition underground outside of the site. Gas lines will need to be rerouted underground further north, towards East Washington Avenue to avoid the footprint of the Maintenance Building/Parking Structure. Both of these utilities have current easements through the site that will need to be replatted to allow for the new construction to take place.

Thursday May 12, 2005
Day Four

Overview

After three days of intense design, consideration, planning and review with Metro Staff it was time to work out the details of the chosen concept design. Day four was spent bumping up the working drawings in scale so that the details of each area of the facility could be drawn out and assessed from a design and function standpoint and could be presented to Metro Staff. Once the details started coming through with the larger scale there were programmatic details that needed to be worked out and new comments from Metro Staff that needed to be addressed. Such comments and concerns were as follows:

- There is concern on how the paint booth is going to be ventilated to the outside if given an internal location. *The paint booth was relocated to an exterior wall.*
- The battery room needs relocating to a space where it has exterior wall exposure. *The battery room was relocated.*
- Common work areas are needed throughout the new Maintenance facility. *More space was provided in the program and in the floor plan.*
- There was concern that there is not enough areas provided for toolbox storage. *More space was allocated in the plan.*
- Concerns of not enough storage space was remedied by explanation that there is going to be plenty of square feet

of mezzanine space available in both the new Maintenance Facility and the Bus Storage building

- There is a need for a larger Building and Grounds Warehouse which will also help to serve the storage needs of other Metro Transit functions. *More space was allocated adjacent to Operations.*
- There is an issue of where new fueling tanks will go to replace the existing in ground tanks to supply the new Service Islands. *To be determined.*
- After adding bus turning radii templates it was apparent that four rows of buses parked in the storage facility need to be parked facing East, making a trip to the West end of the garage for the maneuver.
- A small office is needed within the Bus Storage Area for the garage dispatcher. *This office will be located at Servicing or at the Site Entry Portal.*
- How visitation can be controlled on each floor without adding a staff position for reception? *Security doors with key card access shall provide the needed security throughout the facilities.*
- Staff patio spaces were not to be located on street level, however the roof side patio was taking up valuable space on the Administration level and should be located to the roof of Bus Storage.

Confirmation of Metro Transit planning standards during the charrette ensures that Metro Transit will ultimately construct facilities that are consistent with Metro Transit's current and future needs and the Industry's most recent standards

- Operations does not need to be so spread out on the first floor and separate workstations may be combined into grouped workstations for operations supervisors. *Space was allocated to Building and Grounds Warehouse.*
- More office space with window front is desired along Ingersoll Street. *Offices were re-arranged accordingly.*
- Building and Grounds Maintenance needs enclosed storage for gas powered equipment. *Enclosed storage space is provided on the North side of the warehouse.*

- Try to design with a group cluster format in mind to keep related Administrative units together.

Close study of each concept by Metro Staff helps them provide the Study Team with valuable feedback

Detailed explanation of concept function enhances the understanding of Metro Staff Members

Day Four concluded with the general discussions to further develop Concept B1 based on the input from the participants of the morning's review meeting. All questions and concerns that Metro Staff had were noted and addressed with further iterations of the floor plans. The afternoon of Day Five an open house was held to give all of Metro Staff the opportunity to review and comment on the concepts, program and initial modeling of the new site and facilities. The minor tweaks and adjustments were made for Day Five's morning's wrap-up meeting.

Friday May 13, 2005
Day Five

Overview

Throughout the week discussions at length were held on how Metro Transit and the Study Team were going to get the program onto the existing property. Even though a split program was proposed to relocate some if not all of Metro's Operations the full projected program to remain on the existing site was selected. To achieve the complete utilization and redevelopment of the current Metro Transit property phasing will have to take place, which has been proposed to happen in three parts.

Phasing

The following was compiled by the Study Team in order to demonstrate to Metro Staff the phasing plan needed in order to start construction of new facilities on the existing site. The proposed steps in phase one is as follows:

Phase 1

- Relocate storage spaces, money room, some bus storage and A/C Shop
- Relocate employee parking, possible short term lease on Mullen's Property
- Reconfigure employee parking lot for temporary storage of buses for construction of new Service Lanes
- Construct any necessary areas in relation to new Service Lanes
- Upgrade mechanical, electrical, plumbing and structural systems as required in Bus Storage
- Construct utilities infrastructure where needed
- Demo existing service lanes

Phase 2

- Relocate bus storage back into original garage and implement left hand turn circulation pattern
- Construct new Bus Maintenance Facility with Parking Structure
- Relocate Bus Maintenance to new facility upon completion
- Demo Maintenance B

Phase 3

- Relocate Administration and Operations to a short term leased property such as the Mullen's Property, continued utilization of the Johnson Building as well as the possible use of portable trailers on site

- Demo Existing Administration and Operations section of facility
- Continue to upgrade existing MEP systems in existing areas.
- Finish construction of remaining Bust Storage and circulation area
- Construct new Administration and Operations wing
- Construct new entry portal and sky bridge

Design Narrative Summary

Throughout the many discussions at review meetings each day of the on-site a clear direction of design had been chosen. Many of the details and program concerns had been worked through and larger issues and concerns for the whole project were ironed out. This design narrative reads an inclusive summary of the decisions and design efforts made during the week.

Site

Concept Plan improvements to Metro's property accomplish the goals of the program by addressing fundamental ways that buses, automobiles and people interact with the site and the built space. First, the bus entrance will be left in its current location with the sky bridge creating an entry portal into the site, prominently marking the bus entrance. Buses will enter the site in line with Main Street, providing enough space for several of them to stack as they cross Ingersoll Street to enter. This avoids any bottlenecking or unnecessary congestion in and around the site. Exiting the site, buses will depart from the same portal and can turn either direction on Ingersoll Street or go straight out onto Main Street to their routes.

Along the Ingersoll frontage the footprint of the building will step back from the street, creating a wide landscape buffer to the street and making a connection to the future park across Railroad Street. Landscape plantings will be added and visitor parking allocated in front of the public entrance to the building, thereby removing pedestrian traffic from the main bus circulation point of the site.

The East Washington Avenue facade will be renovated as well in keeping with the East Washington Avenue Corridor Improvement project that the City of Madison is implementing. Metro's facilities will be modified to be more pedestrian friendly and contribute to the aesthetic improvements along this major traffic artery. Additional trees and planting beds will be added

along the sidewalk to buffer between the building and the street.

On the second floor level above the bus storage a rooftop patio will be constructed that is accessed directly from the administration and training areas. It will provide outdoor space that is separated from public space and is easy to access. The roof will be constructed with a system known as a "green roof" to sustain low maintenance plantings in a shallow soil composition. This will reduce the radiated heat generated on the roof in summer and help to insulate the roof in all seasons. It will also buffer the volume of water runoff on the roof, storing it in the soil and either absorbing it into the plants or seeping out of the soil composition.

Along the south side of the property, Railroad Street will be utilized for access to employee parking and loading dock functions of vehicle maintenance. It is currently not being used as a public street, however its right-of-way will be maintained to give Metro and adjoining properties access. This entrance will be improved to accommodate the high traffic loads it will see for daily employee parking and loading dock use.

Traffic

Buses are the primary purpose of the facility and their efficient circulation is imperative to a successful Concept Plan. Once inside the site, buses will enter the main building and circulate in a counter-clockwise fashion, opposite from the existing flow. The service lanes will be aligned with the entrance along the south wall, while a by-pass lane for heavy traffic periods will alleviate bottlenecking. Exiting the building, buses will pass between the parking spaces and the administration/operations building addition, at the same place they entered. Emergency bus exiting from the storage space will be provided on the north end of the site, likely through the East Washington Avenue building façade.

Visitor parking spaces will be provided along Ingersoll Street with meters to regulate short term parking on the site. These spaces will allow public access to the site that is easily located and avoids bus traffic, thus improving safety on the site. For this same reason, employee parking will be located on two upper levels above the maintenance facility and connected to the administration/operations building with a sky bridge.

Along with the employee parking entrance, loading dock functions will be located along Railroad Street, improving the

site efficiency and safety by separating vehicle traffic from bus traffic. The dock will primarily serve the vehicle maintenance functions for parts and supplies but will also accommodate the major shipping and receiving needs for the whole facility.

Functional Adjacencies

Day three and four of the On-site Design Charette were spent on the actual details of the new facility design. It was imperative that many concepts and options in floor plans were explored as to design for the most efficiently functional spaces possible for the new Metro Facilities.

Vehicle Maintenance

Maintenance spaces will be located in a new facility that will be constructed separate from the main building. This will eliminate problems with the current exposure to the service lanes, bus storage, and administration. This separation will improve the environmental conditions of these spaces by allowing each building's system to meet the specific needs of each use. By relocating the maintenance spaces it will also allow easier bus circulation through maintenance and use existing bus storage space more efficiently.

In this new facility, maintenance offices will be located near the entrance into the maintenance area while still maintaining some level of separation. The running repair and PM/inspection bays will be efficient drive-through bays located on the north side of a central drive aisle. Major rebuild, chassis wash, AC bay and paint/body repair bays will located on the other side of the drive aisle. Support spaces for these bays, such as component rebuild, brake shop, tire shop, and weld shop are located on the south side of the building, adjacent to the bays they serve. Parts issue will be located approximately in the center of the building, providing easy access to all areas of maintenance. This facility will also provide improved locker rooms and maintenance staff spaces in the new building.

Operations

Operations will be reconstructed on the current footprint it occupies today. It will exist on the first floor with direct connection to the bus storage area. The new construction will also greatly improve the connection between dispatch and the operator's room. It will also provide open, flexible office space for dispatch offices and operations supervisors. This group will be more centralized and efficient as a result of the new construction.

The operator's room will be located along the demising wall between operations and the bus storage space for quick access to buses. It is centrally located to the rest of the operations space and has direct adjacency to supervisors, dispatch and locker room facilities. Quiet room, kitchen and television rooms for operator use are all provided next to this space as well. Lockers will be in a shared space with separate toilet/shower facilities and unisex toilet room. A wellness room will also be provided between the toilet/shower rooms for the entire staff to use.

Dispatch will be in a large open space with ample circulation around its perimeter to allow operators to access and cycle through to their assignments. It will be situated close to the bus entrance into the building, centered on the end of the bus parking lanes. Visual connection to the buses will be provided from this space and out onto the drive lanes in order to monitor bus traffic.

Operations supervisor offices are located across the main corridor of the operations building. These offices front on Ingersoll and will have ample glazing, making a visual connection to the outside and allowing daylight into the space. They will provide some separation from operators and dispatch, controlling access to supervisory staff.

Administration

Administration space will be built on the second floor giving adequate separation from other functions of the facility and controlling public access. A reception lobby that connects the first and second floor will act as a checkpoint to these spaces. Different departments will be clustered together, making the spaces more cohesive and consolidated. Finance, Planning, Marketing, and Management suites are organized with perimeter offices, an internal office core and a corridor loop that connects them all. This second level will be situated above the roof of the bus storage building, allowing openings on all sides. Views and day lighting will be maximized with ample glazing integrated in the new facades. A rooftop patio will be located above the bus storage and accessed from the second floor of this new construction creating outdoor space for staff that is also private and has controlled access.

Directly above the dispatch office space are training spaces that will be used by the entire staff. These also have Ingersoll frontage and will be bright spacious classroom areas that can be divided into smaller rooms with operable partitions.

Adjacent chair and table storage are large enough to store items for utilizing this space for banquet functions as well.

Building and Grounds

The remaining footprint of the first floor being shared with operations is the building and grounds space. Materials storage makes up the majority of the area that is dedicated to this use. This will be open warehouse space with storage racks and an adjacency to the building and grounds shop. The shop space will be equipped with an overhead door providing direct connection to the bus parking.

Portable equipment storage will be associated with this area as well, with a similar overhead door connection to bus parking. Office space for this group will be located along Ingersoll, providing the day lighting similar to administration and operations offices. It will consist of offices for supervisors, copy room, crew room, and individual toilet facilities.

Service

One concept being considered with the relocation of the Service Facilities is to have the bus wash be the first part of the cycle that the buses pass through. This allows the buses to be cleaned of snow, ice and dirt that may accumulate on the buses and regulates the temperature of the vehicles before they are serviced. It will cool the outside of the vehicle on hot summer days and act to defrost the buses in the winter. This will also keep outdoor pollution on the buses from migrating into the building.

Fueling will follow bus wash in the service cycle. The location of the fuel tanks currently will lend well to this plan. Minimal piping and slab excavation will be needed and ultimately this will provide a safer and more reliable fueling system. Equipment space to support the fueling and wash, such as vacuum, lube, and fueling equipment rooms are aligned on the south wall. These spaces will have overhead door access to the exterior through the south wall.

Fares will be the last stage of the service cycle and will be collected and counted at the point where the Gisholt Building was added on to. There is a step in the building along the south wall that provides an opportunity for another entrance. This will be constructed into a sally port to allow armored cars to enter and pick up fares in a secure controlled room.

Bus Storage

Metro's current facilities are large enough to hold the number of buses projected for the growth of their fleet. By removing interior spaces and functions that interrupt the open structural grid of the bus storage, fleet parking capacity increases significantly. Buses will be stacked sixteen deep at full parking capacity. This improves the ratio of circulation space versus useable parking space and uses what limited square footage available for parking as many buses as possible.

Employee Parking

Over the maintenance building, two levels of employee parking will be provided. These will be flat plates with speed ramps located on the east side of the building. Additional parking decks could be added, however, the current intent is to keep the access to this parking limited to employees only. Two stair towers at opposite ends of the building will connect these levels of parking. Employees can access the sky bridge from the tower at the bus entrance connecting the lower level of parking to the administration/operations building safely.

Aesthetic Impact

The main purposes of this Concept Plan are to improve the safety, performance and efficiency of the facility for future growth, in addition to improving the appearance of the building/site. East Washington Avenue is undergoing a major corridor improvement project and that façade of the building is in dire need of some improvements. The existing corrugated metal siding and door vestibules will be demolished and new façade treatments with punched openings will be added. This, along with additional landscape plantings will greatly improve the scale of the building and relate better to pedestrian and vehicle traffic.

The corner of Metro's site at the intersection of East Washington Avenue and Ingersoll Street currently lacks a strong architectural presence. The concept plan build out will place a prominent building form on this prominent corner in order to anchor the building massing on Metro's site. The main pedestrian public entry will be in the middle of the administration/operations building along Ingersoll and will also use the same architectural character to establish its presence to the public. It will be located directly adjacent to the visitor's short term parking.

The Bus entry along Ingersoll Street will be marked by the connecting sky bridge between the maintenance/parking structure and main building. This will create a portal into the site that defines the entry, making it a focal point of the facade. The span of the sky bridge connects two vertical circulation cores that will anchor the ends of the portal, creating a formal and symmetrical entrance.

The architecture of the maintenance/parking structure will be complimentary to that of the administration/operations addition, creating a consistent image along Ingersoll Street. The spaces in the building along Ingersoll Street and Railroad Street are office/shop related and will be able to have some glazing in them. This will also relate aesthetically to the office space of the administration/operations building on the other end of the property. Where parking levels on the second floor will not be enclosed space, glazing will be left out of the wall system for durability and cost savings. The aesthetics of this building will be commercial in character with rhythmic massing and materials that relate to human scale. The maintenance bays that have overhead doors are along the north side of the building, somewhat screened from view by the bus entrance and stair towers.

Building Systems Upgrades

The existing building has serious deficiencies in its electrical and mechanical systems. Electrical costs to light a space as large as this facility can be offset by letting in as much daylight as possible. Also the level of diesel exhaust at peak times can be overwhelming and Metro has had to allow some operators with medical problems retrieve their buses outside, greatly reducing efficiency due to poor air quality.

The Gisholt Building was constructed with a saw tooth roof that can be easily retrofitted with translucent glazing panels to allow diffused light to brighten the space. The exterior walls of this and the remaining bus storage area will also have windows added along the East Washington Avenue frontage to allow more light into the space at the perimeter of the building along the drive aisles. Supplemental electrical lighting will be high efficiency fixtures placed strategically to provide optimal light levels where needed.

The saw tooth forms in the Gisholt Building may also provide opportunities to ventilate the space more effectively. The entire bus storage area will be equipped with upgraded ventilation equipment as well to address this issue. Another upgrade to the building will be to replace the existing asphalt

interior paving in the bus parking with a concrete slab-on-grade floor. This will have greater longevity than asphalt can endure the sustained heavy bus traffic.

As a plan was discussed as to what was going to happen in the future for this project the question is what happens next? For Metro the answer is to continue to review design concept, program and the Space Needs Study. The Study Team must now refine concept ideas, Develop conceptual cost estimates, complete draft of final Space Needs Study report and prepare for the schematic design phase. Further discussions brought forth future time frames of this project to include a two and a half to three year time frame from construction to implementation.

Metro Transit Site Design:

Post Charrette

For a complete set of concepts leading up to the Metro Transit Site Design, included at the end of this Report, please see *Appendix E - Charette Concepts*.

Final Concepts

The final concepts for Metro Transit Maintenance and Operations Facility can be found on the following pages:

- **Exhibit 6.A:** Selected Site Concept Plan (general site layout only, does not include refined floor plans)
- **Exhibit 6.B:** Selected Administrative Floor Plan
- **Exhibit 6.C:** Selected Operations/Building and Grounds/Service Area Floor Plan
- **Exhibit 6.D:** Selected Bus Storage/Service Area Floor Plan
- **Exhibit 6.E:** Selected Maintenance Facility Floor Plan
- **Exhibit 6.F:** Selected Parking Structure Floor Plans
- **Exhibit 6.G:** Selected East Washington Avenue/Ingersoll Street Site Plan

Exhibit 6.A
Selected Site Concept Plan

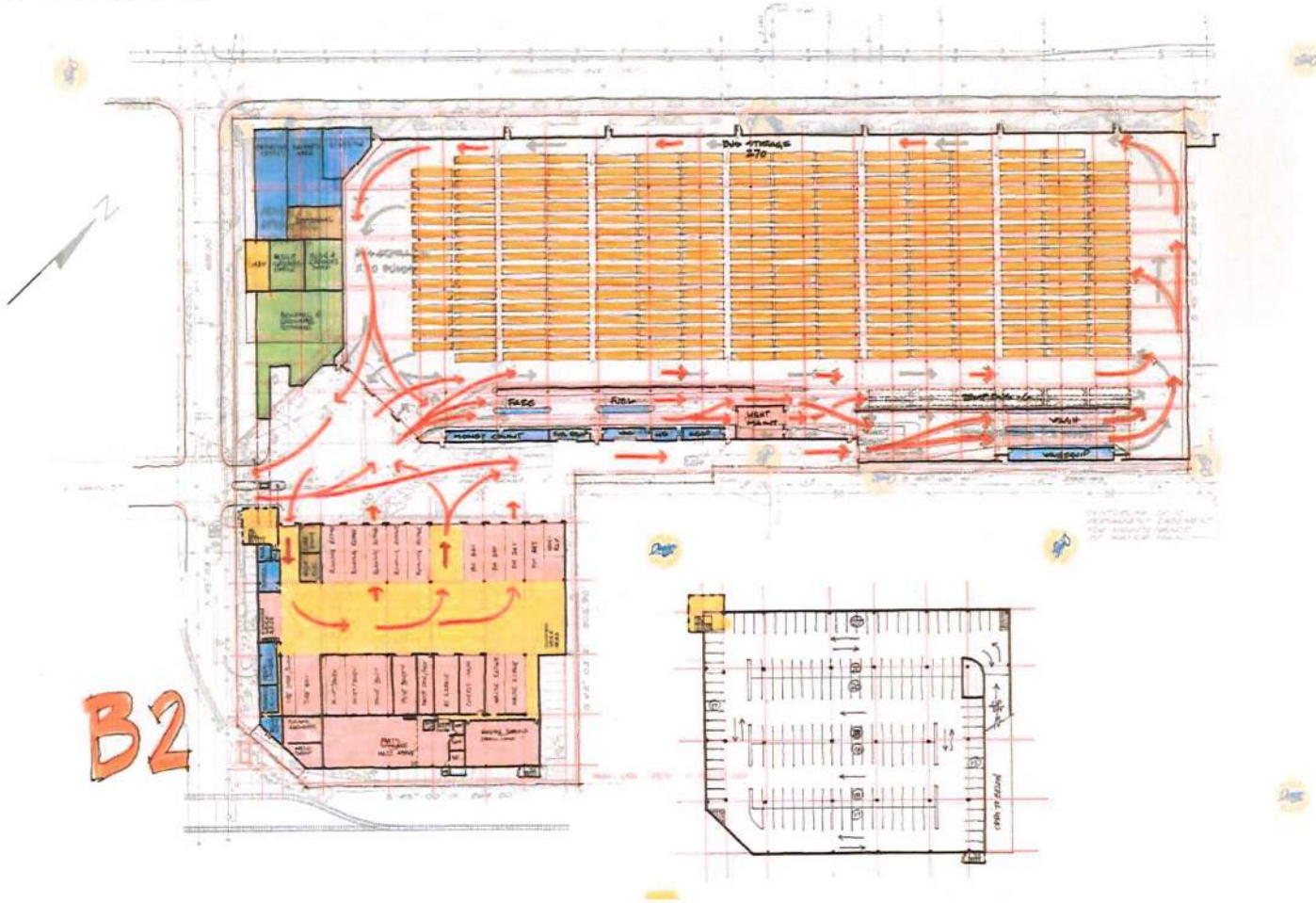


Exhibit 6.B
Selected Administrative Floor Plan

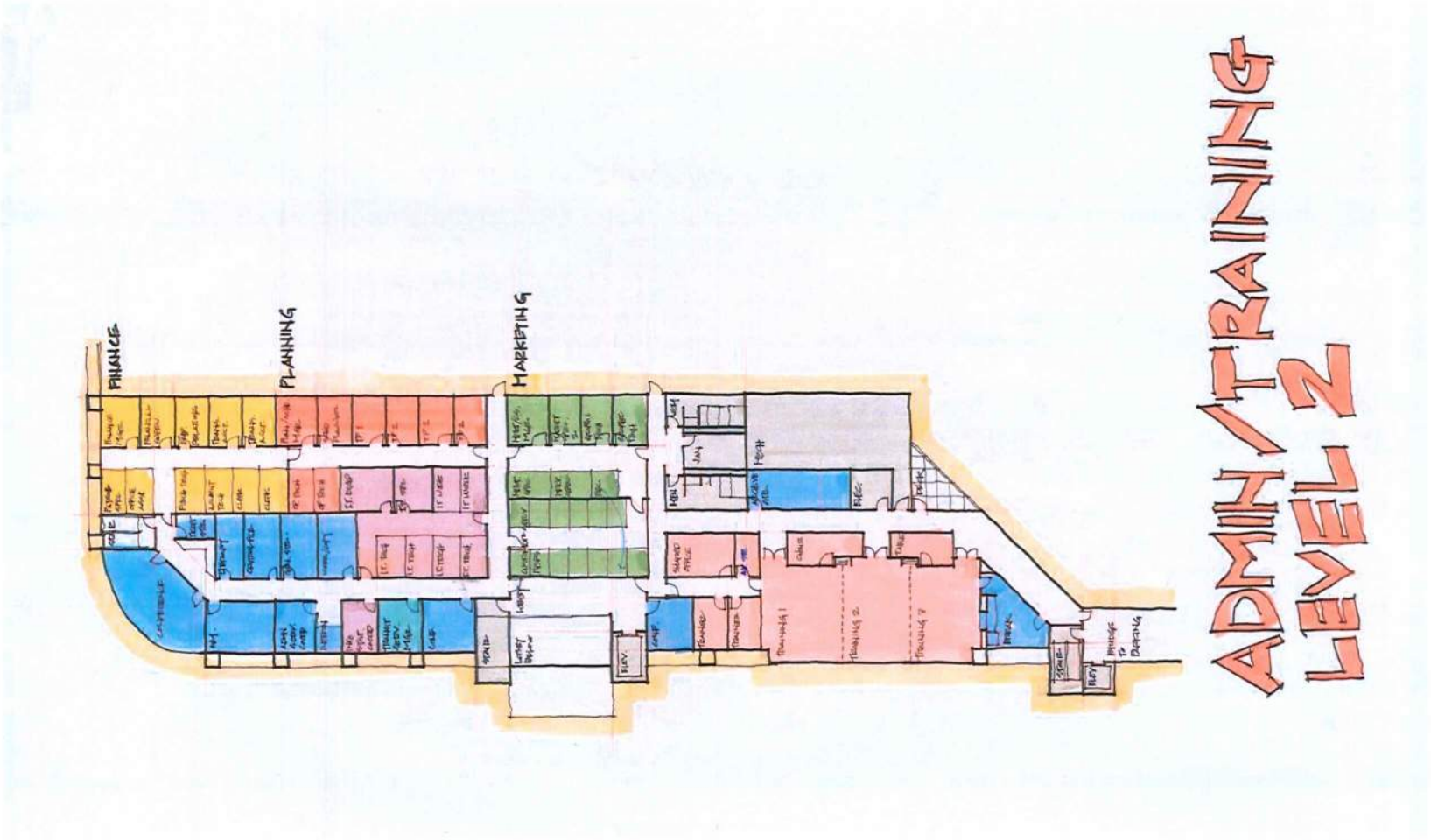


Exhibit 6.C
Selected Operations/Building and Grounds/Service Area Floor Plan

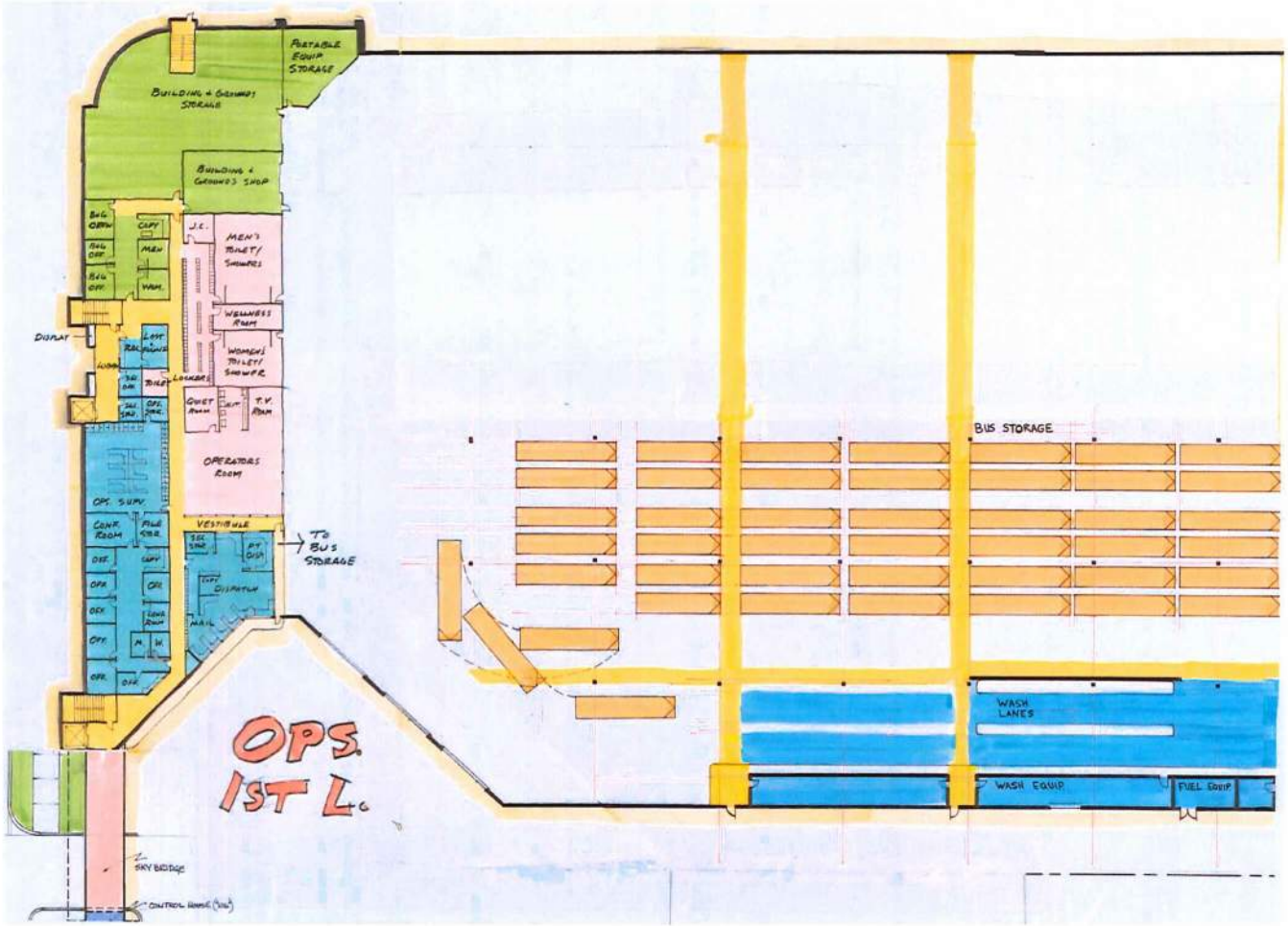


Exhibit 6.D
Selected Bus Storage/Service Area Floor Plan

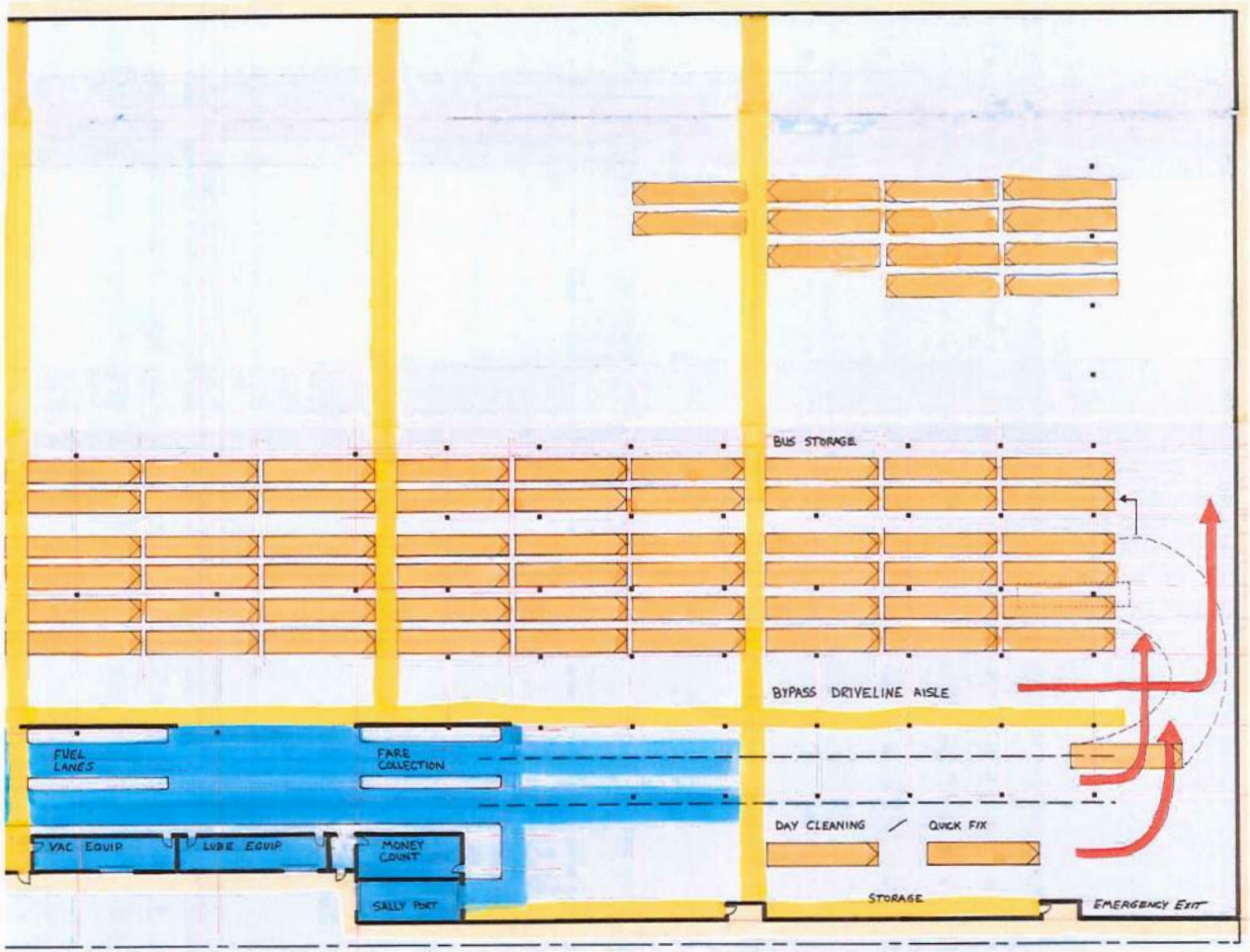


Exhibit 6.E
Selected Maintenance Facility Floor Plan

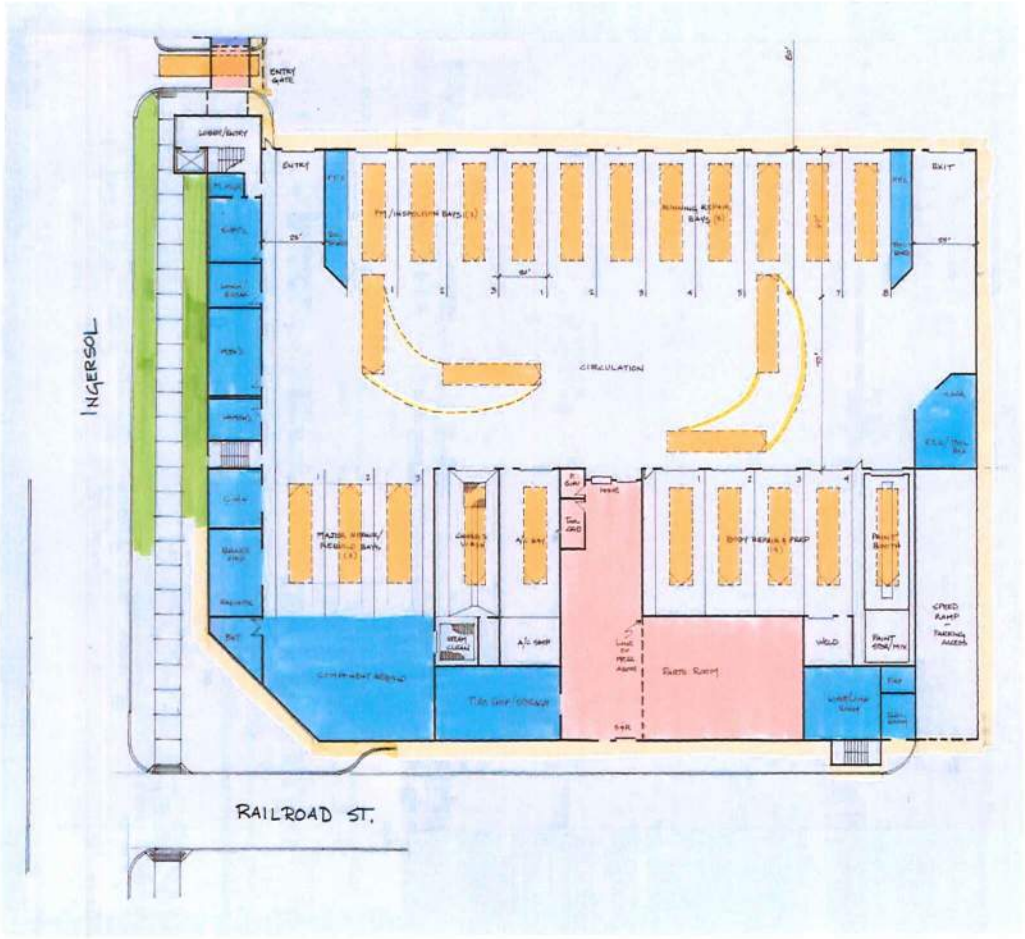
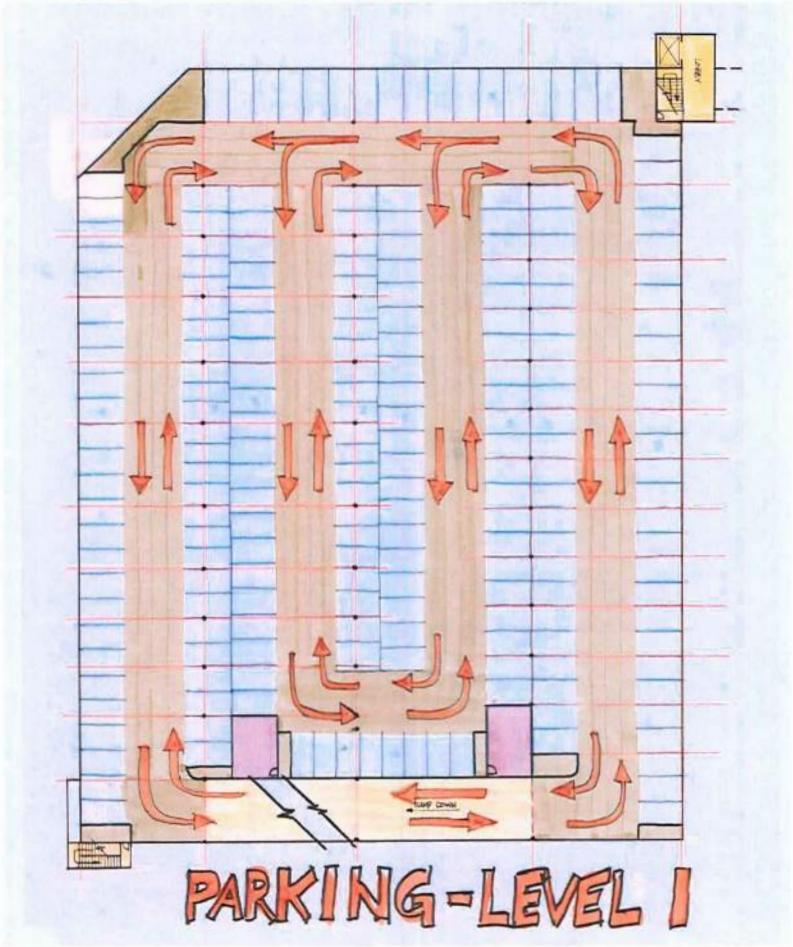


Exhibit 6.F
Selected Parking Structure Floor Plans



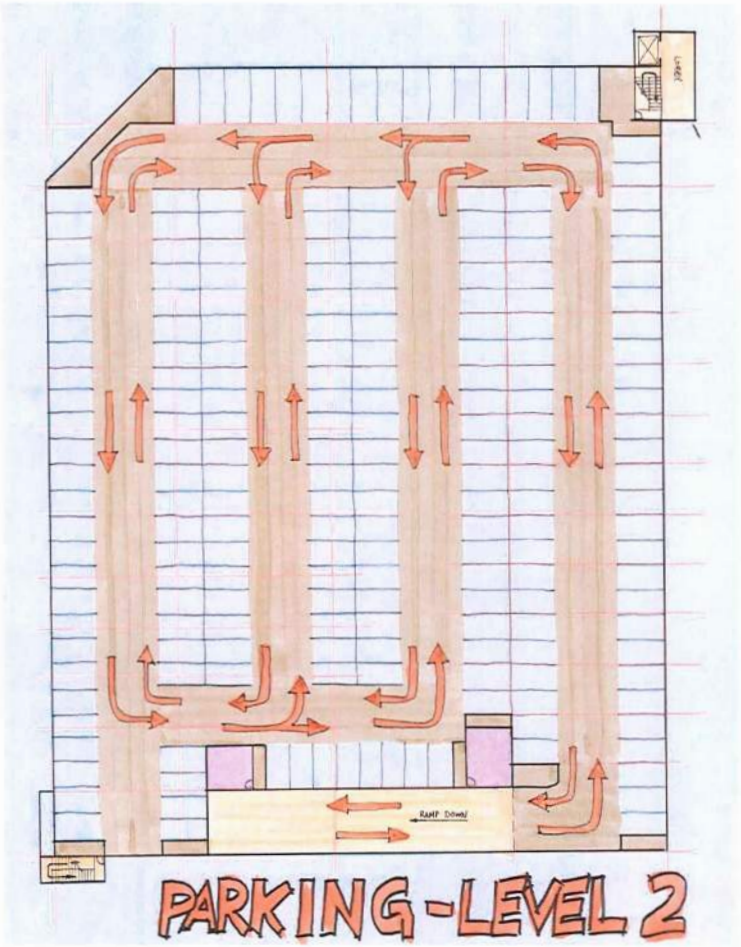
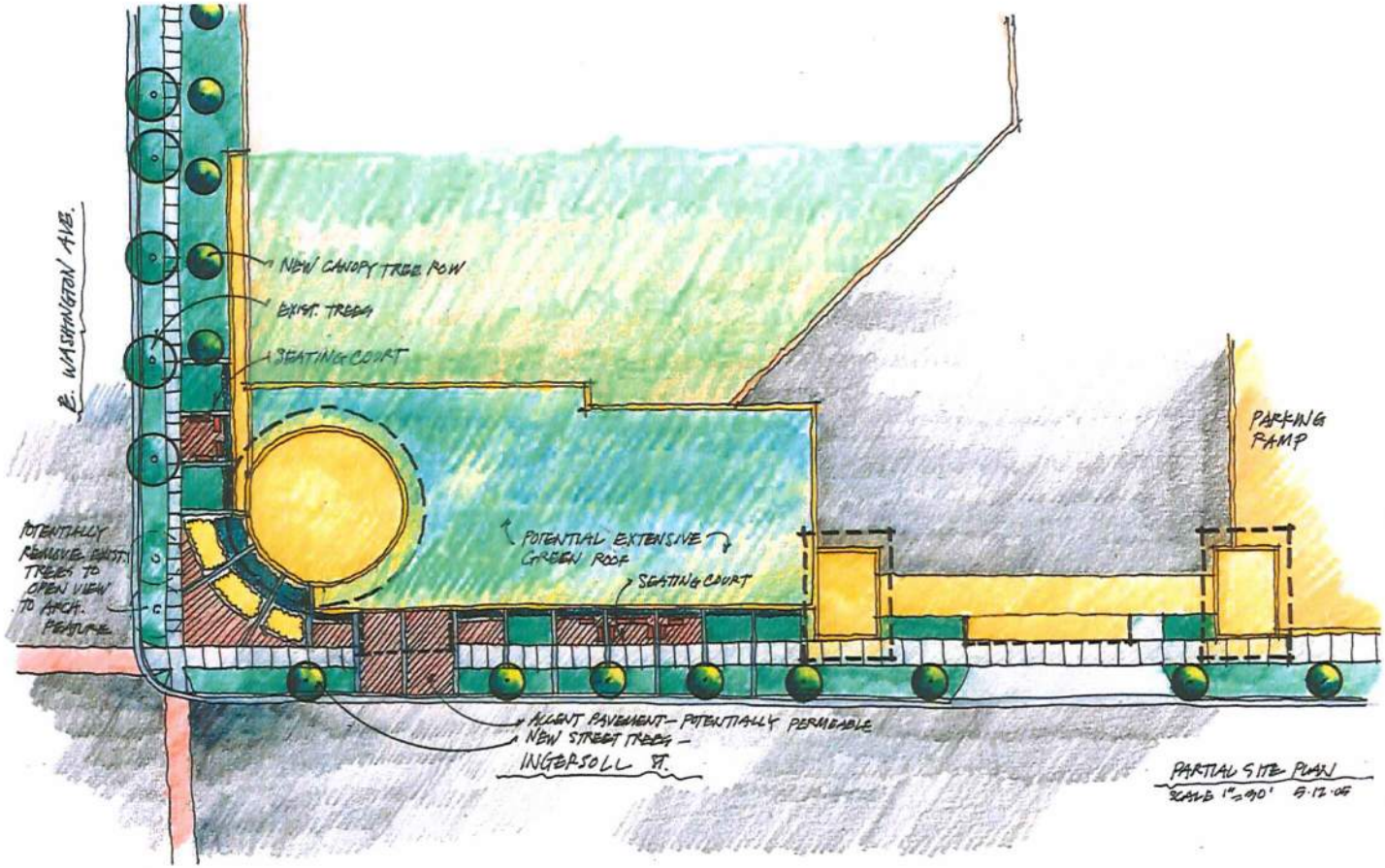


Exhibit 6.G
Selected East Washington Avenue/Ingersoll Street Site Plan



Section Seven
Opinion of Probable Cost

Section Seven
Opinion of Probable Cost

Introduction

The following is a good faith estimate of the probable cost to complete the concept plan for redeveloping Metro Transit's facilities as determined by RNL and MDG during the conceptual design phase. The estimate presented in **Appendix F** was prepared by **M. Lee Corporation, Construction Cost Consultants.** The values are derived from information in the program document, onsite drawings, and supplemental information given to a cost-estimating consultant of the design team. An architectural narrative of the project is included in section six and has been the basis for the estimate.

Budgetary Assessment

Project Budget

The Project Budget for the new Metro Transit Facility includes two elements: hard costs, soft costs.

- Hard costs are those related to construction.
- Soft costs are administrative costs supporting the design and management of the project.

Hard Cost

An appropriate amount of contingency has been built into the estimate to cover issues that have not been addressed in the design process yet. The contingency will diminish as the design documents become more refined and decisions are made about specific issues that affect cost, allowing the actual price for construction to be more accurately assessed.

Methods and values used in determining the construction cost of the facility were based on historical data. Information regarding projects that have been recently constructed in the surrounding region that are similar in scope and construction methods as assumed in the conceptual design were analyzed in this process. Cost per square foot values as well as lump sum unit costs, both based on current available data were applied to the rough square foot areas of the conceptual plans. These values include the cost for everything affecting the project including, but not limited to, site work, selective building demolition, materials and labor for new construction, furniture, finishes, and equipment.

For detailed data of the costs estimate, please refer to **Appendix F** Opinion of Probable Cost Detail. It should be

noted that the cost information has been based on the following assumptions.

- The project will be constructed utilizing prevailing wage rates.
- An Escalation Factor has been included assuming a mid-point of construction of July 2007.
- A Design Contingency of 15% has been included due to the conceptual nature of the documentation.

Not included in the hard construction cost estimates are:

- Costs associated with removal and disposal of any hazardous materials from the existing site.

As with any estimate, the possibility exists that market conditions will change. In recent years the cost of construction has increased significantly. Accordingly, the escalation projected for the duration of this project is based on schedule estimates. If the project moves forward the design process and bidding will be completed approximately by spring of 2006. A thirty-month construction schedule has been assumed for the scope of work. The escalation factor has been taken to the mid-point of construction reflecting average increase for material and labor during the course of the project. Scopes of work that are performed early in the construction process will see little or no cost increase due to escalation, whereas the trades and materials involved at the end of construction will recognize the full effect of increasing economic conditions in the building industry.

Soft Cost

Soft costs listed in the estimate will cover the funds that will be needed for permitting, insurance, materials testing, hazardous material abatement, project construction management, design services, surveying, and other items identified in the estimate preamble under section *2.1 Assumptions and qualifications.* These soft costs are figured as a percentage of the total construction cost and have likewise been based on historical data from other projects of similar characteristics.

Table 7.A is a summary of the construction costs presented in **Appendix F** Opinion of Probable Cost Detail derived from the Selected Concept Plan. The estimate for the Selected Concept Plan is based on the concept plan and conceptual building floor plans developed during the charrette. The figures in the summary table have been rounded to the nearest thousand.

Table 7.A - Summary of Costs (Construction Costs)

Cost Item	Selected Concept Plan
Site Work	$1,268,000
Maintenance and Parking Structure	$14,280,000
Administration and Ops Building	$7,653,000
Bus Storage	$9,587,000
Special Equipment (per MDG)	$4,449,000
Hard Cost Fees	$0
Soft Costs	$16,682,000
Cost Escalation 12%	$4,468,000
Hard Cost Total	**$58,387,000**

Costs include prorated portions of escalation figures calculated in addition to Total Costs.

These represent the primary costs in the selected concept plan and are a result of a refined cost estimating method and an actual site concept plan and building conceptual floor plans. Specific issues that impacted the costs are presented below.

- **Site work:** The preferred site on East Washington Avenue is approximately 10.5 acres and is land locked and roughly 70% utilized therefore reducing the ability to build new facilities without major demolition and phasing relocation.
- **Building Areas:** During the charrette, the Study Team maximized the build able site area which increased the square footage of Building Areas designed. A large amount of square footage was added to the building programs including Bus Maintenance, Servicing Areas, Building and Grounds, as well as the addition of a Parking Structure on the site above Bus Maintenance.
- **Maintenance Equipment:** The cost for special equipment was based on information provided by Maintenance Design Group.
- **Hard Cost Fees:** Any necessary Bonding and contractor fees were not included in the estimate.

Summary

The total combined estimated cost for Hard and Soft Costs for the Selected Concept Plan in the Study Report was **$58,387,000**. This preliminary look at the budget for this project will allow the design team and owner's representatives to determine the appropriate scope of the project to solve the design challenge of this project. It is by no means a final cost and is intended to be a flexible document that will represent

changing information to the team based on owner and design team decisions through the process. It will allow tracking of the accuracy of the design documentation to the final budget for the project.

Schematic Design Report

Metro Transit
Madison, Wisconsin

November 2005

Submitted by

RNL

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Section Eight
Schematic Design Narrative

Section Eight
Schematic Design Narrative

Introduction

In a multi-day design session, RNL Design and Maintenance Design Group (MDG) developed conceptual plans, sections, elevations and site plan to improve the safety, appearance, performance and efficiency of Metro Transit's existing facilities all while planning for future growth. These were refined to one solution through owner feedback and gradually adding more detail through the design session. The following is a summary of the resulting schematic design solution.

General Scope

The existing building will be utilized as much as possible to efficiently meet Metro Transit's functional needs. This approach allows Meter Transit to realize a benefit from the value of the existing facilities. Interior partitions or other interruptions in the existing bus garage will be removed to maximize the amount of bus parking spaces. This will meet additional bus storage needs on the site and minimize the amount of building area dedicated to circulation. This selective demolition, combined with relocating the service cycle lanes to the south exterior wall, reversing the circulation of bus traffic to a counter-clockwise flow, and relocating vehicle maintenance spaces to a separate building will accomplish Metro transit's functional needs.

Vehicle maintenance will be relocated to a new facility constructed on the current parking lot. This new building will have all bus maintenance related spaces on the ground floor and two levels of employee parking above it in a structured parking facility. The entrance and exit to the parking levels, and the loading dock will be located along the Railroad Street frontage of this building. Parking levels will be connected to the main building by a second level "Sky bridge" providing pedestrian access separate from bus traffic.

The Administration and Operations groups to be relocated during the construction phases and eventually will occupy new facilities built where the present bus maintenance, dispatch and administration spaces exist sharing space with Building and Grounds Maintenance. These functions and Building and Grounds This will be a new two-story building that occupies the corner of East Washington Avenue and Ingersoll Street, providing a prominent, open and inviting public entrance for the facility.

Site Entries

The improvements outlined in the Master Plan accomplish the goals of the program by addressing fundamental ways that buses, automobiles and people interact with the site and the built space. First, the bus entrance will remain in its current location with the proposed sky bridge creating an entry portal into the site, prominently marking the bus entrance. This entry is in line with Main Street, providing enough space for several buses to stack prior to crossing Ingersoll Street to enter the site. This avoids any bottlenecking or unnecessary congestion in and around the site. Exiting buses will depart through the same portal and can turn either direction on Ingersoll Street or go straight out onto Main Street to their routes.

Facade and Landscaping

Along the Ingersoll frontage, the footprint of the building will step back from the street, creating a wide landscape buffer to the street and making a connection to the future park across Railroad Street. Landscape plantings will be added and visitor parking allocated in front of the public entrance to the building, thereby removing pedestrian traffic from the main bus circulation point of the site.

Exterior patios and Green Roofs

The East Washington Avenue façade will also be renovated, consistent with the East Washington Capitol Gateway Build Committee Guidelines that are currently under develop by the City. Metro transit's facilities will be modified to be more pedestrian friendly and contribute to the aesthetic improvements along this major traffic artery. Punched openings and glass storefronts will be added to allow natural light into the bus storage space and provide spaces for Metro Transit to display its collection of vintage buses to the public. Additional trees and planting beds will also be added along the sidewalk to create public gathering spaces and to buffer between the building and the street.

On the second floor level above the Bus Storage a rooftop patio will be constructed that is accessed directly from the administration and training areas. It will provide outdoor space that is separated from public space and is easy to access. The roof will be constructed with a system known as a "green roof" to sustain low maintenance plantings in a shallow soil composition. This will reduce the radiated heat generated on the roof in summer and help to insulate the roof in all seasons. It will also buffer the volume of water runoff on the roof, storing it in the soil and either absorbing it into the plants or slowly seeping out of the soil composition.

Along the south side of the property, Railroad Street will be utilized for access to employee parking and loading dock functions of vehicle maintenance. Currently this street is not being used as a public street; however, its right-of-way will be maintained to give vehicle access to Metro Transit and adjoining properties. This entrance will be improved to accommodate the high traffic loads expected for daily employee parking and the occasional loading dock use.

Site utilities and legal property modifications will be necessary to construct the full master plan. Currently, there are underground natural gas lines and overhead electrical lines running down the alley in line with Main Street. Overhead electrical lines will need to be raised on a short-term basis in order to construct the new maintenance/parking structure and sky bridge. On a permanent basis, the electrical lines will be relocated and buried outside the site as part of an improvement project by Madison Gas & Electric. Based on current available information the underground gas lines currently avoid the footprint of the maintenance building and should not need to be relocated, but will need to be taken into account during construction. Both of these utilities have current easements through the site, which will likely need to be re-planned during the new construction.

Vehicle Traffic and Parking

Bus Storage, Service, and Maintenance are the primary purposes of the facility and the efficient circulation of buses is imperative to a successful master plan and facility expansion. Once inside the site, buses will enter the bus storage building and circulate in a counter-clockwise fashion, opposite from the existing flow. The Service Lanes will be re-aligned with the entrance along the south wall. A by-pass lane will be added for heavy traffic periods to alleviate bottlenecking. Exiting the building, buses will pass between the parking spaces and the administration/operations building addition, at the same place they entered. Emergency bus exiting from the storage space will be provided on the north end of the site through the East Washington Avenue building façade.

Visitor parking spaces will be provided along Ingersoll Street with parking meters to regulate short-term parking on the site. These spaces will allow public access to the Metro Transit facility that is easily located and avoids bus traffic, thus improving safety on the site. For this same reason, employee parking will be located on two upper levels above the maintenance facility and connected to the administration/operations building with a sky bridge.

The employee parking entrance and loading dock functions will be located along Railroad Street. This will improve site efficiency and safety by separating vehicle traffic from bus traffic. The dock will primarily serve the automotive maintenance functions for parts and supplies but will also accommodate the major shipping and receiving needs for the whole facility.

Functional Adjacencies

Vehicle Maintenance

Maintenance spaces will be located in a new facility that will be constructed separate from the main building. This will eliminate problems with the current exposure to the service lanes, bus storage, and administration. This separation will improve the environmental conditions of these spaces by allowing each building's system to meet the specific needs of each use. This relocation of the maintenance spaces will allow improved bus circulation through maintenance and use existing bus storage space more efficiently.

In this new facility, maintenance offices will be located on the ground floor and mezzanine level along Ingersoll Street. This will place them near the entrance into the maintenance area while still creating some level of separation. The running repair and PM/inspection bays will be efficient drive-through bays located on the north side of a central drive aisle. Major Rebuild Bays, Chassis Wash Bays, AC bays, and Paint/Body Repair Bays will be located on the south side of the drive aisle. Support spaces for these bays, such as Component Rebuild, Brake Shop, Tire Shop, and Weld Shop are located on the south side of the building adjacent to the bays they serve. Parts issue will be located at the southwest corner of the building, providing easy access to all areas of maintenance. This facility will also provide improved locker rooms and maintenance staff spaces.

Operations

Operations will be reconstructed on the current footprint it occupies today, on the first floor with direct connection to the bus storage area. The new construction will provide a more centralized, open, and flexible office space for dispatch offices and operations supervisors. This will greatly improve the connection and efficiency between dispatch and the operator's room.

The operator's room will be located along Ingersoll Street with an enclosed outdoor patio. It is centrally located to the rest of the operations space and has direct adjacency to supervisors,

dispatch and locker room facilities. Quiet room, kitchen and television rooms for operator use are all provided next to this space as well. Access to the bus storage area from this space passes directly by dispatch, providing the best means of monitoring the buses and operators. Lockers will be in a shared space with separate toilet/shower facilities and unisex toilet room. A wellness room will also be provided between the toilet/shower rooms for the entire staff to use.

Dispatch will be in a large open space with ample circulation around its perimeter to allow operators to access and cycle through to their assignments. It will be situated adjacent to the bus entrance into the building, providing direct access to the bus parking lanes. Visual connection to the buses will be provided from this space and out onto the drive lanes in order to monitor bus traffic.

Operations supervisor offices are located across the main corridor of the operations building. These offices front on Ingersoll and will have ample glazing, making a visual connection to the outside and allowing daylight into the space. They will provide some separation from operators and dispatch, controlling access to supervisory staff.

Administration

Administration space will be built on the second floor giving adequate separation from other functions of the facility and controlling public access. A reception lobby that connects the first and second floor will act as a checkpoint to these spaces. Different units will be clustered together, making the spaces more cohesive and consolidated. Finance, Planning, Marketing, and Management suites are organized with perimeter offices, an internal office core and a corridor loop that connects the units. This second level will be situated above the roof of the bus storage building, allowing openings on all sides. Views and day lighting will be maximized with ample glazing integrated in the new facades. A rooftop patio will be located above the bus storage, which is accessed from the second floor of this new construction creating outdoor space for staff that is also private and has controlled access.

Directly above the operators' space are training spaces that will be used by the entire staff. These also have Ingersoll frontage and will be bright spacious classroom areas that can be divided into smaller rooms with operable partitions. Adjacent chair and table storage are large enough to store items for utilizing this space for multi-use functions as well.

Building and Grounds

The remaining footprint of the first floor shared with Operations is the Building and Grounds Maintenance space. Materials storage makes up the majority of the area that is dedicated to this use. This will be open warehouse space with storage racks and an adjacency to the building and grounds shop. The shop space will be equipped with an overhead door providing direct connection to the bus parking.

Portable equipment storage will be associated with this area as well, with a similar overhead door connection to bus parking. Office space for this group will be located along Ingersoll, providing the day lighting similar to administration and operations offices. It will consist of offices for supervisors, copy room, crew room, and individual toilet facilities.

Service Cycle

Relocating the service cycle provides opportunity to address some issues with the current system. Fueling will be the first stage in the service cycle. The current location of the fuel tanks will lend itself well to the plan as shown. Minimal piping and slab excavation will need to take place and ultimately provides a safer and more reliable fueling system. Equipment space to support the fueling and wash cycles, such as vacuum, lube, and fueling equipment rooms are aligned on the south wall. These spaces will have overhead door access to the exterior through the south wall.

Fare collection will be the next stage of the service cycle and will be collected and counted along the south exterior wall of the building. There is a step in the building footprint along the south wall that provides an opportunity for another entrance. A vehicle sally port will be constructed at this location to allow armored cars to enter and pick up fares in a secure controlled room.

The bus wash will be the last part of the cycle that the buses pass through. Its location at the end of the cycle will ensure that the buses are fully cleaned before being parked. It also confines the wet environment to the end of the cycle, thereby minimizing the safety concerns for the service staff.

Bus Storage

Metro's current facilities are large enough to hold the number of buses projected for the growth of their fleet. By removing interior spaces and functions that interrupt the open structural grid of the bus storage, fleet parking capacity increases significantly. Buses will be efficiently stacked end to end at full parking capacity. This density improves the ratio of circulation space versus useable parking space and uses what limited

square footage available for parking as many buses as possible.

Employee Parking

Over the maintenance building, two levels of employee parking will be provided. These will be flat plates with speed ramps located on the east side of the building. Additional parking decks could be added to provide lease space for area employers parking. This provision beyond Metro's staff will require additional secure access control to the parking and ultimately the Metro site. Two stair towers at opposite ends of the building will connect these levels of parking. Employees can access the sky bridge from the stair tower at lower level of parking and cross over to the administration/operations building safely without conflict with buses at the Ingersoll bus entry.

Aesthetic Impact

The main purposes of this master plan are to improve the safety, performance and efficiency of the facility for future growth, in addition to improving the appearance of the building/site. East Washington Avenue is undergoing a major corridor improvement project and the building façade of Metro's property needs to be improved to compliment this urban planning effort. The existing corrugated metal siding and door vestibules will be partially removed where punched openings and vintage bus displays will be added. Where possible, the siding will be left in place, thereby lending to the sustainable approach of this facility expansion. Along the Gisholt façade of the building the existing brick will be revealed by removing all of the siding and translucent panel glazing will be applied where openings once were. This, along with additional landscape plantings will greatly improve the scale of the building, provide interest and relate better to pedestrian and vehicle traffic.

The site sits upon a very prominent corner along the East Washington corridor. Metro's decision to stay on the site and send a message of being a part of the community core in Madison calls for a solution that establishes a strong presence and an inviting face to the community. The corner of Metro's site at the intersection of East Washington Avenue and Ingersoll Street currently lacks this strong architectural presence. The master plan build out will place a prominent rotunda lobby at that location, anchoring the building massing on Metro's site. The main pedestrian public entry will be in this lobby space located directly adjacent to the visitor's short term parking along Ingersoll Street.

The Bus entry along Ingersoll Street will be marked by a clock tower anchoring the connecting sky bridge between the

maintenance/parking structure and main building. This will create a portal into the site that defines the entry, making it a focal point of the façade. The span of the sky bridge connects two vertical circulation cores that will anchor the ends of the portal, creating a formal and symmetrical entrance.

The architecture of the maintenance/parking structure will be complimentary to that of the administration/operations addition, creating a consistent image along Ingersoll Street. The spaces in the building along Ingersoll Street and Railroad Street are office/shop related and will be able to have some limited glazing in them. This will also relate aesthetically to the office space of the administration/operations building on the other end of the property. Where parking levels on the second floor will not be enclosed space, glazing will be left out of the wall system for durability and cost savings. The aesthetics of this building will be commercial in character with rhythmic massing and materials that relate to human scale. The maintenance bays that have overhead doors are along the north side of the building, partially screened from view by the bus entrance and stair towers.

Building Systems Upgrades

The existing building has serious deficiencies in its electrical and mechanical systems. Electrical costs to light a space as large as this facility can be offset by letting in as much daylight as possible. In addition, the level of diesel exhaust at peak times can be overwhelming and Metro has had to allow some operators with medical problems retrieve their buses outside, greatly reducing efficiency due to poor air quality.

The Gisholt Building was constructed with a saw tooth roof that can be easily retrofitted with translucent glazing panels to allow diffused light to brighten the space. The later addition to the facility will have light monitors retrofitted into the roof, also allowing daylight into the middle of the occupied space. The exterior walls of this and the remaining bus storage area will also have windows added along the East Washington Avenue frontage to allow more light into the space at the perimeter of the building along the drive aisles. Supplemental electrical lighting will be high efficiency fixtures placed strategically to provide optimal light levels where needed.

The saw tooth forms in the Gisholt Building and new light monitors may also provide opportunities to ventilate the space more effectively. The entire bus storage area will be equipped with upgraded ventilation equipment as well to address this issue. Another upgrade to the building will be to replace the existing asphalt interior paving in the bus parking with a

concrete slab-on-grade floor. This will have greater longevity than asphalt and can endure the sustained heavy bus traffic.

The existing sprinkler system in the bus storage area will be upgraded. New sprinkler heads that deliver more water and react quicker will be installed. These new heads require higher pressure and flow and therefore a fire pump will be included in the new construction. The existing sprinkler piping will also be reinforced to meet the increased demand.

Structural Framing Systems

Administration Building

Roof

Roof area over the Administration building footprint will consist of metal roof deck on bar joist framing spanning 40 feet spaced approximately five and a half feet on-center supported by interior and exterior steel beam/joist girder lines running in the east-west direction. It is anticipated that roof framing will be pitched for drainage and that the perimeter overhangs will be accommodated using extended ends on the bar joists and with outriggers where overhangs are perpendicular to bar joist framing.

Outdoor terrace area framing will consist of a concrete on metal deck slab supported by steel beam framing spanning 33' in the east-west direction. These beams in turn will be supported by either steel plate girders or trusses spaced 33 feet on-center spanning 75 feet. The actual slab and member sizes will be a function of the amount and type of material to be constructed on top of the structural slab for the terrace area.

Floor Framing

Second floor framing for the administration building will consist of concrete on metal deck floor slabs supported by steel bar joists spanning 40 feet and spaced approximately three feet on-center. An alternative to the concrete/metal deck slab and bar joist system would be a topping slab on pre-cast plank. With either the bar joist or pre-cast plank system, these elements would then be supported by interior and exterior steel beam lines running in the east-west direction supported by steel columns that run from top of foundations to roof framing.

Foundations

Based on the existing building plans, new construction will need to be supported by a deep foundation system. The

original building was constructed utilizing steel H-piling with a combination of capacities ranging from 50tons to 100 tons. It is anticipated that similar type piles would be utilized for the proposed new construction. Along the building's perimeter, concrete grade beams extending four and a half feet into the ground for frost protection will be used to support the building facade.

Although column loads and perimeter walls need to be supported by a deep foundation system, the use of conventional slab-on-grades is anticipated. Area within the new administration building subject to office loadings will be a five inch thick concrete slab reinforced with five pounds per cubic yard of macro poly fibers. Slab will be supported by three inches of 'stone dust' (locally known as traffic bond) on vapor retardant/ barrier (as appropriate) on six to eight inches of granular base course.

Maintenance Building

Roof Framing

The structural portion of the roof system will consist of pre-cast concrete double tees supported by pre-cast concrete inverted T-beams or L-beams supported by pre-cast concrete columns. Structural system will be pitched for drainage and will be overlaid with a four to five inch cast-in-place concrete slab drive surface on a membrane and insulation system (refer to architectural description/drawings).

Depending upon clear height versus building height requirements, structural bay sizes could be 20 by 60 to 70 feet to 40 feet by 60 to 70 feet.

Mezzanine

A cast-in-place concrete topping slab on pre-cast concrete plank will be used for mezzanine spaces required. Where able, these floor elements will be supported by load bearing concrete masonry unit (CMU) walls that define the spaces. Where none, pre-cast concrete beams supported by the columns that are part of the roof framing will be used.

Foundations

Based on the existing building plans, new construction will be supported by a deep foundation system. Original building was constructed utilizing steel H-piling with a combination of capacities ranging from 50 tons to 100 tons. It is anticipated that similar type piles would be utilized for the proposed new construction. Along the building's perimeter, concrete grade beams extending four and a half feet into the ground for frost protection will be used to support the building facade.

Although column loads and perimeter walls need to be supported by a deep foundation system, the use of conventional slab-on-grades is anticipated. Area within the new maintenance building will be an eight inch thick concrete slab reinforced with 35 pounds per cubic yard of steel fibers. Slab will be supported by a one inch choker course of 'stone dust' (locally known as traffic bond) over six to eight inches of granular base course. Due to the nature of the facility various pits, trenches and depressions will be required within the on-grade slab in particular the chassis wash area.

Connector Bridge

Floor framing for the connector bridge will either be concrete on metal deck on steel framing or pre-cast plank/tees with a cast-in-place concrete topping slab. The roof framing would be similar to the administration roof framing which consists of metal roof deck on steel framing. One of the two ends of the connector bridge will need to be an expansion joint with connections supporting this working joint.

Electrical Systems

Administration and Operations Facility

Normal Power Distribution

Normal power will be received from Madison Gas and Electric at a secondary voltage of 480/277 volt. The new service switchboard will be located in a dedicated electrical room positioned at the perimeter of the building. This electrical service will also serve the adjacent Maintenance facility.

- 480/277 volts will be utilized to serve motors greater than 1/3 hp and lighting fixtures.
- 208/120 volts will be derived from dry type step-down transformers to serve small motor and equipment loads as well as general purpose receptacles.
- The service entrance switchboard will consist of a main circuit breaker section and circuit breaker distribution sections. The main switchboard bussing shall be fabricated from tin plated copper.
- Panel boards will be furnished with copper bussing and a ground bus. Circuit breakers will be plug-on type.

- All wiring will utilize copper conductors.
- A green equipment grounding conductor will be provided in all feeder and branch wiring circuits.
- Branch circuits will be limited to six general purpose duplex outlets on a single circuit. Dedicated circuits shall be provided for outlets as determined during detailed design development and those serving large electrical loads including by not limited to photo-copiers, electric water coolers, microwave ovens, refrigerators, vending machines, etc.

Emergency Power Distribution

Emergency power at 480/277 volts provided by a natural gas engine generator serving an automatic transfer switch and panel board(s). This emergency system will also serve the adjacent Maintenance facility.

- Loads to be served from this system will be life safety egress lighting, exit signs and the fire alarm system.

Fire Alarm System

An independent multiplexed manual fire alarm system will be provided. The main control panel will be located in the fire command center. The system will monitor the control panel in the adjacent Maintenance facility.

Paging System

A building wide zoned paging system will be provided. This system will be interfaced with the paging system in the adjacent Maintenance building.

- Speakers in the existing bus depot will be retained.

Lighting

The following are requirements for lighting in the administration and operations facility.

- Lighting in interior areas will be provided by fluorescent luminaries.
- Lighting in the existing bus depot will be replaced with HID, high pressure sodium enclosed lighting fixtures.
- Illumination levels will be provided as recommended by the Illuminating Engineering Society handbook.
- A low voltage lighting control system will be provided to comply with the shut-off requirements of the Energy code.

- All three foot and four foot fluorescent lamps will be 32 watt T-8 type with an apparent color temperature of 3100 degrees Kelvin.
- All fluorescent ballasts for use with three foot and four foot lamps will be high frequency electronic type.
- All fixtures utilizing compact fluorescent type lamps will be high power factor type.
- HID lighting fixtures connected to the emergency generator will be provided with auxiliary quartz lamps to provide illumination during the metal halide lamp re-strike time.
- LED exit lights will be provide as required by code.

Telephone/ Data

The following are requirements for telephone and data in the administration and operations facility

- Telephone service will be an extension of the main service to be provided for the adjacent Administration building.
- Telephone and data outlets will provided as determined during detailed design development.
- Wiring in accessible concealed areas will be permitted to install without conduit. Wiring in exposed areas will be required to be installed with-in conduit.

Maintenance Facility

Normal Power Distribution

Normal power received from the main electrical service provided in the adjacent Administration building at a secondary voltage of 480/277 volt. The new service switchboard will be located in a dedicated electrical room positioned at the perimeter of the building. The service entrance switchboard will consist of a main circuit breaker section and circuit breaker distribution sections. The main switchboard bussing shall be fabricated from tin plated copper.

- 480/277 volts will be utilized to serve motors greater than 1/3 hp and lighting fixtures.
- 208/120 volts will be derived from dry type step-down transformers to serve small motor and equipment loads as well as general purpose receptacles.

- Panel boards will be furnished with copper bussing and a ground bus. Circuit breakers will be plug-on type.
- All wiring will utilize copper conductors.
- A green equipment grounding conductor will be provided in all feeder and branch wiring circuits.

Branch circuits will be limited to six general purpose duplex outlets on a single circuit. Dedicated circuits shall be provided for outlets as determined during detailed design development and those serving large electrical loads including by not limited to photo-copiers, electric water coolers, microwave ovens, refrigerators, vending machines, etc.

Emergency Power Distribution

Emergency power at 480/277 volts will be received from the emergency system provided in the adjacent Administration building.

Loads served from this system will be life safety egress lighting, exit signs and the fire alarm system.

Other loads to be served include partial garage ventilation, three hoists and associated lighting, fuel dispenser for the engine generator, entrance and exit doors.

Fire Alarm System

An independent multiplexed manual fire alarm system will be provided. This system will be connected to the fire command center central fire alarm control panel/ enunciator in the adjacent Administrative building.

Paging System

A building wide zoned paging system will be provided. This system will be interfaced with the paging system in the adjacent Administration building.

Lighting

Lighting of the maintenance service and repair area will be provided by high intensity discharge (HID), metal halide enclosed lighting fixtures. Lighting layouts will be aligned with the aisles between buses.

Lighting in other interior areas will be provided by fluorescent luminaries.

Lighting of the open parking levels will be provided by HID metal halide lighting fixtures. The first level will utilize surface

mounted enclosed and fixtures with gaskets. Illumination of the upper level will be provided by fixtures mounted on poles.

Illumination levels will be provided as recommended by the Illuminating Engineering Society handbook.

A low voltage lighting control system will be provided to comply with the shut-off requirements of the Energy code.

All three foot and four foot fluorescent lamps will be 32 watt T-8 type with an apparent color temperature of 3100 degrees Kelvin.

All fluorescent ballasts for use with three foot and four lamps will be high frequency electronic type.

All fixtures utilizing compact fluorescent type lamps will be high power factor type.

HID lighting fixtures connected to the emergency generator will be provided with auxiliary quartz lamps to provide illumination during the metal halide lamp re-strike time.

LED exit lights will be provide as required by code.

Telephone/Data

Telephone service will be an extension of the main service provided for the adjacent Administration building.

Telephone and data outlets will provided as determined during detailed design development.

Wiring in accessible concealed areas will be permitted to be installed without conduit. Wiring in exposed areas will be required to be installed in conduit.

Plumbing Systems

Administration/ Operations Facility

Demolition

The west portion of the existing Administration/Operations facility will be removed/ demolished. The following equipment is located in the west portion of the existing building and will be removed:

- Water service and water meter
- Water softener
- Water heater and storage tank

- Air compressor
- Along with the plumbing fixtures and piping

Sanitary Drain and Vent

The sanitary drain system will be gravity flow from the plumbing fixtures and equipment to the connection to the municipal sanitary sewer system in Ingersoll Street or East Washington Avenue. There will be several building sewer connections to the municipal sanitary sewer system. Several of the building sewers will connect to existing laterals into the building.

The bus storage area will have a series of garage catch basins to collect solids and oil in the wastewater stream before connection to the sanitary system. There will not be a need for a central sand/oil separator with the local garage catch basins.

The bus washing system will recycle the wash water. There will be an underground storage tank to collect the wastewater. Pumps will suck the water from the tanks and distribute the water through the filtration system back to the nozzles. The makeup water will discharge through a pretreatment tank before connection to the sanitary drain system.

The venting system will connect to the drain system to prevent the various traps from siphoning. The vents will be collected and terminate through the roof.

Storm Drainage

Roof drains are added for the new roof areas. The storm piping will connect to the roof drains and drop vertically to below the slab on grade. A horizontal building storm drain under the slab will collect the various vertical conductors and route the storm drain piping to connect with the storm sewer system on site. Special roof drains will be used in the roof garden area.

To protect the roof from the possibility of standing water, a roof overflow drain system will be provided. The overflow storm piping will connect to the overflow drains. The overflow storm piping will be an independent system discharging to grade (daylight).

Clearwater Drain and Vent

Clean water from cooling coil condensate will be collected in hub drain receptors. The hub drains will be trapped and

vented. The Clearwater piping will connect to the storm drain system. The individual hub drain receptors will have a backwater sleeve included to prevent backflow and sewer gas escape.

The Clearwater vent system will connect to the drain piping and terminate through the sidewall.

Domestic Water

There will be a combination (fire and domestic) water service connected to the municipal water main in Ingersoll Street. The domestic water service will be metered. The water will be treated using a softener. Softened water will be distributed throughout the facility connecting to plumbing fixtures and the water heater(s). The water heater will provide hot water for the plumbing fixtures. There will also be a water system that is not treated connecting to the exterior hose bibs and interior hose bibs. The hose bibs in the bus storage will be larger sized and used for wash down.

The water heater(s) will be located centrally so that the distance to connections is balanced and a water circulation to maintain temperature is not required.

There will be a treated water connection to the bus washing equipment.

Compressed Air

A compressed air connection from the maintenance facility will be routed in the pedestrian walkway. The compressed air will be incidental use at bus cleaning and bus washing.

Fixtures and Equipment

The following is a list of necessary fixtures and equipment:

- Water Closet: Vitreous china fixture with flush meter.
- Lavatory: Vitreous china fixture with manual faucet.
- Mop Basin: Plastic floor receptor with hose connection faucet.
- Hand wash Sink: Solid surface material, semicircular, with sensor operated faucet.
- Shower: Solid surface base and walls with pressure balance shower valve.
- Break Room Sink: Stainless steel, counter mounted with manual faucet.
- Miscellaneous Connections: Provide water and drain connections for:
    - Dishwasher (under counter)
    - Ice machine in refrigerator(s)
    - Coffee machine(s)

- Water Heater: Gas-fired, sealed combustion, or storage tank with water-to-water heat exchanger.
- Water Softener: Cation exchange resin type, duplex or triplex, brine regeneration.
- Garage Catch Basin: Pre-cast concrete or fiberglass sump with heavy duty cast iron frame and grate.
- Hose Bib (Wash down): 1½ -inch hose connection with vacuum breaker.

Fire Protection System

Water Service

There will be an eight inch combined (fire and domestic) water service connected to the municipal water main in Ingersoll Street. The fire service will have a backflow prevention device (double check valve assembly). The water service will then connect to a fire pump. The fire pump will supply water to the sprinkler and standpipe system. There will be a fire department connection to provide an auxiliary supply to the fire protection system

Sprinkler

An automatic sprinkler system is provided throughout the Administration/Operations facility. The sprinkler system in the facility will be a wet pipe system. The coverage in the administration area will be light hazard coverage. The coverage in the bus storage area will use early suppression fast response (ESFR) sprinkler heads at 50 psi minimum pressure to supply additional water.

Standpipe

Standpipes with fire department valves is provided throughout the building. The standpipes and fire department valves will be located at entrances/exits to allow the fire department to have a source of water inside the building.

Fire Pump

Centrifugal, inline, rated at 1000 gal/min and 75 psi TDH.

HVAC Systems

Administration

Hot Water System

Hot water is generated at by the new boiler plant located in the Administration second level. Hot Water will be pumped to serve terminal heating devices in Maintenance Facility.

The hot water system will serve terminal heating devices such as unit heaters, cabinet unit heaters, convectors, fin-tube, reheat coils, preheat coils, etc.

- Unit Heaters will serve storage and mechanical rooms.
- Cabinet Unit heaters will serve stairwells, vestibules and exterior doors.
- Convectors will serve toilet room, lockers and shower areas.
- Fin-tube radiation in offices and conference areas.
- Reheat coils in offices, conferences, toilet rooms, lockers and showers areas.
- Preheat coils in air handling units.

Air Conditioning Unit

One DX refrigeration rooftop air handling unit (AHU's) will serve the offices, conferences, and toilet/locker rooms. Unit capacity will be 45,000 CFM airflow or 130 Tons. Unit to be located on roof south side of Green roof area.

System will be a single duct, variable volume with reheat to provide heating and cooling to the spaces. System will consist of factory rooftop air handling unit with integral air-cooled condenser with pre-filters MERV 8, final filter MERV 13, hot water coil, DX refrigeration coil, smoke detector and mixing dampers.

Air will be supplied to all appropriate spaces and a portion of this air will be returned to the air handling unit. The remaining portion of air not returned to the air handling unit shall be utilized as make-up air for the toilet exhaust system as necessary. Return fan will be plenum type with air foil blades. Both supply and return fan speed will be modulated airflow by VFDs controlled by duct static pressure controller.

Spaces will have individual air terminals with hot water reheat coils to maintain temperatures.

Toilet Exhaust System

There will be toilet exhaust fans to serve the serve the Administration Building. The toilet exhaust system will have run-a-round piping heat recovery system. Each fan system will have a capacity of 3,000 CFM airflow. Toilet exhaust fans will be located on upper roof of Administration Building.

*Refer to heat recovery system for reclaim coils.

Heat Recovery System

Heat recovery will be a run-a-round piping system. System will consist of with pre-filters, here site coated reclaim water coils, pumps, expansion tank, glycol fill with tank, and bypass damper arrangement. System will be constant volume pumping distribution. Piping will distributed from exhaust system to ventilation system.

Controls

Controls will be DDC/electronic controls tied into Building Automation System. Control valves and dampers will be pneumatic actuation.

Operations Facility

Hot Water System

Hot water will be generated at by the new boiler plant located above the Operation Facility. Hot Water will be pumped to serve terminal heating devices in Operation Facility.

- The hot water system will serve fin-tube terminal heating in the exterior areas of the Operation Facility.

Air Conditioning Unit

One DX refrigeration rooftop air-handling unit (AHU's) will serve the Operation Facility. Unit capacity will be 3,000 CFM airflow or 10 Tons. This air conditioning unit to be located on roof south side of Green roof area.

System will be a single duct, constant volume with reheat to provide heating and cooling to the spaces. System will consist of factory rooftop air handling unit with integral air-cooled condenser with pre-filters MERV 8, final filter MERV 13, gas fired heating coil, DX refrigeration coil, smoke detector and mixing dampers.

Air will be supplied to all appropriate spaces and a portion of this air will be returned to the air-handling unit. The remaining portion of air not returned to the air-handling unit shall be utilized as make-up air for the toilet exhaust system as necessary.

Individual spaces will have individual air terminals with hot water reheat coils to maintain temperatures.

Toilet Exhaust System

There will be toilet exhaust fan to serve the serve the Operation Facility. The toilet exhaust fan system will have a capacity of 500 CFM airflow. Toilet exhaust fan will be located on upper roof of Administration Building.

Controls

Controls will be DDC/electronic controls tied into Building Automation System. Control valves and dampers will be pneumatic actuation.

Bus Storage

Ventilation System

Twelve makeup rooftop air-handling units (AHU's) will serve the Bus Depot facility. Unit capacity will be 15,000 CFM airflow each.

System will be a single duct, constant volume providing heating and ventilation to the spaces. System will consist of factory-packaged air handling units with pre-filters MERV 8; reclaim water coils, smoke detectors and isolation dampers. Air will be supplied at 100% to all appropriate spaces and exhausted by general fan systems throughout the Bus Depot facility.

*Refer to heat recovery system for reclaim coils.

Hot Water System

Hot water will be generated at by the new boiler plant located in the Administration second level. Hot Water will be pumped to serve terminal heating devices in Bus Depot Facility.

The hot water system will serve terminal heating devices such as unit heaters, cabinet unit heaters, door curtains, reheat coils, makeup heating coils, etc.

- Unit Heaters will serve sally ports and washing areas.
- Cabinet Unit heaters will serve exterior doors.
- Door curtains will serve overhead doors.
- Fin-tube radiation in offices, break rooms and money count areas.
- Convectors in toilet rooms.
- Reheat coils in offices, toilet rooms, lockers and showers areas.
- Makeup heating coils in air handling units.

Air Conditioning Unit

One air-handling unit (AHU's) will serve the support offices. Unit capacity will be 3,000 CFM airflow or 10 Tons. Unit to be located on mezzanine level.

System will be a single duct, constant volume reheat providing heating and cooling to the spaces. System will consist of factory-packaged air handling units with integral condenser, pre-filters MERV 8, hot water coil, DX refrigeration coil, smoke detector, and isolation dampers. Air will be supplied to all appropriate spaces and a portion of this air will be returned to the air-handling unit. The remaining portion of air not returned to the air-handling unit shall be utilized as make-up air for the toilet exhaust systems as necessary.

Spaces will have individual hot water reheat coils to maintain temperatures.

Specialty Exhaust System

There will be four specialty exhaust fans with associated automatic dampers to serve the serve the Bus Depot areas. Below are some of these types of specialty exhaust systems. Specialty exhaust fans will be located on roof level.

- Local snorkel exhaust system
- CO exhaust
- Equipment wash areas

General Exhaust System

There will be twelve general exhaust fans to serve the serve the Bus Depot area. General exhaust system will have run-a-round piping heat recovery system. Each fan system will have a capacity of 15,000 CFM airflow. General exhaust fans will be located on roof level.

*Refer to heat recovery system for reclaim coils.

Heat Recovery System

Heat recovery will be a run-a-round piping system. System will consist of with pre-filters, site coated reclaim water coils, pumps, expansion tank, glycol fill with tank and bypass damper arrangement. System will be constant volume pumping distribution. Piping will distributed from exhaust system to ventilation system.

Controls

Controls will be DDC/electronic controls tied into Building Automation System. Control valves and dampers will be pneumatic actuation. Ventilation and exhaust fans will be tied into smoke management system.

Boiler Plant Facility

Boilers

Existing fire tube hot water boilers are to be reused and relocated in new mechanical room located on second floor Administration. Existing boiler capacity is 6,700 MBH. Boilers are dual fire utilizing No. 2 oil and natural gas. Existing utility gas meter and regulator will be relocated to Bus Depot entrances.

Hot Water System

Hot water will be generated by the new boiler plant located in the Administration second level. New reheat and perimeter pumps will distribute to serve terminal heating devices in Bus Depot Facility.

The perimeter and reheat hot water system will consist of two perimeter heating distribution pumps, two reheat coil distribution pumps, expansion tank, air separator, and two distribution piping systems.

The perimeter and reheat hot water system will be a variable volume system utilizing a modulating two-way control valve at each terminal device. Distribution pumps will each be provided with VFD.

A differential pressure transmitter between the preheat water supply and return mains of each system will be utilized to vary the speed of the pumps, via the frequency drives, to maintain a constant pressure differential between the piping mains of the respective system.

The hot water system will serve terminal heating devices such as unit heaters, cabinet unit heaters, door curtains, reheat coils, makeup heating coils, etc. throughout the facility.

Controls

Controls will be DDC/electronic controls tied into Building Automation System. Control valves and dampers will be pneumatic actuation.

General Exhaust System

There will be general exhaust fan to serve the boiler room. General fan system will have a capacity of 9,100 CFM airflow. General exhaust fan will be located on roof level.

*Refer to heat recovery system for reclaim coils.

Maintenance Facility

Ventilation System

Ten makeup air-handling units (AHU's) will serve the Maintenance service facility. Unit capacity will be 10,000 CFM airflow each.

System will be a single duct, constant volume providing heating and ventilation to the spaces. System will consist of factory packaged air handling units with pre-filters MERV 8, reclaim water coils, smoke detectors and isolation dampers. Air will be supplied at 100% to all appropriate spaces and exhausted by specialty fan systems throughout the facility.

*Refer to heat recovery system for reclaim coils.

Hot Water System

Hot water will be generated at by the new boiler plant located in the Administration second level. Hot Water will be pumped across the pedestrian bridge to serve terminal heating devices in Maintenance Facility.

The hot water system will serve terminal heating devices such as unit heaters, cabinet unit heaters, door curtains, convectors, fin-tube, reheat coils, makeup heating coils, etc.

- Unit Heaters will serve storage, shipping and receiving areas.
- Cabinet Unit heaters will serve stairwells and exterior doors.
- Door curtains will serve overhead doors.
- Convectors will serve toilet room, lockers and shower areas.
- Fin-tube radiation in offices areas.
- Reheat coils in offices, toilet rooms, lockers and showers areas.
- Makeup heating coils in air handling units.

Air Conditioning Unit

One air-handling unit (AHU's) will serve the offices, library, and toilet/locker rooms. Unit capacity will be 3,000 CFM airflow or 10 Tons. Unit to be located on mezzanine level adjacent to stairwell.

System will be a single duct, constant volume reheat providing heating and cooling to the spaces. System will consist of factory-packaged air handling units with pre-filters MERV 8, hot water coil, DX refrigeration coil, smoke detector and isolation dampers. Air will be supplied to all appropriate spaces and a portion of this air will be returned to the air-handling units. The remaining portion of air not returned to the air handling units shall be utilized as make-up air for the exhaust systems as necessary.

Spaces will have individual hot water reheat coils to maintain temperatures.

Remote condenser will be outdoors on grade adjacent to stair tower.

Specialty Exhaust System

There will be ten to twelve exhaust specialty exhaust fans with associated automatic dampers to serve the serve the Maintenance service facility. Below are some of these types of specialty exhaust systems. Specialty exhaust fans will be located on upper roof parking level. Custom hoods will be installed.

- Spray Paint Booth (26,000 cfm)
- Welding benches
- Local snorkel exhaust system
- CO vehicle hose reels exhaust
- Equipment wash areas
- Battery storage room

General Exhaust System

There will be four to six general exhaust fans to serve the serve the Maintenance service facility. General exhaust system will have run-a-round piping heat recovery system. Each fan system will have a capacity of 10,000 CFM airflow.

General exhaust fans will be located on upper roof parking level.

*Refer to heat recovery system for reclaim coils.

Heat Recovery System

Heat recovery will be a run-a-round piping system. System will consist of pre-filters, site coated reclaim water coils, pumps, expansion tank, glycol fill with tank and bypass damper arrangement. System will be constant volume pumping distribution. Piping will distributed from exhaust system to ventilation system.

Controls

Controls will be DDC/electronic controls tied into Building Automation System. Control valves and dampers will be pneumatic actuation.

Sustainable Equipment

There is a potential to have a number of Energy Logic waste oil heating equipment that utilizes reclaimed engine oil to provide heating capacity within the Maintenance Facility. Each unit is 140 MBH.

Special Maintenance Equipment

The Metro Transit Bus Maintenance Facility will be outfitted with special maintenance equipment. For the Schematic Design this Maintenance Equipment is organized in a Preliminary Equipment List to be utilized by the Design Team for coordination purposes and updated as the design process for the Facility Expansion occurs. The purpose of the Preliminary Equipment List (**Appendix K**) is to identify types and quantities of maintenance equipment recommended for facility operations and to provide the Design Team with relevant coordination data. Recommendations are based on the initial discussion with Metro Transit staff and typical equipment found in state-of-the-art efficient bus maintenance facilities. The Maintenance equipment described in **Appendix K** represents the needs of each functional area of the facility based on discussions with Metro Transit staff.

Equipment List Description

Maintenance Equipment in the list is listed by functional area with the following information:

- **Revision Note:** Identifies an item that has been modified from the previous Equipment List. (N = New information, U = Updated information)
- **Equipment Identifier:** All identical equipment items are assigned the same number. The Equipment Identifier coordinates this list with equipment layout drawings and specifications.
- **Item Description:** Description for equipment.
- **Unit Price:** Is the estimated price not including installation.
- **Quantity:** The number of equipment items located within the functional area is listed.
- **Extended Price:** The estimated price of equipment based on quantities required.
- **Dimensions:** Overall equipment width and depth, respectively, listed in inches unless otherwise noted.
- **Specified By:** Identifies suggested responsibility for specification preparation. (MT = Metro Transit - Madison, WI; MDG = Maintenance Design Group, RNL = RNL Design, A&O = Arnold & O'Sheridan INC)
- **Furnish/Install:** Recommends responsibility to furnish and install equipment.

    - CF/CI - Contractor to furnish and install, usually by bid package specifications for General Contractor installation.
    - OF/CI - Owner to furnish and Contractor to install. This includes any items in the existing facilities, which are to be moved by the Contractor to the new Metro Transit Expansion Facility. The Contractor would be responsible for final utility connections and verification of satisfactory operation.
    - OF/OI - Owner to furnish and install, usually smaller office and shop equipment normally purchased by Metro Transit. This also includes any items in the existing facilities, which are to be moved to the new Metro Transit Expansion Facility.

- **Comments:** Includes special requirements and other relevant data to be considered during detailed design.

The Preliminary Equipment List included in this report as Appendix K is intended to show the typical equipment needed in the newly expanded facilities and to add accurate equipment cost to the cost estimates found in appendices F and J. As the Metro Transit Facility Expansion project continues, this Preliminary Equipment List will evolve in

response to Metro's needs and the variations in market innovations.

Section Nine
Schematic Design

Section Nine
Schematic Design

Introduction

In a multi-day design session, RNL and MDG developed conceptual plans, sections, elevations and site plan to improve the safety, appearance, performance and efficiency of Metro Transit's existing facilities all while planning for future growth.

As described in Section Eight: Schematic Design Narrative, the Master Plans and Conceptual Designs were refined during a second on-site design charrette. The result was a selected design solution. Through the charrette process, the Team was able to solicit owner feedback and by integrating this input and by gradually adding more detail through the design session, the Schematic design was developed.

The following Schematic Design drawings represent the refinement of the selected design solution.

- Schematic Exterior Views
- Schematic Perspective Views
- First Floor Composite Plan
- Second Floor Composite Plan
  - Mezzanine
  - Third Floor Plan
- Second Floor Administration Plan and
  - First Floor Operations Plans
- Mezzanine Floor Maintenance Plans
  - First Floor Maintenance Plan
  - Service Cycle Floor Plan
- Elevations
- Sections

METRO TRANSIT - FACILITY EXPANSION

GROUND LEVEL VIEW OF ENTRY

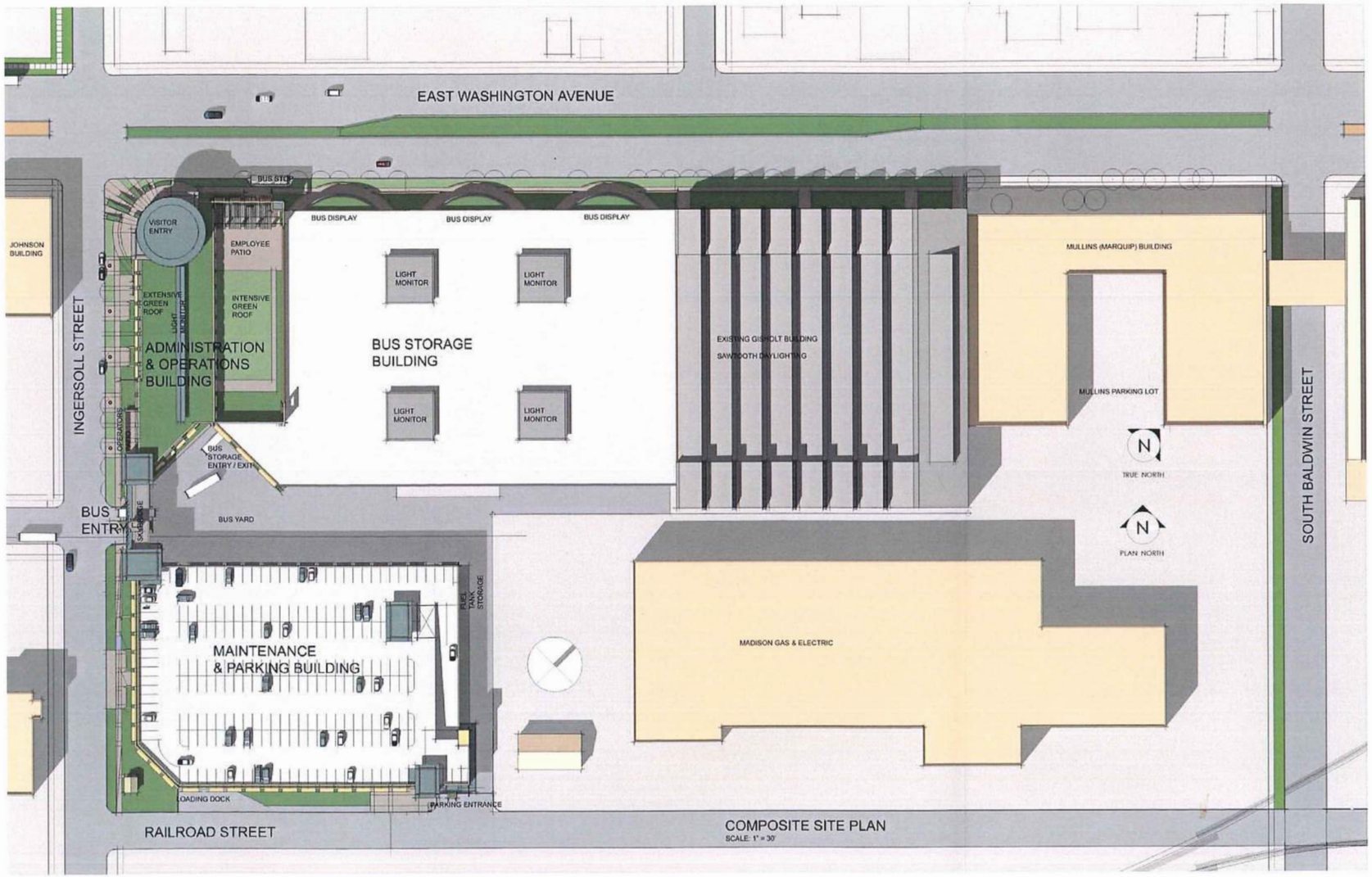
VIEW OF VINTAGE BUS DISPLAY WINDOW

AERIAL VIEW OF ENTRY

VIEW OF BUS ENTRY ALONG INGERSOLL

Metro Transit Facility Expansion Madison, Wisconsin

RNL Maintenance Design Group



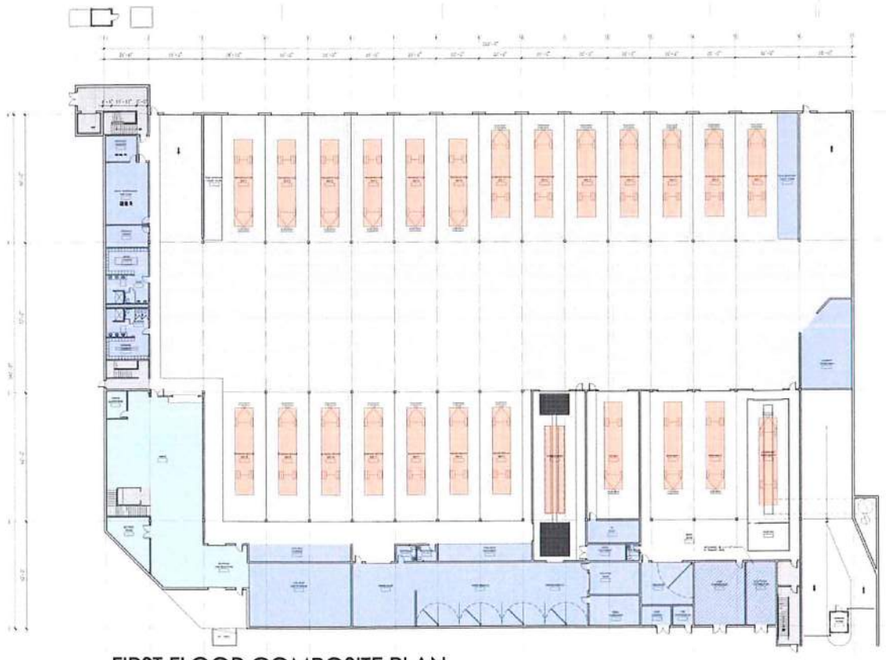
VIEW ALONG INGERSOLL STREET

PARKING ENTRY ALONG RAILROAD STREET

BUS COURT

PROJECT DESCRIPTION

Metro Transit's Maintenance and Operations Facility expansion is a response to the growing needs for bus storage to serve public transit demands for the city of Madison, Wisconsin. This project will entail the construction of a new maintenance building with two levels of automobile parking above it. In addition, the current bus storage facility will be preserved and reconfigured to maximize efficient bus parking. The flow of bus traffic will be reversed to move in a counter-clockwise fashion. Finally, the service lanes will be relocated to streamline the fuel, fare and wash cycles, while dispatch, operations and administration will be placed in a new two story building attached to the end of the bus storage space. This project also includes implementing sustainable design strategies of daylighting, water reclamation and improved ventilation. These steps will allow Metro Transit to serve the community and improve the quality of their facilities.



FIRST FLOOR COMPOSITE PLAN

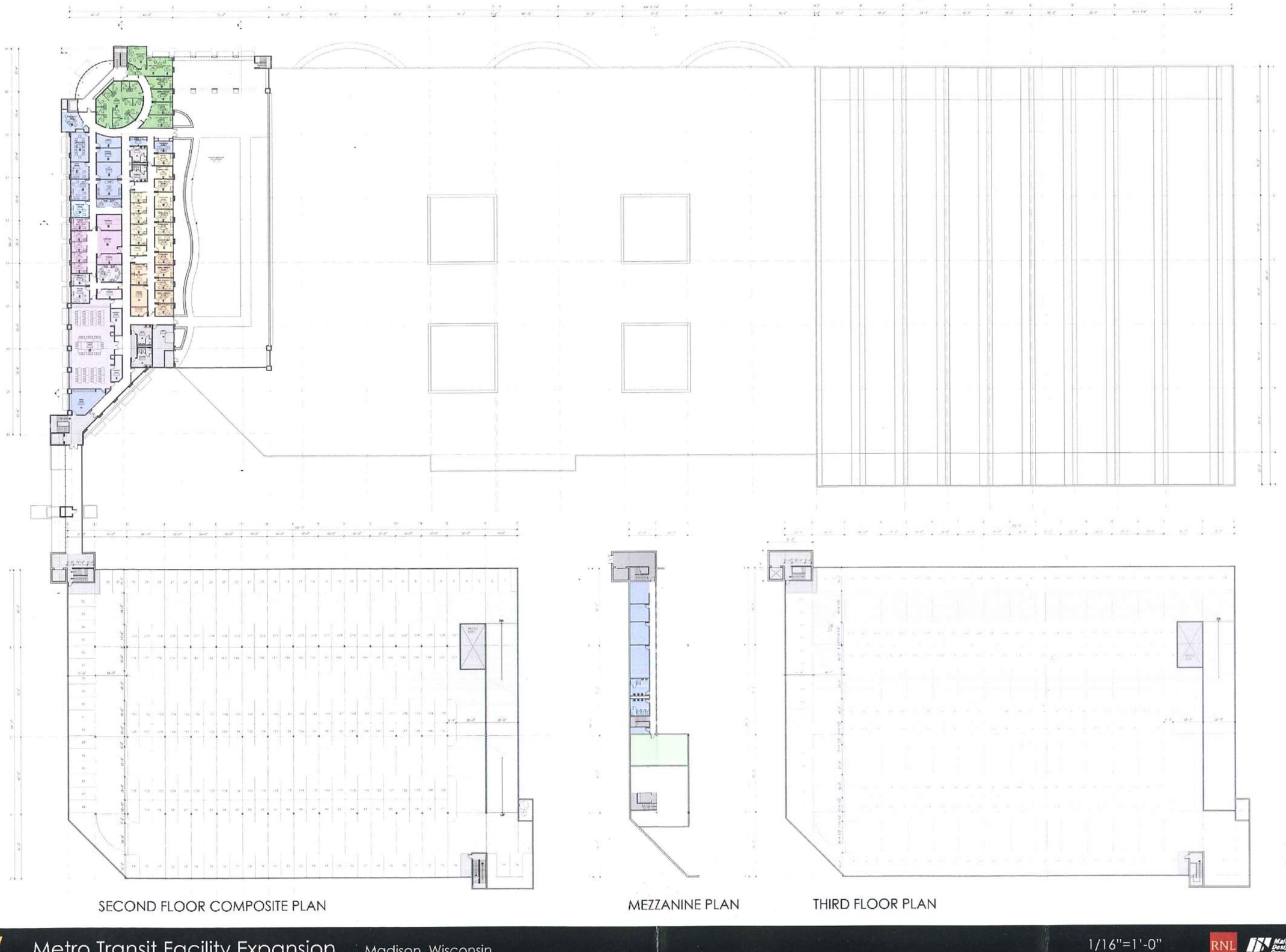
TRUE NORTH

PLAN NORTH

Metro Transit Facility Expansion Madison, Wisconsin

1/16"=1'-0"

RNL Maintenance Design Group



SECOND FLOOR COMPOSITE PLAN

MEZZANINE PLAN

THIRD FLOOR PLAN

TRUE NORTH

PLAN NORTH

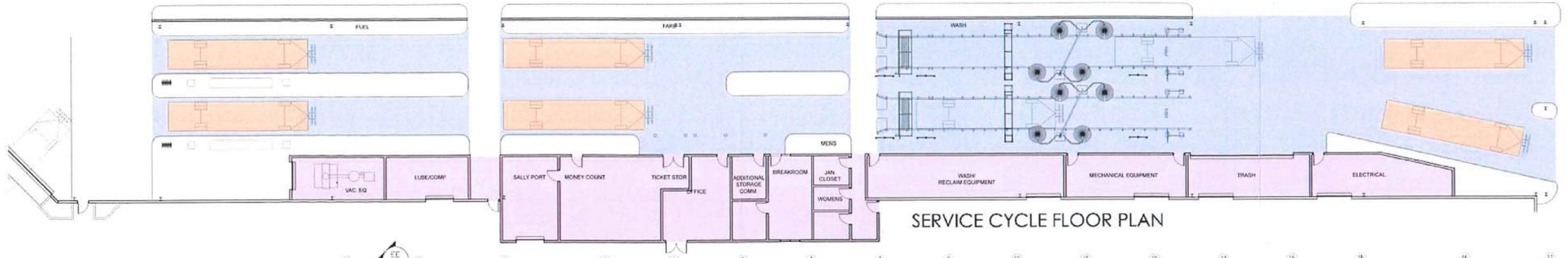
Metro Transit Facility Expansion Madison, Wisconsin

1/16"=1'-0"

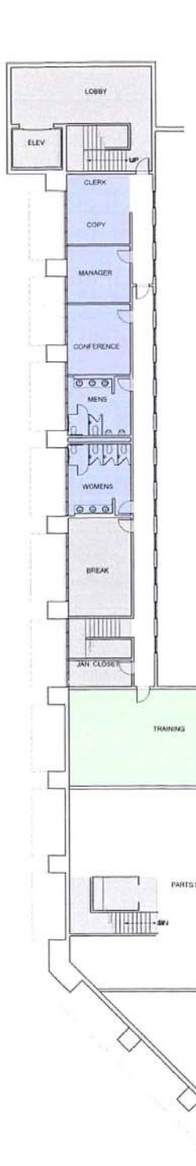
RNL Maintenance Design Group

Second Floor Administration Plan

First Floor Operations Plan



SERVICE CYCLE FLOOR PLAN



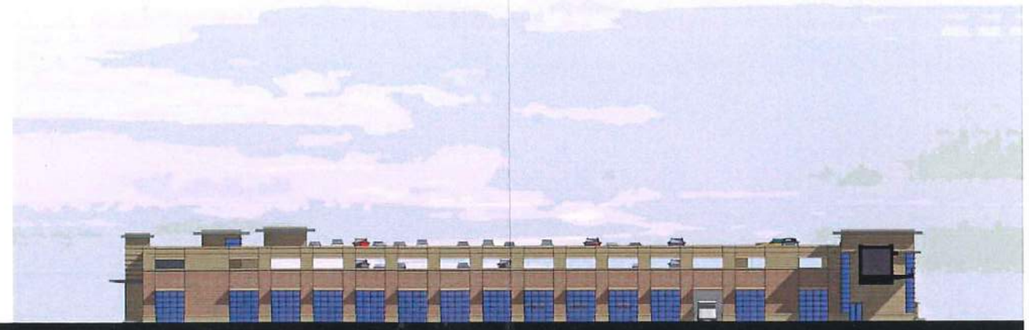
MEZZANINE FLOOR MAINTENANCE PLAN

FIRST FLOOR MAINTENANCE PLAN

Metro Transit Facility Expansion Madison, Wisconsin

RNL Maintenance Design Group

RAILROAD STREET ELEVATION



MAINTENANCE ELEVATION

INGERSOLL STREET ELEVATION

BUS COURT ELEVATIONS

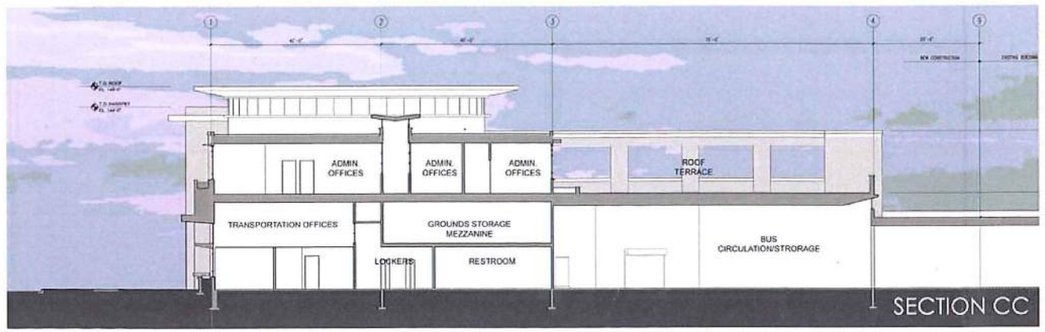
ENLARGED INGERSOLL STREET ELEVATION

BUS ENTRY ELEVATION

ENLARGED EAST WASHINGTON STREET ELEVATION

Metro Transit Facility Expansion Madison, Wisconsin

RNL Maintenance Design Group



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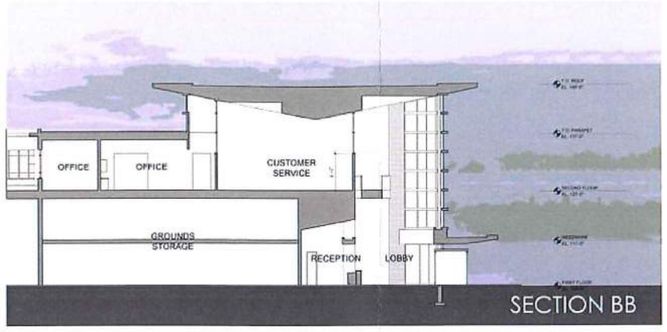

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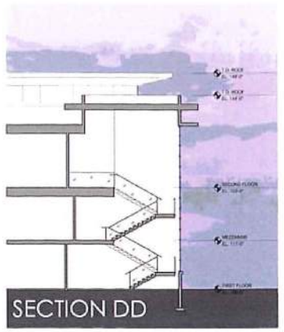

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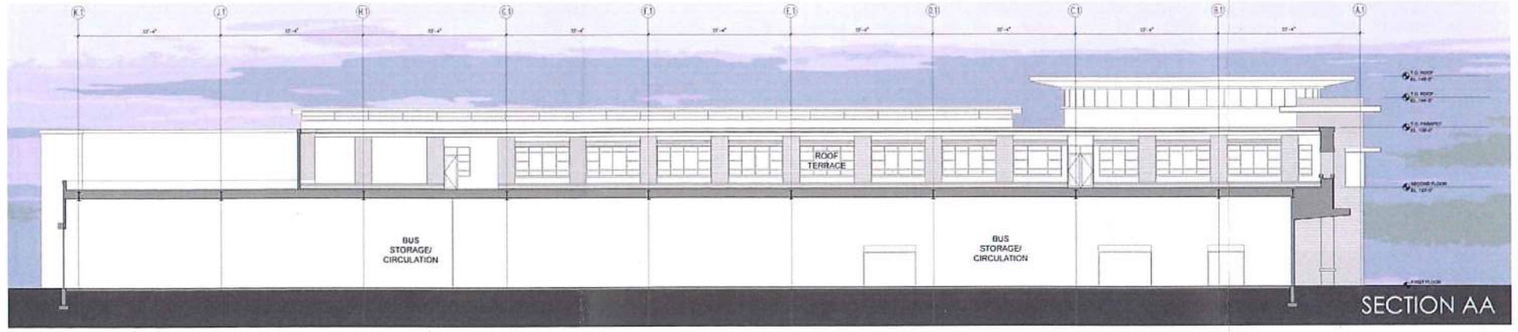
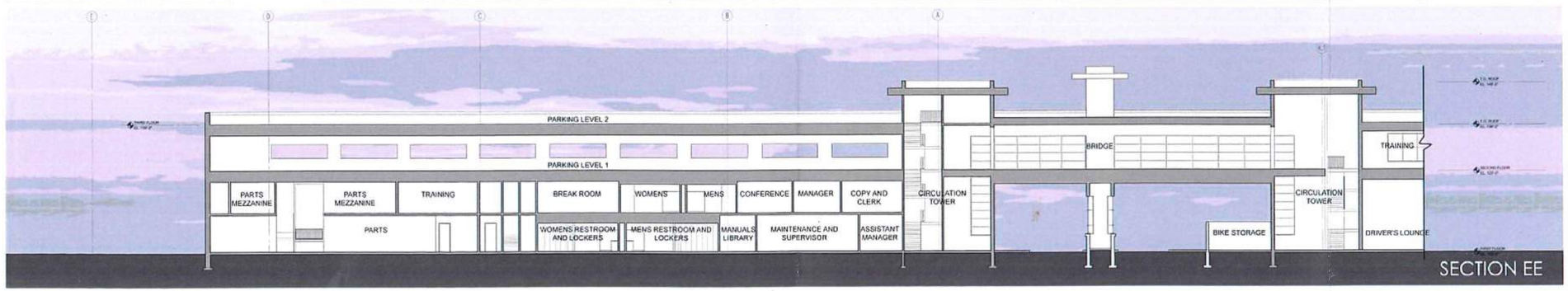


SECTION AA



SECTION EE

SECTION FF

Metro Transit Facility Expansion Madison, Wisconsin

RNL Maintenance Design Group

Section Ten
Recommendations For Sustainable Design

Section Ten Recommendations For Sustainable Design

Introduction

During the conceptual design phase sustainable solutions for Metro Transit Facility Expansion were identified and implemented where possible. The following is a summary of the recommendations for Sustainable Design that have been incorporated into the Schematic Design. They are based on the LEED certification system for sustainable design of buildings and will be developed further as the design process gets more detailed.

Sustainable Site

Alternative Transportation, Public Transportation Access: This strategy is accomplished by the nature of the site and its proximity to public transportation stops. The requirement is satisfied by the facility being within a quarter of a mile to two or more bus stops.

Alternative Transportation, Bicycle Storage and Changing Rooms: The changing rooms that are provided for the operators and for the maintenance staff will meet part of this requirement. Additional space dedicated on the site, near employee parking and the administration/operations addition, for bicycle parking will also be provided to meet this goal.

Alternative Transportation, Parking Capacity: By increasing the density on the site to meet the program, parking has been limited to what is required by the City of Madison. The intent is to encourage people to carpool, use public transportation or bicycles rather than one person per car.

Reduced Site Disturbance, Protect or Restore Site: This approach is meant to reduce the amount of hardscape area that takes away natural areas of vegetation and habitat. By increasing the amount of landscaping on the site in the master plan and on the building rather than paving, the site will provide attractive natural spaces that enhance the aesthetic appearance of the facility.

Storm water Management, Rate and Quality: The rooftop patio is one measure taken to reduce the amount of storm water runoff that leaves the site by 25%. This area above part of the bus storage will absorb storm water from the roof through

plants and soil composition. In addition, pervious paving will be used where feasible to allow water to infiltrate into the ground and keep runoff and associated pollutants (sediment, vehicle waste, trash) out of the regional waterways.

Storm water Management, Treatment: This strategy is intended to filter surface water on the site, eliminating contaminates and increasing on-site infiltration. Pervious paving will help filter storm water on the surface of the site by allowing it to soak into the ground naturally. The increased landscape areas will also help filter storm water and associated pollutants preventing them from entering regional waterways.

Heat Island effect, Non-Roof: Heat that radiates from asphalt paving can increase the ambient temperature on a site significantly. This puts additional load on the cooling system and creates uncomfortably hot outdoor spaces in normal warm weather. Reducing the amount of radiant heat, or "heat islands" on the site is the goal of this strategy. By covering fifty percent of the existing parking with the maintenance/parking structure the requirements are met and exceeded when additional shading on the site from trees is taken into account.

Heat Island effect, Roof: The intent of this strategy is the same as the previous goal but deals strictly with roofs. The rooftop patio, green roofs and roof materials with a high level of reflectivity will accomplish these requirements. This also helps to reduce the cooling loads on the building by reflecting solar heat rather than absorbing it.

Light Pollution Reduction: Light emitting from the site effects surrounding properties and ultimately contributes to skies in urban areas never going dark at night. To be a good neighbor, outdoor lighting will be adequate to illuminate the site, but the design of the fixtures and the lighting levels will stop at the property line. This will also save energy costs by not producing excessive amounts of artificial light that is wasted.

Water Efficiency

Water Efficient Landscaping, Non-irrigated: The climate in Wisconsin is such that plants need only enough watering to become established right after planting and they will be sustained without additional irrigation. These requirements are met with no additional provisions than normal landscape design would offer in the region.

Water Use Reduction 20%: Water consumption will be reduced by using occupancy sensors on plumbing fixtures and low flow fixtures as well as using grey water (filtered rainwater or recycled water that has not been in contact with human or food waste) for non-potable uses such as sewage conveyance and custodial uses. In addition to this the bus wash equipment will integrate a water-recycling system to greatly reduce the amount of potable water being used by the facility. The purpose of this approach is to reduce the amount of water that has been stringently treated to be safe enough for drinking, only to use it for flushing a toilet or to clean a floor or bus. Reaching thirty percent reduction from the baseline standard can also attain an additional credit.

Energy and atmosphere
Optimize Energy Performance: This strategy is intended to increase the energy efficiency of the building and its systems. Systems affected include HVAC, hot water service, interior/exterior lighting, plug loads, equipment loads, and other systems that use energy during normal use of the building. Metro's new facility will be designed and modeled to apply the most cost effective measures for life cycle cost savings, including natural ventilation and day lighting.

Renewable Energy: Metro will reduce pollution and burning of fossil fuels by creating energy on the site. Using photovoltaic cells on the roof to create electricity from the sun will reduce the amount of electricity being purchased from municipal power sources. To meet this goal renewable energy must account for 5% of the energy used on the site.

Ozone Depletion: All HVAC equipment will be free of HCFC and Halon, which have been proven to deplete the ozone layer.

Green Power: This strategy is intended to encourage the development of non-polluting, renewable energy by power companies to feed into the national power grid. By purchasing at least half of its power through a municipal utility provider from renewable energy sources Metro can attain this standard.

Materials and Resources

Building Reuse: The master plan for the facility involves maintaining a portion of the existing building on site. If this percentage is greater than 75% of the existing structure and shell of the existing building volume the intent of this strategy

will be met. Complete removal of the exterior walls at the bus storage will push the extent of reuse down and may miss the goal of 75%. This will be taken into account in schematic design for the exterior façade renovation.

Construction Waste Management: In order to divert construction waste from landfills and to capitalize on reusable material available the contractor shall implement a plan for managing waste during construction. This plan will need to separate salvageable and recyclable materials from other waste to use in other construction or return to the manufacturing industry for processing of new materials.

Resource Reuse: Similar to the credit for construction waste management, the intent of this credit is to divert construction waste from landfills by using materials that have been refurbished or salvaged. Most construction materials left over from demolition are in good condition and with minimal effort existing doors and hardware, light fixtures, conduit and cabling, and plumbing fixtures, for example, can be used in the construction of the new facilities.

Recycled Content: The intent of this approach is to increase the demand for products that contain recycled content and reduce the impacts of extraction and processing of reconstruction materials on the project. Doubling that amount of recycled content in the project will attain an additional credit.

Local/Regional Materials

This credit is based on acquiring materials that have been harvested and/or manufactured in the reign an additional credit.

Local/Regional Materials: This credit is based on acquiring materials that have been harvested and/or manufactured in the region of the project. Since the Great Lakes region is nearby and many products are manufactured close to Madison this credit can be attained by using 20% of the materials for construction that have been manufactured within a 500-mile radius. If half of the material content on the project can be harvested from local sources in the same proximity an additional credit will be awarded.

Rapidly Renewable Materials: Using materials that are rapidly renewable helps to reduce the amount of finite raw materials

that are consumed through construction. Where possible Metro's facilities will use materials that are harvested from plant sources with ten-year growth cycles or shorter to reach a minimum total of five% of the total materials on the project.

Certified Wood: Where wood is used on the project, certified wood products will be specified to account for at least half of these materials. This program encourages responsible forest management in the timber industry to preserve the natural resource of forests and the availability of wood as a future construction material.

Indoor Environmental Quality

Environmental Tobacco Smoke Control: This prerequisite strategy to LEED certification is intended to eliminate exposure to second-hand smoke from tobacco smoking. There will still be no smoking permitted in the building as it is today and any designated smoking areas will be located away from operable windows and fresh-air intakes for mechanical systems.

Carbon Dioxide Monitoring: In order to maintain indoor air quality for the occupants of the facility, carbon dioxide levels will be monitored. In this facility improved ventilation and ventilate accordingly to maintain fresh air levels in the building.

Ventilation Effectiveness: Beyond the monitoring of carbon dioxide, the HVAC systems will be designed to provide effective and efficient methods for distributing fresh air hods for distributing fresh air throughout the building while conserving energy in tempering the air through the use of heat exchangers and radiant heating where overhead doors and other exterior penetrations are frequently open.

Low-Emitting Materials: To control the amount of odorous and potentially irritating and/or harmful air contaminants in the building, materials that are identified as low volatile organic compound (VOC) content will be specified exclusively. This applies to many materials including adhesives, sealants, paints, coatings, flooring and composite wood products. These often contain chemicals or particle matter that off-gas harmful compounds to the occupants of the building.

Indoor Chemical and Pollutant Source Control: The intent of this strategy is to reduce the amount of exposure of occupants to pollutants within the building. Entryway systems such as

floor grates will be added to control the amount of outdoor pollution that is brought into the building by occupants. Also required is separation of areas where chemicals such as printing/copying, housekeeping and vehicle maintenance chemicals are used.

Controllability of Systems: Strategies for both perimeter and non-perimeter spaces in the building are intended to provide a high level of control to occupants for lighting, ventilation and thermal systems. Metro's staff will be able to efficiently tailor the conditions of their spaces while working with the building systems to do so and not against them.

Thermal Comfort: HVAC systems will be monitored to control the thermal comfort in the building based on occupancy. This will control humidity and temperature and will be greatly facilitated by separating incompatible uses in the master plan. The purpose for this is to maximize comfort and productivity for the occupants of the building.

Daylight and Views: This strategy is intended to provide building occupants a connection to the outside environment and to introduce daylight into spaces to reduce interior lighting. Metro's facility will provide 75% of the occupied space with daylight and/or views to the outdoors. The administration/operations building in particular will facilitate this on its second floor as it has a shallow floor plate with the potential for glazing on all sides that will permit day lighting into most spaces.

Section Eleven
Schematic Opinion of Probable Construction Cost

Section Eleven
Schematic Opinion of Probable Construction Cost

Introduction

The following is the revised good faith estimate of the probable cost to complete the modifications and new construction identified in the Schematic Design for Metro Transit Facility Expansion. The estimate presented in **Appendix J** was prepared by **M. Lee Corporation, Construction Cost Consultants.** The values were initially derived from information in the program document, onsite drawings, and other supplemental information. This information was augmented by the Schematic Design level drawings and narrative presented in this report.

Budgetary Assessment

Project Budget

The Project Budget for the Metro Transit Facility Expansion includes two elements: hard costs, soft costs.

- Hard costs are those related to construction.
- Soft costs are administrative costs supporting the design and management of the project.

Hard Cost

As with the conceptual estimate, appropriate amount of contingency has been built into the estimate to cover issues that have not been addressed in the schematic design process. The contingency will diminish as the design documents become more refined and decisions are made about specific issues that affect cost, allowing the actual price for construction to be more accurately assessed.

Methods and values used in determining the construction cost of the facility were based on historical data. Information regarding projects that have been recently constructed in the surrounding region that are similar in scope and construction methods as assumed in the schematic design were analyzed in this process. Values included in the estimate include the cost for everything affecting the project including, but not limited to, site work, selective building demolition, materials and labor for new construction, furniture, finishes, and equipment.

For detailed data of the costs estimate, please refer to **Appendix J,** Schematic Opinion of Probable Construction

Cost Detail. It should be noted that the cost information has been based on the following assumptions.

- The project will be constructed utilizing prevailing wage rates.
- An Escalation Factor has been included assuming a mid-point of construction of August 2008.
- A Design Contingency of 17.5% has been included due to the conceptual nature of the documentation.

Not included in the hard construction cost estimates are:

- Costs associated with removal and disposal of any hazardous materials from the existing site.

As with any estimate, the possibility that market conditions will change exists. In recent years, due to environmental events, economic cycles, and material supply and demand trends the cost of construction has increased significantly. Accordingly, the escalation factored for the duration of this project is based on schedule estimates. Upon notification to proceed, the design process for the first phase, as detailed in the phasing document, will take approximately 8 months. From that point bidding and awarding will account for the remainder of the year. From that point a thirty-month construction schedule has been assumed for the full scope of work and accounts for the design of future phases to happen concurrently with the construction of prior phases. The values are based on initial design commencing in spring of 2006. Starting the design later may result in increasing values based on continued escalation. Construction cost estimates for these phases uses escalation factors that have been taken to the mid-point of construction reflecting average increase for material and labor during the course of the project. Scopes of work that are performed early in the construction process will see little or no cost increase due to escalation, whereas the trades and materials involved at the end of construction will recognize the full effect of increasing economic conditions in the building industry

Soft Cost

Soft costs listed in the estimate will cover the funds that will be needed for permitting, insurance, materials testing, hazardous material abatement, project construction management, design services, surveying, and other items identified in the estimate preamble under section *2.1 Assumptions and qualifications* of the Schematic Opinion of Probable Construction Cost, **Appendix J**. These soft costs are figured as a percentage of

the total construction cost and have likewise been based on historical data from other projects of similar characteristics.

The following table (Table 11.A) is a summary of the construction costs presented in **Appendix J,** Schematic Opinion of Probable Construction Cost Detail derived from the Schematic Plans and Narrative. The figures in the summary table have been rounded to the nearest thousand.

Exhibit 11.A – Schematic Opinion of Probable Construction Cost

Cost Item	**Selected Concept Plan**
Site Work	$1,317,000
Maintenance and Parking Structure	$14,697,000
Administration and Ops Building	$8,789,000
Bus Storage	$11,201,000
Special Equipment (per MDG)	$5,314,000
Hard Cost Fees	$0
Soft Costs	$14,565,000
Cost Escalation 17.5%	$7,231,000
Hard Cost Total	**$63,114,000**

Costs include prorated portions of escalation figures calculated in addition to Total Costs.

These represent the primary costs in the selected concept plan and are a result of a refined cost estimating method and an actual site concept plan and building conceptual floor plans. Specific issues that impacted the costs are presented below.

- **Site work:** The preferred site on East Washington Avenue is approximately 10.5 acres and is land locked and roughly 70% utilized therefore reducing the ability to build new facilities without major demolition and phasing relocation.
- **Building Areas:** During the charrette, the Study Design Team maximized the build able site area which increased the square footage of Building Areas designed. A large amount of square footage was added to the building programs including Bus Maintenance, Servicing Areas, Building and Grounds, as well as the addition of a Parking Structure on the site above Bus Maintenance.
- **Maintenance Equipment:** The cost for special equipment was based on information provided by Maintenance Design Group.

- **Hard Cost Fees:** Any necessary Bonding and contractor fees were not included in the estimate.

Summary

The total combined estimated cost for Hard and Soft Costs for the Schematic Design is **$63,114,000**. This preliminary look at the budget for this project will allow the design team and owner's representatives to determine the appropriate scope of the project to solve the design challenge of this project. It is by no means a final cost and is intended to be a flexible document that will represent changing information to the team based on owner and design team decisions through the process. It will allow tracking of the accuracy of the design documentation to the final budget for the project.

Section Twelve
Implementation and Phasing Plan

Section Twelve Implementation and Phasing Plan

Introduction

Metro Transit is committed to delivering excellence in Transit Service to the Madison Community. In order to maintain this commitment, a strategy has been developed to implement the facility improvements outlined in the Schematic Design while maintaining operations. The following is a description of the phases including all associated demolition and new construction that will ultimately lead to full build out of the Master Plan. Ideally these phases occur one after another in a seamless construction sequence. Each phase represents a level of implementation that will allow Metro to reach a milestone in the construction build out and continue operations.

Phase One: Maintenance and Parking Facility

The first phase of development will involve the construction of the three-story vehicle maintenance facility and employee parking structure. This building will be constructed on the existing employee parking lot. The following steps will need to occur during this first phase:

- Metro Transit to obtain temporary parking space.
- Visitor parking will need to be provided near the main entry placed along Ingersoll Street in its ultimate location in the Master Plan.
- Site demolition of existing parking lot and its infrastructure.
- Non-revenue fueling island will need to either be relocated on the site or gasoline fueling services must be secured at an off site location.
- The existing Building and Grounds storage building will be removed and its functions need to be provided on site or off site close to Metro's facility.
- Construction of the foundations for the maintenance building and pits for the maintenance lifts/bays following demolition.
- Site work to accommodate existing utilities in place.
- An accurate survey of the site utilities be performed.
- The existing overhead power lines limit the aerial crane capabilities on the site and will need to be taken into consideration during the construction phase.
- The possibility to use adjacent property for staging building materials will need to be investigated.

- The impacts of construction activities on bus circulation and queuing must be taken into consideration. Currently bus traffic passes through the area that will be affected during construction.

Construction of the Maintenance/Parking Facility will consist of concrete topping slabs on double-tees supported by pre-cast concrete beams and columns. The walls will be of CMU construction with face brick veneer. Various pilasters, openings and planters will articulate the building along Ingersoll Street and set the architectural vocabulary for the new facility in this first phase. The total construction schedule will span approximately twelve months. Upon its completion, employee parking will be moved back to its final location above the maintenance facility on two levels.

Once the maintenance functions are moved out of the existing area and into the new facility, selective demolition of the existing maintenance areas can take place:

- Maintenance "B" may be left in place to provide Metro flexibility in future construction phases
- Other demolition to include maintenance, support areas, shops, parts storage, shipping and receiving, paint booth, and tire/brake shops.
- Free up space for storage that is currently taking up bus parking area and provide bus storage in the former maintenance bay locations.

See exhibits 12.A at the end of this section for a graphical model of this Phasing Plan.

Phase Two Part A Service Cycle Relocation

The second phase of construction includes the construction of a new service cycle in the existing bust storage building. In following with the phasing of construction the following will occur:

- Selective demolition of the existing AC Bay, Money Counting Room, and clearing bus parking along the south wall of the bus storage building.
- Tire Storage along the east wall will be cleared.
- Existing slab on grade to be removed in places to accommodate water and sewer lines for the new bus wash equipment.
- South exterior wall partially demolished and new exterior walls and foundations constructed.

This demolition will require protection of the bus fleet as well as some re-routing of circulation aisles within the Bus Storage area. Once these areas have been cleared and selective demolition is complete, the construction of the new Service Lanes, equipment, and associated support areas will begin.

The scope of Phase 2A will include mostly partition wall construction and equipment installation. With the exception of south exterior wall demolition and any concrete slab on grade replacement or trenching for plumbing, the existing building will be unaffected structurally. The other major impact of this phase would be the bus circulation shift upon full installation of service lanes, equipment, and Service Support Areas. After demolition of the existing Service Lanes is complete bus traffic inside the building will reverse to a permanent counter-clockwise circulation pattern. Additional bus parking will then become available in the place of the former service lanes. Exhibit 12.B shows this Phased Construction.

Phase Two Part B Bus Storage Modification

Phase Two Part B will encompass a separate scope of work that would happen concurrently with the service lane relocation to included:

- Modifications to the façade of the building along East Washington Avenue.
- Selective demolition of bus storage building.
- Reconstructing of the main bus entrance.
- Installation of translucent glazing in the Gisholt Building saw tooth roof and light monitors in the remaining Bus Storage areas.
- Selective demolition of the corrugated metal cladding on the East Washington Avenue façade.
- The planned bus displays for the vintage buses along East Washington Avenue will be built.
- The Gisholt Building to have all of the corrugated metal cladding removed from its façade and openings will be retrofitted with translucent panel glazing assemblies.
- Demolition of the saw tooth roof areas over the Gisholt Building.
- Installation of translucent glazing.
- Air handling equipment improvements during roof modifications.

Demolition of the roof above the existing service lanes and ultimately the west end of the bus storage building will need to wait until the new service lanes are functional. During this

stage protection of the fleet from construction impacts will need to be carefully managed. A significant amount of building material will be removed and installed directly above main circulation routes and parking areas, requiring some detours in bus traffic within the building.

The construction that follows demolition of the west end of the Bus Storage area will also begin to impact the administration and operations areas and will require that those functions be relocated temporarily. These functions could be relocated in any one of several temporary locations including:

- Off-site office space
- On-site in trailers
- In office space retrofitted within the former Maintenance "B"
- The remaining spaces in the existing admin/dispatch building
- The new maintenance building space

Upon clearing the area and demolishing the west side of the Bus Storage building, a new area separation wall will be built running parallel to Ingersoll Street. From this wall east to the limit of selective demolition of the bus storage will be rebuilt, clear-spanning the final drive aisle out of the Bus Storage area. See exhibit 12.C at the end of this section which graphically depicts this Phasing Plan.

Phase Three Administration and Operations Building

In the final phase of the planned expansion, the new administrative building at the corner of Ingersoll Street and East Washington Avenue will be constructed. Administration offices and Operator areas, including Dispatch will be located in this portion of the building. Before final Phase Three construction will occur, the following must be accomplished:

- Relocation of remaining administration and operations staff.
- Full demolition of the existing building along Ingersoll Street.

The construction process for this phase is projected to span twelve months and design will occur during the construction of Phase Two. The construction process will provide methods of construction to provide for a state-of-the-art facility to include:

- Steel bar joists and a concrete topping slab for floors.

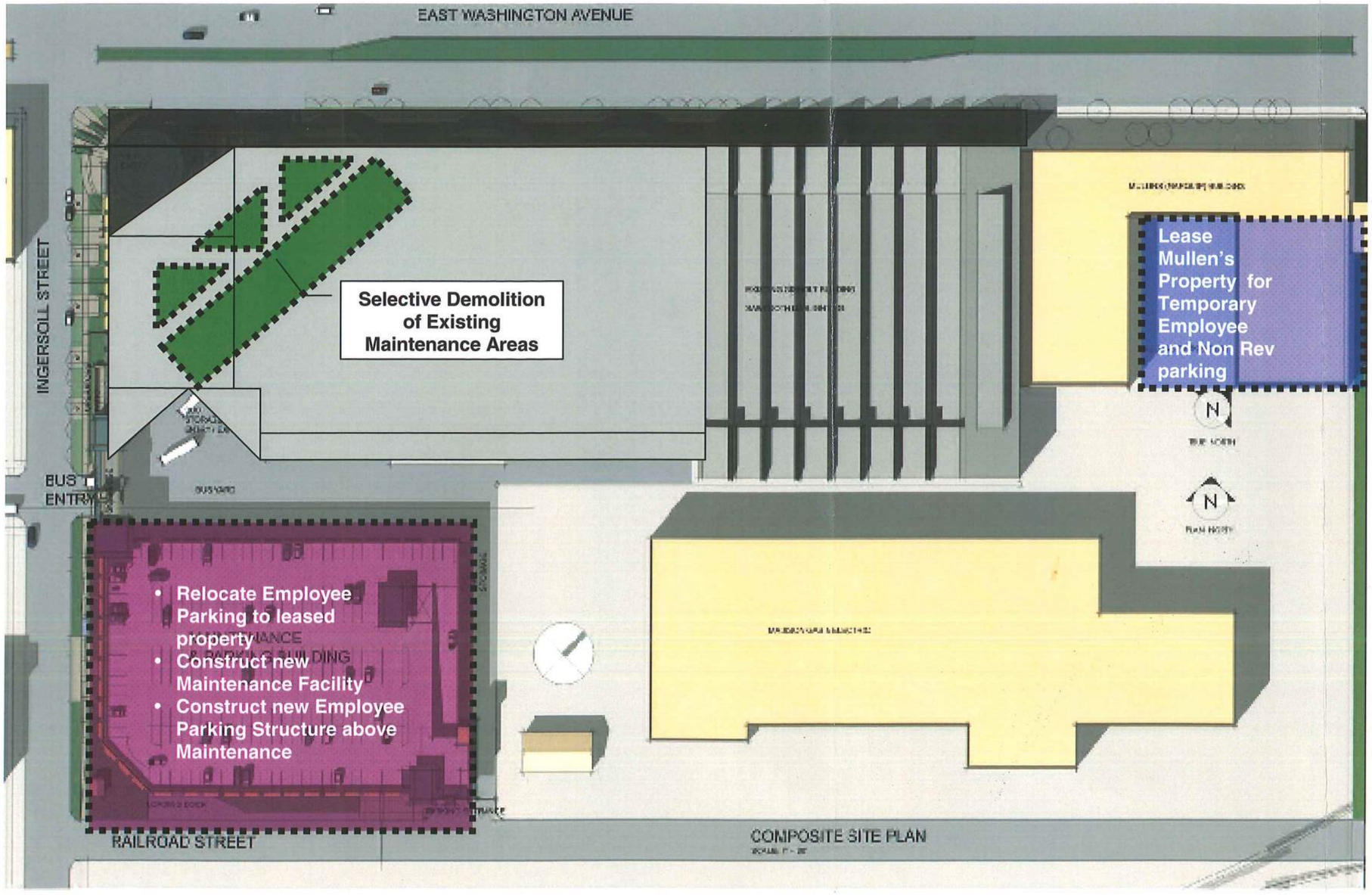
- Steel beams, girders, and columns, transferring to the foundation.
- Foundations consisting of deep H pile systems with grade beams.
- The ground floor will be a concrete slab on grade.
- The exterior walls of this new construction will be similar to the maintenance building being a masonry cavity wall of CMU and brick veneer.
- Planters, shading devices and canopies will articulate the façade of this building, giving it a pedestrian scale.

See exhibit 12.D on the following pages to see the model of Phasing Plan Three.

Conclusion

Upon completion of this phase the Metro Transit Facility Expansion will be complete. Bus storage adequate for the current bus fleet and projected fleet growth of 285 Transit Buses will be available, new Service Lanes, Maintenance Facility, parking structure and new Administration and Dispatch/Operators Facilities. The efficiency, safety and appearance of the facility will be greatly improved while still maintaining Metro Transit's presence on the site they have occupied for many years. Sustainable strategies will be in place that reduce the impact of the building on its surrounding environment and maximize its efficient use of energy and resources. These steps of facility improvement will allow Metro Transit to continue its excellent service to the Madison community.

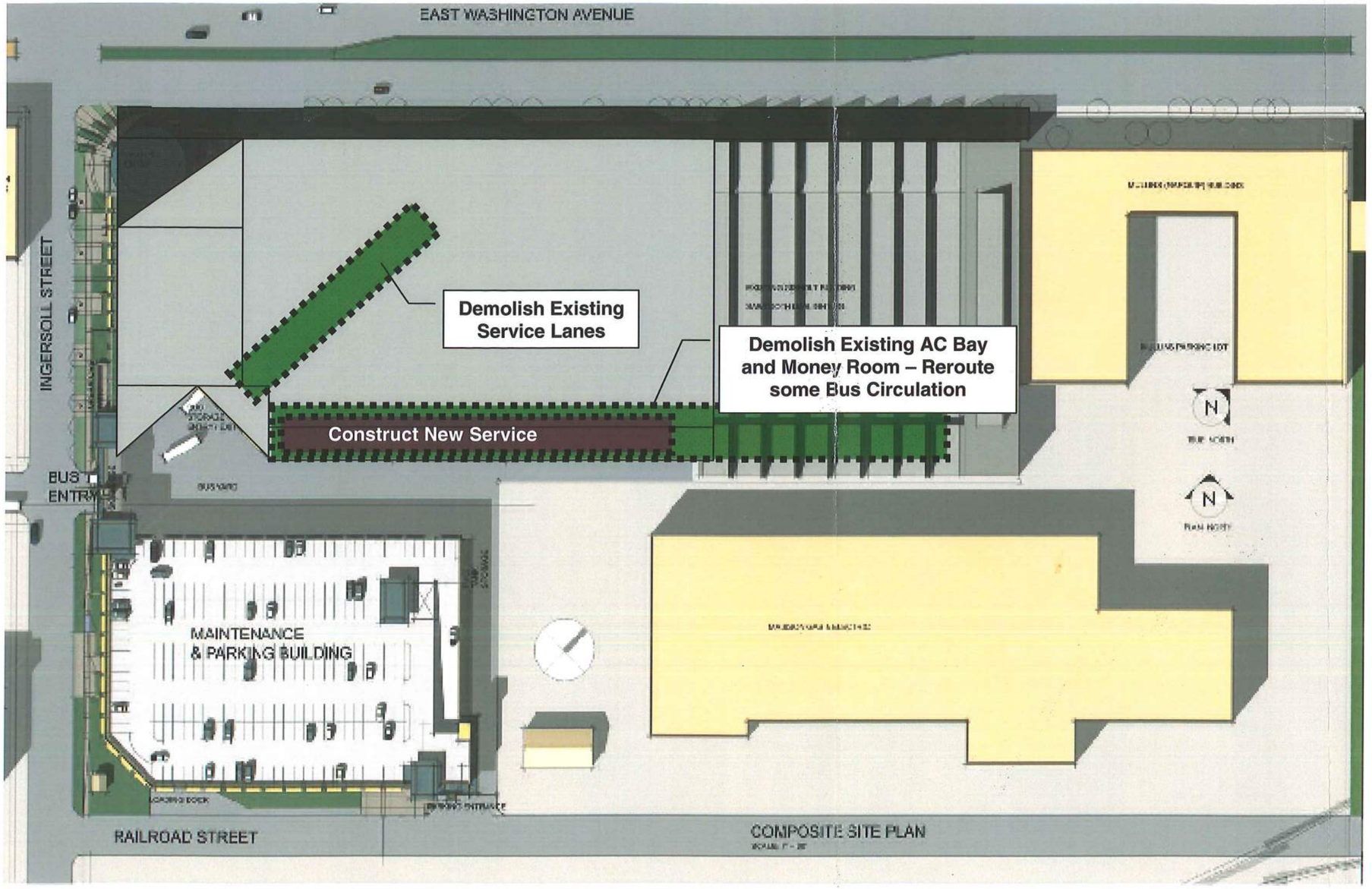
Exhibit 12.A
Phase One:
Maintenance and Parking Facility



Phase One

- New Construction
- Demolition of Interior Areas
- Temporary Use

Exhibit 12.B
Phase Two Part A:
Service Cycle Relocation



Phase Two Part A

- New Construction
- Demolition of Interior Areas
- Temporary

Exhibit 12.C
Phase Two Part B:
Bus Storage Modification

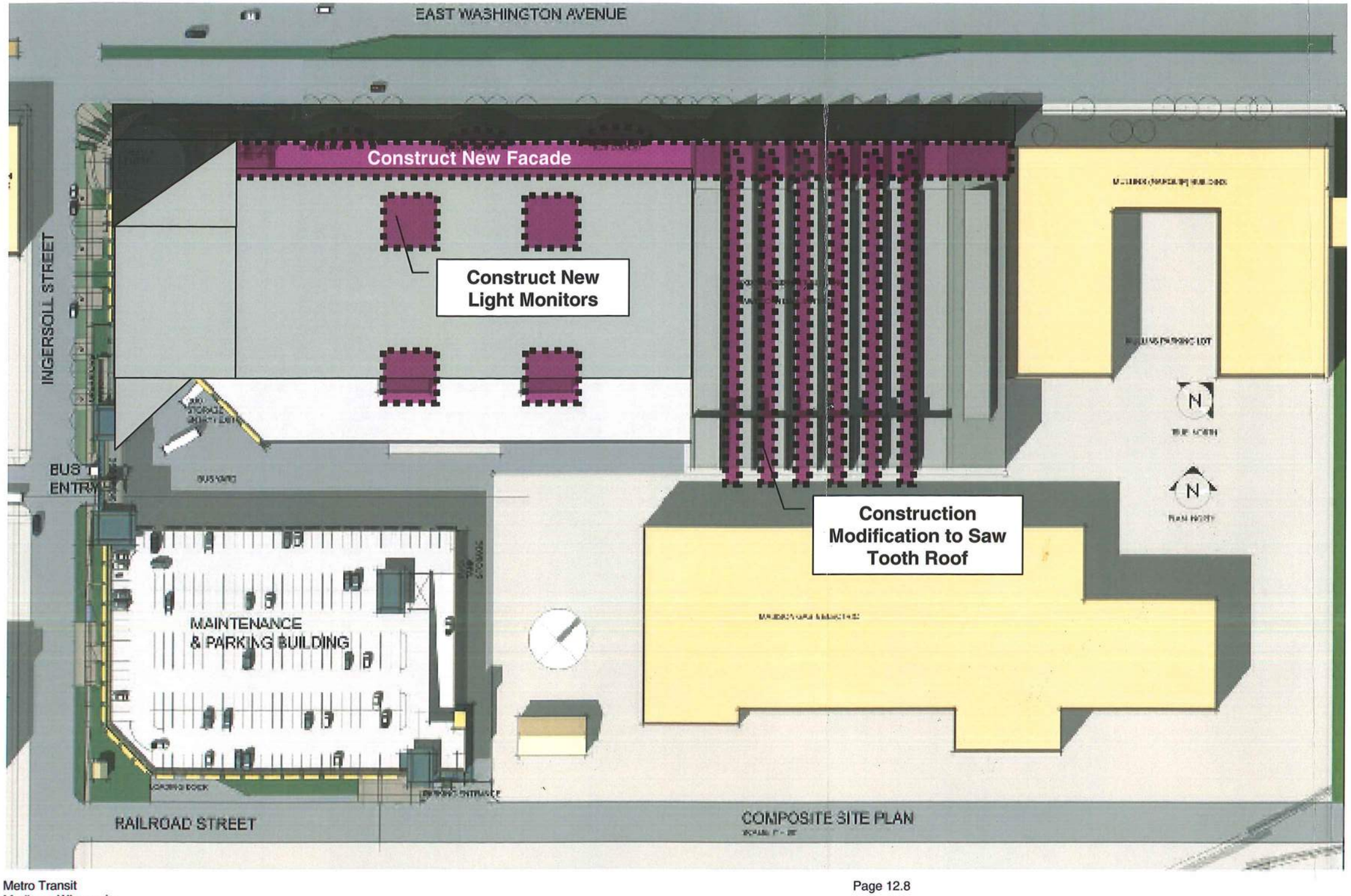
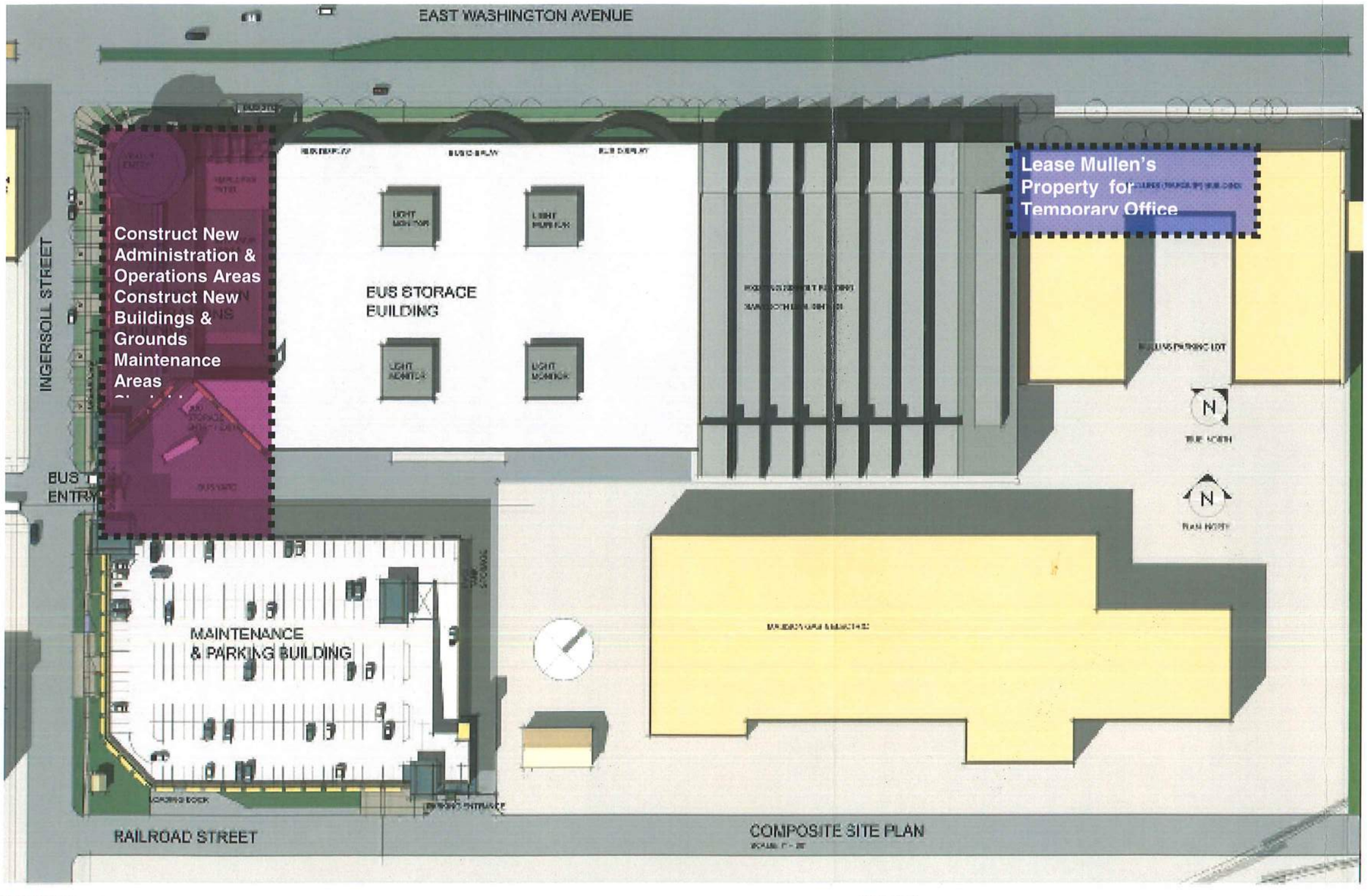


Exhibit 12.D
Phase Three:
Administration & Operations Building



Phase Three

- New Construction
- Demolition of Interior Areas
- Temporary

Implementation Schedule

The following exhibit (Exhibit 12.E) presents the proposed Implementation Plan Schedule for the proposed Metro Transit Facility Expansion. This schedule defines the implementation scenario based on the Selected Schematic Design and includes event sequence and an overlay of the project costs and the resulting financial encumbrance by fiscal year. This Implementation Schedule is based on a limited effort by the Team to define phasing and should not be considered final or comprehensive. Instead this schedule is meant to convey one possible scenario for the development of the Metro Transit Facility Expansion.

The total project budget estimated for the Selected Schematic Design was **$63,498,250**. This included both hard and Soft Costs including Metro Transit internal project costs and A/E Design Fees.

This project cost was thought to be too large for Metro Transit based on the current capital plans already in place without significant phasing. It should be noted that some additional escalation costs may need to be included to account for a more project start date more than one year out.

Exhibit 12.E

Metro Transit Facility Expansion

Metro Transit - Madison, WI

Project Schedule

Phase One

Project Event	Duration Weeks	FY/01												FY/02												FY/03												FY/04												FY/05											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Design																																																											
Design Development	15																																																										
Construction Documents	20																																																									
Bidding	6																																																									
Award/Negotiations	6																																																									
Construction																																																										
Site Demolition/Prep	6																																																									
Excavations/Foundations	11																																																									
Superstructure	7																																																									
Shell construction/Slab on grade	16																																																									
Mechanical/Electrical	13																																																									
Interior partitions	9																																																									
Interior finishes/Fixtures/Equipment	10																																																									
Final punch	4																																																									
Owner occupy	6																																																									
Capital Outlay by Fiscal Year		**$6,813,910**												**$22,560,940**												**$338,400**												**$0**												**$0**											
% of Total Capital Outlay by Fiscal Year		**10.73%**												**35.53%**												**0.53%**												**0.00%**												**0.00%**											
Cumulative Capital Outlay by Fiscal Year		**$6,813,910**												**$29,374,850**												**$29,713,250**												**$29,713,250**												**$29,713,250**											

Phase One:
Metro Transit to obtain temporary parking space.
- Visitor parking will need to be provided near the main entry placed along Ingersoll Street in its ultimate location in the Master Plan.
- Site demolition of existing parking lot and its infrastructure.
- Non-revenue fueling island will need to either be relocated on the site or gasoline fueling services must be secured at an off site location.
- The existing Building and Grounds storage building will be removed and its functions need to be provided on site or off site close to Metro's facility.
- Construction of the foundations for the maintenance building and pits for the maintenance lifts/bays following demolition.
- Site work to accommodate existing utilities in place.
- An accurate survey of the site utilities be performed.
- The existing overhead power lines limit the aerial crane capabilities on the site and will need to be taken into consideration during the construction phase.
- The possibility to use adjacent property for staging building materials will need to be investigated.
- The impacts of construction activities on bus circulation and queuing must be taken into consideration. Currently bus traffic passes through the area that will be affected during construction.

Total For Phase One
$29,713,250
47%
$29,713,250

Exhibit 12.E

Metro Transit Facility Expansion

Metro Transit - Madison, WI

Project Schedule

Phase Two

Project Event	Duration Weeks	FY/01												FY/02												FY/03												FY/04												FY/05											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Design																																																				
Design Development	11																																																			
Construction Documents	16																																																		
Bidding	5																																																		
Award/Negotiation	5																																																		
Construction																																																			
Selective/Building demolition	14																																																		
Foundation/Slab on grade	7																																																		
Shell construction	11																																																		
Mechanical/Electrical distribution	16																																																		
Bus Displays/Daylighting-Demo/Construction	10																																																		
Interior Partitions	11																																																		
Interior finishes/Fixtures	7																																																		
Final punch	6																																																		
Owner occupy	6																																																		

Phase Two-A and Two -B:

- Selective demolition of the existing AC Bay, Money Counting Room, and clearing bus parking along the south wall of the bus storage building.
- Tire Storage along the east wall will be cleared.
- Existing slab on grade to be removed in places to accommodate water and sewer lines for the new bus wash equipment.
- South exterior wall partially demolished and new exterior walls and foundations constructed.
- Modifications to the façade of the building along East Washington Avenue.
- Selective demolition of bus storage building.
- Reconstructing of the main bus entrance.
- Installation of translucent glazing in the Gisholt Building saw tooth roof and light monitors in the remaining Bus Storage areas.
- Selective demolition of the corrugated metal cladding on the East Washington Avenue façade.
- The planned bus displays for the vintage buses along East Washington Avenue will be built.
- The Gisholt Building to have all of the corrugated metal cladding removed from its façade and openings will be retrofitted with translucent panel glazing assemblies.
- Demolition of the saw tooth roof areas over the Gisholt Building.
- Installation of translucent glazing.
- Air handling equipment improvements during roof modifications.

	FY/01	FY/02	FY/03	FY/04	FY/05	Total For Phase Two
Capital Outlay by Fiscal Year	$0	$3,464,250	$16,551,750	$0	$0	$20,016,000
% of Total Capital Outlay by Fiscal Year	0.00%	5.46%	26.07%	0.00%	0.00%	32%
Cumulative Capital Outlay by Fiscal Year	$0	$3,464,250	$20,016,000	$20,016,000	$20,016,000	$20,016,000

Exhibit 12.E

Metro Transit Facility Expansion

Metro Transit - Madison, WI

Project Schedule

Phase Three

Project Event	Duration Week	FY/01												FY/02												FY/03												FY/04												FY/05											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Design																																																												
Design Development	15																																																											
Construction documents	20																																																											
Bidding	6																																																											
Awards/Negotiation	6																																																											
Construction																																																												
Building demolition	6																																																											
Excavations/Foundations	11																																																											
Superstructure	7																																																											
Shell construction/Slab on grade	16																																																										
Mechanical/Electrical-Equipment/Distribution	13																																																											
Interior partitions	9																																																											
Interior finishes/Fixtures/Equipment	10																																																											
Final punch	4																																																											
Owner occupy	6																																																											

Phase Three:
- Relocation of remaining administration and operations staff.
- Full demolition of the existing building along Ingersoll Street.
- Steel bar joists and a concrete topping slab for floors.
- Steel beams, girders, and columns, transferring to the foundation.
- Foundations consisting of deep H pile systems with grade beams.
- The ground floor will be a concrete slab on grade.
- The exterior walls of this new construction will be similar to the maintenance building being a masonry cavity wall of CMU and brick veneer.
- Planters, shading devices and canopies will articulate the façade of this building, giving it a pedestrian scale.

						Total For Phase Three
Capital Outlay by Fiscal Year	$0	$0	$317,800	$6,050,625	$7,400,575	$13,769,000
% of Total Capital Outlay by Fiscal Year	0.00%	0.00%	0.50%	9.53%	11.65%	22%
Cumulative Capital Outlay by Fiscal Year	$0	$0	$317,800	$6,368,425	$13,769,000	$13,769,000

Capital Outlay by Fiscal Year	$6,813,910	$26,025,190	$17,207,950	$6,050,625	$7,400,575	$63,498,250
% of Total Capital Outlay by Fiscal Year	10.73%	40.99%	27.10%	9.53%	11.65%	100%
Cumulative Capital Outlay by Fiscal Year	$6,813,910	$32,839,100	$50,047,050	$56,097,675	$63,498,250	$63,498,250

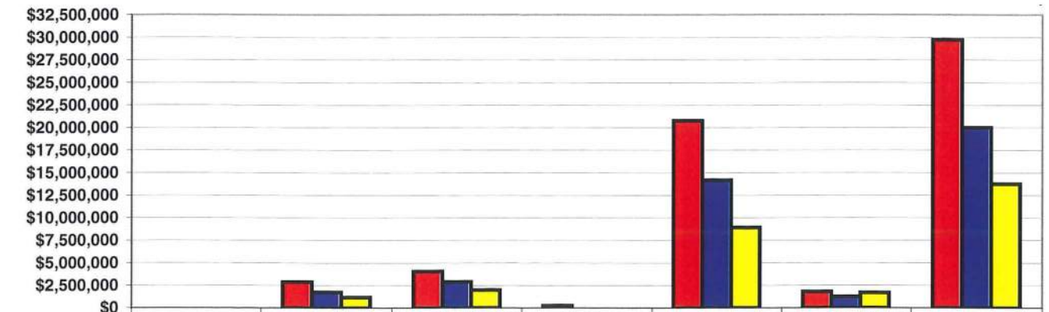
Exhibit 12.E

Metro Transit Facility Expansion

Metro Transit - Madison, WI

Project Schedule

Funding Needs by Expenditure Type



	A/E Fees	Additional Soft Costs	Design Contingency	Construction	Construction Contingency	Totals
Phase One	$2,869,284	$4,034,463	$248,503	$20,756,120	$1,804,880	$29,713,250
Phase Two	$1,728,719	$2,890,281	$0	$14,165,240	$1,231,760	$20,016,000
Phase Three	$1,188,494	$1,989,506	$0	$8,896,440	$1,694,560	$13,769,000

Funding Needs by Phase

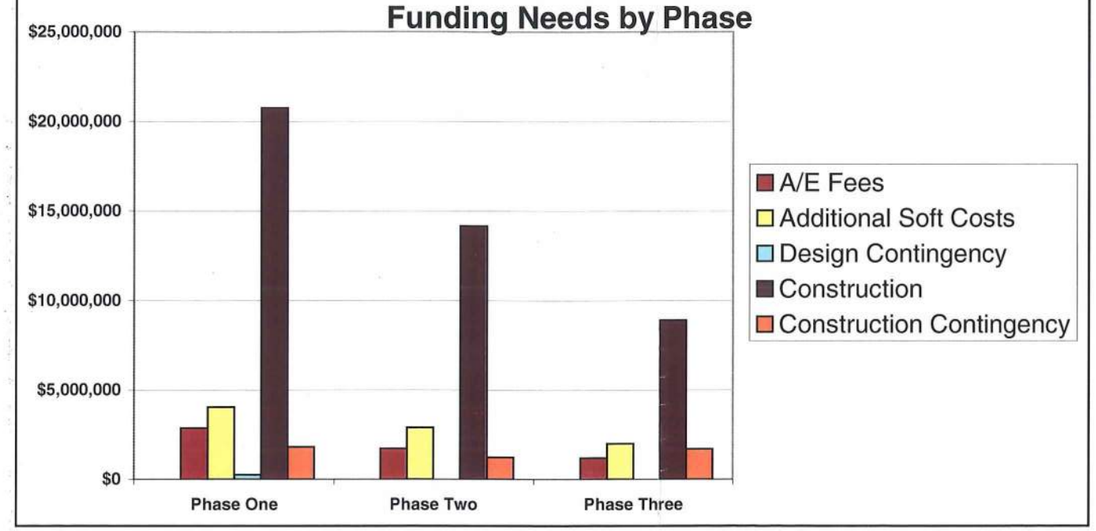


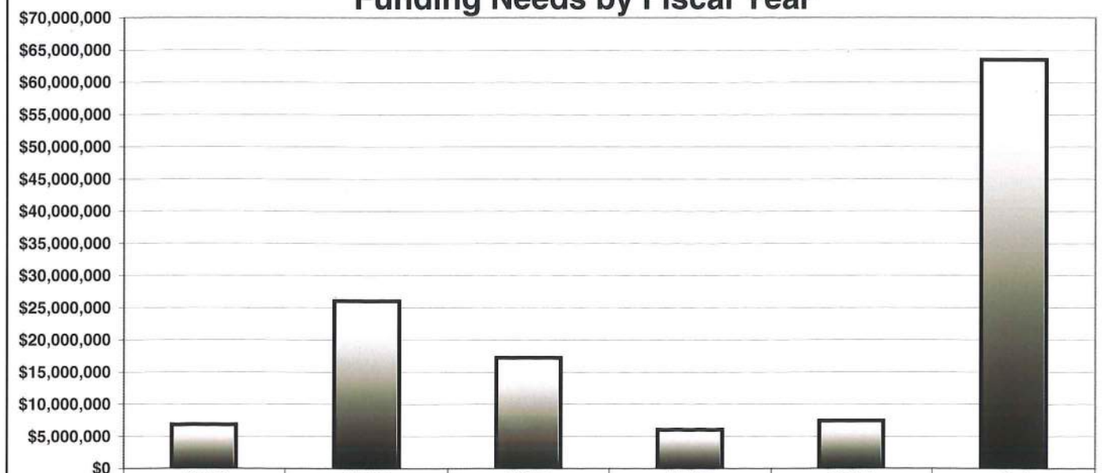
Exhibit 12.E

Metro Transit Facility Expansion

Metro Transit - Madison, WI

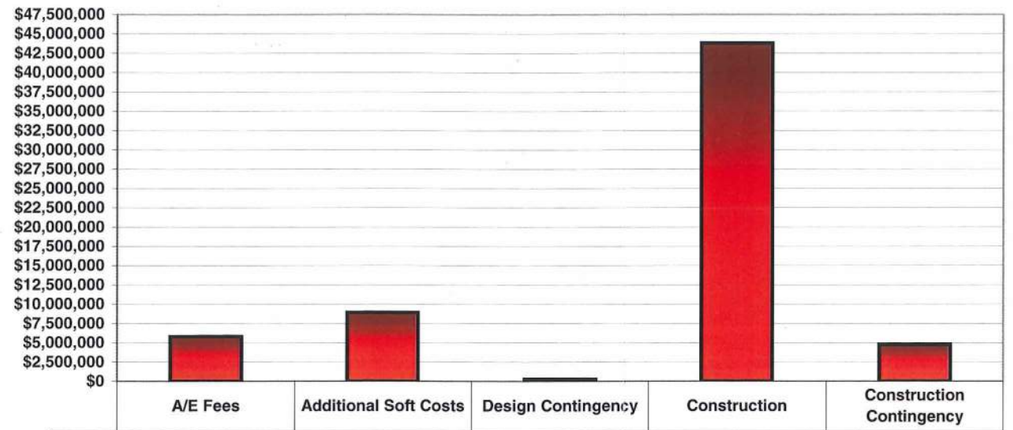
Project Schedule

Funding Needs by Fiscal Year



	FY/01	FY/02	FY/03	FY/04	FY/05	Totals
Totals	$6,813,910	$26,025,190	$17,207,950	$6,050,625	$7,400,575	$63,498,250

Funding Needs by Expenditure Type



	A/E Fees	Additional Soft Costs	Design Contingency	Construction	Construction Contingency
Series1	$5,786,497	$8,914,250	$248,503	$43,817,800	$4,731,200

Metro Transit Facility Expansion

Metro Transit - Madison, WI

Estimated Project Costs

Phase One	FY/01	FY/02	FY/03	FY/04	FY05	Totals
A/E Fees	$2,248,026	$497,007	$124,252	$0	$0	**$2,869,284**
Additional Soft Costs	$2,963,721	$856,593	$214,148	$0	$0	**$4,034,463**
Design Contingency	$248,503	$0	$0	$0	$0	**$248,503**
Construction	$1,353,660	$19,402,460	$0	$0	$0	**$20,756,120**
Construction Contingency	$0	$1,804,880	$0	$0		**$1,804,880**
Totals	**$6,813,910**	**$22,560,940**	**$338,400**	**$0**	**$0**	**$29,713,250**

Phase Two	FY/01	FY/02	FY/03	FY/04	FY05	Totals
A/E Fees	$0	$1,296,539	$432,180	$0	$0	**$1,728,719**
Additional Soft Costs	$0	$2,167,711	$722,570	$0	$0	**$2,890,281**
Design Contingency	$0	$0	$0	$0	$0	**$0**
Construction	$0	$0	$14,165,240	$0	$0	**$14,165,240**
Construction Contingency	$0	$0	$1,231,760	$0	$0	**$1,231,760**
Totals	**$0**	**$3,464,250**	**$16,551,750**	**$0**	**$0**	**$20,016,000**

Phase Three	FY/01	FY/02	FY/03	FY/04	FY05	Totals
A/E Fees	$0	$0	$118,849	$876,514	$193,130	**$1,188,494**
Additional Soft Costs	$0	$0	$198,951	$1,467,261	$323,295	**$1,989,506**
Design Contingency	$0	$0	$0	$0	$0	**$0**
Construction	$0	$0	$0	$2,859,570	$6,036,870	**$8,896,440**
Construction Contingency	$0	$0	$0	$847,280	$847,280	**$1,694,560**
Totals	**$0**	**$0**	**$317,800**	**$6,050,625**	**$7,400,575**	**$13,769,000**

Totals	**$6,813,910**	**$26,025,190**	**$17,207,950**	**$6,050,625**	**$7,400,575**	**$63,498,250**

All Phases	FY/01	FY/02	FY/03	FY/04	FY05	Totals
Totals	**$6,813,910**	**$26,025,190**	**$17,207,950**	**$6,050,625**	**$7,400,575**	**$63,498,250**

Metro Transit Facility Expansion

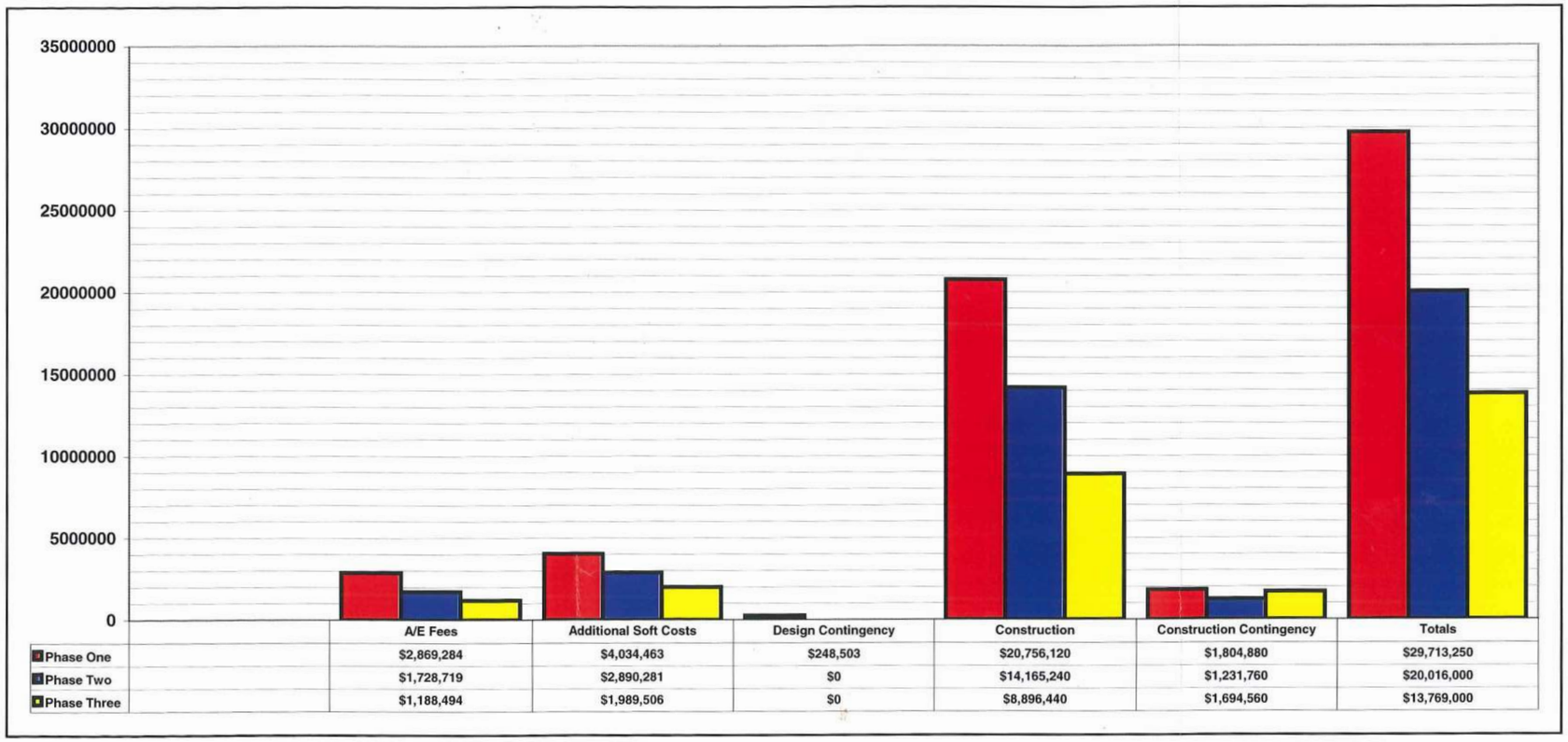
Metro Transit - Madison, WI

Estimated Project Costs

Phase One	Totals
A/E Fees	$2,869,284
Additional Soft Costs	$4,034,463
Design Contingency	$248,503
Construction	$20,756,120
Construction Contingency	$1,804,880
Totals	$29,713,250

Phase One	Totals
A/E Fees	$1,728,719
Additional Soft Costs	$2,890,281
Design Contingency	$0
Construction	$14,165,240
Construction Contingency	$1,231,760
Totals	$20,016,000

Phase One	Totals
A/E Fees	$1,188,494
Additional Soft Costs	$1,989,506
Design Contingency	$0
Construction	$8,896,440
Construction Contingency	$1,694,560
Totals	$13,769,000



	A/E Fees	Additional Soft Costs	Design Contingency	Construction	Construction Contingency	Totals
Phase One	$2,869,284	$4,034,463	$248,503	$20,756,120	$1,804,880	$29,713,250
Phase Two	$1,728,719	$2,890,281	$0	$14,165,240	$1,231,760	$20,016,000
Phase Three	$1,188,494	$1,989,506	$0	$8,896,440	$1,694,560	$13,769,000

Phase One	Phase One	Phase Two	Phase Three	Totals
A/E Fees	$2,869,284	$1,728,719	$1,188,494	$5,786,497
Additional Soft Costs	$4,034,463	$2,890,281	$1,989,506	$8,914,250
Design Contingency	$248,503	$0	$0	$248,503
Construction	$20,756,120	$14,165,240	$8,896,440	$43,817,800
Construction Contingency	$1,804,880	$1,231,760	$1,694,560	$4,731,200
Totals	$29,713,250	$20,016,000	$13,769,000	$63,498,250

Facility Expansion

Metro Transit - Madison, Wisconsin

Cost Breakdown by Fiscal Year

Description	Project Costs	Remarks
Phase One - Maintenance and Parking Facility		
Hard Costs	22,561,000	46% of total construction cost
Soft Costs	6,768,000	
Estimated Project Costs	**29,329,000**	
FY 1		
A/E Fees (through SD)	384,250	Complete, not added to Phase One total cost
A/E Fee (100% Final Design)	1,863,776	75% billed (DD, CD, Bidding, Award)
Total A&E Fees	2,248,026	
Additional soft costs	2,963,721	
Design contingency	248,503	
Construction (6% complete)	1,353,660	
	6,813,910	
FY 2		
A/E Fee (95% CA)	497,007	95% billed - 20% phase 1 fee (Construction Administration)
Additional soft costs	856,593	
Construction (100% complete)	19,402,460	
Construction contingency	1,804,880	8% of construction cost
	22,560,940	
FY 3		
A/E Fee (CA)	124,252	100% billed - 5% phase 1 fee (Record Drawings)
Additional soft costs	214,148	
	338,400	
FY 4		
Phase 3	0	
	0	
FY 5		
Phase 3	0	
	0	
Total	#REF!	

Facility Expansion

Metro Transit - Madison, Wisconsin

Cost Breakdown by Fiscal Year

Description	Project Costs	Remarks
Phase Two - Service Cycle Relocation/Bus Storage Modification		
Hard Costs	15,397,000	32% of total construction cost
Soft Costs	4,619,000	
Estimated Project Costs	**20,016,000**	
FY 1		
Concept Design	0	
	0	
FY 2		
Phase One Design	0	
	0	
FY 3		
A/E Fee (100% Final Design)	1,296,539	75% billed (DD, CD, Bidding, Award)
Additional soft costs	2,167,711	
	3,464,250	
FY 4		
A/E Fee (CA)	432,180	100% billed - 20% Construction Administration, 5% record drawings
Additional soft costs	722,570	
Construction (100% complete)	14,165,240	
Construction contingency	1,231,760	
	16,551,750	
FY 5		
Phase 3	0	(15% of total value)
	0	

Facility Expansion

Metro Transit - Madison, Wisconsin

Cost Breakdown by Fiscal Year

Description	Project Costs	Remarks
Phase Three - Administration and Operation Building		
Hard Costs	10,591,000	22% of total construction cost
Soft Costs	3,178,000	
Estimated Project Costs	**13,769,000**	
FY 1		
Concept Design (see above)	0	
	0	
FY 2		
Phase One Design (see above)	0	
	0	
FY 3		
Phase Two Design(see above)	0	
	0	
FY 4		
A/E Fee (DD)	118,849	10% billed (DD)
Additional soft costs	198,951	
	317,800	
FY 5		
A/E Fee (100% Final Design)	876,514	84% billed (DD, CD, Bidding, Award, Construction Administration [35%])
Additional soft costs	1,467,261	
Construction (35% complete)	2,859,570	
Construction Contingency	847,280	
	6,050,625	
FY 6		
A/E Fee (CA)	193,130	100% billed (20% Construction Administration [65%], 5% Record Drawings)
Additional soft costs	323,295	
Construction (100% complete)	6,036,870	
Construction Contingency	847,280	
	7,400,575	

Conclusion

Upon completion of this phase the Metro Transit Facility Expansion will be complete. Bus storage adequate for the current bus fleet and projected fleet growth of 285 Transit Buses will be available, new Service Lanes, Maintenance Facility, parking structure and new Administration and Dispatch/Operators Facilities. The efficiency, safety and appearance of the facility will be greatly improved while still maintaining Metro Transit's presence on the site they have occupied for many years. Sustainable strategies will be in place that reduce the impact of the building on its surrounding environment and maximize its efficient use of energy and resources. These steps of facility improvement will allow Metro Transit to continue its excellent service to the Madison communit