



NASA AMES DEVELOPMENT PLAN

NASA RESEARCH PARK AND BAY VIEW

TRANSPORTATION DEMAND
MANAGEMENT PLAN

D•R•A•F•T R•E•P•O•R•T

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Submitted by



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1. Introduction

1.1 NRP TDM Plan Purpose

The Transportation Demand Management (TDM) Program for the NASA Research Park (NRP) and Bay View has been developed to:

- 1.1.1 Support NASA's sustainable development goals;
- 1.1.2 Provide a transportation infrastructure that supports a pedestrian-oriented environment;
- 1.1.3 Reduce vehicle trips to the site to minimize the traffic and environmental impacts of the land uses; and
- 1.1.4 Increase the attractiveness of the site by increasing transportation choices.

1.2 NRP TDM Plan Applicability

1.2.1 The requirements of this NRP TDM Plan apply to all partners, lessees, permittees, concessioners, cooperators, and other tenants located in the NASA Research Park and Bay View areas pursuant to the NASA Ames Development Plan Environmental Impact Statement (NADP EIS). At its sole and absolute discretion, NASA may adjust from time to time the total square feet subject to this NRP TDM Plan. Figure 1-1 shows the site.

1.2.2 This area includes the NASA Research Park (NRP), approximately 3,029,000 square feet of educational, office, research and development, museum, conference center, housing and retail space covered under the conditions of the NASA Ames Development Plan EIS.

1.2.3 This area also includes the Bay View district, approximately 1,240,000 square feet of residential, retail, child care, and support services covered under the conditions of the NASA Ames Development Plan EIS.

1.3 TDM Plan Authority

1.3.1 The approval documents for the NASA Ames Development Plan (NADP) that govern adherence to, and participation in, this TDM Plan are the Space Act Agreement and Lease Agreement signed by each partner/lessee.

1.3.2 This TDM Plan is also governed by Executive Order 13148, "Greening the Government Through Leadership in Environmental Management." EO 13148 charges each Federal agency to ensure "...that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision-making and long-term planning process, across all agency mission, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management." This TDM Plan complies with EO 13148 by developing strategies to reduce vehicle trips, which reduces emissions of nitrogen oxides and hydrocarbons, thereby reducing ground-level ozone. Vehicle trip reduction reduces paving of land. Excessive paving disrupts groundwater cycles, increases temperatures, and increases the flow of contaminants to surface waters. Vehicle trip reduction is also one step toward reducing dependence on fossil fuel, which is inherently unsustainable.

1.4 Other Approved or Proposed Development at the NASA Ames Research Center

1.4.1 Ames Campus and Eastside Airfield Districts: The NADP also proposes limited development located within the Ames Campus (500,000 square feet of office, high density R&D uses) and the Eastside Airfield (12,000 for the relocation of the Moffett Field control tower). Development in these areas will remain behind the NASA fence line and is not subject to the TDM programs or trip generation targets laid out in this TDM plan. Employees and employers located in these two areas of the Ames Research Center will be offered the existing and future NASA Ames Campus TDM programs. These TDM programs are separate from those described in this plan.

1.4.2 The 1994 Comprehensive Use Permit Environmental Assessment ("CUP EA"): This includes approximately 120,000 square feet for the Carl Sagan Center for the Study of Life in the Cosmos and 600,000 square foot Lockheed Martin Development area, as well as 167,000 square feet of additional development identified pursuant to the CUP EA, located entirely within the NRP.

1.5 Consistency Among TDM Plans

1.5.1 While this NRP TDM Plan is an independent requirement of the NADP EIS to ensure that the projects minimize their traffic and air quality impacts, the proposed TDM Plan under the CUP EA (CUP EA TDM Plan) will be designed to be consistent with this NRP TDM Plan.

1.5.2 Pursuant to the individual lessee's ("Lessee's") Space Act Agreement with NASA and Lease with NASA, uses under the CUP EA would be subject to the requirements of the "CUP EA TDM Plan." Phases 1 through 4 identified in the CUP EA TDM Plan are identical to Phases 1 through 4 identified in the NRP TDM Plan. Once development moves into Phase 1, all land uses within the proposed NRP would be subject to the exact same TDM requirements.

1.5.3 Proposed development on the "Ames Campus" and "Eastside Airfield" will remain behind the NASA fence line and is not subject to this NRP TDM Plan. Employees and employers located in these two areas of the Ames Research Center will be offered the existing and future NASA Ames Campus TDM programs. These TDM programs are separate from those described in this Plan.

1.6 Program for a Single Plan

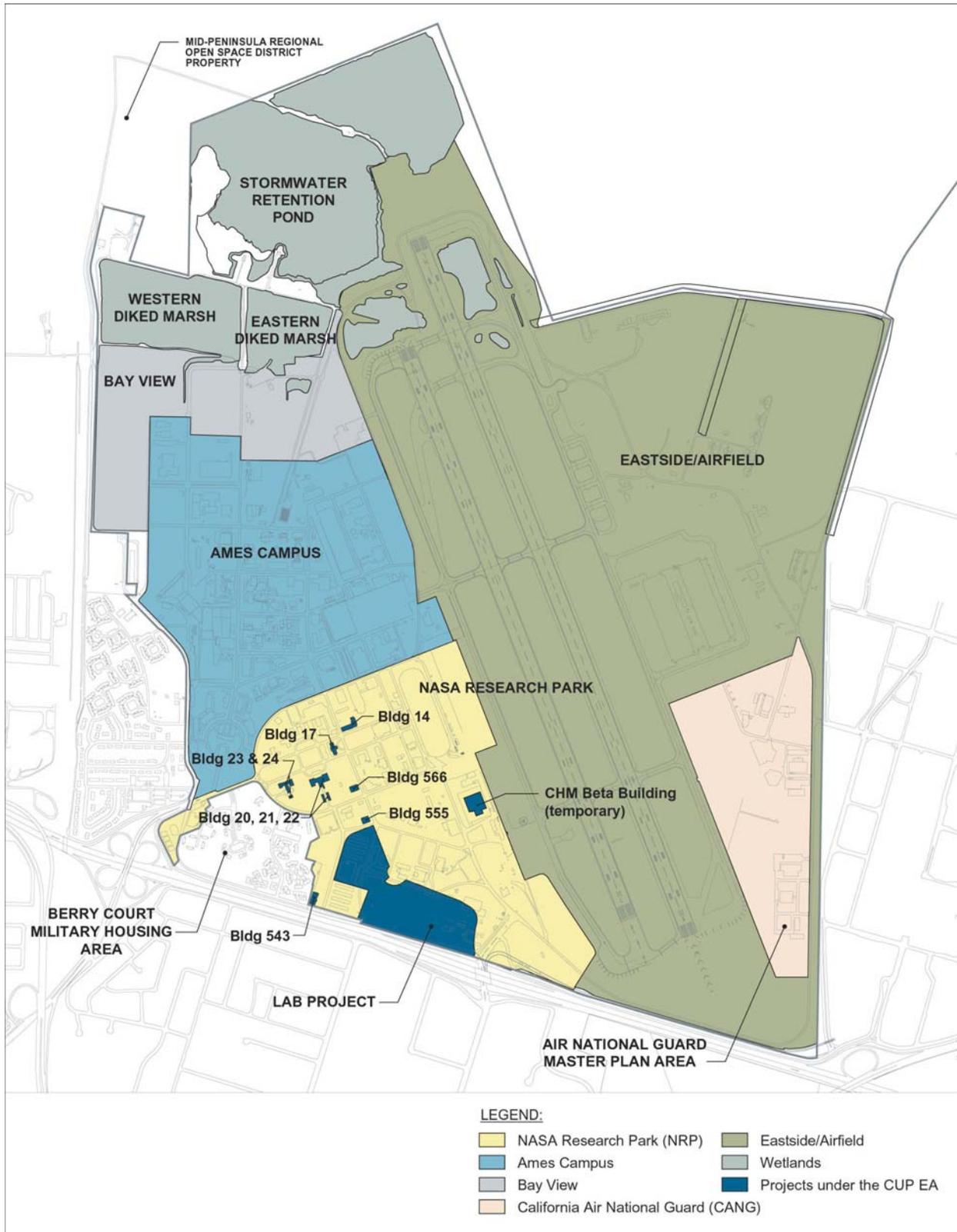
1.6.1 Different environmental entitlement approvals for each area of development within the Ames Research Center (e.g., the projects authorized by the CUP EA and the NADP) require the development of separate TDM plans. It is NASA's intent, however, that a consistent and comprehensive TDM Program ("Comprehensive Program") will be developed for the site.

1.6.2 Once the Comprehensive Program is established (i.e. Phase 1), it is anticipated that the NASA Research Park Tenants Association ("TA") will act as the Transportation Management Association ("TMA") for the land uses subject to this NRP TDM Plan.

1.7 Summary of Organization of NRP TDM Plan

Section 2 presents the goals and objectives of the plan. Section 3 explains the plan's implementation, evaluation and compliance strategies. Section 4 presents descriptions of the NRP TDM Plan elements and Section 5 describes the parking management program.

Figure 1-1: Site Map



2. GOALS AND OBJECTIVES

2.1 Sustainable Development

2.1.1 As it proceeds to implement the NADP EIS, NASA seeks to adhere to the maximum extent feasible to “sustainable” planning and design concepts. The concept of sustainability means complete physical, economical and social systems that produce no polluting waste products, can continue operating indefinitely and do not prevent other people and systems from enjoying the same.

2.1.2 Applied to transportation, this goal translates into the following project objectives:

- 2.1.2.1 Promote access to the site via transportation modes that reduce the consumption of gasoline;
- 2.1.2.2 Limit the amount of land that will be paved;
- 2.1.2.3 Reduce vehicle trips to reduce air pollutants, including greenhouse gases;
- 2.1.2.4 Reveal the “hidden” costs of parking to consumers and other decision-makers; and
- 2.1.2.5 Reduce peak-hour vehicle trips, since these add more demand on the transportation system than do trips made at other times of the day.

2.2 Campus Urban Design Vision

The TDM Plan supports a land use strategy to create a consistent, pedestrian-friendly, campus-like environment throughout the land parcels covered under the NADP. Initial traffic modeling at the NRP and Bay View assumed traditional trip generation rates for the type of development that would occur at the site. This modeling produced traffic volumes requiring four-lane roadways throughout the NRP. Such wide, busy streets are inconsistent with the NRP design envisioned by the NRP partners.

Additional traffic modeling showed that in order for the NRP’s roadway infrastructure to meet the urban design vision, vehicle trip generation would have to be reduced to achieve the narrower roadway widths desired by the NRP partners and NASA. The TDM plan is intended to achieve this reduction in vehicle trips, as well as increase vehicle occupancy and diversify modes of transportation.

2.3 Minimize Traffic and Air Quality Impacts

2.3.1 Projects under the NADP EIS will be designed and developed to minimize traffic and air quality impacts and to:

- 2.3.1.1 Promote orderly and controlled growth at Ames Research Center;
- 2.3.1.2 Provide workable relationships between land uses and the transportation system;
- 2.3.1.3 Conserve energy and land resources; and

2.3.1.4 Keep pollution at or below regulated levels¹

2.3.2 This NRP TDM Plan reflects NASA's commitment to aggressive strategies, including parking management, parking pricing and urban design strategies that create a pedestrian-friendly environment.

2.4 Increase Transportation Choices

Increasing transportation choices increases the attractiveness to tenants and future employees. Providing shuttle connections, encouraging increased transit, offering carpool, and transit subsidies, and providing a comprehensive bicycle network are programs that increase employee convenience, thereby increasing the attractiveness of the site as a place to do business.

The NADP also calls for the development of 810 dormitory units in the NRP area and 1,120 townhome and apartment units in Bayview. At least one resident of each Bayview unit must work or go to school at NASA Ames and 100% of dormitory unit residents must work or go to school at NASA Ames. Opportunities to live near the NRP will increase the ability of many people to accept employment or attend school at the NRP, thereby improving recruitment and retention for employers located in the NRP.

2.5 Trip Reduction Objectives

2.5.1 The NRP TDM Plan is designed to achieve an Average Vehicle Ridership of 1.72, or 58 cars per 100 commuting² employees/students coming to the site. This represents a 32% reduction beyond the baseline of 85.6 cars per 100 employees (an AVR of 1.17)³. Trips generated by the on-site housing that are traveling to destinations outside the NRP will not be counted in the annual AVR goal assessment. (See Section 3.5.1 for Cordon Count Guidelines and 3.5.2 for Cordon Count Conceptual Plan.)

2.5.2 The majority of trips will be generated by employees and students, while the rest will be generated by visitors and delivery vehicles. The NRP TDM program is designed to make it more feasible for employees, students and visitors to access the site using alternatives to the single occupant vehicle. The majority of the trip reduction impact, however, must come from employee and student trips.

2.5.3 A mode split objective needed to produce 58 cars per 100 daytime⁴ students and employees is shown in Figure 2-1. It is possible to achieve an AVR of 1.72 with different combinations of commute mode. The mode split shown in Figure 2-1 is one example.

¹ The development that will occur under the Ames Research Center NADP EIS can produce no more than 100 tons of NO_x emissions per year. See Appendix A for information on how these limits relate to trip generation.

² Commuting means employees and students who travel to the site on a regular basis of once a week or more. Includes those traveling from NRP and BayView housing to work or school within NRP.

³ Baseline measurement represents the number of cars per 100 employees at the worksites of Santa Clara resident employees where there are no TDM programs. Source: RIDES for Bay Area Commuters, *Commute Profile 2000*.

⁴ Daytime means the hours in which the cordon count (as described in Section 3.5.1) will be conducted. This will be a time period that includes, but is broader than, the peak hour (7 AM to 8 AM) so that student trips can be captured in the count.

Figure 2-1: Sample Mode Split Objective for Uses Under the NRP TDM Plan

Commute Mode	Mode Split
Drive Alone	52%
Carpool / Vanpool	12%
Bicycling ^{5 6}	12%
Transit ⁷	15%
Walk ⁸	10%
TOTAL	100%
Vehicle Trips/100	57
Average Vehicle Ridership	1.75

3. IMPLEMENTATION PLAN

3.1 Project Phasing

3.1.1 The NRP TDM Plan includes four phases. The phasing is designed to ensure that the programs are implemented in a manner that is supported by the level of development on site. The NRP TDM Plan's phasing requirements are based upon the total number of employees working at proposed NADP sites *plus* CUP EA sites. The NRP TDM program will take effect when the first project under the NADP EIS is occupied.

3.1.1.1 Phase 1: 0 to 2,675 employees/daytime students;

3.1.1.2 Phase 2: 2,675 to 5,999 employees/daytime students;

3.1.1.3 Phase 3: 6,000 to 7,999 employees/daytime students;

3.1.1.4 Phase 4: 8,000 to project build-out (about 12,226⁹ employees/daytime students)¹⁰ (9,626 employees/daytime students associated with NADP EIS; 2,600 associated with CUP EA)

⁵ Assumes that affiliates of NRP land uses have equal opportunity to live in any on-site housing that may be developed in the future under the proposed NADP.

⁶ Bicycling mode share comes from employees and students living off-site as well as in the proposed on-site housing. It is estimated that 1,400 students and employees affiliated with onsite partners will live in the proposed Bay View housing and that 1,560 students and employees affiliated with onsite partners will live in the NRP housing. It is estimated that about 79% of these people will be affiliated with NADP EIS land uses and that 100% of these people will ride the shuttle, walk, carpool, bicycle to the NRP or be dropped off at on-site work or school locations.

⁷ Transit mode share comes from employees and students living off-site as well as in Bay View.

⁸ Walk mode share comes from employees and students primarily living in housing located in Buildings 19, 20 and Parcel 6. (1,560 total; ~1,250 affiliated with EIS)

⁹ This employee/student count represents the estimated number of employees and daytime students under the CUP EA and NADP. This includes roughly 2,100 Lab Project employees, 500 "other CUP EA" employees, 6,626 NADP EIS employees, 3,000 daytime students.

¹⁰ Phases 2 through 4 are triggered only if development under the proposed NADP is approved.

3.2 Trip Reduction Phasing

The trip reduction objective of 58 cars/100 employees (1.72 Average Vehicle Ridership (“AVR”)) will be phased in over the course of the development as follows:

- 3.2.1 Phase 1: AVR goal of 1.33 (75 cars/100 employees/ students)
- 3.2.2 Phase 2: AVR goal of 1.45 (69 cars/100 employees/ students)
- 3.2.3 Phase 3: AVR goal of 1.60 (62.5 cars/100 employees/students)
- 3.2.4 Phase 4: AVR goal of 1.72 (58 cars/100 employees/students)¹¹

Phasing of the AVR goal is necessary because the critical mass of on-site employees will not initially exist to support the high-frequency shuttle services and carpool/vanpool capacity needed to achieve such aggressive AVR goals. In addition on-site housing will not be built until University-partner development phases begin, on-site retail, child care and fitness facilities will not reach their full potential until at least Phase 2, and at the start of development, abundant parking on open surface lots will be available to employees and visitor, thus requiring a phase in of the controlled-parking supply and parking pricing. Finally, parking prices will increase over time based on project and parking development.

3.3 Transportation Management Agency

3.3.1 Definition: A Transportation Management Agency (“TMA”) is an organization dedicated to the improvement of transportation access to a specific geographic area. NASA expects that the TMA will bear ultimate responsibility for running the site-wide TDM programs described in Section 4.3, managing the parking supply, and providing support to employers for any employer-specific programs that will be developed by Lessees.

3.3.2 Requirements:

- 3.3.2.1 Each partner/lessee/tenant is required to fund the TMA based upon the funding strategy described in Section 3.3.4.
- 3.3.2.2 Each partner/lessee/tenant is required to designate an employee to serve as a point of contact for the TMA.
- 3.3.2.3 Each partner/lessee/tenant shall serve on the board of directors of the TMA. Depending on the number of tenants, appointment to the TMA Board could rotate over time.
- 3.3.2.4 Each partner/lessee/tenant shall cooperate with the TMA to share information about their employees that will be useful to TDM programming. (e.g. GIS plotting information)

¹¹ Phases 2 through 4 are triggered only if development under the proposed NADP is approved.

3.3.3 TMA Formation: Initial TMA formation may occur prior to site occupation by uses under the NADP EIS. If the TMA has not yet been formed by the time this TDM Plan becomes effective, the TMA will be created by the partners through the Tenant's Association to manage all site-wide TDM programs.

3.3.4 TDM Program Funding

3.3.4.1 In Phase 1, the TMA and the site-wide TDM programs will be funded by revenues generated by TMA fees that are assessed on each Lessee/Partner/Tenant. Lessees/Partners/Tenants will independently continue to fund those aspects of the TDM program identified in Section 4.4.

3.3.4.2 Upon commencement of parking fees, (Phase 2), the TMA and the site-wide TDM programs will be funded by revenues generated from parking fees.¹² Lessees/Partners/Tenants will independently continue to fund those aspects of the TDM program identified in Section 4.4. Figure 3-1 estimates in 2002 dollars the TMA costs and revenues for each phase at recommended levels of service.

3.3.4.3 The fees in Figure 3-1 are based on the estimated costs of the TDM program elements described in Section 4. A budget showing the costs of the TDM program elements by project phase is shown in Figure 4-7. While these estimates are based upon the technical expertise and experience of the plan preparer, the estimates provided herein are for planning purposes only and neither Nelson-Nygaard Consulting Associates nor NASA warrant or guarantee these estimates. Actual costs may vary.

3.3.4.4 The TMA board or the tenant's association will be responsible for determining the best way to assess fees prior to revenue generation from parking fees (i.e. during Phase 1 and Phase 2, prior to establishment of parking charges). A per-employee fee methodology is presented in Figure 3-1. Other options could include a per-square-foot fee or per vehicle trip fee. Additionally, the structure could be set to include per-visitor or housing unit surcharges to meet the needs of the development partners as agreed to by the future TMA board or tenant's association.

¹² As per Chapter 5 of this TDM Plan, parking fees would be required to be set to cover the costs to provide parking and the cost of the TDM programs.

Figure 3-1: Potential TMA Annual Dues
for Recommended Levels of Programs

	Phase 1	Phase 2 (post implementation of parking fees)	Phase 3	Phase 4
Estimated Site-wide TDM Program Costs	\$915,000	\$2,530,000	\$3,840,000	\$4,020,000
Parking Fees Revenue Available to Support TMA programs	N/A	\$2,800,000	\$4,200,000	\$4,500,000
Amount to be funded through TMA dues	\$915,000	\$0	\$0	\$0
# of employees & daytime students at end of phase ¹³	2,675	2,676 to 5,999	6,000 to 7,999	8,000 to 12,226
Per Ee/Student Fee estimate	\$342/ee & daytime student	\$0/ee & daytime student ¹⁴	\$0/ee & daytime student	\$0/ee & daytime student

Appendix C provides information about revenues generated from parking fees.

Because the plan requires partners/lessees/tenants to charge for parking based on the cost to provide the parking, commercial and non-commercial partners save the cost they would normally spend to provide the parking supply for their employees. (For commercial partners, this also includes land costs.) The TDM program offers a savings over what partners would traditionally pay to provide access to their employees, students and visitors through a 100% subsidized parking supply. Further savings are realized, because partners are required to construct less parking than traditional parking ratios would require.

¹³ Includes all daytime students and all employees covered by the NRP TDM plan and CUP EA TDM plan.

¹⁴ Prior to the implementation of parking fees in Phase 2, the annual per employee/student cost *could* increase to ~\$750 (i.e. 2,676 employees with a program cost of \$2 million). (Program costs would not reach the high end of \$2.5 million until more employees were on-site.)

3.3.5 Benefits of the TMA

3.3.5.1 The TMA structure provides central management of critical TDM programs, thereby generating economies of scale and relieving individual Lessees from the operational and financial responsibility of providing these programs.

3.3.5.2 The broader the market for TDM programs, the greater their effectiveness. The site-wide TDM program managed by the TMA is designed to provide TDM benefits to a broad market while still recognizing the unique aspects of each Lessee's employment base.

3.3.5.3 The TMA provides continuity across the NRP regarding transportation policies and programs

3.3.5.4 The TMA structure sets up the framework to either:

3.3.5.4.1 manage the shared parking supply; or

3.3.5.4.2 oversee a contract for third-party management of the shared parking supply

3.3.5.5 Through its oversight and management of the shared parking supply, the TMA structure creates uniform parking policies and procedures to support the shared system.

3.4 Program Responsibility

Section 3.4.1 lists the TDM programs that will be managed by the TMA on a site-wide basis and financed through TMA dues. Section 3.4.2 and 3.4.3 list the programs that will be the responsibility of individual tenants/partners. Section 3.4.4 itemizes optional TDM strategies that the partners/lessees/tenants may choose to implement. Section 4.0 provides details about each of the TDM program elements.

3.4.1 TMA Site-Wide TDM Programs (Phase 1 – 4)

3.4.1.1 Shuttle Program

3.4.1.2 Preferential HOV parking

3.4.1.3 Carpool promotion

3.4.1.4 Bicycle racks

3.4.1.5 Bicycle promotional programs

3.4.1.6 Car-share program

3.4.1.7 On-site bicycle fleet

3.4.1.8 Site-wide Transit Pass/Subsidy program

3.4.1.9 Guaranteed Ride Home Program

- 3.4.1.10 Marketing and Information
- 3.4.1.11 Community outreach
- 3.4.1.12 Parking management

The items described in Section 3.4.1 are further explained below and used to estimate TDM program costs. This list, however, is not intended to be all inclusive. The TMA may find that additional programs could have a more effective trip reduction impact. If the TMA finds that a program is simply not effective¹⁵, the TMA, through board action, may replace the program with another option.

3.4.2 Partner/Lessee Site-Wide TDM Programs Required as Part of Site Development

The programs listed in 3.4.2 are site-wide programs, but the responsibility for implementation rests with the partners/lessees/tenants. Some will be developed collaboratively among the partners for site-wide benefit, while others require collaboration between the partners to achieve collective benefit for all members of the NRP (e.g. on-site housing). In addition, some will be implemented by specific partners for the benefit of the site (e.g. on-site retail, on-site fitness center).

- 3.4.2.1 Pedestrian path network (see the NRP Design Guidelines for additional requirements)
 - 3.4.2.2 Bicycle path network (see the NRP Design Guidelines for additional requirements)
 - 3.4.2.3 On-site housing (see the NRP Design Guidelines for additional requirements)
 - 3.4.2.4 On-site fitness center
 - 3.4.2.5 Site signage (see the NRP Design Guidelines for additional requirements)
 - 3.4.2.6 On-site retail, open space and other site amenities
- #### 3.4.3 Partner/Lessee Required Programs (Phase 1 – 4)
- 3.4.3.1 Class I, Long-term bicycle parking
 - 3.4.3.2 Class II, Short-term bicycle parking
 - 3.4.3.3 Showers and clothing lockers
 - 3.4.3.4 Marketing and information to new employees
 - 3.4.3.5 TDM program designee

¹⁵ Effective means effective in terms of reducing vehicle trips. If a program is found to have excessive administrative difficulties or create excessive liability exposure, these programs can be replaced with other options at the direction of the TMA board.

3.4.4 Partner/Lessee – Specific Programs (Optional)

3.4.4.1 Employer-specific shuttles

3.4.4.2 Local shuttles

3.4.4.3 Parking cash-out, transportation allowance, or other subsidy programs

3.4.4.4 Alternative work hours

3.4.4.5 Telecommuting

3.4.4.6 Subscription buses

3.4.4.7 Long-term non-commute bicycle parking

3.4.4.8 Electric carts/bikes as part of service fleet

3.5 **Program Evaluation**

AVR will be measured annually.

3.5.1 Annual Cordon Count Guidelines

It is recommended that a cordon count be conducted to evaluate annual site-wide AVR. A Cordon Count is recommended because of the economies of scale given the number of partners, lessees and tenants that will occupy the site. In addition, a cordon count is less labor intensive than an annual survey (given the number of partners, lessees and tenants on site and the number of people who will not have regular schedules or regular office locations). The cordon count is more accurate since it is not subject to response rate biases and will measure the joint AVR of the partners, lessees and tenants, and will not place measurement burden on each entity. Finally, the cordon count is designed to work in conjunction with the penalty mechanism, such that more car-intensive entities pay proportionally more (through parking fees) than less car-intensive entities.

The TMA board may, however, decide that individual partner/lessee/tenant AVR counts are more appropriate. Such individual counts would facilitate the use of “AVR credits,” whereby a partner with a higher AVR could sell or trade AVR credits to a partner with a lower AVR. The TMA board can decide if these individual AVR counts should be done through cordon counts or surveys. If a survey method is selected, each partner/lessee/tenant must achieve a 60% survey response rate among its total daytime (6 AM to 7 PM) population.

The following describes the Cordon Count guidelines.

3.5.1.1 The annual cordon count will assess the number of bicyclists, walkers, carpoolers; vanpoolers and solo drivers entering the proposed NRP;

3.5.1.2 The TMA will be responsible for conducting the annual count;

3.5.1.3 The count will be conducted to capture a period greater than the peak period, so that student trips are included. The TMA can determine the appropriate hours for the count to meet the needs of this plan;

- 3.5.1.4 The count will be conducted annually and around the same time each year;
- 3.5.1.5 The count will be conducted in a month in which any of NASA's university partners is in full session;
- 3.5.1.6 The count will be conducted at a time that does not conflict with any major holidays; and
- 3.5.1.7 It is recommended that the count be conducted at a time that is typically not part of the rainy season in order to capture bicyclists and walkers.
- 3.5.1.8 The following outlines a concept plan for how the count could be administered. Based on actual build-out of development under the NADP, the partners may choose to develop a different strategy. The point of this concept plan is to provide guidance to staff members who will coordinate the count.

3.5.2 Cordon Count Conceptual Plan

3.5.2.1 Single Occupant Vehicles, Carpools and Vanpools: Garage technology will be able to provide the daily count of vehicles and the number of occupants per vehicle entering and exiting controlled lots.

3.5.2.2 Bicyclists and Pedestrians: Bicyclists and pedestrians would be counted at the following intersections:

- a. Bailey Road & McCord Avenue Extension (residential district entry)
- b. Westcoat Road & Clark Road
- c. Ellis Street Entry
- d. Bicyclists and pedestrians counted exiting the NRP at the last two count locations would be subtracted from the count of entering bikes and pedestrians, since these people would be campus residents cycling off-campus (e.g. spouses living in NRP housing) or people traveling to jobs at the Ames Campus located outside the NRP.
- e. Another bike/ped count location would be set up at the light rail station to count people who are walking or biking to the NRP after taking light rail. (These people would be counted as light rail riders. It is anticipated that this count can be done in a location such that people who are walking from the transit center parking garage will not be counted.)
- f. To ensure full capture of those traveling from housing located within the NRP to jobs or school within the NRP, additional count sites may be needed within the interior of the NRP depending on the precise location of future housing. It may be more practical to capture the walk and bike trips made by these residents through an estimation of the on-site population.

3.5.2.3 Transit

- 3.5.2.3.1 Caltrain, Altamont Commuter Express (ACE), some Valley Transportation Authority (VTA) bus riders and light rail riders who transfer to the shuttles will be counted through the on-board shuttle survey and ridecheck described in Section 3.5.3.
- 3.5.2.3.2 If VTA buses make drop-offs on-site, these transit riders will be counted at the VTA bus stops on the NRP
- 3.5.2.3.3 Light-rail riders who walk or bike from the transit center to the NRP will be counted at the pedestrian/bicycle check point at the transit center. (If they are walking through the NRP to the Ames Campus, they will be subtracted at the Westcoat & Clark intersection.)

3.5.3 Annual On-Board Shuttle Survey and Ridecheck

- 3.5.3.1 An annual on-board shuttle survey will be administered on the same day as the annual cordon count. In addition to gathering information from passengers about the shuttle system, the on-board survey will confirm:
 - 3.5.3.1.1 How passengers got to the shuttle system to determine if they are light rail, Caltrain, VTA, ACE riders or parkers at the transit center garage; and
 - 3.5.3.1.2 Where passengers are going to: various NRP locations, Bay View, or Ames Campus.
- 3.5.3.2 All passengers will be counted. The NRP passengers who come from Caltrain, VTA, ACE or the light rail will be tallied for purposes of the Average Vehicle Ridership calculation. NRP shuttle passengers who are coming from the transit center parking garage will not be counted. These people will be counted through the vehicle counts described above.

3.5.4 Average Vehicle Ridership (AVR) Calculation

- 3.5.4.1 NRP AVR will be calculated using the following formula:

Transit riders + walkers + bikers + total vehicle passengers¹⁶ entering NRP / Total vehicles¹⁷ entering NRP

- 3.5.4.2 Telecommuting and Compressed Work Weeks
A Cordon Count will not capture the effects of telecommuting and compressed work weeks. To include the benefits of these programs in the Annual Cordon Count, the TMA will request information from partners/lessees/tenants about their telecommuting and compressed

¹⁶ not including passengers in commercial vehicles

¹⁷ not including transit vehicles, shuttle vehicles & commercial vehicles

work week programs. Partners must be able to provide the following information in order for the trip reduction benefits of these programs to be counted in the AVR calculation:

- # of employees telecommuting on a weekly basis (e.g. at least once a week)
- average number of days per week employees telecommute
- # of employees working a 9/80 schedule
- # of employees working a 4/10 schedule

(Teaching and class schedules at Universities do not always require students and faculty to come to site every day of the week. While such schedules do not *require* this travel behavior, there is no guarantee that those not scheduled for classes will not come to the site. Separate monitoring of such schedules will not be included in the Telecommuting/Compressed Work Week count.)

The amount of trip reduction attributable to telecommuting and compressed work week programs will be applied consistent to the mode split measured by the cordon count. If the mode split from the cordon count finds that 50% of trips to the NRP are in Single Occupant Vehicles, then 50% of the telecommuters and those working compressed work weeks would be credited for reducing vehicle trips by telecommuting, etc. A sample calculation is shown below.

	# of employees	Avg. # of days/week	Avg. Daily Trip Reduction	% of SOV (50%)
telecommuting	500	1	100 trips	50 trips
9/80	500	.5	50 trips	25 trips
4/10	100	1	20 trips	10 trips

$$\text{AVR from Cordon Count} = \frac{20,000 \text{ person trips}}{11,500 \text{ vehicle trips}} = 1.74$$

$$\text{AVR with CWW \& TC} = \frac{20,085 \text{ person trips}}{11,500 \text{ vehicle trips}} = 1.75$$

3.6 Compliance

3.6.1 Compliance: Phase 1 through Implementation of Parking Fees

3.6.1.1 It is anticipated that parking fees will not be implemented until some point during Phase 2 (see Section 5.4). If the AVR target is not met before parking charges have been established, the partners/lessees/tenants shall pay a supplemental TDM charge. This charge shall be assessed annually, each year the applicable AVR goal is not achieved. If population levels move the site into a new phase (thereby raising the AVR target) within the six months prior to the cordon count, an average of the new and old target will be used to determine whether supplemental charges are required. The supplemental charge will be billed to the partners/tenants/lessees as a

surcharge to the annual TMA dues bill (TMA dues are discussed in Section 3.3.44).

- 3.6.1.2 The surcharge will mirror the percentage by which the measured AVR falls below the AVR target. For example, in Phase I, the AVR target is 1.33. If a 1.27 AVR is achieved, this is 4.5% below the target and each Lessee/Tenant Partner will be charged an additional 4.5% of their annual TMA fee. For a tenant whose annual TMA dues are \$50,000, this represents an additional \$2,500 fee.

3.6.2 Compliance: Post Parking Fee Implementation

3.6.2.1 If the AVR calculation shows that the AVR target is not met, the TMA will raise parking rates by the same percentage by which the AVR target was missed. For example:

AVR Target	=	1.72
AVR Measured	=	1.68
% by which target was missed	=	$(1.72 - 1.68)/1.72 = 2.3\%$
Existing Parking Rate	=	\$175/month
New Rate	=	\$180/month

3.6.2.2 Under this plan, it does not matter which partners/lessees have a high AVR or a low AVR. The collective NRP AVR is measured; not the AVRs of each partner/lessee. This allows more car-intensive and less-car-intensive uses to mutually benefit each other. At the same time, those partners/lessees who have the highest proportion of parkers will be most impacted by the failure to achieve target AVR, since the penalty is assessed through parking fees. In this way, those who are most responsible for not meeting the AVR target are assessed the most.

3.6.3 Use of Compliance Fees

3.6.3.1 The additional revenue will be used to provide more TDM programs. These additional TDM programs could include:

- 3.6.3.1.1 Transit voucher subsidies to employees who ride ACE, BART or other transit systems not covered by the EcoPass program (employees must ride these systems as part of their commute to NRP three days per week or more.)
- 3.6.3.1.2 Vanpool voucher subsidies to employees who vanpool to work three days per week or more
- 3.6.3.1.3 Taxable cash subsidies to employees who bike or walk to work three days per week or more
- 3.6.3.1.4 Taxable cash subsidies to carpools carpooling to work three days per week or more (including drop-offs). Subsidy amount should increase with the size of the carpool.

4. TDM PROGRAM ELEMENTS

4.1 Existing Conditions

4.1.1 Carpooling

4.1.1.1 Existing carpool lanes provide significant travel-time savings for vehicles with two or more people traveling to the Ames Research Center. Continuous carpool lanes are available on the following highways:

4.1.1.1.1 US 101 between Redwood City and south San José

4.1.1.1.2 Highway 85 connecting U.S. 101 in Mountain View with U.S. 101 in south San Jose

4.1.1.1.3 Highway 237 from Mathilda to I-880

4.1.1.1.4 Lawrence Expressway

4.1.1.1.5 Interstate 280 from Highway 87 to Highway 85

4.1.1.2 Planned projects by other federal, state and local agencies would increase the carpool lane network throughout most of Santa Clara County.

4.1.2 Transit

4.1.2.1 Light Rail

The NASA Ames Research Center has a light rail stop on site. The stop is about 0.25 to 1 mile from Lessee/Tenant/Partner's Premises. The light rail runs from 5 AM to about 3 AM and provides service every 10 minutes between 5 AM and 7 PM. Service is less frequent between 7 PM and 3 AM. The NASA stop is on the Mountain View – I-880/Milpitas line which runs between downtown Mountain View and Milpitas. Riders can make connections to the Baypointe – Santa Teresa Line at the Baypointe station. A third light rail line connects to the Baypointe – Santa Teresa Line at the Ohlone/Chynoweth station.

4.1.2.2 Caltrain

The nearest Caltrain Station is located in downtown Mountain View, about 3 miles from the Ames Research Center. Caltrain can be accessed from the NRP either on the light rail or by shuttle. Caltrain operates commuter rail service between San Francisco and San Jose, as well as limited service extending to Gilroy. On weekdays, Caltrain runs from about 4:30 AM to about 1:30 AM with 15 to 30 minutes between trains during the AM and PM peaks and 60 minutes between trains midday and after 7:00 PM. Service is less frequent on Saturdays, Sundays, and holidays.

4.1.2.3 Valley Transportation Authority

Figure 4-1 shows the VTA bus lines that serve the NRP and downtown Mountain View. Line 51 is the only route that provides direct service to the NASA Ames Research Center. The other routes serve downtown Mountain View.

Figure 4-1: VTA Bus Routes Serving the NRP and/or Downtown Mountain View

Route	Service Area
51	Vallco Parkway in Cupertino to NASA Ames Research Center
34	Mountain View to Santa Clara Caltrain
35	Stanford Shopping Center (Palo Alto) to Mountain View Caltrain
47	Mountain View Caltrain to San Antonio Shopping Center (Mountain View)
48	Mountain View Caltrain to Middlefield & Ellis
52	Mountain View Caltrain to Foothill College (Los Altos Hills)
22	Palo Alto to San Jose (serves downtown Mountain View) VTA's most-traveled, most-frequent route.
304	Peak Hour Express Service: Mountain View Caltrain to Santa Teresa (San Jose)
305	Peak Hour Express Service: Mountain View Caltrain to South San Jose
345	Peak Hour Express Service: Mountain View Caltrain to Eastridge (San Jose)

4.1.2.4 Shuttles

NASA currently operates a shuttle between the Ames Research Center and the Mountain View Caltrain station. Shuttles currently run between 6:10 and 9:25 in the morning, and between 2:48 and 5:48 in the afternoon.

4.1.2.5 Altamont Commuter Express (ACE)

The closest ACE rail station is the Great America station located on Lafayette Street at Tasman Drive. Patrons can transfer directly to the LRT at the Lick Mill station.

4.1.3 Bicycling

Within the Ames Research Center, marked bicycle lanes exist on Wright Avenue between the Moffett Extension and Hunsaker Road. In addition, a separate bicycle path was recently constructed adjacent to Macon Road between Ellis Street and the Lockheed Gate on 5th Avenue. Throughout the remainder of the Ames Research Center, the low traffic volumes and the availability of sidewalks or shoulders provide a reasonable environment for cyclists.

4.1.3.1 Bicycle facilities external to the Ames Research Center include the Stevens Creek Trail, which runs from Landels School in Mountain View to the Bay Trail. The Stevens Creek Trail intersects Moffett Boulevard providing access to the Ames Research Center. Cyclists and pedestrians can also access the Ames Research Center via a bridge over the creek and a gate located north of the military housing area. The Stevens Creek trail will ultimately be extended south to Cupertino and Los Altos.

4.1.3.2 Moffett Boulevard is a designated bike route between the main gate of the Ames Research Center and downtown Mountain View. Bike lanes have been marked on Moffett Boulevard beginning on the west side on the Highway 101 interchange. Bicycle travel through the Moffett Boulevard interchange is considered difficult because bicyclists must cross weaving vehicle traffic using the loop and high-speed direct ramps.

4.1.3.3 Bike lanes are also marked on Ellis Street on the west side of the Highway 101 interchange. Bicycle travel through the Ellis Street interchange is also considered difficult because cyclists share the relatively narrow travel lanes with vehicles under the Highway 101 overpass. Designated bike lanes are provided on Manila Drive east of Ellis Street.

4.1.3.4 Combined, the available facilities provide a reasonable level of bicycle access to the Ames Research Center. While gaps in exclusive bicycle facilities across Highway 101 and Highway 237 limit the attractiveness to cyclists, the City of Sunnyvale plans to construct a new bike bridge in 2002, and the NADP includes a mitigation measure to improve bicycle access through the Ellis Street interchange.

4.2 **TMA Managed Site-Wide TDM Programs (Phase 1 – 4)**

4.2.1 Shuttle Programs

4.2.1.1 The TMA will develop and manage a comprehensive NRP shuttle system. The TMA will coordinate the involved parties, provide administrative services to keep the shuttles on the road, and act as the interface between those served by the shuttle (riders and partners/tenants) and the shuttle contractor. It is anticipated that shuttle operations will be contracted to third-party shuttle service provider. If fueling capacity is available on-site or nearby, the shuttle service should operate CNG or bio-diesel vehicles.

4.2.1.2 The shuttle system will include several routes. The shuttle program is committed to meeting the needs of the entire research park, but the specific shuttle plan will remain flexible in order to adjust to the market and changes in the transportation infrastructure.

4.2.1.3 Shuttle Service Design Guidelines:

4.2.1.3.1 At a minimum, shuttle connections will be provided between the following:

- a. NRP and light rail
- b. NRP campus and large parking facilities as needed
- c. Bay View and NRP
- d. NRP and Altamont Commuter Express (ACE) rail
- e. Bay View, NRP and downtown Mountain View (Caltrain & El Camino)
- f. Shuttles serving the NRP will operate bi-directionally to create a transit system that is easily understood by users
- g. Shuttle services may be phased in over the course of the project phases and frequency of service will increase over time. From the outset, an NRP to Downtown Mountain View shuttle connection will be provided.
- h. Shuttle frequencies will be increased over the course of the project phases as needed to achieve AVR goals. At a minimum, shuttles are recommended to begin on 20-minute headways.
- i. The NRP/downtown shuttle is recommended to achieve ten-minute headways no later than the beginning of Phase 3.
- j. Shuttles will meet at a central location on the NRP, such as McCord Avenue.
- k. A shuttle connection to downtown Mountain View will be the most important link in the shuttle system. Connections to both Caltrain and VTA buses traveling along El Camino will be made by this shuttle.
- l. Given the short distances between land uses within the NRP, emphasis will be placed on high frequency service.
- m. Any stop located within 1,000 feet of a building is considered to serve that building.

4.2.1.3.2 Coverage and Frequency

Given the short distances between origins and destinations at the NRP (0.4 mile from the light rail station to the heart of the NRP parcels), it is recommended that shuttles provide frequent service in order to attract riders. Potential riders will not wait ten minutes for a trip that would take two minutes in a car or seven minutes to walk. Furthermore, it is recommended that stops located within 500 feet of any front door be considered "front door" service.

4.2.1.4 NASA and NRP Shuttles

4.2.1.4.1 Shuttle service to the NASA property located behind the NASA fence line will not be funded through the TMA. The TMA and

NASA, however, are encouraged to work together to provide services to both entities to:

- a. Realize the greatest economies of scale,
- b. Serve as many riders as possible without duplicating service,
- c. Provide more frequent service, and
- d. Equitably fund the services.

4.2.1.5 Sample Route Design

4.2.1.5.1 Conceptual schematics of the shuttle system are provided in Figure 4-2. Weekday service is concentrated on key corridors in order to provide high-frequency, cost-effective routing that provides stops within 1,000 feet of critical destinations. The route design makes the best use of the NRP's pedestrian-orientation and the short walking distances between land uses.

4.2.1.5.2 The design provides door-to-door service (stop within 500 feet) at the following locations:

- a. Light Rail Station
- b. Lab Project Parcel
- c. McCord Avenue Extension
- d. NRP Housing Parcel
- e. University Partner Parcels
- f. Conference & Training Center
- g. California Air & Space Center
- h. Computer Museum History Center
- i. Ames Campus
- j. Bay View Housing
- k. Caltrain
- l. Downtown Mountain View & El Camino Real
- m. ACE Train Station

4.2.1.5.3 Service would be rerouted on weekends to serve residents.

Figure 4-2: Conceptual Shuttle System – Weekday Service



4.2.2 Preferential Parking for Carpools and Vanpools

4.2.2.1 The majority of the parking supply within the NRP will be shared between the different land uses (See Section 5). Parking will be supplied according to the plan described in Section 5. Carpool parking will be provided within the total shared supply that is located within the NRP. Through its parking management function (see Section 5.0), the TMA will be responsible for registering carpools for preferential parking privileges and monitoring HOV parking spaces for abuse.

4.2.2.2 The parking access technology guidelines (described in Section 5.10) require that the parking technology be programmed to recognize multi-passenger vehicles, either by allowing 2 or more ID badges to be swiped when one car is at the access gate or with monitoring cameras. This will allow flexibility in the future to potentially offer reduced parking pricing for carpools as well as desirable parking spaces.

4.2.3 Carpooling

4.2.3.1 The following programs will further encourage carpooling:

- 4.2.3.1.1 Preferential Parking (see Sections 4.2.2, 4.3.2 and 5.5)
- 4.2.3.1.2 Car Share Vehicles available to regular carpools (see Section 4.2.6)
- 4.2.3.1.3 Ability to share parking fees
- 4.2.3.1.4 Guaranteed Ride Home Program (see Section 4.2.10)
- 4.2.3.1.5 Ride matching (see Section 4.2.11)
- 4.2.3.1.6 Annual carpool registration campaign (see Section 4.2.11)

4.2.4 Bicycle Parking¹⁸

4.2.4.1 As itemized in section 3.4, the TMA will be responsible for installing and maintaining Class II bicycle rack parking in common areas around the NRP (about 300 rack spaces). (The partners will be responsible for installing and maintaining Class I covered bike parking and Class II bike rack parking on their parcels.)

4.2.4.1.1 Guidelines for Bicycle Rack Design:

- a. Must support the bicycle frame
- b. Must allow cyclists to lock both the bicycle frame and wheel with a U-lock (This is the definition of Class II bike parking.)
- c. Must be easy to use

¹⁸ All bicycle guidelines in the CUP EA TDM Plan meet the requirements of VTA's bicycle technical guidelines. Additional information and detail about bike parking, network development and signage can be obtained from "Bicycle Technical Guidelines: A Guide for Local Agencies in Santa Clara County," published by the VTA.

- d. Locking mechanisms/instructions must be understandable to the first-time user
- e. Must ensure that surrounding space is used efficiently, so that cyclists can park close together yet have adequate room to maneuver their bicycles in and out of the spaces

4.2.4.1.2 Guidelines for Bicycle Rack Placement:

- a. Bike racks will be located within 50 feet of building entrances (per the Valley Transportation Authority's "Bicycle Technical Guidelines"). Not every building must have a bike rack.
- b. The exact rack placement shall be made to avoid pedestrian conflicts.
- c. Bike racks will be installed within easy viewing distance from a main pedestrian walkway.
- d. Sidewalks with bicycle parking should be at least 12 feet wide to accommodate bicycle parking.
- e. When placed against buildings or walls, bike racks need at least 2 feet of clear space between the rack and a parallel wall, and 2.5 feet of clear space between the rack and a perpendicular wall.
- f. Racks will be placed on hard surfaces (i.e. paved)
- g. Bike racks on sidewalks will be placed on the curb-side and in a manner to avoid pedestrian conflicts.
- h. Where bike racks on sidewalks are adjacent to a free-flowing traffic lane, the rack should be placed a minimum of 3 feet from the curb.
- i. Rack placement will be phased in over time as the NRP population grows. Bicycle racks to accommodate 3% of the NRP population will be located throughout the common areas (300 rack spaces at build-out).

4.2.4.2 TMA-Provided Bicycle Rack Locations

4.2.4.2.1 TMA-provided bicycle racks are expected to be located at the following locations:

- a. Transit Green parking garage
- b. McCord Avenue shopping district – in front of key retail destinations
- c. Park Circle

- 4.2.4.2.2 Additional short-term, as well as long-term, bicycle parking will be provided by partners and Lessees. (See Section 4.2.4) The TMA will be available to administer the distribution of bicycle parking cards and help manage the long-term bike parking program.

4.2.5 Bicycle Promotional Programs

4.2.5.1 The TMA will be instrumental in developing a bicycle culture at the NRP by providing support programs for cyclists, such as a “pedal club.”

4.2.5.2 Sponsor an annual event to promote cycling, like “Bike to Work” day or week.

4.2.5.3 Keep bicycle maintenance supplies in the TMA office such as extra tire tubes, a tire pump, wrenches, etc.

4.2.5.4 Provide on-site bicycle registration.

4.2.5.5 Provide a “spot improvement” program to allow bicyclists to inform the TMA of potholes or other maintenance problems along bike travelways. The TMA will forward these maintenance requests to the entity responsible for roadway maintenance at that location.

4.2.5.6 On an as-needed basis, the TMA will conduct a Level-of-Service (LOS) analysis of bicycle conditions. When bicycle LOS reaches levels of E or F, the TMA will recommend necessary improvements to the entity (or entities) responsible for bicycle access conditions at that location. While there are no “official” Institute of Transportation Engineers (ITE) bicycle LOS standards, some cities have developed their own bicycle LOS standards. A bicycle LOS standard that has been developed is the “Bicycle Compatibility Index.” This index uses the amount of vehicle traffic, vehicle speeds, the separation between bicycles and moving traffic, the presence of on-street parking and heavy vehicles, and the condition of the pavement surface to compile a mathematically derived LOS. This standard is available in Federal Highway publication FHWA-RD-98-072 (December 1998). The TMA could also develop its own bicycle LOS standards and/or consult with neighboring cities and the VTA.

4.2.6 On-Site Car-Share Program

4.2.6.1 The TMA will manage an on-site, non-profit car-share program. The car-share program is designed to provide cars to people who need them on an occasional basis. Since the cars will mainly be used on weekends (by site residents) and during weekday days (by site employees), the cars will also be made available to regular carpool commuters. User-groups are described in the following table. Fees will be structured so that the car-share program is self-financed and covers the cost of parking for the cars. Cars used for the guaranteed ride program, however, will be issued free of charge. The number of vehicles available through the car-share program will increase over time as more employees and residents are located at the NRP.

4.2.6.2 Figure 4-3 illustrates how a car share program might work. It is provided for illustrative and guidance purposes. The actual program should be designed by the TMA to best meet the needs of TMA members.

Figure 4-3: Conceptual Car Share Program

User Group	Purpose	Sample Rates
Commuters	Car-share vehicles will be available for full-time carpoolers (2 or more people; at least 4-days per week)	Available on a monthly basis only \$0.35 per mile (including gas)
On-site residents	Any travel need	\$2.50 per hour (capped at 10 hours/day) \$0.45 per mile (including gas)
Any NRP employee	Mid-day business travel needs	\$2.50 per hour \$0.45 per mile (including gas)
Registered NRP alternative commuters	Guaranteed Ride Home program	free

4.2.7 On-Site Bicycle Fleet

4.2.7.1 A fleet of on-site bicycles, including some electric bikes, will be provided to facilitate travel between the light rail station and the NRP, as well as throughout the NRP.

4.2.7.2 The bikes should be of high enough quality to make them an attractive alternative for getting around campus. Helmets must also be provided as required by NASA (currently mandatory). If theft is a concern, these “grab ‘n go” bicycles could be equipped with GPS trackers. Figure 4-4 explains how the program might work. This example is provided for illustrative and guidance purposes. The actual program will be designed by the TMA to best meet the needs of TMA members.

Figure 4-4: “Grab ‘n Go” Bike Program Sample Plan

<p>Anyone wishing to use a grab ‘n go bike will register with the NRP TMA for the program and receive a personalized access device called a fob. The fob will work as a key-card to unlock the bicycle. Registered users can take the bikes anywhere on the NRP, Bayview or Ames Campus grounds.</p>
<p>Information recorded from the fob and bicycle will allow the NRP TMA to know who took the bicycle last and where it is parked at any time. Grab ‘n Go bikes will be high-quality bikes that will be uniquely identifiable by their paint.</p>

4.2.8 Vanpool Program

4.2.8.1 The TMA vanpool program will include the following:

4.2.8.1.1 Vanpool formation meetings

4.2.8.1.2 Vanpool promotion

Vanpools will be required to pay for the cost of their parking. The success of vanpools will increase as the NRP's population grows.

4.2.9 Site-Wide Transit Pass/Subsidy Program

4.2.9.1 Lessee shall provide the VTA EcoPass program site-wide to provide free transit on VTA buses and Caltrain. A description of this program follows in Figure 4-5. Lessee has the authority to replace the EcoPass program with another transit subsidy program that can better meet the needs of the employees, students, tenants, lessees and partners. The EcoPass program is recommended, because it encourages regular, as well as occasional, transit use and offers the greatest convenience and flexibility to users. It is also the most cost-effective transit subsidy program available. If the board replaces EcoPass with another subsidy option, the following guidelines shall apply. The replacement program shall:

- 4.2.9.1.1 provide free or deeply discounted transit to regular transit users
- 4.2.9.1.2 provide free or deeply discounted transit to occasional transit users
- 4.2.9.1.3 provide free or deeply discounted transit for all trip purposes
- 4.2.9.1.4 continue to subsidize both local buses (VTA) and Caltrain
- 4.2.9.1.5 be available site-wide
- 4.2.9.1.6 encourage mode shift

4.2.9.2 Under the EcoPass system, Lessee shall coordinate payment to VTA and coordinate provision of annual EcoPasses to its employees.

Figure 4-5: How VTA EcoPass Works

The employer (in this case the NRP) pays a set per-head fee to the VTA to purchase annual passes for all their employees. The passes are good on VTA buses, Light Rail, the Dumbarton Express, Highway 17 Express buses and Caltrain. In order to receive the deep-discount, the NRP TMA must pay the per-head fee for every employee working at, and daytime student attending school at, the NRP, regardless of whether the employee/student will use transit or not. Employers then provide these passes free to any employee (student) working (attending school) at the NRP.

4.2.10 Guaranteed Ride Home Program

A Guaranteed Ride Home program provides free rides home to alternative transportation users who have emergencies on days when they are without their cars at work. Qualified emergencies include personal illness or illness of a family member, an issue at a child's school, or being required to work unexpected overtime. Employees who use their EcoPasses to ride VTA buses, light rail or Caltrain will be eligible to use

the VTA guaranteed ride home program. The NRP TMA will also offer a guaranteed ride home program for people who walk, bike, carpool, vanpool, or take other types of transit to work. Rides home will be provided with taxi cabs, car-share vehicles, and other on-site fleet vehicles.

4.2.11 Marketing and Information

Marketing alternative transportation programs and providing information about transportation choices is critical to developing the necessary support for these travel modes. Marketing helps define a campus culture that is enthusiastic about using alternatives to the single occupant vehicle. The TMA's marketing efforts shall include:

4.2.11.1 Website with descriptions of all TDM programs, program forms (including ridematching forms), shuttle schedule information, and links to other transit providers

4.2.11.2 In-house, real-time ridematching, so that employees can instantly receive the names and phone numbers of employees who live in their area.

4.2.11.3 An office or "outlet" space in the main retail area of the NRP (or other central location) where employees can get information, pick up their EcoPasses, add revenue to their parking debit cards, etc.

Other recommended marketing efforts include:

4.2.11.4 Annual carpool registration drive

4.2.11.5 At least one annual transportation event per calendar year to occur when universities are in session

4.2.11.6 Printed materials

4.2.11.7 Mailings to all employees who pay for monthly parking to encourage them to use alternatives

4.2.11.8 Information kiosk(s) at the TMA office and at two to three other key locations at the NRP

4.2.12 Improved VTA Bus Service and Community Relations

4.2.12.1 The TMA will identify key areas from where NRP employees commute. The TMA will work with VTA and other transit providers to improve bus service to the research park.

4.2.12.2 The TMA will develop and maintain liaison with employees, neighboring employment centers, regional and local ridesharing programs. Where effective, and at board discretion, the TMA may expand or combine forces with other employers in the area.

4.2.13 Parking Management

The TMA will be responsible for managing the shared parking supply and ensuring its efficient use (See Section 5.0). TMA management of the shared supply will create uniform parking policies and procedures to support the shared system. The TMA will

provide or contract for central management of parking payment, maintenance, security, operations, information and janitorial services.

4.2.14 Site Wide TDM Program Costs and Phasing

It is anticipated that the cost of the site-wide TDM program for all NRP land uses, including those subject to the terms of the CUP EA, will range from \$915,000 during Phase 1 to \$4,020,000 during Phase 4. This cost includes all program operating costs, TMA staffing and overhead costs, and program evaluation costs. Figure 4-6 shows an estimated time line for the implementation of the site-wide TDM program. Figure 4-7 shows the estimated program costs.

Figure 4-6: Site Wide TDM Program Phasing

Program	Start-Up
TMA Establishment	Phase 1
Cordon Count	Phase 1
Shuttle Program	Phase 1
Preferential HOV parking	Phase 1
Bicycle racks	Phase 1
Site-wide EcoPass	Phase 1
Guaranteed Ride Home Program	Phase 1
Marketing and Information	Phase 1
Staffing	Phase 1
Parking management	Phase 1
Parking pricing	Phase 2
Bicycle promotional programs	Phase 2
Car-share program management	Phase 2
On-site bicycle fleet	Phase 2

Figure 4-7: Estimated Site-Wide TDM Program Costs (2001 \$)

	Estimated Annual Costs At Recommended Program Levels ¹⁹			
	Phase 1 ²⁰	Phase 2	Phase 3	Phase 4
Shuttle Program ²¹	\$415,000	\$1,600,000	\$2,700,000	\$2,700,000
HOV Parking & Carpool programs ²²		\$5,000	\$6,000	\$6,000
Bicycle Racks ²³	\$5,000	\$4,000	\$3,000	\$4,000
Bicycle promotional programs		\$5,000	\$7,500	\$7,500
Car-share program management ²⁴		\$5,000	\$7,500	\$7,500
On-site bicycle fleet ²⁵		\$60,000	\$20,000	\$25,000
Site-wide EcoPass ²⁶	\$230,000 ²⁷	\$417,000	\$554,000	\$685,000
Guaranteed Ride Home Program	\$5,000	\$5,000	\$7,500	\$10,000
Marketing and Information	\$10,000	\$20,000	\$30,000	\$40,000
Staffing ²⁸	\$100,000	\$250,000	\$300,000	\$300,000
TMA Overhead & Admin ²⁹	\$125,000	\$125,000	\$150,000	\$175,000
Cordon Count	\$25,000	\$35,000	\$50,000	\$60,000
TOTAL	\$915,000	\$2,531,000	\$3,835,500	\$4,020,000

¹⁹ Costs figured based on number of employees per phase as described in Section 3.1.3.

²⁰ Assumes no housing in Bay View until Phase 2.

²¹ Based on program described in Section 4.2.1 and \$45/hour operating costs.

²² Costs are included in staffing costs and TMA administrative fee costs.

²³ Purchase and installation of bike rack parking spaces for 3% of employee/daytime student count @ avg. \$50 per rack space + installation, etc.

²⁴ Costs are included in staffing costs and TMA administrative fee costs.

²⁵ Bicycle purchase + technology + replacement and maintenance; Purchase bikes for 2% of employee/daytime student population bikes @ \$500/bike (cost averaged over the 3 phases)

²⁶ \$55 per employee * # of employees at end of each phase. It is possible that this cost could be lowered given the large number of students and employees at the NRP or if the student portion were funded through student fees, or if the NRP TMA joined with another TMA.

²⁷ Includes additional money for program start-up and promotion.

²⁸ \$100K per FTE salary & benefits. 1.5 FTEs in phase 1; 2.5 FTEs in phase 2; 3.0 FTEs in phases 3 & 4.

²⁹ Office rent, equipment and supplies

4.3 Partner/Lessee Site-Wide TDM Programs Required a Part of Site Development

4.3.1 Pedestrian Path Network -- As part of the development of the NRP, partners/lessees will be responsible for the development of a pedestrian path network. Guidelines for development of the pedestrian network are included in the NRP Design Guidelines.

4.3.2 Bicycle Path/Lane Network -- As part of the development of the NRP, partners/lessees will be responsible for the development of the basic roadway network. The roadway network will feature bike lanes along its entire length. Guidelines for development of the bicycle network are included in the NRP Design Guidelines and in "Bicycle Technical Guidelines: A Guide for Local Agencies in Santa Clara County" published by the Valley Transportation Authority. In addition to following these two documents for guidance, the bicycle lanes shall be designed by someone with specific expertise in bicycle facilities engineering to ensure that a comprehensive network of safe, effective cycling routes is developed throughout the NRP and that intersection design addresses both bicycle and motorized vehicle turning movements.

4.3.3 On-Site Housing -- As part of the development of the NRP, partners/lessees will construct housing units within the NRP and at the Bay View site. On-site housing is a critical component to reducing trips at the NRP.

4.3.3.1 Residents located in the Bay View housing district will not be eligible to buy daily parking located within the NRP.

4.3.3.2 Residents located in housing within the NRP will not be able to buy a parking permits for areas within the NRP except for the residential parking permits available for parking near their homes.

4.3.3.3 One to two residents of each housing unit must be affiliated with the Ames Research Center (depending on the type of housing).

4.3.3.4 Housing will be designed for both students (graduate and undergraduate) as well as faculty, visiting faculty, and other site employees

4.3.3.5 Housing areas will be designed using street grids that allow convenient shuttle and bus circulation.

4.3.3.6 Bicycle parking will be incorporated into unit design to allow for secure, convenient, covered bicycle parking at each unit.

4.3.3.7 Housing areas will include the same bicycle and pedestrian path guidelines that apply to the rest of the NRP.

For the purpose of the TDM Plan, the AVR goal of 1.72 relates to employment and school trips attracted by the NRP as an employment/ educational site. Trips generated by the on-site housing that are traveling to destinations outside the NRP will not be counted in the annual AVR goal assessment. (See Section 3.5.2 for Cordon Count Conceptual Plan)

4.3.4 On-Site Fitness Center: An on-site fitness facility allows employees to access gym facilities without having to drive off-site. Partners are required to provide on-site fitness facilities such that anyone working or attending school at the NRP will have the opportunity to use these facilities. It is at the discretion of the NRP partners how this requirement will be accommodated. For

example, some (or all) partners may want to share such facilities between them. This could require joint development of such a facility or a cross-partner fee structure.

4.3.5 Site Signage –

4.3.5.1 Clear, well-placed, well-designed signage is critical to convenient travel and way-finding whether a person is in a car, on foot, or on a bike. As part of the development of the NRP, all buildings will be clearly identified to ensure easy way finding. Building identification will be provided at building entrances that face bicycle and pedestrian paths. The type-face will be large enough to be read by bicyclists or pedestrians from the adjacent bicycle or pedestrian pathway. Signs should be posted to direct bicyclists to parking racks and long-term bike parking locations that may not be readily apparent. Wherever a “No Bicycle Parking” sign is positioned, additional sign information should direct cyclists to the location of the nearest bike parking. (Additional guidelines about bicycle signage can be found in “Bicycle Technical Guidelines: A Guide for Local Agencies in Santa Clara County,” produced by the Valley Transportation Authority.)

4.3.5.2 Directional signs will be located at key intersections to point the way to the sub-areas of the NRP (CMU, UCSC, museums, Conference & Training Center, etc.) and to the Bay View. These directional signs will be designed to be easily read by passing cars, bicycles, and pedestrians. Bike route signage will include directional information such as an arrow and the name of the destination indicated.

4.3.5.3 Site maps showing all parts of the NRP and its relationship to the rest of the Ames Research Center will be provided at main pedestrian gathering places. These signs will show the network of pedestrian and bike paths, shuttle routes, shared-facility parking, common retail areas, and common-use open spaces.

4.3.6 On-Site Retail, Open Space and Other Amenities: On-site retail, open space and other amenities will also be developed by the NRP partners. Although not developed for the sole purpose of mitigating trips, these on-site services are a critical trip reduction strategy. At a minimum, the on-site retail will feature:

4.3.6.1 A variety of food vendors, including “fast” or convenience food outlets as well as higher-quality food service choices

4.3.6.2 Coffee shop(s)

4.3.6.3 Book store

4.3.6.4 Automatic Teller Machines

4.3.6.5 On-Site Child Care

4.3.6.6 Bike shop

4.3.6.7 Postal and shipping services or on-site delivery

4.3.6.8 On-site retail will be ground-floor, street-facing retail, developed along pedestrian-friendly corridors. The on-site child care will most likely be developed through the Partner Tenant Association at the NRP and Bay View and run by a third party child care provider. If the demand for child care services are greater than space available, priority for child care slots should go to

employees living in on-site housing and to employees who use alternatives to the single-occupant vehicle to get to the NRP.

4.4 **Required Partner/Lessee Programs**

4.4.1 Class I³⁰ Bicycle Parking – Commuters and Residents

4.4.1.1 As part of the development of the NRP, each partner/lessee is required to provide secure, covered bicycle parking for long-term bicycle parking (i.e. 8 hours per day) at their site. The following guidelines explain the requirements for the provision of this secure bike parking:

4.4.1.2 Each partner must provide enough covered, enclosed bicycle parking within the NRP employment area to accommodate 3% of its daytime employee/student population

4.4.1.3 The number of bicycles that can be parked in any one covered, secure area can vary based on expected demand in that area

4.4.1.4 Housing areas must be developed to provide secure, ground-floor, covered storage spaces for two bicycles per unit.

4.4.1.5 Class I bike parking can be provided through one of the following:

4.4.1.5.1 Parking in buildings: allowing cyclists to bring bikes into offices or providing controlled-access space within a building to allow bike parking. If the latter, the location within the building must be convenient to the majority of the building users and must ensure building safety.

4.4.1.5.2 Parking in a controlled-access structure located on the NRP site (e.g. a “bike cage” or “bike structure/house”)

4.4.1.6 Regardless of the strategy used to provide long-term bicycle parking, the parking must be strategically located in areas of high demand, be close to building clusters and offer convenient access to buildings.

4.4.1.7 Structures will be designed in accordance with the NRP design guidelines and must blend in with their surrounding architecture.

4.4.1.8 Each structure will be accessed with card-key technology. Any partner that provides structures or cages must coordinate with the NRP TMA to ensure that its card-key technology is consistent with any card-access guidelines established for the NRP.

4.4.1.9 Bicycle racks will be provided within the structures.

4.4.1.10 Partners may coordinate with each other to provide joint facilities in areas where they may be convenient to more than one partner location.

³⁰ Class I bicycle parking is defined as bike parking that protects the entire bicycle and components from theft, vandalism, or inclement weather.

4.4.1.11 The NRP TMA will be available to administer and manage the distribution of bike cage access cards and coordinate with bicyclists on use of the bike structures.

4.4.2 Class II³¹ Bicycle Parking at Building Entrances

4.4.3 All NRP partners, including the museums and the Conference & Training Center, are required to provide Class II bicycle parking at their site's buildings. Providers of bicycle parking shall follow the guidelines for bicycle rack design outlined in section 4.2.4.1. In addition to the guidelines for bicycle rack placement outlined in section 4.2.4.2, the partners/lessees/tenants shall following these guidelines for rack placement:

4.4.3.1 Additional Guidelines for Bicycle Rack Placement for Partners/Lessees/Tenants

4.4.3.2 University partners shall provide at least 1 bicycle rack parking space per 9 student classroom seats (per the VTA *Bicycle Technical Guidelines*).

4.4.3.3 Non-university partners (other than museum partners) shall provide bicycle rack parking spaces to accommodate at least 3% of their daytime population.

4.4.3.4 Museum partners shall provide bicycle rack parking spaces to accommodate at least 3% of their daily visitor projections.

4.4.3.5 Bike racks must be placed within 50 feet of building entrances and every building must have bicycle rack parking located within 200 feet of the main building entrance.

4.4.4 Showers and Clothing Lockers for Bicycle and Pedestrian Commuters: Each NRP partner/lessee must ensure that their employees (including contract employees and students, where applicable) have free access to showers and a changing facility with clothing lockers within a ¼ mile distance from the work site. For employers that have an on-site fitness center, the showers and lockers at the fitness center count toward this requirement, as long as employees have free access to the showering and changing facilities.

4.4.5 Marketing and Information

4.4.5.1 NRP employers/tenants are required to provide information about transportation alternatives to all new employees. Employers can use materials developed by the TMA for this purpose.

4.4.5.2 NRP employers/tenants are required to provide information to their employees about the NRP's TDM programs by having a convenient, on-site location where employees can obtain program forms, brochures and information. NRP employers are required to cooperate with the placement of the NRP TMA's on-site information kiosks.

4.4.5.3 Employer/tenant cooperation in distributing TMA information to each employee will be required on an as-needed basis. The employer can do this by using internal resources to communicate with each employee through e-mail, voice-mail or inter-office mail. The

³¹ Class II bicycle parking is defined as a bike rack to which the frame and at least one wheel can be secured with a user-provided U-lock or padlock and cable.

employer can also choose to supply the TMA with access to full-employee e-mail lists and/or a full set of envelopes pre-labeled with inter-office addresses for each employee.

4.4.6 TDM program designee: Each employer/tenant is required to appoint a TMA liaison. This person will be responsible for passing TMA information on to employees, helping the TMA to coordinate events and marketing promotions, and special programming. The time commitment of this person to the TMA will vary, but may be as much as a .25 FTE requirement.

4.5 **Optional Lessee/Tenant/Employer Programs**

4.5.1 Employer-specific shuttles

Lessee/employer-specific shuttles could be developed for needs unique to that Lessee/employer. If a Lessee/employer wanted to develop such a program, the Lessee/employer is encouraged to work with the NRP TMA to integrate the service into the rest of the shuttle system. In addition, the Lessee could contract with the TMA to help develop and provide the service.

4.5.2 Local Shuttles

4.5.2.1 Lessees/employers may want join together to create shuttles beyond the four that would be provided by the TMA. For example, an employer may find that a large percentage of its population lives in a certain area nearby. The Lessee/employer may want to provide shuttle service between this area and campus or may want to work closely with public transit to increase service to this area. Another example might be a shuttle service to the airport.

4.5.2.2 As members of the board of directors of the TMA, Lessees can also direct the TMA to provide some of these additional services for the benefit of all if warranted. The TMA board would have to assess available revenues to provide such services and adjust the TMA funding mechanism accordingly.

4.5.3 Parking Cash-Out, Transportation Allowance, or Other Transportation Subsidies

(See also Section 5)

4.5.3.1 In addition to the site-wide transit subsidy program, an employer/Lessee may provide additional economic incentives to its employees who use alternatives to the single occupant vehicle. Subsidy programs that employers could implement include:

4.5.3.1.1 Parking Cash-Out

- a. An employer may choose to offer its employees the choice of:
 - (i) free parking (the employer would cover the cost of the employee parking);
 - (ii) a transit/vanpool subsidy equal to the value of the parking (of which a portion would be tax-free); or
 - (iii) a taxable carpool/walk/bike subsidy equal to the value of the parking.

4.5.3.1.2 Transportation Allowance

a. In a transportation allowance program, employees receive monthly allowances (e.g. \$50 per month) that they can apply to their parking or other transportation costs. An equal allowance is provided to all employees, regardless of their travel mode. Subsidies for transit and vanpooling are tax free up to \$100 per month. Parking subsidies are tax free up to \$175 per month.

b. Employers offering parking cash-out or transportation allowance programs will have the option to contract with the TMA to administer their programs.

4.5.3.1.3 Subsidies

An employer can also choose to offer subsidies for specific modes. For example, an employer may decide not to offer a complete transportation allowance program but may decide to provide financial incentives to people who bicycle or walk. Cash subsidies for carpooling, walking and bicycling are considered taxable income.

4.5.4 Alternative Work Hours

Alternative Work Hours can move trips outside the AM and PM peaks and/or reduce weekly trip generation. Alternative Work Hours programs include:

4.5.4.1 Flex-Time: Allowing employees to come and go from work on flexible schedules. This can range from ultimate flexibility (e.g. allowing employees to work any time of day) to requiring core hours (e.g. that employees must arrive within a window, such as 6 AM to 10 AM)

4.5.4.2 Compressed Work Weeks: Allowing employees to work a 40-hour work week in less than the standard 5-day work week (e.g. 4 10-hour days)

4.5.5 Telecommuting

Employers can institute telecommuting programs to either allow or encourage their employees to work at home. Telecommuting programs can range in scope. At the most basic level, a telecommuting program is simply a policy that allows employees to work remotely. Aggressive telecommuting programs will provide training, include detailed policies about the extension of the work place to home, and will provide home networking equipment.

4.5.6 Subscription Buses

Lessees/tenants may pursue funding or support the development of subscription buses with area transit agencies. Subscription bus services are set up from areas where an employer may have a concentration of employees living. Subscription bus services are generally cost effective for commute distances of 40 miles or more.

4.5.7 Long-Term Non-Commute Bicycle Storage

Employers/Lessees may want to provide secure locations for employees/students to store their bicycles on-site over the summer or over breaks.

4.5.8 Electric Carts/Bikes Requirement for Service Fleet

To reduce parking demand for Lessee/employer fleet vehicles, on-site fleet vehicles (e.g. security cars, delivery/maintenance vehicles, etc.) can be electric golf carts, mopeds, bicycles (electric or human-powered), or other human-powered vehicles.

5. PARKING

To achieve its goals the NRP must take a bold approach to parking supply, management and pricing. Implemented well, these strategies will reduce congestion, increase local transit use, encourage rational user choice, and help realize project goals.

Partner/Tenant/Lessee parking built or assigned shall be subject to these parking requirements as implemented by a TMA.

5.1 Parking Program Principles/Overview

- 5.1.1 Parking will be a shared resource throughout the NRP
- 5.1.2 A third party entity – the TMA -- will be created to manage the parking supply
- 5.1.3 Lessees will grant easements for parking as necessary to the TMA.
- 5.1.4 A certain amount of supply will be available for reserved use
- 5.1.5 All parking will be controlled-access parking.
- 5.1.6 There will be no free parking on site Monday through Friday from 6 AM to 7 PM³² once parking charges have been phased into the project. Employees, however, may select a parking subsidy if their employer offers a parking cash out, or transportation allowance, program. In these cases, the employer bears the cost of parking.
- 5.1.7 Parking charges will take effect during Phase 2 at the earliest feasible point in site development.
- 5.1.8 Parking is priced based on the cost to provide parking and fund the site-wide Transportation Demand Management programs.
- 5.1.9 Tenants, residents, employers, and employees are under no obligation to lease any minimum amount of the parking supply.
- 5.1.10 In any lease agreements, parking costs will be separated from other lease costs.
- 5.1.11 Employers that want to subsidize parking for their employees have the option to do so through parking cash-out arrangements only (i.e. employers are not able to absorb the cost of parking for their employees, unless they offer equal benefits to non-parking employees).
- 5.1.12 Parking pricing and card-access technology will be used to provide economic incentives to those using transportation alternatives on an occasional basis.

³² Fee parking will be extended to 9 PM when the number of students on site after 7 PM exceeds 2,000.

- 5.1.13 Access technology will be used to limit the need for extensive parking policing and permit systems.
- 5.1.14 Parking supply will reflect anticipated trip reduction and opportunities for shared-use parking.
- 5.1.15 Parking pricing will not reward long-term parkers.
- 5.1.16 In the long-term, technology will be maximized to provide economic incentives to those parking outside the peak by charging flexible parking rates based on demand.
- 5.1.17 Parking policies outlined in this plan apply to the housing that is located within the NRP. Reserved parking permits for housing within the NRP are not good for parking at other locations within the NRP.
- 5.1.18 Bay View Parking Policy -- parking for housing in the Bay View is not addressed in this TDM plan other than the following policy: Parking Permits that are good for parking in the Bay View would not be good for parking in the NRP.
- 5.1.19 Bay View Parking Recommendation -- It is recommended that the cost of parking in the Bay View be charged separately from the cost of housing in the Bay View.

5.2 Benefits of the Parking Program

5.2.1 Charging for Parking

- 5.2.1.1 Charging for parking is the single most effective strategy to encourage people to use alternatives to the single occupant vehicle.
- 5.2.1.2 Supports sustainability goals by not subsidizing drive alone behavior.
- 5.2.1.3 Parking charges have been found to reduce vehicle trips anywhere from 8% to 30%.

5.2.2 Third-Party Managed Supply

- 5.2.2.1 Eliminates the propensity for site-employers to provide free or reduced-cost parking to certain classes of employees due to union bargaining or other company policies.
- 5.2.2.2 Central management of parking payment, maintenance, security, operations, information and janitorial services, relieves partners/Lessees from these responsibilities.
- 5.2.2.3 The third-party managed parking supply separates the cost of parking from the cost of other real estate, which supports the project's sustainability goals.

5.2.3 Shared Parking

- 5.2.3.1 Reduces the total amount of parking that would otherwise be needed; reduces the amount of land that must be dedicated to parking; reduces paving of land; supports sustainability goals.
- 5.2.3.2 Shared parking supports the use of the large, centralized parking facilities that will be located at Hangar 1 and the light rail station. In addition to keeping cars out of the NRP core, this results in more efficient traffic flow as fewer parking entrances and exits are needed.

5.3 Supply

5.3.1 It is critical to not just price parking properly, but to supply it properly. The NASA Research Park will not need as much parking as would be required using traditional suburban office-park parking demand formulas. The TDM program aims to reduce employee commute trips 32% beyond what is traditionally achieved at Silicon Valley employment sites, while the mixed-uses at the site create the opportunity for shared parking. In addition, the on-site retail will be used by employees, residents and students of the research park, many of whom will walk to the retail. Supplying parking using standard demand rates would result in an oversupply of parking. This would be an inefficient use of valuable resources and would not support the parking pricing strategy.

5.3.2 Applying traditional parking ratios to the land uses within the NRP reveals that the research park (3,000,000 square feet approved under the proposed NADP plus 887,000 square feet approved under the CUP EA) would need about 10,050 parking spaces at build-out. Applying trip reduction expectations and the opportunities for shared parking reveals that the NRP will need about 7,972 parking spaces³³. This represents about a 28% reduction beyond what the traditional supply formulas would prescribe³⁴.

5.3.3 Mitigated Alternative 5 -- It should be noted that the parking supply numbers cited throughout this plan do not reflect the increased housing supply located within the NRP that is included in Mitigated Alternative 5. While the precise locations and types of parking cited in this plan are conceptual, the total parking supply number is set to reflect the reduced supply needed based on the parking pricing/TDM strategy. Thus, it may turn out that additional parking will be needed for on-site housing than what is outlined in this plan, but less parking will be needed in the commuter shared supply because more people live on-site. The net amount of parking would not increase beyond what is described in this plan. The estimates of parking supply are shown in Appendix B.

5.3.4 Those providing parking are required to equip at least 0.5% of their parking supply with electric vehicle charging capabilities that will be available to all parkers.

³³ NADP EIS land uses alone located within the NRP (not including those permitted under the CUP EA) would require 7,550 parking spaces using traditional formulas, but only 5,200 parking spaces based on trip reduction expectations.

³⁴ The benefits of shared parking have been used to reduce the amount of parking supplied by a wide range of percentages (from 10% to 100%) depending on the geography, land uses and transportation infrastructure. There are no strict formulas for determining the appropriate reduction.

5.4 Phase-In of Parking Charges and Parking Management

Parking will be built gradually over the course of the development. The NRP site currently has an abundance of open, surface parking lots estimated to supply about 2,500 parking spaces. Thus, it will be infeasible to control and charge for parking in the earliest stages of development. Since it is critical that parking be perceived as a valuable resource, the parking supply will be established as a controlled, priced resource as soon as feasible. It is estimated that this will take place during Phase 2.

5.4.1 Phase 1

5.4.1.1 It is anticipated (although not certain) that Phase 1 will occur prior to University construction. The development site currently has an abundance of open, surface parking lots. There are about 2,500 parking spaces located within the NRP including 1,500 located at Hangar 1. It is anticipated that in Phase 1 parking will be free, since the principles of supply and demand cannot support priced parking.

5.4.1.2 Upon commencing construction, developers/Lessees are required to fence off the surface spaces located on the parcel. Toward the end of Phase 1, as more construction begins, the abundant, free parking supply will diminish. If a partner wants to fence off the surface supply on its parcel(s) prior to commencing construction, the partner may do so. If a partner wants to charge for parking during Phase 1, and can establish the necessary controls to do so, the partner is welcome to do so, and will be assisted by the TMA to manage the Phase 1 paid parking program.

5.4.1.3 Controlled access of the Hangar 1 lot will occur in the same timeframe as when the University Partner lots are fenced-off for construction. Controlled access of the Hangar 1 Lot would occur in Phase 1, if the University Partners fence off their lots in Phase 1.

5.4.1.4 Each partner/lessee/tenant will be required to sign the Transportation Demand Management Plan, acknowledging that parking will not remain free in subsequent phases of development and that the partner/lessee/tenant agrees to the terms of the TDM plan and its parking policies. The TDM Plan is also part of the terms of the NADP Environmental Impact Statement..

5.4.2 Phase 2

5.4.2.1 Parking charges will begin at the earliest feasible point in Phase 2. This point is contingent upon the phasing of development, the loss of the open, surface parking lots due to construction and the increasing number of employees working on site. The TMA will be responsible for working with the partners to manage the introduction of new parking supply and the elimination of the old supply. The TMA and its board will be responsible for determining the point at which parking charges will be implemented. In addition, all new parking structures and surface lots will be equipped with parking control technology from inception and will charge for parking as soon as they are brought on-line.

5.4.2.2 The existing surface parking supply located at Hangar 1 will be modified to create a controlled-access, paid lot during Phase 2. The employee population in Phase 2 will be 2,675 to 5,999 employees/students, while the pre-existing 2,500 surface spaces (Hangar + partner parcels) will have decreased due to site construction.

5.4.3 Phases 3 and 4

5.4.3.1 The TMA or another third party concessionaire will assume management of the parking supply (existing and constructed by site developers). To provide an example of one possibility of what fees could look like, general parking phasing assumptions are presented in Appendix B along with the resulting monthly parking costs. Parking phasing and the types of structures to be built over time will be determined at a later date based on construction phasing.

5.4.3.2 The TMA will manage the supply of parking and will return a portion of parking revenues to the owners of the parking lots. Rates will be set based on the parking revenues needed to cover parking and TDM program costs (see Section 5.9 and Appendix C) and parking location desirability (see Section 5.9). Revenues returned to each garage owner will be based on the cost to provide that particular parking supply. Revenues held by the TMA will be based on the amount needed to finance the site-wide TDM programs. Thus, the parking owners will receive parking revenues based on what it cost the owner to construct the supply (not on the rate charged in the structure they own).

5.5 Parking Supply Phasing

5.5.1 Phase 1

Phase 1 covers occupancy of the NRP up to 2,675 employees. The only parking that is expected to be built in this phase will be Lab Project parking. There are an additional 332 surface spaces that are needed for EA uses in the historical district. In Phase 1, these spaces will most likely be part of the existing supply. As construction takes place in subsequent phases, these spaces may be part of a new surface lot.

5.5.2 Phase 2

5.5.2.1 The TMA will begin managing the NRP-wide parking supply³⁵ at the time when parking demand becomes sufficient to make shared parking feasible. It is anticipated that this will occur during Phase 2, although the TMA board has the flexibility to determine the right point during Phase 2 for this transition to shared parking.

5.5.2.2 Upon transition of parking management to the TMA, the TMA will have the following parking responsibilities:

- 5.5.2.2.1 Create uniform parking policies and procedures to support the shared system
- 5.5.2.2.2 Interface with all employees to provide parking information
- 5.5.2.2.3 Centrally manage parking payment – this entails coordinating with the TMA board and employers to develop systems for revenue flow, reconciliation and employee parking pre-tax payment

³⁵ Such an arrangement was developed in Portland, Oregon when the Association for Portland Progress (APP), a non-profit business association, took over management of City-owned garages. APP became responsible for all revenue handling, policy setting, garage management, marketing, maintenance and security. The City continued to own the parking supply.

5.5.2.2.4 Centrally manage maintenance, security, operations, information and janitorial services

5.5.3 Phase 3 and 4

5.5.3.1 The TMA or a third party parking vendor will be responsible for financing, building and developing additional parking supply at Parcel 10/11 and coordinating this supply with the remainder of the shared parking supply.

5.6 **Parking Supply Distribution**

Figure 5-1 shows potential parking distribution and the phase in which it would be added.

Figure 5-1: Conceptual Plan for Parking Supply Location and Phasing

Location	Type of Parking	Number of Spaces	Phase Built
Lab Project	Garage	2,440	1
Parcels 12-15 (Historic District)	Existing surface lot	332 ³⁶	1
<i>SUBTOTAL CUP EA</i>		<i>2,772</i>	
Hangar 1	Existing surface parking	1,200 ³⁷	2
Parcels 12 – 15 (Historic District)	New surface/small lot parking	660	2
Parcel 7 (CHM)	New surface/small lot parking	80	2
Parcel 5 (University)	New surface/small lot parking	500	3
Parcel 6 (University Housing) ³⁸	New surface/small lot parking	495	3
Parcel 8 (Partner Parcel)	New structured parking	600	3
Parcel 16 (Partner Parcel)	New surface/small lot parking	165	3
Parcel 17 (Partner Parcel)	New surface/small lot parking	100	3
Parcel 10/11 (Transit Station)	New structured parking	1,400	4
<i>Subtotal NADP EIS</i>		<i>5,200</i>	
Total		7,972	

³⁶ In Phase 1, these spaces will most likely be part of the existing supply. As construction takes place in subsequent phases, these spaces may be part of a new surface lot.

³⁷ Includes 30 bus parking stalls for museum visitors

³⁸ The parking supply numbers in this NRP TDM Plan do not include Bay View. They also have not been updated to reflect changes in housing supply associated with Mitigated Alternative 5.

This distribution of the parking supply makes use of existing resources and places the majority of parking on the periphery of the NRP's core. Parking supply will be shared (see 5.7) with reserved supply designated in each location.

5.7 Shared and Reserved Parking

5.7.1 Parking located within a leased parcel will be included as part of the maximum square footage of allowable development within that parcel. Once parking charges are implemented, the partner/Lessee located within that parcel will not pay lease costs on the land that lies beneath the shared or reserved parking.

5.7.2 Nearly half of the parking supply will be shared between partners and tenants. To accommodate the functional needs of the partners and tenants, however, a certain amount of reserved³⁹ space will be available. It is anticipated that the reserved spaces will be located closer to partner buildings and will cost more than parking on the periphery.

5.7.3 Shared parking supports the use of the large, centralized parking facilities that will be located at Hangar 1 and the light rail station. It is anticipated that the majority of the shared spaces will be located on the periphery of the NRP and will cost less than parking within the NRP core.

5.7.4 Figure 5-2 shows the anticipated amounts and locations of parking that will be dedicated to shared and reserved use.

Figure 5-2: Conceptual Plan for Shared and Reserved Parking Supply by Location

Location	Reserved Supply	Shared Supply	Total Supply
Lab Project (CUP EA)	2,440 – Commercial Partner	0	2,440
Parcel 10/11 (Transit Station)	0	1,400	1,400
Hangar 1	500 – CASC/CMHC visitors	700	1,200
Parcels 12 – 15 (Historic District)	250 -- CTC	732 ⁴⁰	982
Parcel 7 (CHM)	40	40	80
Parcel 5 (University)	400 – Universities	100 ⁴¹	500
Parcel 6 (University Housing)	440 -- Residents	55	495
Parcel 8 (Partner Parcel)	0	600	600
Parcel 16 (Partner Parcel)	0	165	165
Parcel 17 (Historic Dist. Reno)	0	100	100
Total	4,070	3,892	7,972

5.8 Parking Costs

5.8.1 Free parking encourages people to drive, increases the costs of development, and encourages a built environment that does not put land to its highest and best use. The powerful subsidy of free parking makes driving the most economically advantageous and rational choice for travelers compared to walking, cycling, or using transit. Free parking is at odds with the goals of the NASA Research Park to reduce auto traffic and emissions.

³⁹ For the purposes of the TDM plan, “reserved spaces” are spaces that are not part of the shared supply, but are reserved for use by a particular partner. The partners may use these spaces to meet their needs.

⁴⁰ 332 parking spaces for uses approved under CUP EA.

⁴¹ The 100 non-reserved parking spaces within the University parcel will be designated High-Occupancy-Vehicle parking.

5.8.2 Appendix B provides detailed information about how the following parking costs were derived. Figure 5-3 summarizes the annual costs of providing parking at the NRP that would be passed on to the parking consumer. These costs include:

- 5.8.2.1 TMA fees for parking management & operations (revenue will equal about \$440,000 per year at build-out)
- 5.8.2.2 Construction, including gate access technology
- 5.8.2.3 In lieu of land opportunity costs, site-wide TDM program costs were included
- 5.8.2.4 Financing

Figure 5-3: Estimated Cost of Parking Supply (Phase 4 Costs)⁴²

Supply	Annual Cost Per Space	Total Number of Spaces	Annual Cost of Supply
New structured parking	\$1,868	4,940	\$9,228,000
New surface parking	\$888	1,832	\$1,332,000
Existing surface parking	\$728	1,200	\$874,000
Total		7,962	\$11,434,000

5.9 Parking Fees

5.9.1 Parking prices will be charged using a time-based strategy so that long-term or more-frequent parking is not rewarded with discounts. It is anticipated that this will be done using debit-card or smart card technology. For non-reserved spaces, the hourly rate per day will max out at eight hours and the daily rate per month will max out at 22 days per month. Anyone who parks a minimum of eight hours per day for 22 days per month would max out at the monthly parking rate. Employees, visitors, and students who park less than eight hours per day or less than 22 days per month will end up paying less than the monthly rates.

5.9.2 Reserved parkers pay a flat monthly fee for their reserved spaces. Weekend parking is free, except during events. Parking between 7 PM and 6 AM is also free.

5.9.3 The TMA, under the guidance of its board of directors, will develop a revenue and reconciliation model for the distribution of the parking fees generated to cover parking construction costs back to the parking owners. This will be determined based on parking data from the controlled-access card readers. Appendix C provides an understanding of the amount of revenue generated to cover the costs of the TDM program versus cover the costs of parking construction.

⁴² See Appendix C. Includes construction cost, financing, maintenance, site-wide TDM and management.

Figure 5-4: Estimated Parking Charges at Project Build-Out (2001\$)⁴³

	Monthly Cost	Annual Cost	Daily Cost	Hourly Cost
Pool Space Cost A (P6-8, P12-15, P16, P17)	\$92	\$1,104	\$4.20	\$0.55
Pool Space Cost B (Hangar 1)	\$85	\$1,020	\$3.85	\$0.45
Pool Space Cost C (Transit Center)	\$85	\$1,020	\$3.85	\$0.45
Museum Reserved Space Cost (Hangar 1)	\$75	\$900	\$3.40	\$0.45
Reserved Carpool Spaces (University Parcel 5)	\$75	\$900	\$3.40	\$0.45

Employees can use it for parking, transit costs, or pocket the cash if they choose to walk or bike.

5.9.4.5 Employers offering parking cash-out or transportation allowance programs will have the option to contract with the on-site TMA to administer their programs.

5.9.5 Subsidized Visitor Parking

Employers will be able subsidize their visitor parking in one of two ways:

5.9.5.1 Purchase a supply of reserved parking that the employer can designate as visitor parking. The employer will be responsible for paying the monthly reserved fee to the third party parking management association.

5.9.5.2 Purchase employer-provided validation stickers. These stickers will be priced at the market rates described above.

5.9.6 NRP Residential Parking Charges

Residents will pay for parking separately from their housing rental costs. Reserved parking rates will apply at the NRP housing. Each resident in the NRP will be able purchase at least one parking space at their housing location. Residents may be able to purchase more than one on-site parking space on an as-available basis. Residents who do not want to pay the reserved rates for parking at their housing location have the option to park in the Transit Green garage or the Hangar 1 lot at the shared-pool parking rate.

5.10 **Parking Controls/Technology**

5.10.1 All parking will be controlled with card access technology. The following are the parking access technology guidelines.

5.10.2 The TMA will install and operate parking controls.

5.10.3 Prior to the formation of a TMA, Lessee's will set aside funds in a separate account to pay for their fair share of parking control costs at the time a TMA is established.

5.10.4 Parking access will be monitored through technology as opposed to manual policing of permits.

5.10.5 All parkers will use card-access technology to enter any parking supply.

5.10.6 Card-access technology will be consistent between garages and lots and will feed into the same database regardless of parking location.

5.10.7 Card access technology will be programmed to charge parkers based on an hourly/daily rate using debit-card technology.

- 5.10.8 Technology will be programmed to charge parkers an hourly rate until the parker “maxes out” at eight hours, and on a daily rate until the parker “maxes out” at 22 days per month. (There is no cost advantage to park long-term. There are cost advantages for parking less than full-time.)
- 5.10.9 Technology will be programmed to provide daily, weekly and monthly reports on:
 - 5.10.9.1 Who is parking (affiliation and other information requested by partners)
 - 5.10.9.2 # of vehicles accessing more than once per day
 - 5.10.9.3 access and egress by time and volume
- 5.10.10 Technology will be programmed to recognize multi-passenger vehicles (either by allowing 2 + ID badges to be swiped when one car is at the access gate or with monitoring cameras)
- 5.10.11 Technology will be programmed to allow any parker to easily check his/her parking account balance.
- 5.10.12 The parking access technology will be developed along with the NRP identification badge. Magnetic stripes on the employee ID badge will be used to program parking access information.

Appendix A

After accounting for NO_x emissions from construction, the following numbers of vehicle trips can be generated by NRP uses pursuant to the EIS in the following time frames. The number of vehicle trips shown in Figure A is below the estimated trip generation for the site.

Figure A NRP Vehicle Trip Cap Estimates Based on NO_x Limits (Uses pursuant to EIS)

Year	2005	2010	2015
Annual NO _x Cap (tons)	100	100	100
a) Construction Source NO _x Emissions Estimate (tons per year) ⁴⁵	76.1	58.32	0
b) Area Source NO _x Emissions Estimate (tons per year) ⁴⁵	1.8	6.3	9.9
c) Mobile source NO _x Emissions Estimate (tons per year) ⁴⁵	11.43	31.5	42.57
d) Additional NO _x Emissions "available" before cap is reached	10.67	3.88	47.53
NO _x "Potentially Available" for Vehicle Trips (tons/year) (c + d)	22.1	35.38	90.1
NO _x "Potentially Available" for Vehicle Trips (grams/year)	20,066,800	32,125,040	81,810,800
Grams of NO _x Emissions ⁴⁶ per Vehicle Trip (start + mileage ⁴⁷)	7.9	6.16	5.39
# of Vehicle Trips "Permitted" per Year Based on NO _x Limit	2,540,101	5,215,104	15,178,256
Maximum # of One-Way Vehicle Trips "Permitted" per Weekday Based on NO _x Limit	10,160	20,860	60,713

⁴⁵ Source: NADP EIS "Total Annual Air Pollutant Emissions, NO_x"

⁴⁶ Source: ARB Emission Factor MVEI7G Model for Santa Clara County using the Santa Clara County vehicle mix

⁴⁷ Assumes an average of 6.9 miles per vehicle trip for trips in Santa Clara County. Source: BAAQMD

APPENDIX B: NRP PARKING SUPPLY

Appendix A shows that if traditional parking ratios were applied, development in the NRP would have to include over 10,000 parking spaces (column C). Under the proposed NADP, TDM and shared parking limit the number of parking spaces that will be built in this proposed development (column D). CUP EA parking supply is not reduced based on TDM, because this was not part of the EA requirements (column E). The total parking supply in the NRP with both projects is slated at 7,972 spaces (column F). Table 2 provides more detail about how the NRP NADP parking reductions were determined.

TABLE 1: NRP PARKING SUPPLY

	A	B	C	D	E	F
	Total Base Units	Parking Supply formula	Parking Need (no TDM, no Shared Parking)	Proposed NADP Parking Need (TDM & Shared Parking)	CUP EA Parking Need	Total Parking Need: CUP EA & Proposed NADP
Lab Project	120,000 sq ft ^A	N/A	460	N/A	460	460
Lab Project	600,000 sq ft ^A	3.3/1000 sq ft	1,980	N/A	1,980	1,980
Historic District	135,000 sq ft ^A	2.1/1000 sq ft	282 ^D	N/A	282	282
Retail	15,000 sq ft ^A	3.3/1000 sq ft	50	N/A	50	50
Office/HD R&D	448,645 sq ft ^B	3.3/1000 sq ft	1,481	975	N/A	975
University	7,372 daytime students & staff/faculty ^C	.45 * population	3,317	2,600	N/A	2,600
Public/Museum	1,000,000 annual visitors ^C	1/1000 Annual Visitors	1,000	750	N/A	750
Retail	152,000 sq ft ^B	4/1000 sq ft	608	65	N/A	65
Conf/Training	250 rooms ^B	1.3/CTC room	325	260	N/A	260
Recreation	25,000 sq ft ^B	4/1000 sq ft	100	25	N/A	25
Support	25,000 sq ft ^B	4/1000 sq ft	100	30	N/A	30
Housing	350 units ^B	350@1.5+1/4	613	495	N/A	495
TOTAL			10,315	5,200	2,772	7,972

- ^A per CUP EA
- ^B Source: NRP EIS per BAE
- ^C Source: BAE employment + University-provided # of daytime students
- ^D Source: NRP EIS, Alt. 5

Table 2: NRP NADP Parking Reductions

	Total Employees ^A	Daytime Students ^B	Daily Visitors	Parking Need
Office/HD R&D	1,792	N/A	179 ^C	975 ^I
University	4,032	3,000	N/A ^D	2,600 ^J
Public/Museum	115	N/A	3,177 ^E	750 ^K
Retail	347	N/A	N/A ^F	65 ^L
Conf/Training	250	N/A	390 ^G	260 ^M
Recreation	40	N/A	N/A ^H	25 ^N
Support	50	N/A	N/A ^H	30 ^N
Housing	N/A	N/A	N/A	495 ^O
	6,626	3,000		5,200

Total Employee & Daytime Students at Buildout = 9,626 (~ 10,000)

- ^A Source: Bay Area Economics information provided for NADP EIS. Total employee numbers differ between EIS presentation of Alternative 5 and the NRP TDM plan, since the EIS includes Eastside Airfield and some Ames Campus employees. NRP TDM plan includes daytime university students.
- ^B Source: University estimates
- ^C 10% of daily employee population
- ^D Universities will attract visitors, but visitor trips are not used to calculate parking demand
- ^E Based on CMHC and CASC estimates
- ^F Retail will attract patron trips, but actual # is not used to calculate parking demand
- ^G 250 overnight visitors + 140 conference center day-users
- ^H Recreation & support will attract patron trips, but actual # is not used to calculate parking demand
- ^I Assumptions: 90% of employees on site at any one time, 58% require parking. Each visitor p-space turns over 4 times per day and 90% of visitors need parking.
- ^J Based on ratio of total students/staff/faculty to parking at six other UC schools (.35 spaces per student/staff/faculty)
- ^K visitors are "other" visitors, spaces turn over 1.5 times per day, 10% on transit; 90% in 2.5-person cars ~ 700 spaces
- ^L ITE standard for retail parking is 4 spaces per 1,000 sq ft. Assume that 90% of retail trips are coming from on-site users who parked in another location or who do not have a car on site. Therefore, only need 10% of the parking typical of standard = 0.4 space/1000 sq ft. 152,000 sq ft of retail space per EIS = 65
- ^M Assumptions: 60% of employees on site at any one time; 58% require parking (87 spaces). 50% of overnight guests fly in; of these 50% rent cars & 50% use shuttles/taxis = 62 spaces. 50% of overnight guest are local/regional & 70% bring cars = 87 spaces. 75% of day users are already on-site and walk or use shuttle. 25% of day users are coming from off-site & 60% bring cars = 21 spaces
- ^N Assumptions: 90% of employees on site at any one time; 58% require parking. Assume that patrons are coming from on-site, thus their demand has been counted in other line items.
- ^O 350 units @ 1.25 spaces/unit plus 1 visitor space per 6 units.

Appendix C

COSTS BASED ON LAND COST OF \$0 PER ACRE + TDM

COST PER PARKING SPACE

Capital Costs	PHASE 2			PHASE 3			PHASE 4		
	Surface Parking	Garage Parking	Existing Supply	Surface Parking	Garage Parking	Existing Supply	Surface Parking	Garage Parking	Existing Supply
Construction cost per Space	\$2,000	\$11,500	\$200	\$2,000	\$11,500	\$200	\$2,000	\$11,500	\$200
Controlled-access, debit card technology per space	520	350	\$500	520	350	\$500	520	350	\$500
Project management at 3.45%	\$87	\$409	\$24	\$87	\$409	\$24	\$87	\$409	\$24
Land Cost Per Space 1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital Cost Per Space	\$2,607	\$12,259	\$724	\$2,607	\$12,259	\$724	\$2,607	\$12,259	\$724
Annual Capital Cost Per Space 2	\$221	\$1,038	\$61	\$221	\$1,038	\$61	\$221	\$1,038	\$61
Operating Costs									
Annual maintenance	\$30	\$150	\$30	\$30	\$150	\$30	\$30	\$150	\$30
Utilities	\$5	\$8	\$5	\$5	\$8	\$5	\$5	\$8	\$5
Annual parking management/staff	\$50	\$75	\$50	\$50	\$75	\$50	\$50	\$75	\$50
Insurance	\$15	\$30	\$15	\$15	\$30	\$15	\$15	\$30	\$15
TDM (Program Cost divided by Total Spaces)	\$592	\$592	\$592	\$578	\$578	\$578	\$504	\$504	\$504
Total/Space	\$692	\$855	\$692	\$678	\$841	\$678	\$604	\$767	\$604
Total Annual Cost Per Space	\$913	\$1,893	\$753	\$899	\$1,879	\$740	\$825	\$1,805	\$666
Total to Cover TDM (in lieu of land fee of \$4.3 mil/acre)	\$592	\$592	\$592	\$578	\$578	\$578	\$504	\$504	\$504
Total to Cover Parking Construction, Maintenance, Debt	\$321	\$1,301	\$161	\$321	\$1,301	\$161	\$321	\$1,301	\$161

SUPPLY BY PHASE (including all CUP EA/NRP parking)

	Surface Parking	Garage Parking	Existing Supply	Total Supply	Cumulative Supply
PHASE 1	332	2440		2772	2772
PHASE 2	740		1200	1940	4712
PHASE 3	760	1100		1860	6572
PHASE 4		1400		1400	7972
NRP ONLY	1500	2500	1200	5200	
	\$481,099.25	\$3,252,424.65	\$193,577.61	\$3,927,102	755,211,829.2

ANNUAL COST BY PHASE

	PARKING & TDM COSTS				PARKING COSTS ONLY				TDM COSTS
	Surface Parking	Garage Parking	Existing Supply	Total	Surface Parking	Garage Parking	Existing Supply	Total	
PHASE 1	\$303,062	\$4,619,103	\$0	\$4,922,166	\$106,483	\$3,174,366	\$0	\$3,280,850	\$1,641,316
PHASE 2	\$978,562	\$4,619,103	\$904,104	\$6,501,770	\$343,826	\$3,174,366	\$193,578	\$3,711,770	\$2,790,000
PHASE 3	\$1,646,864	\$6,652,299	\$887,430	\$9,186,593	\$587,583	\$4,605,433	\$193,578	\$5,386,593	\$3,800,000
PHASE 4	\$1,511,396	\$8,917,860	\$798,696	\$11,227,951	\$587,583	\$6,426,791	\$193,578	\$7,207,951	\$4,020,000

COST (= FEES) AVERAGE OVER ALL TYPES OF SPACES BY PHASE

	Surface Parking	Garage Parking	Existing Supply	Total Cost	Cumulative Cost	Average Cost Per Space	Ave. Cost Per Space Per Month
PHASE 2	\$978,562	\$4,619,103	\$904,104	\$6,501,770	\$6,501,770	\$1,380	\$115
PHASE 3	\$683,197	\$2,067,098	\$0	\$2,750,295	\$9,186,593	\$1,398	\$116
PHASE 4		\$2,527,329	\$0	\$2,527,329	\$11,227,951	\$1,408	\$117

2 30-year financing at 7.5%

Appendix C, Page 2
FEES BY TYPE OF SPACE BY PHASE

Phase 1 -- Not Applicable

Phase 2

	Monthly	Annual Cost	# of Spaces	Annual Revenue	Daily Cost	Hourly Cost
Shared Space Cost A (P12-15)	\$85	\$1,020	822	\$838,440	\$3.86	\$0.48
Shared Space Cost B (Hangar 1)	\$80	\$960	700	\$672,000	\$3.64	\$0.45
Museum Reserved Space Cost (Hangar 1)	\$70	\$840	500	\$420,000	\$3.18	\$0.40
Non-Museum Reserved Space Cost	\$145	\$1,740	250	\$435,000	N/A	N/A
Lab Parking	\$145	\$1,740	2,440	\$4,245,600		
Totals			4,712	\$6,611,040		
Difference b/w cost of shared parking supply and revenues generated			0	\$109,270		

Phase 3

	Monthly	Annual Cost	# of Spaces	Annual Revenue	Daily Cost	Hourly Cost	% Change from Prior Phase
Shared Space Cost A (P6, P7, P8, P12-15, P16, P17)	\$88	\$1,056	1,742	\$1,839,552	\$4.00	\$0.50	3.5%
Shared Space Cost B (Hangar 1)	\$83	\$996	700	\$697,200	\$3.77	\$0.47	3.8%
Museum Reserved Space Cost (Hangar 1)	\$72	\$864	500	\$432,000	\$3.27	\$0.41	2.9%
Carpool Spaces (University Parcel 5)	\$72	\$864	100	\$86,400	\$3.27	\$0.41	N/A
Non-Museum Reserved Space Cost (P6, P5, P8, P12-15)	\$155	\$1,860	1,090	\$2,027,400	N/A	N/A	6.9%
Lab Parking	\$155	\$1,860	2,440	\$4,538,400	\$7.05	\$0.88	6.9%
Totals			6572	\$9,620,952			
Difference b/w cost of shared parking supply and revenues generated			0	\$434,359			

Phase 4

	Monthly	Annual Cost	# of Spaces	Annual Revenue	Daily Cost	Hourly Cost	% Change from Prior Phase
Shared Space Cost A (P6, P7, P8, P12-15, P16, P17)	\$92	\$1,104	1,742	\$1,923,168	\$4.18	\$0.52	4.5%
Shared Space Cost B (Hangar 1)	\$85	\$1,020	700	\$714,000	\$3.86	\$0.48	2.4%
Museum Reserved Space Cost (Hangar 1)	\$75	\$900	500	\$450,000	\$3.41	\$0.43	4.2%
Carpool Spaces (University Parcel 5)	\$75	\$900	100	\$90,000	\$3.41	\$0.43	4.2%
Non-Museum Reserved Space Cost (P6, P5, P12-15)	\$170	\$2,040	1,090	\$2,223,600	N/A	N/A	9.7%
Shared Space Cost C (P10/11)	\$85	\$1,020	1,400	\$1,428,000	\$3.86	\$0.48	N/A
Lab Parking	\$170	\$2,040	2,440	\$4,977,600	\$7.73	\$0.97	9.7%
Totals			7,972	\$11,806,368			
Difference b/w cost to supply parking and revenues generated			0	\$578,417			