



MEMORANDUM

TO: Kwasi Bosompem
DATE: August 30, 2019
FROM: Jennifer J. Ray, AICP
PROJECT: Naval Base Commuter Multi-Modal Mobility Planning Study
JMT JOB NO: 18-03784-01A
RE: Deliverable #3: Implementation Plan and Cost Estimate

One of the most challenging aspects of a multi-modal mobility planning study is the implementation strategy. A large amount of coordination and short, medium, and long-term planning must occur to ensure that key agencies and stakeholders are on the same page and aware of each other's efforts. Several recommendations are provided to assist NAS/PAX with implementation of strategies needed to promote multi-modal mobility on base.

1. General Implementation Guidelines

C-SMMPO and NAS/PAX should make it known to the base community and other agencies (such as SHA, STS, and Calvert County Public Transportation officials) that this study was completed and that the focus is to reduce congestion on MD 235 by promoting multi-modal mobility on base. Additionally, C-SMMPO should encourage NAS/PAX to think about what projects and when coordination with SHA will be necessary. For some of long-term recommendations, it will be imperative that C-SMMPO encourage NAS/PAX and SHA to work together to implement some of the improvements as SHA is the owner and responsible for the maintenance of MD 235.

2. Short Term (0-5 Years)

Short term recommendations are defined as opportunities to implement improvements that would advance NAS/PAX multi-modal mobility within the next five years. County projects that are already underway, such as the Three Notch Bike Trail and the FDR Boulevard project are considered as short-term improvements, as C-SMMPO and NAS/PAX should continue to encourage the completion of these projects. Otherwise, all other projects requiring county or state coordination are considered medium- or long-term recommendations.

Recommendations under the short-term timeframe are those that would require minimal coordination, design, and construction time or that should be considered priority projects for the base. These include the installation of alternative mobility hubs (AMHs), where



amenities such as a bike share program, bike storage facilities, and shelters for transit are to be placed. It is important to note that these facilities can be constructed before the implementation of the on-base shuttle system because of the numerous benefits they provide for other means of transportation around base. Additionally, it is imperative that the installation of shower and locker facilities around base be considered a short-term project, as the availability of showers will be the first step in successfully promoting bicycling to and around base as a viable means of transportation.

Transportation Demand Management (TDM) improvements are also all considered short-term coordination efforts as they are concepts that utilize and optimize the existing transportation systems without any capacity and/or construction activities. This is accomplished by reducing the travel demand on existing facilities during the peak traffic times. TDM improvements are also being recommended to promote change in behavior for the way NAS/PAX employees think about transportation. While the installation of additional sidewalk facilities or bike lanes may not garner much attention at first, the inclusion of these new facilities with the promotion of wellness education, transit education campaigns, and other outreach efforts can encourage people to change their behavior.

See the matrix of recommendations and responsibilities for a full list of short-term recommendations.

3. Medium Term (5-10 Years)

Medium term recommendations are defined as opportunities to implement improvements that would advance NAS/PAX multi-modal mobility within the next five to ten years. Many of these projects seek to improve roadway or intersection operations on base as well as off base on MD 235. Medium term recommendations build upon the short-term recommendations and assume that they have been completed.

Recommendations under the medium-term timeframe are those that require greater coordination efforts and potentially a greater design and construction phase. In order to move these projects along, C-SMMPO should encourage NAS/PAX to begin some of the coordination efforts in a short-term timeframe. Examples of these recommendations include expanding the bike lane network on base, constructing sidewalks in a continuous manner, and redesigning some of the intersections on base to maximize efficiency. Off base, a crucial medium-term recommendation is the construction of a new pedestrian crossing of MD-235 (of which coordination should begin as soon as possible) and the extension/ repair of bike lanes along MD 235.

See the matrix of recommendations and responsibilities for a full list of medium-term recommendations.



4. Long Term (10+ Years)

Long term recommendations predominately include opportunities to expand multi-modal mobilities to its “ultimate” condition. These projects will require the most coordination, design and construction time, and financially will be some of the largest projects. Long term projects build off all recommendations to date and assume they have been completed.

Examples of long-term recommendations include creating a fully separated bike facility adjacent to MD 235 and extending roads on base. It is important to note that there is carry-on of medium-term projects into the long-term timeframe; this is to account to the lengthy period of time that coordination and construction activities will require.

See the matrix of recommendations and responsibilities for a full list of long-term recommendations.

5. Recommendation Matrix

A matrix has been developed to organize and present a timeline of recommendation implementation in an organized manner. Recommended projects have been organized based on target category consistent with the Naval Base Multi-Modal Mobility Planning Study.

The timeline for each recommended project is broken down into three sections: coordination, design, and construction. It is important to note that many of these recommendations will require coordination throughout the entirety of the implementation cycle; however, for presentation purposes has only been included as in the initial phases of implementation. Each project also has a recommended key agency that C-SMMPO should coordinate efforts with for recommendation implementation.

6. Cost Estimate

A planning level cost estimate has been prepared for all recommendations. The cost summary and cost analysis by recommendation can be found following the recommendation matrix.

Matrix of Recommendations and Responsibilities
Naval Base Commuter Multi-Modal Mobility Planning Study

	Project	Cost*	Timeframe			Key Agencies**	Process to Implement / Remarks
			Short Term 0-5 Years	Medium Term 5-10 Years	Long Term 10+ Years		
Transit Recommendations							
1.1	Install Alternative Mobility Hubs (AMH): to include bike racks, bus shelters, and signage	\$250,00 - \$300,000	  			NAS/PAX	Secure funding to install AMHs at the 11 key nodes identified in the Naval Base Commuter Multi-Modal Mobility Planning Study.
1.2	Develop an On-Base Shuttle System: NAS/PAX to secure funding for vehicles	No additional cost				NAS/PAX	Secure funding for transit vehicles and develop an operating schedule.
1.3	Reinstate the On-Call Taxi Service	No Cost				NAS/PAX	Futher encourage NAS/PAX officials to implement and fund the service.
Bicycle Improvements							
2.1	Implement a bike share program on-base	\$150,000 - \$200,000	  			NAS/PAX St. Mary's County	Work with NAS/PAX officials and St. Mary's County to coordinate with bike share providers to bring the infrastructure to base.
2.2	Install shower and locker facilities on base	\$40,000 - \$45,000	  			NAS/PAX	Install shower and locker facilities at key employment centers.
2.3	Supply additional bicycle storage areas	\$35,000 - \$40,000	  			NAS/PAX	Install bicycle storage areas at key employment centers.
2.4	Implement a Bicycle Subsidy Benefit Program	No Cost				NAS/PAX DOD DOI	Coordinate with DOD to adopt the DOI's Transportation Subsidy Program.
2.5a	Expand bike lane network on base	Included in cost of 4.9	  			NAS/PAX	Expand bike lane infrastructure in key locations outlined in the Naval Base Commuter Multi-Modal Mobility Planning Study.
2.5b	Install sharrow markings on secondary and local roads	Included in cost of 4.9	  			NAS/PAX	Install sharrow markings on all roads without a bike lane.
2.6a	Re-stripe existing bike lanes on MD 235	\$150,000 - \$200,000				MDOT SHA St. Mary's County	Re-stripe bike lanes on MD 235 to ensure visibility and comply with current SHA design standards
2.6b	Create a separated bike path along MD 235	\$7 - \$10 Million		  		MDOT SHA St. Mary's County	Educate St. Mary's County on the importance of bicycle safety and promote the removal of bike lanes on MD 235 and the creation of separate bicycle facilities that are adjacent to MD 235. Coordinate with the county and SHA to utilize ROW.
2.6c	Extend bike lane on MD 235 between Cedar Point Rd and Hermanville Rd	\$75,000 - \$100,000		  		MDOT SHA St. Mary's County	Coordinate with St. Mary's County and SHA to utilize ROW to extend the existing bike lane on MD 235.
2.6d	Complete the FDR Boulevard Project	\$12 Million (Currently included in the St. Mary's Capital Budget)				NAS/PAX MDOT SHA St. Mary's County	Encourage St. Mary's County to continue funding for the extension of FDR Boulevard.
2.6e	Complete the Three Notch Bike Trail	Included in completion cost of 2.6d				NAS/PAX MDOT SHA St. Mary's County	Encourage St. Mary's County to continue funding for the completion of the bike trail in order to promote biking as a viable form of transportation to access base.
2.6f	Create a bicyclist education and safety campaign	\$20,000 - \$30,000				NAS/PAX	Coordinate with NAS/PAX to develop a public outreach campaign that will disperse information regarding upgrades and implementation of bike lanes, bike share, new facilities, and general bicyclist safety tips.

*Feasibility level construction cost estimates

**Key Agencies for C-SMMPO to coordinate efforts for recommendation implementation



Matrix of Recommendations and Responsibilities
Naval Base Commuter Multi-Modal Mobility Planning Study

	Project	Cost*	Timeframe			Key Agencies**	Process to Implement / Remarks
			Short Term 0-5 Years	Medium Term 5-10 Years	Long Term 10+ Years		
Pedestrian Connectivity Recommendations							
3.1	Construct sidewalks in a continuous manner throughout base	\$25 - \$30 Million				NAS/PAX	Work with NAS/PAX to identify all locations on base where sidewalks and crosswalk infrastructure is missing. Primary focus should be on areas surrounding the identified key employment nodes and areas around bus stops.
3.2	Install pedestrian crossing signals and crosswalks at all appropriate intersections throughout base	\$300,000 - \$400,000				NAS/PAX	Work with NAS/PAX to inventory intersections on base and install crosswalks. Survey signaled intersections and ensure proper pedestrian crossing signals are active and in proper shape.
3.3	Install a pedestrian crossing of MD 235	\$200,000 - \$250,000				MDOT SHA St. Mary's County	Coordinate with MD SHA to install a signalized pedestrian crossing on the southeast side of the MD 235/Cedar Point Road intersection.
3.4	Reimagine the Tulagi Place Park and Ride	No Cost				NAS/PAX St. Mary's County	Coordinate with St. Mary's County to secure continued usage of the Tulagi Place Park and Ride. Promote the value of the park and ride as a food truck hub and connect with local food trucks to encourage a weekly or monthly gathering.
3.5	Increase ADA compliancy	Included in cost of 3.1				NAS/PAX	Work with NAS/PAX to survey existing pedestrian infrastructure on base and ensure that existing and future entities conform to ADA requirements.
Recommended Geometric Changes							
4.1	Add a bike lane from the intersection of MD 235 and Cedar Point Road to Millstone Road.	\$50,000 - \$75,000				NAS/PAX MDOT SHA	Coordinate with NAS/PAX officials to construct these changes.
4.2	Redesign intersection of Cuddihy Road and Buse Road to realign turn lanes.	\$125,000 - \$175,000				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.3	Install pedestrian crossing signals and crosswalks at the Buse Road/Cuddihy Road intersection.	Included in cost of 4.2				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.4	Widen Cedar Point Road from intersection of MD 235 to Cuddihy Road to accommodate bike lane	\$225,000 - \$275,000				NAS/PAX MDOT SHA	Coordinate with NAS/PAX officials to construct these changes.
4.5	Revise Liljencrantz westbound approach to only allow right turns during the AM peak hours.	\$500 - \$1,200				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.6	Extend Davis Spur Road to Tate Road	\$500,000 - \$600,000				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.7	Install pedestrian signal to existing traffic signal at Cedar Point/Tate Road intersection.	\$125,000 - \$175,000				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.8	Implement back-in on-street parking only	No Cost				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.9	Re-stripe the entire bike loop around base	\$600,000 - \$700,000				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.
4.10	Improve all taxiway crossings	\$1.0 - \$1.5 Million				NAS/PAX	Coordinate with NAS/PAX officials to construct these changes.

*Feasibility level construction cost estimates

**Key Agencies for C-SMMPO to coordinate efforts for recommendation implementation



Matrix of Recommendations and Responsibilities
Naval Base Commuter Multi-Modal Mobility Planning Study

	Project	Cost*	Timeframe			Key Agencies**	Process to Implement / Remarks
			Short Term 0-5 Years	Medium Term 5-10 Years	Long Term 10+ Years		
Transportation Demand Management Improvements							
5.1	Implement staggered work hours	No Cost				NAS/PAX	Coordinate with different base divisions to create a consistent staggered work schedule among offices and departments.
5.2	Increase telework opportunities	No Cost				NAS/PAX	Work with different base entities to promote consistent telework options.
5.3	Implement Transportation Stipend promotion	No Cost				NAS/PAX	Work with NAS/PAX to include information about the stipend program in weekly e-mail blasts and other social media outreach posts.
5.4	Create a forum for car/van pool participants	No Cost				NAS/PAX	Work with NAS/PAX to develop a secure forum that will allow base employees to easily connect with one another when searching for alternative methods to get to base.
5.5	Implement a Transit Awareness Campaign	\$20,000 - \$30,000				NAS/PAX	Encourage NAS/PAX to develop a media campaign to promote multi-modal mobility on base. A media campaign is ongoing requiring constant updates.

*Feasibility level construction cost estimates

**Key Agencies for C-SMMPO to coordinate efforts for recommendation implementation

Coordination

Design

Construction

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 1.1 Develop On-Base Shuttle System

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 11,010.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,835.00	2% of total construction cost
Roadway						
	Bus Shelter	EA	13	\$ 1,600.00	\$ 20,800.00	13 Buildings - 2 showers each 2016 RS Means - page 291
	Bike Racks	EA	11	\$ 700.00	\$ 7,700.00	2017 RS Means - page 190
	Small Sign on Wood Supports	EA	11	\$ 500.00	\$ 5,500.00	
	Concrete Sidewalk, 5"	SF	3,850	\$ 15.00	\$ 57,750.00	
Subtotal					\$ 91,750.00	
Contingent Categories				Subtotal	\$ 104,595.00	
	Preliminary		40%	\$ 104,595.00	\$ 41,838.00	
	Drainage		30%	\$ 104,595.00	\$ 31,378.50	
	Landscape		6%	\$ 104,595.00	\$ 6,275.70	
Subtotal 2					\$ 171,242.20	
	Contingency		40%		\$ 68,496.88	40% of Subtotal 2
Subtotal 3					\$ 239,739.08	
	Engineering		10%		\$ 23,973.91	
	CM		10%		\$ 23,973.91	
Total					\$ 287,686.90	

**Naval Base Commuter Multi-Modal Mobility Planning Study
 Cost Analysis
 Site Option: 2.2 Install Shower and Locker Facilities on Base**

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 2,495.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 415.00	2% of total construction cost
Facility						
	Install Showers at Facilities around base	EA	13	\$ 1,600.00	\$ 20,800.00	13 Buildings - 2 showers each 2016 RS Means - page 291
Subtotal					\$ 20,800.00	
Contingent Categories				Subtotal	\$ 23,710.00	
	Preliminary		15%	\$ 23,710.00	\$ 3,556.50	
	Drainage		5%	\$ 23,710.00	\$ 1,185.50	
	Landscape		5%	\$ 23,710.00	\$ 1,185.50	
Subtotal 2					\$ 26,727.50	
	Contingency		40%		\$ 10,691.00	40% of Subtotal 2
Subtotal 3					\$ 37,418.50	
	Engineering		10%		\$ 3,741.85	
	CM		10%		\$ 3,741.85	
Total					\$ 44,902.20	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 2.3 Supply Additional Bicycle Storage Areas

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 2,100.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 350.00	2% of total construction cost
Facility						
	Bike Racks	EA	25	\$ 700.00	\$ 17,500.00	2017 RS Means - page 190
	Small Sign on Wood Supports	EA		\$ 500.00	\$ -	
	Curb and Gutter	LF	0	\$ 45.00	\$ -	
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 17,500.00	
Contingent Categories				Subtotal	\$ 19,950.00	
	Preliminary		15%	\$ 19,950.00	\$ 2,992.50	
	Drainage		5%	\$ 19,950.00	\$ 997.50	
	Landscape		5%	\$ 19,950.00	\$ 997.50	
Subtotal 2					\$ 22,487.50	
	Contingency		40%		\$ 8,995.00	40% of Subtotal 2
Subtotal 3					\$ 31,482.50	
	Engineering		10%		\$ 3,148.25	
	CM		10%		\$ 3,148.25	
Total					\$ 37,779.00	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 2.6a Re-stripe Existing Bike Lanes on MD 235

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 10,245.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,705.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Edge Line	MI	9.2	\$ 7,920.00	\$ 72,864.00	SHA Cost Estimating Guide
	Pavement Marking Symbols (Bike Markings)	SF	500	\$ 5.00	\$ 2,500.00	Assumed 25 SF per marking, 10 markings January 2019 Price Index
	Small Sign on Wood Supports	EA	20	\$ 500.00	\$ 10,000.00	Assumed 2 SF Signs, 10 new signs. SHA Cost Estimating Manual
	Curb and Gutter	LF	0	\$ 45.00	\$ -	?
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 85,364.00	
Contingent Categories				Subtotal	\$ 97,314.00	
	Preliminary		15%	\$ 97,314.00	\$ 14,597.10	
	Drainage		5%	\$ 97,314.00	\$ 4,865.70	
	Landscape		5%	\$ 97,314.00	\$ 4,865.70	
Subtotal 2					\$ 109,692.50	
	Contingency		40%		\$ 43,877.00	40% of Subtotal 2
Subtotal 3					\$ 153,569.50	
	Engineering		10%		\$ 15,356.95	
	CM		10%		\$ 15,356.95	
Total					\$ 184,283.40	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 2.6b Create a Separated Bike Path Along MD 235

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 460,000.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 76,665.00	2% of total construction cost
Roadway						
	Shared-Use Path	LANE-MI	4	\$ 1,000,000.00	\$ 3,833,333.33	SHA Cost Estimating Guide
Subtotal					\$ 3,833,333.33	
Contingent Categories				Subtotal	\$ 4,369,998.33	
	Preliminary		15%	\$ 4,369,998.33	\$ 655,499.75	
	Drainage		5%	\$ 4,369,998.33	\$ 218,499.92	
	Landscape		5%	\$ 4,369,998.33	\$ 218,499.92	
Subtotal 2					\$ 4,925,832.92	
	Contingency		40%		\$ 1,970,333.17	40% of Subtotal 2
Subtotal 3					\$ 6,896,166.08	
	Engineering		10%		\$ 689,616.61	
	CM		10%		\$ 689,616.61	
Total					\$ 8,275,399.30	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 2.6c Extend Bike Lane on MD 235 to Hermanville Rd

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 4,645.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 775.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Edge Line	MI	4.1	\$ 7,920.00	\$ 32,313.60	SHA Cost Estimating Guide
	Pavement Marking Symbols (Bike Markings)	SF	275	\$ 5.00	\$ 1,375.00	Assumed 25 SF per marking, 10 markings January 2019 Price Index
	Small Sign on Wood Supports	EA	10	\$ 500.00	\$ 5,000.00	Assumed 2 SF Signs, 10 new signs. SHA Cost Estimating Manual
	Curb and Gutter	LF	0	\$ 45.00	\$ -	?
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 38,688.60	
Contingent Categories				Subtotal	\$ 44,108.60	
	Preliminary		15%	\$ 44,108.60	\$ 6,616.29	
	Drainage		5%	\$ 44,108.60	\$ 2,205.43	
	Landscape		5%	\$ 44,108.60	\$ 2,205.43	
Subtotal 2					\$ 49,715.75	
	Contingency		40%		\$ 19,886.30	40% of Subtotal 2
Subtotal 3					\$ 69,602.05	
	Engineering		10%		\$ 6,960.21	
	CM		10%		\$ 6,960.21	
Total					\$ 83,522.46	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 3.1 Construct Sidewalks

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 1,021,970.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 170,330.00	2% of total construction cost
Facility						
	Concrete Sidewalk, 5"	SF	567,760	\$ 15.00	\$ 8,516,400.00	
Subtotal					\$ 8,516,400.00	
Contingent Categories					Subtotal	\$ 9,708,700.00
	Preliminary		40%	\$ 9,708,700.00	\$ 3,883,480.00	
	Drainage		30%	\$ 9,708,700.00	\$ 2,912,610.00	
	Landscape		6%	\$ 9,708,700.00	\$ 582,522.00	
Subtotal 2					\$ 15,895,012.00	
	Contingency		40%		\$ 6,358,004.80	40% of Subtotal 2
Subtotal 3					\$ 22,253,016.80	
	Engineering		10%		\$ 2,225,301.68	
	CM		10%		\$ 2,225,301.68	
Total					\$ 26,703,620.16	

**Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 3.2 Install Pedestrian Crossings and Signals**

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 12,840.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 2,140.00	2% of total construction cost
Facility						
	5" White Thermoplastic Paint for Edge Line	MI	0.25	\$ 7,920.00	\$ 1,980.00	
	Install Pedestrian Signal	EA	7	\$ 15,000.00	\$ 105,000.00	
Subtotal					\$ 106,980.00	
Contingent Categories				Subtotal	\$ 121,960.00	
	Preliminary		40%	\$ 121,960.00	\$ 48,784.00	
	Drainage		30%	\$ 121,960.00	\$ 36,588.00	
	Landscape		6%	\$ 121,960.00	\$ 7,317.60	
Subtotal 2					\$ 199,669.60	
	Contingency		40%		\$ 79,867.84	40% of Subtotal 2
Subtotal 3					\$ 279,537.44	
	Engineering		10%		\$ 27,953.74	
	CM		10%		\$ 27,953.74	
Total					\$ 335,444.93	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 3.3 Implement Ped Crossing of MD 235

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 8,370.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,395.00	2% of total construction cost
Facility						
	5" White Thermoplastic Paint for Edge Line	MI	0.09	\$ 7,920.00	\$ 750.00	
	Install Pedestrian Signal	EA	4	\$ 15,000.00	\$ 60,000.00	
	Concrete Sidewalk, 5"	SF	600	\$ 15.00	\$ 9,000.00	
Subtotal					\$ 69,750.00	
Contingent Categories				Subtotal	\$ 79,515.00	
	Preliminary		40%	\$ 79,515.00	\$ 31,806.00	
	Drainage		30%	\$ 79,515.00	\$ 23,854.50	
	Landscape		6%	\$ 79,515.00	\$ 4,770.90	
Subtotal 2					\$ 130,181.40	
	Contingency		40%		\$ 52,072.56	40% of Subtotal 2
Subtotal 3					\$ 182,253.96	
	Engineering		10%		\$ 18,225.40	
	CM		10%		\$ 18,225.40	
Total					\$ 218,704.75	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 4.1 Add Bike Lane from Cuddihy Rd to Millstone Rd

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 3,560.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 595.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Edge Line	MI	2.8	\$ 7,920.00	\$ 22,176.00	SHA Cost Estimating Guide
	Pavement Marking Symbols (Bike Markings)	SF	300	\$ 5.00	\$ 1,500.00	Assumed 25 SF per marking, 12 markings January 2019 Price Index
	Small Sign on Wood Supports	EA	12	\$ 500.00	\$ 6,000.00	Assumed 2 SF Signs, 12 new signs. SHA Cost Estimating Manual
	Curb and Gutter	LF	0	\$ 45.00	\$ -	
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 29,676.00	
Contingent Categories				Subtotal	\$ 33,831.00	
	Preliminary		15%	\$ 33,831.00	\$ 5,074.65	
	Drainage		5%	\$ 33,831.00	\$ 1,691.55	
	Landscape		5%	\$ 33,831.00	\$ 1,691.55	
Subtotal 2					\$ 38,133.75	
	Contingency		40%		\$ 15,253.50	40% of Subtotal 2
Subtotal 3					\$ 53,387.25	
	Engineering		10%		\$ 5,338.73	
	CM		10%		\$ 5,338.73	
Total					\$ 64,064.70	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 4.2 Cuddihy Road and Buse Road Intersection Improvements

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 8,395.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,400.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Lane Line	MI	0.09	\$ 7,920.00	\$ 750.00	SHA Cost Estimating Guide
	5" White Thermoplastic Paint for Crosswalks	MI	0.15	\$ 7,921.00	\$ 1,200.15	SHA Cost Estimating Guide
	Traffic Signal Timing Modification	LS	1	\$ 7,000.00	\$ 7,000.00	
	Install Pedestrian Signal	EA	4	\$ 15,000.00	\$ 60,000.00	
	Small Sign on Wood Supports	SF	2	\$ 500.00	\$ 1,000.00	
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 69,950.15	
Contingent Categories				Subtotal	\$ 79,745.15	
	Preliminary		15%	\$ 79,745.15	\$ 11,961.77	
	Drainage		5%	\$ 79,745.15	\$ 3,987.26	
	Landscape		5%	\$ 79,745.15	\$ 3,987.26	
Subtotal 2					\$ 89,886.44	
	Contingency		40%		\$ 35,954.58	40% of Subtotal 2
Subtotal 3					\$ 125,841.02	
	Engineering		10%		\$ 12,584.10	
	CM		10%		\$ 12,584.10	
Total					\$ 151,009.22	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 4.4 Widen Cedar Point Road for 5' Bike Lanes

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 9,470.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,580.00	2% of total construction cost
	Roadway Widening - Collector	LANE-FT	417	\$ 189.39	\$ 78,914.14	SHA Cost Estimating Guide
Subtotal					\$ 78,914.14	
Contingent Categories				Subtotal	\$ 89,964.14	
	Preliminary		40%	\$ 89,964.14	\$ 35,985.66	
	Drainage		30%	\$ 89,964.14	\$ 26,989.24	
	Landscape		6%	\$ 89,964.14	\$ 5,397.85	
Subtotal 2					\$ 147,286.89	
	Contingency		40%		\$ 58,914.76	40% of Subtotal 2
Subtotal 3					\$ 206,201.64	
	Engineering		10%		\$ 20,620.16	
	CM		10%		\$ 20,620.16	
Total					\$ 247,441.97	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 4.5 Buse Rd and Liljencrantz Rd Intersection Improvements

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 60.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 10.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Edge Line	MI		\$ 7,920.00	\$ -	SHA Cost Estimating Guide
	Pavement Marking Symbols (Bike Markings)	SF		\$ 5.00	\$ -	Assumed 25 SF per marking, 12 markings January 2019 Price Index
	Small Sign on Wood Supports	EA	1	\$ 500.00	\$ 500.00	Assumed 2 SF Signs, 12 new signs. January 2019 Price Index
	Curb and Gutter	LF	0	\$ 45.00	\$ -	
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 500.00	
Contingent Categories				Subtotal	\$ 570.00	
	Preliminary		15%	\$ 570.00	\$ 85.50	
	Drainage		5%	\$ 570.00	\$ 28.50	
	Landscape		5%	\$ 570.00	\$ 28.50	
Subtotal 2					\$ 642.50	
	Contingency		40%		\$ 257.00	40% of Subtotal 2
Subtotal 3					\$ 899.50	
	Engineering		10%		\$ 89.95	
	CM		10%		\$ 89.95	
Total					\$ 1,079.40	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 4.6 Extend a Ped/Bike Connection from Davis Spur Rd to Tate Rd

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 21,115.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 3,520.00	2% of total construction cost
	Shared-Use Path	LANE-FT	929	\$ 189.39	\$ 175,978.54	SHA Cost Estimating Guide
Subtotal					\$ 175,978.54	
Contingent Categories				Subtotal	\$ 200,613.54	
	Preliminary		40%	\$ 200,613.54	\$ 80,245.41	
	Drainage		30%	\$ 200,613.54	\$ 60,184.06	
	Landscape		6%	\$ 200,613.54	\$ 12,036.81	
Subtotal 2					\$ 328,444.82	
	Contingency		40%		\$ 131,377.93	40% of Subtotal 2
Subtotal 3					\$ 459,822.75	
	Engineering		10%		\$ 45,982.28	
	CM		10%		\$ 45,982.28	
Total					\$ 551,787.30	

Naval Base Commuter Multi-Modal Mobility Planning Study
Cost Analysis
Site Option: 4.7 Install Ped Signal at Cedar Point and Tate Road Intersection

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 8,040.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 1,340.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Lane Line	MI		\$ 7,920.00	\$ -	SHA Cost Estimating Guide
	5" White Thermoplastic Paint for Crosswalks	MI		\$ 7,921.00	\$ -	SHA Cost Estimating Guide
	Traffic Signal Timing Modification	LS	1	\$ 7,000.00	\$ 7,000.00	
	Install Pedestrian Signal	EA	4	\$ 15,000.00	\$ 60,000.00	
	Sheet Aluminum Sign	SF		\$ 50.00	\$ -	
	Concrete Sidewalk, 5"	SF		\$ 15.00	\$ -	
Subtotal					\$ 67,000.00	
Contingent Categories				Subtotal	\$ 76,380.00	
	Preliminary		15%	\$ 76,380.00	\$ 11,457.00	
	Drainage		5%	\$ 76,380.00	\$ 3,819.00	
	Landscape		5%	\$ 76,380.00	\$ 3,819.00	
Subtotal 2					\$ 86,095.00	
	Contingency		40%		\$ 34,438.00	40% of Subtotal 2
Subtotal 3					\$ 120,533.00	
	Engineering		10%		\$ 12,053.30	
	CM		10%		\$ 12,053.30	
Total					\$ 144,639.60	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 4.9 Re-Stripe Bike Loop around Base

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 37,110.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 6,185.00	2% of total construction cost
Roadway						
	5" White Thermoplastic Paint for Edge Line	MI	35.1	\$ 7,920.00	\$ 277,992.00	SHA Cost Estimating Guide
	Pavement Marking Symbols (Bike Markings)	SF	1,250	\$ 5.00	\$ 6,250.00	Assumed 25 SF per marking, 50 markings January 2019 Price Index
	Small Sign on Wood Supports	EA	50	\$ 500.00	\$ 25,000.00	Assumed 2 SF Signs, 50 new signs. SHA Cost Estimating Manual
	Curb and Gutter	LF	0	\$ 45.00	\$ -	
	Concrete Sidewalk, 5"	SF	0	\$ 15.00	\$ -	
Subtotal					\$ 309,242.00	
Contingent Categories				Subtotal	\$ 352,537.00	
	Preliminary		15%	\$ 352,537.00	\$ 52,880.55	
	Drainage		5%	\$ 352,537.00	\$ 17,626.85	
	Landscape		5%	\$ 352,537.00	\$ 17,626.85	
Subtotal 2					\$ 397,376.25	
	Contingency		40%		\$ 158,950.50	40% of Subtotal 2
Subtotal 3					\$ 556,326.75	
	Engineering		10%		\$ 55,632.68	
	CM		10%		\$ 55,632.68	
Total					\$ 667,592.10	

Naval Base Commuter Multi-Modal Mobility Planning Study

Cost Analysis

Site Option: 4.10 Improve all Taxiway Crossings

Roadway Costs

Item No.	Description	Unit	Quantity	Unit Cost	Total Cost	Notes
Preliminary						
	Mobilization	LS	1		\$ 67,200.00	12% of total construction cost
	Construction Stake Out	LS	1		\$ 11,200.00	2% of total construction cost
Roadway						
	Install Traffic Signals at Taxiway Intersections	EA	8	\$ 60,000.00	\$ 480,000.00	
	Install Flashing Beacon at Taxiway Intersections	EA	8	\$ 10,000.00	\$ 80,000.00	
	Sheet Aluminum Sign	SF		\$ 50.00	\$ -	
	Concrete Sidewalk, 5"	SF		\$ 15.00	\$ -	
Subtotal					\$ 560,000.00	
Contingent Categories				Subtotal	\$ 638,400.00	
	Preliminary		15%	\$ 638,400.00	\$ 95,760.00	
	Drainage		5%	\$ 638,400.00	\$ 31,920.00	
	Landscape		5%	\$ 638,400.00	\$ 31,920.00	
Subtotal 2					\$ 719,600.00	
	Contingency		40%		\$ 287,840.00	40% of Subtotal 2
Subtotal 3					\$ 1,007,440.00	
	Engineering		10%		\$ 100,744.00	
	CM		10%		\$ 100,744.00	
Total					\$ 1,208,928.00	