2010



STORM WATER DRAINAGE MASTER PLAN

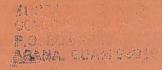












DEPARTMENT OF PUBLIC WORKS

GUAM

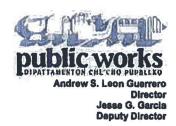
2010



SHIPPARM HIS TANKEN THE RESERVE SALES

BLACK MAR





December 17, 2010

Mr. Gene Niemasz Project Manager Parsons Transportation Group Inc. 590 South Marine Corps Drive ITC Building Ste 403 Tamuning, Guam 96913

Subject: Storm Water Drainage Master Plan

Dear Gene,

The Guam Department of Public Works has reviewed and approves the Stormwater Drainage Master Plan dated December 2010.

Sincerely,

ANDREW S. LEON GUERRERO

DEC 2/1 2010 PARSONS

This page intentionally left blank.

Guam Islandwide Program Management Services PTG DPW FHWA – GU-NH-IPMS(002)

Storm Water Drainage Master Plan

December 2010

The Honorable Felix P. Camacho, Governor The Honorable Michael W. Cruz, M.D., Lieutenant Governor





I HEREBY CERTIFY THAT THIS REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION

Prepared by:

Parsons Transportation Group Inc.

590 South Marine Corps Drive ITC Building, Suite 403 Tamuning, Guam 96913

This report was funded in part through a grant from the Federal Highway Administration, U.S. Department of Transportation. The contents of this report do not necessarily reflect the official views or policies of the U.S. Department of Transportation.

CONTENTS

Execu	utive Summary	
1.0	Introduction	
1.1	Report Objectives and Organization	6
1.2	Project Purpose and Need	7
2.0	Watershed Overview	8
2.1	North Guam Watershed	
2.2	South Guam Watershed	
3.0	Methodology	
3.1	Meetings with Agencies and Village Representatives	
3.2	Site Visits	13
3.3	Classification of Drainage Work Types	14
3.4	Prioritization	15
3.5	Cost Estimates	era watana mesena ki patawa ita
4.0	Summary of Projects	
4.1	Cost Estimates per Village	24
4.2	Village Priority Projects	25
5.0	Implementation	26
5.1	Existing and Potential Funding Sources	26
5.2	Other Environmental Financing Sources	30
5.3	Project Application	31
Appei	ndices	
Α	References	
В	Watershed Maps	
С	Project Summary Data Sheets	
D	Cost Estimation Spreadsheets	
E	Prioritization Spreadsheets	

Storm Water Drainage Master Plan

Figures	
Figure 2-1. Watershed and Village Map of Guam	8
Figure 3-1. Methodology of the Storm Water Drainage Master Plan Effort	11
Figure 5-1 – Sample Project Implementation Timeline	32
Tables	
Table ES-1. Project Evaluation Criteria	iv
Table ES-2. Drainage Improvement Work Types	
Table 1-1. Report Organization	6
Table 3-1. Village Mobilization Schedule	
Table 3-2. Work Types	
Table 3-3. Project Evaluation Criteria	
Table 3-4. Drainage Improvement Unit Costs	21
Table 4-1. Funding Allocation	24
Table 4-2. High Priority Projects	25
Table 5-1. Federal Funding Sources for Watershed Protection	
Table 5-2. Resources for Financing Storm Water/Water Quality Projects	30
Table 5-3. Sample Operating Budget	32

Executive Summary

The Government of Guam Department of Public Works (DPW) has prepared the Guam Storm Water Drainage Master Plan (SWDMP) to present a systematic approach for identifying existing storm water runoff patterns, existing storm water drainage systems, and assessing and prioritizing additional drainage improvements throughout the island of Guam. The SWDMP focuses on drainage improvements at the village level, as well as routed roads. This report documents:

- Methodology of defining drainage improvements;
- Criteria used to evaluate needed drainage improvements;
- Probable costs of improvements;
- Prioritization of projects for Capital Improvement Program (CIP) inclusion; and
- Available funding.

Some drainage improvement sites were initially identified in the Flood Control Master Plan (Earth Tech 1997) and the Village Streets Master Plan (Parsons 2009). Additional drainage improvement sites were obtained by letters and e-mails to the SWDMP team, which were usually sent to DPW and forwarded for inclusion in the SWDMP, as well as information received by the team during meetings with village mayors or mayor's delegated staff during the field effort. These drainage improvement sites were organized into a series of drainage improvement lists on a per village basis and guided the field effort.

The field effort began in mid January 2010 and was completed in early February 2010. During this timeframe, the SWDMP team conducted onsite inspections to evaluate the drainage improvement sites. Approximately 300 locations were evaluated. The field effort had two goals. The first goal was to document drainage deficiencies for later prioritization of potential CIP projects. The second goal was to recommend drainage improvements for generating project cost estimates. At each location, necessary drainage improvements were determined by evaluating and identifying the following:

- Deficiencies in drainage conveyance and storm drain systems;
- Issues regarding hillside, channel, and shoreline erosion;
- Potential undermining at bridges;
- Areas prone to severe sediment and/or debris deposition; and
- Maintenance issues.

Project Prioritization

Drainage improvements were organized into ten categories, including (1) Public Safety Risk; (2) Environmental Severity; (3) Maintainability; (4) Flooding Severity; (5) Floodplain; (6) Erosion Severity; (7) Number of Affected Properties; (8) Roadway Type; (9) Right-of-Way (ROW) Requirements; and (10) Estimated Cost. The evaluation categories and their associated scoring criteria displayed in Table ES-1 were used to develop a prioritized list of projects for each village. For each project, the sum of each criterion multiplied by its ranking factor yielded a prioritized score. Projects with the highest total scores are considered the highest priority projects and will likely be completed first when funding is available.

			WATER OF THE PARTY	RANKING FA	CTORS	
	PRIORITY	CRITERIA	HIGHEST SCORE (X3)	MODERATE SCORE (X2)	LOW SCORE (X1)	NO SCORE (X0)
	10	Public Safety Risk	inaction poses significant risk to public safety, potential loss of life.	inaction poses moderate risk to public safety, potential injury.	inaction poses low risk to public safety.	No risk to public safety.
	20	Environmental Severity	Directly impacts aquifer.	Directly impacts coastal area (within immediate area of shoreline).	Directly impacts surface water (e.g., river, stream, or lake).	No environmental risk.
ORIES	3	Maintainability	Low maintenance projects with easy accessibility.	Moderate maintenance requirement, moderately accessible.		
CATEG	3	Flooding Severity	Unacceptable damage caused by flood events.	Moderate damage caused by flood events.	Flood events cause nuisance damage.	No flood hazard.
NO	3	Floodplain	Inside floodplain.	NA	N/A	Outside floodplain
EVALUATION CATEGORIES	3	Erosion Severity	Unacceptable damage caused by erosion.	Moderate damage caused by erosion.	Erosion damage considered nuisance.	No erosion hazard
EV	3	Number of Affected Properties	Greater than 4 properties affected.	3 to 4 properties affected.	1 to 2 properties affected.	No properties affected.
	3	Type of Roadway	Highway	Arterial	Collector	Private
	3	Right-of-Way Requirement	Requires no ROW.	N/A	N/A	Requires ROW.
	10	Estimated Cost	Cost < \$200,000	\$200,000 < Cost < \$1,000,000	\$1,000,000 < Cost < \$10,000,000	Cost >\$10,000,000

Project Work Type

For documentation and cost estimating purposes, drainage improvements were identified using eight separate categories. These categories were later characterized as the drainage work type. The eight work types are displayed in Table ES-2.

Table ES-2. Drainage Improvement Work Types

Improvem	ent Type
Erosion Control Coastal Protection	
Conveyance Improvements	Conveyance Maintenance
Storm Drain Improvements	Storm Drain Maintenance
Treatment BMP Improvements	Treatment BMP Maintenance

Project Cost Estimating

Costs were estimated based on planning-level cost estimates prepared for standardized improvements (e.g., gabion walls, culvert replacement, riprap revetment) and projecting those costs to the identified location using information obtained during the site visit.

Project Funding

The design, construction, operation, and maintenance of drainage control systems can involve a significant expense, especially when flood concerns, water quality issues, and population growth are factored in. Typically, government agencies can rely on stable sources of funding that are available from an already established storm water utility. For example, communities with an established storm water utility can utilize service fees, property taxes/general fund monies, system development charges, and special assessment districts to fund storm water programs. Given that a storm water utility is not established in Guam, the local government and the Federal Highway Administration (FHWA), as well as private land owners, will need to rely on grants and low-interest loans that are designated for flood control and water quality protection projects. Information on such grants and low-interest loans is provided at the end of the report.

or to recent transmist statement of the

es usque semente uni med un encins, purpulpi, di Ingago om treo quens vaco identición o operado superior un gorbo. These estagantes veno later denos tonistas la estas un testas actual o els upos timo elgan o act tipos seculogiayest estado la estado la estado de la

voeral shelf in entera repail exercists (X-c) void if

This page in	tentionall	y left blank.

tente de la companya A respectation de la companya de la

the case, and the control of a second of the control of the contro

1.0 Introduction

The Government of Guam Department of Public Works (DPW) has prepared the Guam Storm Water Drainage Master Plan (SWDMP) to present a systematic approach for improving drainage throughout the island of Guam.

1.1 Report Objectives and Organization

The SWDMP is one of the key programs developed by DPW to develop criteria, a ranking system, and a prioritization methodology for identifying storm water improvement projects for drainage system upgrades, rehabilitation, and system extensions. Equally important to the prioritization methodology was a process for developing Capital Improvement Program (CIP) storm water projects that would effectively address roadway flooding and other drainage problems. An extensive process was used to analyze the storm water system and identify potential CIP projects.

This report documents the methodology of characterizing drainage system improvements, erosion control improvements, and water quality treatment improvements, along with criteria used to evaluate these improvements, the probable costs of improvements, and available funding. Lastly, it presents a verifiable and repeatable process for prioritizing projects and ensuring that the available funding is used effectively.

The report is divided into five sections, along with references provided in Appendix A and supplemental information provided in the remaining appendices. The report organization is indicated in Table 1-1.

Table 1-1. Report Organization

Section	Description		
Introduction	Presents report objectives and project purpose and need.		
Watershed Overview	Summarizes watershed characteristics for north and south Guam.		
Methodology	Methodology for gathering data, prioritizing projects and estimating costs.		
Ranking	Overall project ranking per village, summaries of project costs and results.		
Appendices	Supporting information on proposed projects, including site visit data, watershed and site maps, project summaries, cost estimates, and prioritization spreadsheets.		

1.2 Project Purpose and Need

The purpose of the SWDMP is to:

- Identify existing storm water runoff patterns;
- Identify existing storm water conveyance systems;
- Characterize drainage, erosion control, and treatment BMP improvements;
- Prioritize potential CIP projects; and
- Provide potential funding sources.

The SWDMP focuses on drainage and erosion control facilities at the village level and along routed roads and offers a generalized description of drainage or erosion control issues. The SWDMP team will work closely with DPW and the Federal Highway Administration (FHWA) to package and schedule these various drainage needs into viable projects as appropriate to the various identified funding sources.

2.0 Watershed Overview

This section summarizes Guam's watershed characteristics and provides information regarding existing surface drainage characteristics in the northern and southern portions of Guam. Guam is the largest and southernmost island in the Mariana Islands chain. It is approximately 30 miles long and 9 miles wide with a total of 116.5 miles of shoreline. The island is divided into two distinct geological formations by a central fault line. The northern half is mainly a broad sloping limestone plateau that is bordered by steep seaward cliffs and fringed by narrow coral reefs. The southern half is mountainous and composed of eroded volcanic formations with well-defined watersheds, as shown in Figure 2-1.

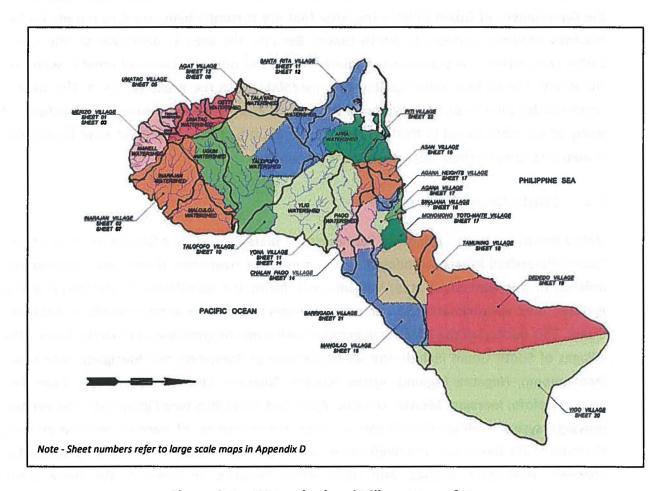


Figure 2-1 - Watershed and Village Map of Guam

2.1 North Guam Watershed

The surface in North Guam is relatively flat, and heavy precipitation generally flows by sheets into swales, then into depressions/retention basins (sinks), where it percolates into the ground. The subsoil is composed of highly porous limestone covered with a soil layer generally less than 2 feet thick. Percolation rates are high, generally from 8 to 24 feet per day. The villages of North Guam include the north portions of Tamuning and Barrigada, and Dededo, Yigo, and Mangilao (see Figure 2-1). Within the rural areas of the villages, roadway runoff either sheet flows through grass strips located along the edge of pavement or it ponds at low points. In the more urban locations, the road cross section is generally curbed with roadway runoff conveyed through a storm drain system that outlets into the sinks or existing infiltration basins. There are numerous infiltration basins owned and maintained by the Government of Guam DPW in this area that are currently being used as outlets for the roadway drainage systems in North Guam. Because the area is underlain by the North Guam Lens, which is a groundwater aquifer that is the primary source of potable water on the island, the surface water quality that percolates into the groundwater in this area is regulated by the Guam Environmental Protection Agency (GEPA). Note that locations of many of the sinks found in North Guam can be identified from the flood zone boundaries shown on the watershed maps provided in Appendix B.

2.2 South Guam Watershed

Unlike northern Guam's relatively flat limestone plateau, surface drainage in the Southern Guam Watershed is accommodated by the numerous rivers that dissect the mountainous uplands in this watershed area. Volcanic rock forms the foundation of the island and is exposed over approximately 35 percent of the island's surface, predominantly in southern Guam. This portion of the island is vegetated with a mix of grassland and patchy forest. The villages of South Guam include the south portions of Tamuning and Barrigada, and Maite (Mongmong), Hagatna (Agana), Agana Heights, Sinajana, Ordot, Chalan Pago, Asan, Piti, Yona, Talofofo, Inarajan, Merizo, Umatac, Agat, and Santa Rita (see Figure 2-1). The existing drainage systems within the villages in south Guam consist of earthen and riprap-lined channels, infiltration (i.e., ponding) basins, underground injection chambers, gabion-lined channels, grass-lined ditches, and storm drain networks in some of the more urban environments.

In general, the west side of southern Guam is traversed by rivers that are short with steep gradients and drainage areas of less than 3 square miles each. Route 1 is located very close to the mouths of several of these streams, which outlet into several bays connected to the

Philippine Sea or Apra Harbor. Several rivers are designated as floodways by the Federal Emergency Management Agency (FEMA), while others are designated as Flood Hazard Zone X (i.e., areas with minimal flooding potential). Several locations along the coast are designated within FEMA Flood Hazard Zone V or VE, which is defined as a coastal flood zone with velocity hazard due to wave action. Floodplain boundaries are shown on the watershed maps provided in Appendix B. The east side of southern Guam is traversed by rivers that are much longer with lesser gradients than the west side but with much larger watersheds. Route 4 is located very close to the mouths of these rivers, which outlet into several bays connected to the Pacific Ocean.

3.0 Methodology

Parsons Transportation Group Inc. (PTG) has assembled the SWDMP as part of the services provided to DPW under the Island-wide Program Management Services contract. A schematic that summarizes the overall approach for development of the SWDMP is indicated in Figure 3-1. Collectively, the project approach included the following:

- Identifying drainage needs;
- Conducting site visits;
- Classifying drainage work types;
- Prioritizing drainage improvements on a village-level basis;
- Performing cost estimates; and
- Ranking projects.

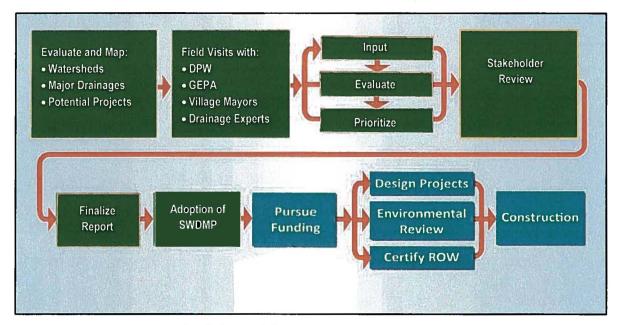


Figure 3-1. Methodology of the Storm Water Drainage Master Plan Effort

The drainage needs evaluated as part of the SWDMP were identified from the following sources:

- Flood Control Master Plan
- DPW direction on specific higher-priority drainage issues
- Projects identified by Village Mayors and/or their representatives
- Others, identified by DPW and their consultants

The methodology associated with the development of the SWDMP involved an understanding of the following:

- Overall watershed characteristics;
- Existing drainage facilities;
- Deficiencies in drainage facilities;
- Erosion potential;
- Input from others; and
- Prioritization of drainage improvements on a village-level basis.

3.1 Meetings with Agencies and Village Representatives

The SWDMP team initiated site visits on January 20, 2010. The initial drainage deficiency list used for the site visits was organized by village and was developed based on the Flood Control Master Plan (Earth Tech 1997), the Village Streets Master Plan (Parsons 2009), and existing geographic information system (GIS) mapping. Additional drainage deficiencies were obtained by letters and e-mails to the SWDMP team, which were usually sent to DPW and forwarded for inclusion in the SWDMP. Each day, prior to mobilizing, the SWDMP team contacted each village mayor to introduce the SWDMP team to the mayor and to:

- Make them aware of scheduled daily activities;
- Discuss initial list of deficiencies;
- Obtain additional information regarding drainage problems; and
- Invite the mayor and/or the mayor's representative to accompany the team.

Table 3-1 displays the field effort schedule and the level of participation by the mayors and the different agency representatives.

Table 3-1. Village Mobilization Schedule

DATE	VILLAGE	MAYOR STAFF SWDMP TEAM		AM	COMMENTS	
DATE	VILLAGE	MEETING	PTG	DPW	GEPA	Commit watershed channel
1/19/2010	Tamuning		х	X	х	Site added by DPW based on e-mail from owner
1/20/2010	Barrigada	х	х	Х	х	Sites were added by the Mayor
1/21/2010	Pitl		Х	X	х	of second to be enjoyed that
1/21/2010	Agana Heights		X	X	X	Sites were added by DPW
1/21/2010	Agana		х	Х	х	
1/22/2010	Asan		х	Х	х	
1/22/2010	Piti		х	Х	х	
4 /25 /2040	Dededo	Dress grants	X	X	X	Mayor provided list to DPW
1/25/2010	Yigo	X	х	X	х	Sites were added by Mayor's Representative
1/26/2010	Mangilao		х	Х	х	Sites were added by DPW
	Talofofo	х	x	X	1931 m	Sites were added by the Mayor
1/27/2010	Chalan Pago Ordot	x	х	Х		Verified site list submitted by the Mayor
	Yona	one Amile in	х	X		Sites were added by DPW
1/28/2010	Inarajan		х	Х		
1/29/2010	Agat	X	Х		minikar	COURS AND STREET THE SAME OF THE
1/31/2010	Merizo		X		-10-1	off and the day as the contract of
2/1/2010	Umatac	X	X	Х	40,000,000	
2/2/2010	Mongmong-Toto- Malte		х	2	li .	Site added by DPW based on e-mail from owne
2/2/2010	Barrigada	97. 9	X	Х	-11	
2/3/2010	Santa Rita	X	X	X	x	Sites were added by DPW
	Barrigada		х			
2/4/2010	Chalan Pago Ordot	re ga T.Sel	Х	FIRE	3 14 - 1	Site added by DPW
	Piti		Х			
2/E/2010	Sinajana		Х	341 i mi	r frui is	CHECK CONTRACTOR AND
2/5/2010	Inarajan		Х			Site added by DPW based on e-mail from owne

3.2 Site Visits

During site visits, it was noted that areas where improvements were required were generally related to maintenance, erosion control, conveyance capacity, or storm drain system issues. The SWDMP team, along with the mayor and/or his/her delegated staff, conducted onsite inspections at approximately 298 locations using a checklist and an evaluation guideline developed specifically for the SWDMP. Use of the checklist facilitated a systematic approach to define the priorities in each village. Later, prioritization was determined by assigning scores and ranking factors to the evaluation criteria.

Generally, the mayor or agency representative directed the SWDMP team to the drainage site and described in detail the deficiencies and problems they were experiencing. The PTG team inspected the site and recorded details of the existing drainage facilities and materials/activities required to resolve any recorded deficiencies. Information regarding the need for drainage easements and right-of-way (ROW) issues, as well as ponding or flooding incidents, was also documented. Projects were not scored in the field but were evaluated in

the office at a later time. A photo log was developed for all drainage sites visited, allowing further review to be performed. These photos are incorporated in the project summaries (see Appendix C).

Data collection was among the most critical aspect of this process. Field visits were conducted not only to gather information for prioritization and cost estimating purposes, but also to verify information provided on the initial drainage improvement list. Sump locations and overland flow paths were identified and documented. Approximate limits of ponding and potential for roadway flooding were noted. Open channels and cross sections were observed, and an estimate on their size was documented. In some instances, discussions with local property and land owners were held regarding past flooding events. Field checklists and digital photographs were used to collect and organize the field data. This extensive data collection process ensured that the analysis was accurate, which is vital for the planning-level cost analyses and project priority process.

3.3 Classification of Drainage Work Types

The SWDMP team began with a list of sites in need of drainage improvements and then added other sites based on visual reconnaissance during the site visits. Other sites were added to the list based on communication from property owners, village mayors or their delegated representatives, and DPW. Collectively, 298 sites were inspected for drainage improvements during the 3-week field effort. For items that were not on the initial list but were provided to PTG in writing after completion of the field effort, such as through personal communication to DPW, the PTG team interpreted the deficiency and added it to the list. The drainage improvements identified during the field effort considers the necessary maintenance, rehabilitation, and/or repair that are required to facilitate storm water runoff conveyance, minimize roadside ponding and adjacent property flooding issues, minimize erosion, and provide treatment for storm water runoff where needed. These drainage improvement categories translated into the project's drainage work types. Translating the drainage improvement categories into drainage work types allowed the PTG team to succinctly describe a drainage improvement at a particular location. This classification scheme also facilitated the project cost estimating process to be conducted in a manageable and efficient manner. The eight drainage work types are described in Table 3-2.

Table 3-2. Work Types

WORK TYPE	DESCRIPTION
Erosion Control	Locations where stream bank erosion, channel deformation, and down cutting were observed. Erosion control includes streambank protection, such as riprap revetment or installation of gabion retaining walls along steep cliff sides, control of hillside erosion with hydroseed, and mulch and/or bonded fiber matrix to control mass erosion.
Conveyance Improvements	Locations where the design and installation of offsite drainage conveyance structures, such as culverts, associated headwalls and wingwalls, channels, ditches, cross culverts, and bridges, are required. Examples include providing increased capacity, as well as replacing structures that are beyond repair.
Conveyance Maintenance	Locations where rehabilitation of conveyance structures or maintenance within conveyance structures is required. Examples include headwall and/or wingwall repair, removal of sediment and debris within and around culverts, and utility encasement or relocation within the conveyance facility.
Treatment BMP Improvements	Includes the design and installation of biofiltration strips/swales, detention devices, media filters, and infiltration trenches/basins for treatment of storm water runoff.
Treatment BMP Maintenance	Includes vegetation management, debris removal, sediment or vegetation removal, and/or side slope stabilization at locations where treatment best management practices (BMPs), such as infiltration basins, are present.
Coastal Protection ¹	Locations where the coastline is within the limits of a routed road and the road has little to no protection. In areas that exhibit coastal erosion encroaching within the roadway ROW, coastal erosion protection in the form of riprap revetment or gabions has been recommended.
Storm Drain Maintenance	Includes locations where sediment/debris removal is required within the storm drain system.
Storm Drain Improvements	All locations where capacity improvements or storm drain replacement is required. Examples include design and installation of storm drain systems, including catch basins, roadway ditches, storm drain pipelines, and storm drain outlets to offsite conveyance systems. Also included are storm drain outlet structures that convey flow to the groundwater regime, such as infiltration basins, infiltration trenches, or underground injection chambers.

3.4 Prioritization

With approximately 298 sites requiring drainage improvements, priorities were established to develop a feasible improvement program. A systematic approach was developed to define the priorities in each village. Prioritization was determined by assigning scores and ranking factors to the evaluation categories. Projects that received the highest score ultimately received highest priority. Table 3-3 shows the developed evaluation criteria. The most important criteria are listed with the highest priority weight and the least important are listed with the lowest. These values range from 3 to 20. Each criterion has a ranking

¹ The sea level in Guam is expected to rise by 4.27 feet over the next 100 years.

multiplication factor ranging from 0 to 3. Multiplying the priority weights by the ranking factor provided the final score for the individual work type. After the priority weights were multiplied by the ranking factor for each work type, the final scores for the individual work type values were added together to provide a combined score. The combined score was used in the final prioritization of projects. The ten evaluation categories, along with the respective priority weighting factors, are described below.

		ATTE SECTIONS	RANKING FACTORS					
nero Estab	PRIORITY	CRITERIA	HIGHEST SCORE (X3)	MODERATE SCORE (X2)	LOW SCORE (X1)	NO SCORE (X0)		
CATEGORIES	10	Public Safety Risk	inaction poses significant risk to public safety, potential loss of life.	inaction poses moderate risk to public safety, potential injury.	noderate risk to public linaction poses low			
	20	Environmental Severity	Directly impacts aquifer.	Directly impacts coastal area (within immediate area of shoreline)	Directly impacts surface water (e.g., river, stream, or lake)	No environmental risk.		
	3	Maintainability	Low maintenance projects with easy accessibility.	Moderate maintenance requirement, moderately accessible.	Difficult to maintain and/or difficult to access.	Very difficult to maintain and/or very difficult to access.		
	3	Flooding Severity	Unacceptable damage caused by flood events.	Moderate damage caused by flood events.	Flood events cause nulsance damage.	No flood hazard.		
Z	3	Floodplain	Inside floodplain.	N/A	N/A	Outside floodplain.		
EVALUATION	3	Erosion Severity	Unacceptable damage caused by erosion.	Moderate damage caused by erosion.	Erosion damage considered nuisance.	No erosion hazard.		
	3	Number of Affected Properties	Greater than 4 properties affected.	3 to 4 properties affected.	1 to 2 properties affected.	No properties affected.		
	3	Type of Roadway	Highway	Arterial	Collector	Private Transpire		
	3	Right-of-Way Requirement	Requires no ROW.	N/A	N/A	Requires ROW.		
100	10	Estimated Cost	Cost < \$200,000	\$200,000 < Cost < \$1,000,000	\$1,000,000 < Cost < \$10,000,000	Cost >\$10,000,000		

Public Safety Risk (Weight = 10)

The safety and protection of human life is of the utmost importance. The highest rated projects are those where inaction may result in the loss of human life. A medium rating may result in injuries. A low rating indicates there is a minor safety risk involved with inaction. Three example scenarios are described below.

High Severity: Undermining of roadway has progressed to near collapse. Without repair, a motorist could be on pavement section during collapse event.

Medium Severity: Low point in roadway experiences ponding after a storm event. Without routing runoff, a motorist could hydroplane and suffer an accident.

Low Severity: Standing water accumulates at the corner of an intersection after every storm event. Pavement begins to deteriorate creating a pothole, which may result in an unsafe road condition if resurfacing is not implemented in a timely manner.

Environmental Severity (Weight = 20)

Guam's quality of life is closely linked to the environmental integrity of its local water resources. As with flooding and erosion, water quality problems primarily stem from changing land use conditions (i.e., urbanization) that modify watershed hydrology and the level of pollutants in local waterways. The water quality assessments evaluated existing and future problem areas based on problem areas provided by DPW and GEPA. Water quality priorities are established based on the resource value of the receiving water and the severity of identified current and future water quality problems as described below.

Affected Water Body: Scoring is based on quality of water source, which is consistent with DPW/FHWA priorities.

Maintainability (Weight = 3)

Overall, DPW oversees and maintains the storm drainage network throughout the island. Maintainability plays an important role in the overall effectiveness of proposed improvements over time. Projects that are difficult to maintain or difficult to access will require greater operation and maintenance costs and may tend toward ineffectiveness in time if not appropriately maintained. The highest rated projects are those where maintenance is relatively easy, requiring maintenance activities that are not labor intensive, not very frequent, and easy to access by required maintenance vehicles. A low rating indicates significant maintenance issues related to the proposed improvements where accessibility may be difficult or where frequent/costly maintenance activities are required to keep the facilities working effectively.

Flooding Severity (Weight = 3)

This guideline is used to identify flooding and infrastructure-related problems and to quantify their causes. The term flooding is used for localized flooding that occurs due to failure of the secondary drainage system. The identification and prioritization of localized flooding problem areas will be based on DPW-provided data. Unlike the creek flooding studies, the prioritization of localized flooding areas will not be based on hydrologic and hydraulic models, but rather on the severity of the damage that occurs. Flooding simulation

models are not available for the extensive storm drain system due to incomplete information on the location, size, and condition of the system. This evaluation category is based on three performance factors, as described below.

Probable Cause of Flooding: Higher score where the cause of flooding can be easily remedied, such as maintenance-related projects that improve safety and protection of existing infrastructure with immediate relief and minimal cost.

Number of Properties Affected: Score is based on population served.

Flooding Frequency: Score is reflective of the severity of the problem. Flood Insurance Rate Maps (FIRMs), information provided, and engineering judgment will be used.

Floodplain (Weight = 3)

All other criteria being equal, projects within Flood Zone A take precedence over those outside the floodplain.

Erosion Severity (Weight = 3)

This evaluation category is used to identify current erosion problems along roads, bridges, and culverts on the road. Damage to roads is caused by water flowing over the top of the roadway and eroding road surfaces, shoulders, and embankments. Inadequate hydraulic capacity of a bridge may result in erosion of the streambed under piers and abutment footings and erosion of the embankments. Damage or failure of a culvert is caused by erosion of the embankment at its entrance and/or outlet, or around the outside of the culvert. Erosion problems primarily result from changing land use conditions (i.e., urbanization) that modify watershed hydrology, significantly increasing storm flows in creeks for even small rainfall events. The change in watershed hydrology, and sediment load, greatly increases the frequency, magnitude, and duration of "erosive" flows. These changes in stream flow have resulted in changes in local creek characteristics. The identification and prioritization of localized erosion problem areas will be based on DPW-provided data, drainage basin maps, and site visits. The prioritization of erosion areas will be based on three performance factors, which are described below.

Types of Erosion: Scoring is according to the severity of the problem and safety issues.

Probable Cause of Erosion: Higher score for maintenance-related issues that provide safety and protection of existing infrastructure with immediate relief and minimal cost.

Affected Area: Score is based on the overall area requiring erosion protection and the erosive nature of the area given soil and hydrologic/hydraulic conditions.

Number of Affected Properties (Weight = 3)

The number of affected properties helps assess the magnitude of drainage deficiencies. The score is based on population served. The ranges used to determine importance factors are as follows:

- 3 = greater than four properties affected
- 2 = three to four properties affected
- 1 = one to two properties affected
- 0 = no properties affected

Type of Roadway (Weight = 3)

The roadway classification helps assess the magnitude of drainage deficiencies. The score is based on level of service, access, and population served.

Right-of-Way Requirement (Weight = 3)

Adequate property owned by the Government of Guam needs to be available at each project location. Sufficient ROW is necessary to ensure that drainage systems are properly maintained and facilities can be upgraded as necessary. While many of the projects will likely require temporary construction easements, this level of detail is not known at this time; therefore, if ROW issues have not been identified, it is assumed that ROW is available. In this way, the projects requiring no ROW take precedence over those requiring ROW.

Estimated Cost (Weight = 10)

The cost of a project is the financial investment required to implement the particular drainage improvement. Cost will include all facets, including the engineering design, construction, and construction management, to complete the project. Lower-cost projects were ranked higher on the premise that more projects benefitting a wider cross section of properties/residents could be completed with limited funds. The cost ranges used to determine importance factors are as follows:

- 3 = project costing under \$200,000
- 2 = project cost ranging from \$200,000 to ≤\$1 million
- 1 = project cost ranging from \$1 million to ≤\$10 million
- 0 = project costing over \$10 million

3.5 Cost Estimates

By examining aerial mapping, site photos, and other available information, a conceptuallevel plan was developed for each of the sample projects, including all of the various items of work inherent in the work types. As an example, for each improvement project, utility relocation, erosion control, replacement of reinforced concrete pipes (RCPs) and reinforced concrete boxes (RCBs) were determined. Unit costs were based on recent estimates for other drainage improvement projects in Guam. The project cost estimates can be found in Appendix D.

3.5.1 Work Elements

The unit costs per site for the various work types were derived from standard elements used in storm water interception, treatment, conveyance, erosion control, and storage. These work elements include excavation, hydroseeding, rock slope protection, slope paving, landscape planting, fencing, removing culverts, installing pipe culverts, adjusting inlets, installing inlets, installing underground injection chambers, and installing minor concrete for channels, ditches, concrete aprons, concrete box culverts, headwalls, and wingwalls.

Additional minor items, such as surveying and construction-related activities, such as testing, erosion control, dust control, clearing and grubbing, and traffic control, were added to each of the work element costs when deemed appropriate for the project. Finally, percentage factors were applied for miscellaneous items, mobilization, contingencies, design, and construction engineering, which is a standard practice. These factors are as follows:

•	Miscellaneous items	10 percent of base + minor
•	Mobilization	10 percent of base +minor
•	Contingency	20 percent of base + minor
•	Design, Environmental, Permitting	15 percent of construction cost
•	Construction Management, Oversight	15 percent of construction cost

Each drainage improvement was broken down into work elements and unit types. The cost was calculated by multiplying the quantity by the cost per unit (see Table 3-4). The total drainage improvement cost was then calculated from the sum of the work elements. In general, unit costs were derived from contract bid item estimates in 2010 U.S. dollars for projects of similar magnitude on the island of Guam. Where unit costs were not available from the contract estimates, unit prices were computed using the Caltrans Contract Cost Data Book (CCDB) (California Department of Transportation 2009), escalated to 2010 at 7 percent per year and then multiplied by a uniform markup for the island of Guam of 2.23. The uniform markup factor was derived from the difference between the Guam unit bid item estimates for existing contracts and the CCDB estimates.

Because of the approximations made in this planning-level estimate, it must be recognized that some individual cost estimates may be higher than anticipated for a particular location, while others may be lower. In the aggregate, the costs offset each other for a reasonable program-level cost estimate.

Table 3-4. Drainage Improvement Unit Costs

Drainage Improvement Work Element	Unit	Unit Cost (\$/Unit)
- Concrete (for Channel Lining)	CY	815
- Concrete (for Culvert)	CY	1,105
- Concrete (for Ditch Lining, Aprons, Pipe Encasement)	CY	635
- Concrete (for Retaining Walls)	CY	1,005
- Concrete (for Slope Protection, Cross-Gutter)	CY	245
- ¾" Rock	CY	45
- Rock Slope Protection	CY	745
- Modify Inlet	EA	3,000
- Adjust Sewer Manhole	EA	1,800
- Catch Basin	EA	3,500
- AC Spillway	EA	1,000
- Headwall for Box Culvert	EA	5,000
- Headwall with Wingwalls	EA	10,000
- Erosion Control [Bonded Fiber Matrix]	SF	1.00
- Erosion Control [Hydroseed]	SF	5.00
- Erosion Control (Blanket)	SF	0.80
- Erosion Control (Netting)	SF	0.50
- Filter Fabric	SF	1.50
- Excavation (for ditches, channels, infiltration basins, trenches)	SF	28
- Clearing/ Debris Removal	AC	4,250
- Gabions	CY	710
- Chain Link Fence	LF	15
- Chain Link Gate	EA	715
- 24" RCP (Installed)	LF	555
- 30" RCP (Installed)	LF	680
- 36" RCP (Installed)	LF	715
- 48" RCP (installed)	LF	745
- 54" RCP (Installed)	LF	1,160
- Injection Well (Installed)	LF	1,000
- Silt Fence	LF	2.80

CY = cubic yards; EA = each; LF = linear feet; SF = square feet

3.5.2 Cost Basis

Due to the large number of drainage improvements to be included in the cost estimate, and limited time to research as-built plans, the cost estimates used channel length and width, pipe diameters, approximate dimensions of culverts, and approximate areas needing erosion control based on estimates that were made during the site visits. Where size estimates were not directly available, average size estimates were used.

22 December 2010

4.0 Summary of Projects

Approximately 298 sites were evaluated using the initial lists, along with information provided by village mayors or their delegated representatives, property owners, and DPW. Overall, there was no difference between the drainage deficiency documented on the initial list or communicated by the village mayors and others, and what was actually observed in the field. Based on the field observations, it was noted that drainage work types, in order of decreasing prevalence, were typically related to storm drain and conveyance structure improvements and maintenance, followed by erosion control, treatment best management practice (BMP) improvement and maintenance, and finally coastal protection.

Of the 298 sites assessed, 112 were characterized as having a direct impact on the aquifer. Of these, approximately twenty-two sites include infiltration trenches, fourteen include infiltration basins, six include routing additional storm water runoff to existing infiltration basins, three include infiltration galleys (i.e. infiltration wells within an infiltration basin), eight include bioswales, one includes an injection well and one includes abandonment of an existing injection well and constructing bioswales. Although another sixty projects were identified as having a direct impact on the aquifer, the use of infiltration BMPs as a drainage improvement strategy was not recommended. The reason for this is that infiltration BMPs were recommended in areas, typically in North Guam, characterized by soils with good infiltration characteristics and sufficiently low groundwater. Within the South Guam Region, where soils exhibit poor infiltration/permeability characteristics and/or groundwater levels are high, such as near the coastline, infiltration basins are not considered feasible.

With the exception of the regional projects, which are discussed later in this section, the frequency of observing drainage work types recommended for one village were similar to the prevalence of observing drainage work types in other villages (i.e., there were no significant differences between one village or another). The only thing that differed was the magnitude of the problem. For example, in Dededo a site was identified as needing erosion control and conveyance maintenance improvements. The project cost for this particular site was estimated at \$1,940, whereas in Merizo, a project requiring the same types of improvements was estimated at \$7.63 million.

A prioritized list of projects was developed for each village according to the evaluation and scoring criteria discussed in Section 3. For each project, the sum of each criterion times its importance factor yielded a prioritized score. Projects with the highest total scores are the highest priority projects and may be completed first when funding is available. The prioritization spreadsheets in Appendix E provide the ranking of projects within each village.

The location for each project is indicated on the cost estimation spreadsheets, which are provided in Appendix D, and detailed recommendations combined with a project photo are provided on the project summary data fact sheets in Appendix C.

It is important to note that the prioritized list of projects is not intended to serve as an implementation plan. Rather, the list is a result of an iterative and interactive process by the SWDMP team to identify locations where drainage deficiencies were observed and to rank and prioritize these projects using the evaluation and scoring criteria discussed in Section 3. Although development of the lists followed a logical and systematic process, the lists can be revised if it is found that it may be more cost effective to group or combine projects based on cost, size, location, or priority. A discussion regarding the organization of projects and contract execution is provided in Section 5.

4.1 Cost Estimates per Village

The final cost estimates by village in the SWDMP (derived from the cost estimating spreadsheets provided in Appendix D) are shown in Table 4-1. Total cost in 2010 U.S. dollars is estimated at \$150 million for the 298 projects.

Table 4-1. Funding Allocation

VILLAGE	PROJECTED COST (million \$)	% OF TOTAL			
TOTAL ALL VILLAGES	150	100			
Agana Heights	2.76	1.9			
Agat	7.92	5.3			
Asan	9.38	6.3			
Barrigada	4.57	3.0			
Chalan Pago-Ordot	5.50	3.7			
Dededo	3.79	2.5			
Hagatna	12.2	8.1			
Inarajan	7.62	5.1			
Mangilao	7.37	4.9			
Merizo	13.2	8.8			
Mongmong-Toto-Maite	1.08	0.7			
Piti	36.6	24.4			
Santa Rita	5.50	3.7			
Sinajana	0.13	0.1			
Talofofo	6.31	4.2			
Tamuning	16.6	11.1			
Umatac	7.58	5.1			
Yigo	0.60	0.4			
Yona	1.01	0.7			

Some of these villages include regional-level projects that go beyond the individual village. Regional projects include: (1) TA-103 at the Tamuning Outlet Channel, which conveys runoff from the villages of Tamuning and Barrigada; (2) PI-119 along Route 1 at Apra Harbor located within the villages of Piti and Santa Rita; (3) ME-114 at the Manell Channel, which conveys runoff from the villages of Merizo and Inarajan; and (4) AS-102 along the coast between Fonte and Asan rivers located within the villages of Asan and Agana. Total cost in 2010 U.S. dollars is estimated at \$61 million for these regional projects.

4.2 Village Priority Projects

While Appendix E provides the spreadsheet results showing the prioritization of projects for each village, Table 4-2 provides a list of the high-priority projects for each village (up to 5 projects per village). Detailed descriptions for these projects are included in Appendix C.

Table 4-2. High Priority Projects

VILLAGE	Priority Projects
Agana Heights	AG-103,, AG-102 AG-101, AG-104
Agat	AV-128, AV-109, AV-125, AV-121, AV-111
Asan	AS-112, AS-111, AS-109, AS-104, AS-102
Barrigada	BV-116, BV-112, BV-131, BV-110, BV-130
Chalan Pago-Ordot	CP-111, CP-112, CP-102, CP-107, CP-104
Dededo	DE-101, DE-102, DE-103, DE-106, DE-105
Hagatna	HA-109, HA-105, HA-103, HA-110,HA-119
Inarajan	IV-116, I-102, IV-124, IV-104, IV-120
Mangilao	MO-111, MO-106, MO-107, MO-108, MO-102
Merizo	ME-102, ME-119, ME-128, ME-103, ME-129,
/longmong-Toto-Maite	MM-101
Piti	PI-107, PI-103, PI-108, PI-111, PI-102
Santa Rita	SR-107, SR-109, SR-105, SR-108, SR-102
Sinajana	SV-102, SV-101
Talofofo	TA-102, TA-108, TA-113, TA-116, TA-112
Tamuning	TV-109, TV-110, TV-103, TV-108, TV-105
Umatac	UM-101, UM-108, UM-112, UM-109, UM-106
Yigo	YI-101, YI-102, YI-103, YI-107, YI-109
Yona	YO-103, YO-107, YO-105, YO-101, YO-108

5.0 Implementation

As demonstrated in previous sections, the need for improving storm water conveyance is great, and opportunities for funding are limited. Successful implementation of the SWDMP will require initiative and perseverance. This report presents a strategy for continuing with the highest-priority projects, as funding is available.

5.1 Existing and Potential Funding Sources

The design, construction, operation, and maintenance of drainage control systems can involve a significant expense, especially when flood concerns, water quality issues, and population growth are factored in. Typically, government agencies can rely on stable sources of funding that are available from an already established storm water utility. For example, communities with an established storm water utility can utilize service fees, property taxes/general fund monies, system development charges, and special assessment districts to fund storm water programs. Given that a storm water utility is not established in Guam, the local government and FHWA, as well as private landowners, can rely on grants and low-interest loans.

There are many resources that local and Federal government agencies, along with private land owners, can consider when seeking financial assistance for their storm water system improvement projects. For example, the United States Environmental Protection Agency (EPA) Catalog of Federal Funding Sources for Watershed Protection offers a searchable database of financial assistance sources (i.e., grants, loans, cost-sharing) available to fund a variety of watershed protection projects. Some of the funding sources identified within the database are displayed in Table 5-1. The agencies listed in this table administer or provide grant monies for government agencies and/or private land owners to pursue projects much like those identified in this SWDMP.

Table 5-1. Federal Funding Sources for Watershed Protection

Program Name	Overview
Aquatic Ecosystem Restoration (CAP 206)	Work under this authority may carry out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest, and are cost effective. There is no requirement that an existing United States Army Corps of Engineers (USACE) project be involved.
Clean Water State Revolving Fund	EPA awards grants to states to capitalize their Clean Water State Revolving Funds (CWSRFs). The states, through the CWSRF, make loans for high-priority water quality activities. As loan recipients make payments back into the fund, money is available for new loans to be issued to other recipients. Eligible projects include point source, nonpoint source, and estuary protection projects. Point source projects typically include building wastewater treatment facilities; combined sewer overflow and sanitary sewer overflow correction; urban stormwater control; and water quality aspects of landfill projects. Nonpoint source projects include agricultural, silviculture, rural, and some urban runoff control; onsite wastewater disposal systems (i.e., septic tanks); land conservation and riparian buffers; and leaking underground storage tank remediation. Estuary protection projects include all of the above point and nonpoint source projects, as well as habitat restoration and other unique estuary projects.
Coastal Program	The United States Fish and Wildlife Service (USFWS) Coastal Program works to conserve healthy coastal habitats on public or private land for the benefit of fish, wildlife, and people in 22 specific coastal areas. The program forms cooperative partnerships designed to (1) protect coastal habitats by providing technical assistance for conservation easements and acquisitions; (2) restore coastal wetlands, uplands, and riparian areas; and (3) remove barriers to fish passage in coastal watersheds and estuaries. Program biologists provide restoration expertise and financial assistance to federal and state agencies, local and tribal governments, businesses, private landowners, and conservation organizations, such as local land trusts and watershed councils.
Coastal Services Center Cooperative Agreements	The National Oceanic and Atmospheric Administration (NOAA) guides the conservation and management of coastal resources through a variety of mechanisms, including collaboration with the coastal resource management programs of the nation's states and territories. The mission of the NOAA Coastal Services Center (CSC) is to support the environmental, social, and economic well being of the coast by linking people, information, and technology. The vision of the NOAA CSC is to be the most useful government organization to those who manage and care for our nation's coasts.
Community Development Block & Entitlement Grants	The objective of this program is to develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for persons of low and moderate income. Recipients may undertake a wide range of activities directed toward neighborhood revitalization, economic development, and provision of improved community facilities and services.

Table 5-1. Federal Funding Sources for Watershed Protection

Program Name	Overview
Coral Reef Conservation Fund	The National Fish and Wildlife Foundation's Coral Reef Conservation Fund supports projects that build public-private partnerships to reduce and prevent degradation of coral reefs and associated reef habitats (e.g., seagrass beds, mangroves). Projects may address causes of coral reef degradation wherever they occur, from inland areas to coastal watersheds to the reefs and surrounding marine environment.
Emergency Watershed Protection	The United States Department of Agriculture (USDA) Natural Resources Conservation Service's Emergency Watershed Protection (EWP) program helps protect lives and property threatened by natural disasters such as floods, hurricanes, tornadoes, droughts, and wildfires. EWP provides funding for such work as clearing debris from clogged waterways, restoring vegetation, and stabilizing river banks. The measures that are taken must be environmentally and economically sound and generally benefit more than one property owner. EWP also provides funds to purchase floodplain easements as an emergency measure. Floodplain easements restore, protect, maintain, and enhance the functions of the floodplain; conserve natural values including fish and wildlife habitat, water quality, floodwater retention, groundwater recharge, and open space; reduce long-term federal disaster assistance; and safeguard lives and property from floods, drought, and the products of erosion. EWP can provide up to 90 percent cost share in limited resource areas as determined by the U.S. Census.
Flood Mitigation Assistance Program	The Flood Mitigation Assistance (FMA) program provides funding to states, federally recognized Indian tribal governments, and communities so that cost-effective measures are taken to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program (NFIP). The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities. Three types of grants are available under FMA: Planning, Project, and Technical Assistance.
Hazard Mitigation Grant Program	FEMA's Hazard Mitigation Grant Program (HMGP) aims to provide states and communities with resources to invest in long-term actions that help reduce the toll from potential natural and manmade hazards. The program also supports implementation of mitigation measures during the immediate recovery from a disaster. The HMGP funds projects to protect either public or private property, as long as the project fits within the state's and local government's overall mitigation strategy and complies with program guidelines. In response to flood hazards, eligible projects include the elevation, relocation, or acquisition and demolition of flood-prone structures, stormwater management projects, and certain types of minor flood control projects. The state is responsible for setting priorities for funding and administering the HMGP. Eligible applicants must apply for the program through the state. Individuals, businesses, or other organizations should contact their State Hazard Mitigation Officer and local government official for specific details.

Table 5-1. Federal Funding Sources for Watershed Protection

Program Name	Overview
Nonpoint Source Implementation Grants (319 Program)	Through its 319 Program, EPA provides formula grants to states and tribes to implement nonpoint source projects and programs in accordance with Section 319 of the Clean Water Act (CWA). Nonpoint source pollution reduction projects can be used to protect source water areas and the general quality of water resources in a watershed. Examples of previously funded projects include installation of BMPs for animal waste; design and implementation of BMP systems for stream, lake, and estuary watersheds; basin-wide landowner education programs; and lake projects previously funded under the CWA Section 314 Clean Lakes Program.
Partners for Fish and Wildlife Program	The Partners for Fish and Wildlife Program provides technical and financial assistance to private landowners to restore fish and wildlife habitats on their lands. Since 1987, the program has partnered with more than 37,700 landowners to restore 765,400 acres of wetlands; more than 1.9 million acres of grasslands and other upland habitats; and 6,560 miles of in-stream and streamside habitat. In addition, the program has reopened stream habitat for fish and other aquatic species by removing barriers to passage.
Pre-Disaster Mitigation Program	The Pre-Disaster Mitigation Program will provide funds to states, territories, Indian tribes, communities, colleges, and universities for pre-disaster mitigation planning and implementation of cost-effective mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations.
Project Modifications for Improvement of the Environment (CAP Section 1135)	Work under this authority provides modifications in the structures and operations of water resources projects constructed by USACE to improve the quality of the environment. Additionally, USACE may undertake restoration projects at locations where an existing USACE project has contributed to the degradation. The primary goal of these projects is ecosystem restoration with an emphasis on projects benefiting fish and wildlife. The project must be consistent with the authorized purposes of the project being modified, environmentally acceptable, and complete within itself.
Public Works and Development Facilities Program	This program provides assistance to help distressed communities attract new industry, encourage business expansion, diversify local economies, and generate long-term, private-sector jobs. Among the types of projects funded are water and sewer facilities, primarily serving industry and commerce; access roads to industrial parks or sites; port improvements; business incubator facilities; technology infrastructure; sustainable development activities; export programs; brownfields redevelopment; aquaculture facilities; and other infrastructure projects. Specific activities may include demolition, renovation, and construction of public facilities; provision of water or sewer infrastructure; or development of stormwater control mechanisms (e.g., a retention pond) as part of an industrial park or other eligible project.

5.2 Other Environmental Financing Sources

Access to many types of environmental financing information is available for local government programs and projects through the Environmental Financing Information Network (EFIN). EFIN maintains a Web site of environmental financial tools, including links to *A Guidebook of Financial Tools*, publications, and links to resources elsewhere on the Internet. Additional financing resources are provided in Table 5-2.

Table 5-2. Resources for Financing Storm Water/Water Quality Projects

Resource	Description	Internet Site		
Sustainable Financing from the National Estuary Program	The National Estuary Program has employed multiple funding mechanisms to increase their capacity. Their Web site highlights examples of funding mechanisms such as real estate taxes, special appeals, and license plate programs.	http://www.epa.gov/ owow/estuaries/ fundexamples.html		
Watershed Information	This Web site offers a roadmap to information services for protecting and restoring water resources, including resources on financial, technical, and hands-on assistance to support watershed efforts.	http://www.epa.gov/ owow/watershed/		
Environmental Finance Center (EFC) Network	The EFC Network is a university-based program that provides financial outreach services to regulated communities. The Network consists of ten EFCs that provide advisory services; education, publications, and training; technical assistance; and analyses on financing alternatives.	http://www.epa.gov/ efinpage/efcn.htm		
Internet Guide to Financing Storm Water Management	This Web site is designed to help communities find ways to pay for storm water management projects. The site includes an annotated bibliography of existing storm water finance materials; a manual that discusses the financing options available to communities for storm water management programs; a set of case studies that describe successful finance mechanisms that have been used in seven communities around the country; and links to other useful Web sites about storm water management.	http://stormwaterfinance. urbancenter.iupui.edu/		
U.S. State and Local Gateway	The Gateway Web site is designed to give state and local government officials and employees easy access to federal funding information, including grant-writing tools, links to grants, and links to other funding directories.	http://www.usa.gov/ Government/State Local.shtml		

As part of the Islandwide Program Management Services contract (GU-NH-IPMS[002]), in 2009, PB Americas, Inc., in association with Hobbs, Ong and Associates, Inc., began a comprehensive study of funding mechanisms for Guam. The grant funding sources being evaluated by the PB Americas, Hobbs, Ong and Associates team include the United States

Department of Interior and the United States Department of Agriculture. The study was in process at the time this report was prepared, so detailed information was not yet available.

5.3 Project Application

Nineteen (19) villages from across the island were studied. The final Prioritization Ranking Worksheet was applied to each of the proposed projects that had been created to address drainage system problems. The drainage improvement projects identified and prioritized through the SWDMP project will allow DPW to prepare a proactive drainage improvement program, rather than a program that merely reacts as problems occur. The SWDMP ensures that funds will be spent on drainage infrastructure that is in the most need of replacement due to structural deficiencies, lack of capacity, or lack of an overland flow path, which may cause flooding. The prioritization methodology and criteria used to select the drainage improvement projects will be very helpful to DPW staff in explaining the short- and long-term need for the drainage improvement projects to the elected officials, as well as the general public. The DPW can now incorporate the remaining drainage improvement projects identified through this study into its future CIP for design and construction at a later date.

Once available funding amounts are defined, a detailed implementation plan can be developed to proceed with the highest priority projects in each village. Funding may be allocated to projects in proportion to the need in each village. This allocation would be based on the final cost estimates by village in the SWDMP, as shown in Table 4-1. Administrative adjustments to this approach would allow for moving money between villages and between projects.

As another option, combining projects in contracts by cost, size, prioritization, and/or location may be more efficient than implementing projects on a per village basis. For example, implementation of all projects along a routed road, which may even extend into other villages, could be more cost effective because it would minimize fragmenting large projects into smaller units just because they extend beyond the village boundary. In other instances, projects may be pursued on an individual basis based on available funding, such as grant funding for coastal protection projects that reduce and prevent coral reef and associated reef habitat degradation.

Prior to organizing projects into contracts, a study would be needed to determine the funding mechanism. Once funding is established, the next step would be to identify projects in each village that will receive funding and to set out an implementation plan for

Funding Summary
Federal Ald

Other (please specify)
Total Funding

Grant

Local Aid

completing the projects. As a first step, a project-specific detailed design would need to be developed. This would be followed by preliminary scoping to confirm elements of work, status of ROWs, and regulatory compliance issues. Cost estimating and environmental and regulatory permit work must also be conducted. A sample timeline for implementation of a regional project is provided in Figure 5-1. Table 5-3 provides an example of a potential operating budget based on grant funding, as well as federal and local resources.

Figure 5-1 – Sample Project Implementation Timeline

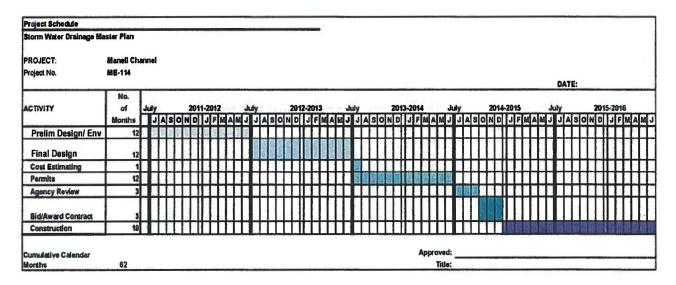


Table 5-3. Sample Operating Budget

Project Name: Mannell Cl Project No.: ME -114 Project Commencement:						
Description of Activity	Total Estimated Cost (\$)	1st Year	2nd Year	3rd Year	4th Year	5th Year
	\$7,630,000					
Prelim Design/ Environmental Docs		\$250,000				
Final Design			\$400,000			
Cost Estimating		11		\$50,000		
Permits				\$50,000		
Construction					\$3,080,000	\$3,800,000
Total	\$7,630,000	\$250,000	\$400,000	\$100,000	\$3,080,000	\$3,800,000

\$150,000

\$100,000

\$250,000

\$150,000

\$250,000

\$400,000

\$35,000

\$50,000

\$15,000

\$100,000

\$2,980,000

\$100,000

\$3,080,000

\$7,000,000

\$600,000

\$30,000

\$7,630,000

\$3,685,000

\$100,000

\$15,000

\$3,800,000

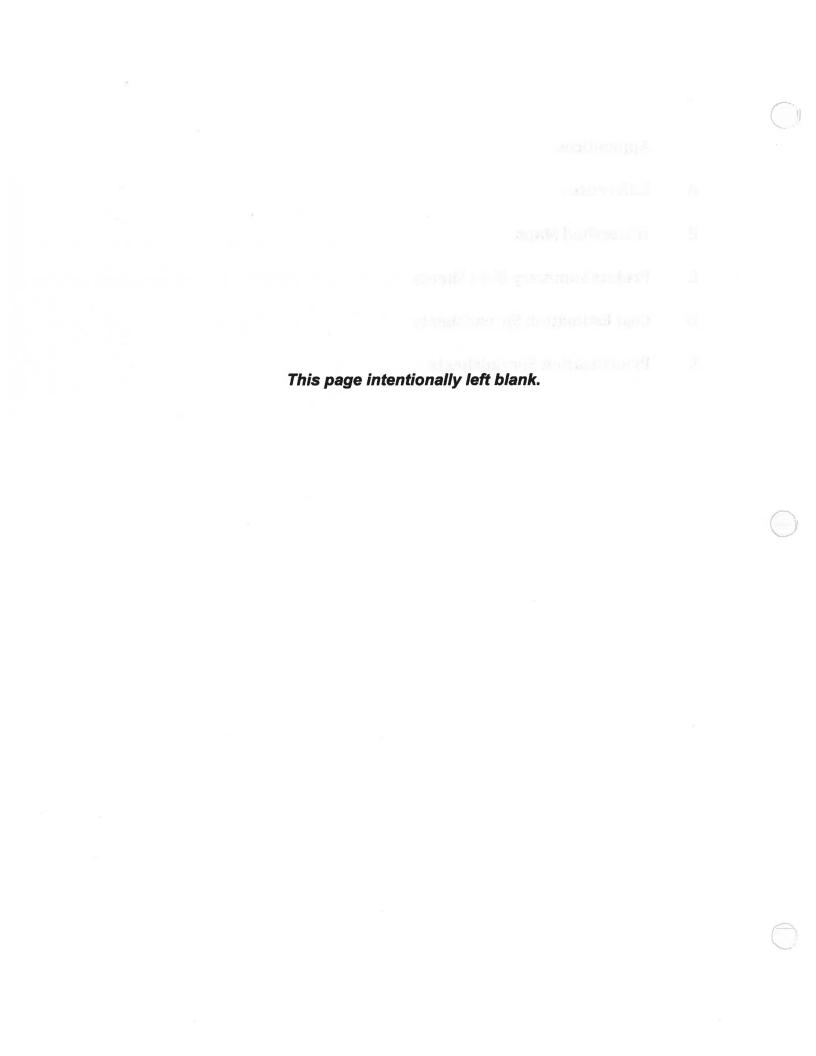
completing the projects to a fest using a mojest assume that design would need to inconstruct of this could be interested by potentials—copy to positive elements of would
restart of Rikes, and regulatory computed issues that extinating and environmental and
regulators prompt and make also be considered. A sample timeline for implementation of a
regulator property is provided to figure 5-1. In the S.A. provides an example of a popular

surprise unitation of the party of the party

This page intentionally left blank.

Appendices

- **A** References
- **B** Watershed Maps
- **C** Project Summary Data Sheets
- D Cost Estimation Spreadsheets
- **E** Prioritization Spreadsheets



Appendix A References

This page intentionally left blank.

California Department of Transportation. 2009. Caltrans Contract Cost Data Book (CCDB). http://www.dot.ca.gov/hq/esc/oe/awards/. Accessed May 2010.

Clean Water Action Plan for Guam. 1998. Clean Water Action Plan for Guam – Unified Watershed Assessment. September.

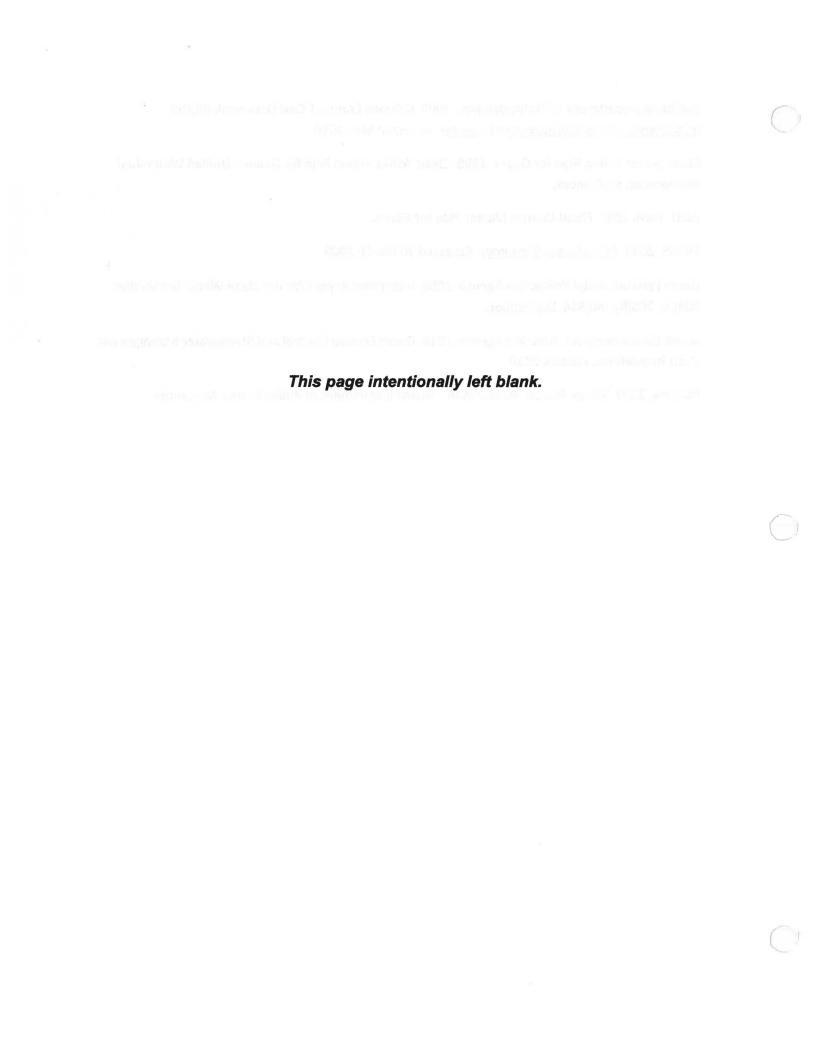
Earth Tech. 1997. Flood Control Master Plan for Guam.

FIRMS. 2009. http://www.fema.gov/. Accessed 30 March 2009

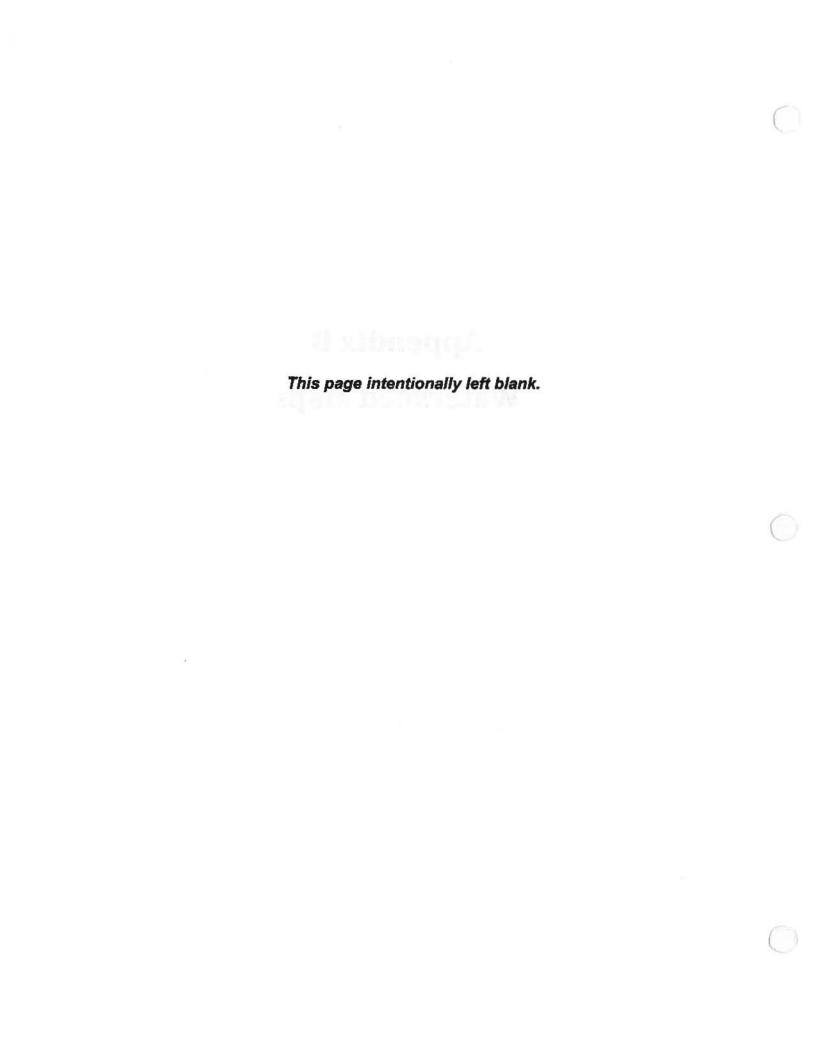
Guam Environmental Protection Agency. 2006. Integrated Report for the Clean Water Act Section 303(d), 305(b) and 314. September.

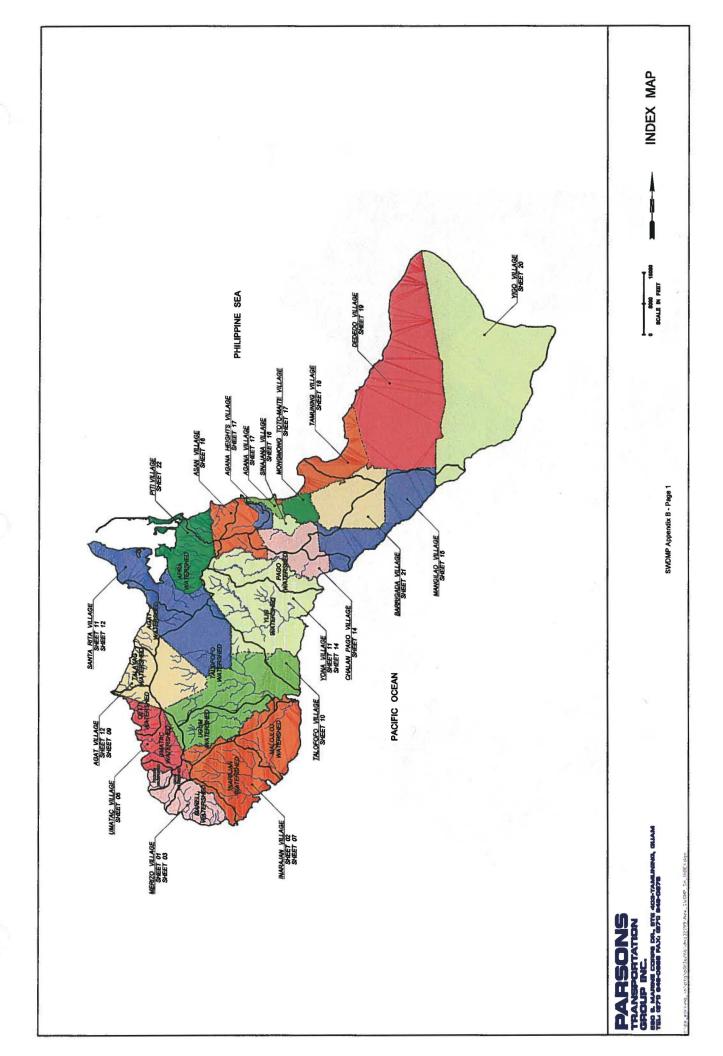
Guam Environmental Protection Agency. 2010. Guam Erosion Control and Stormwater Management Draft Regulations. January 2010.

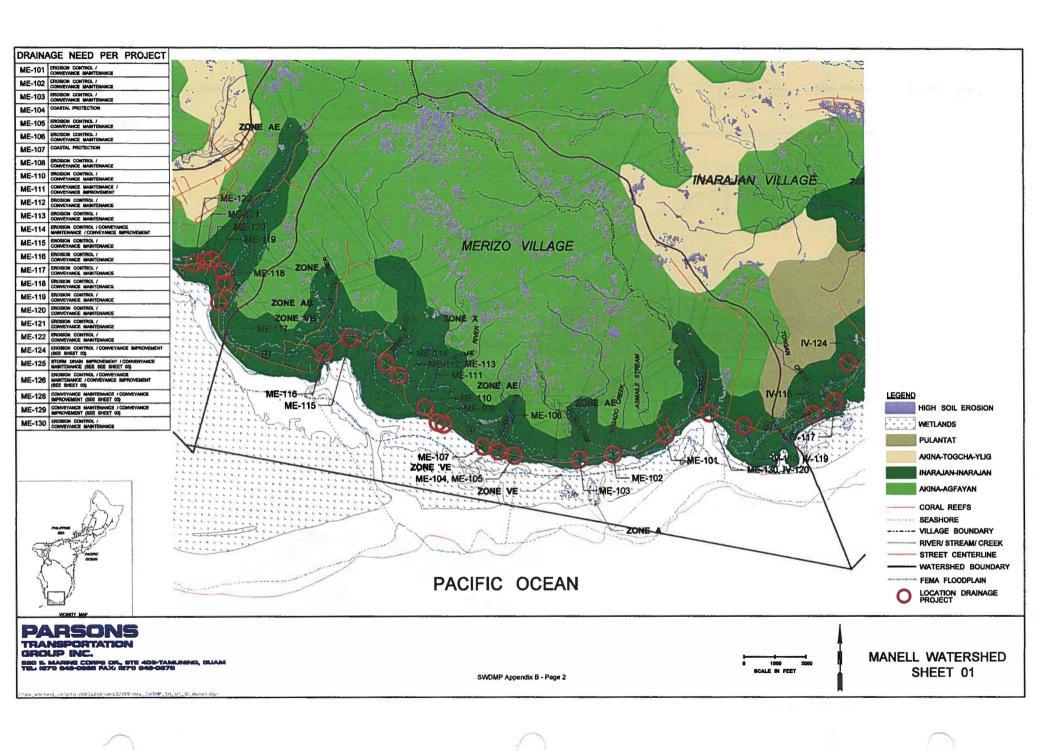
Parsons. 2009. Village Streets Master Plan – Guam Department of Public Works. November.

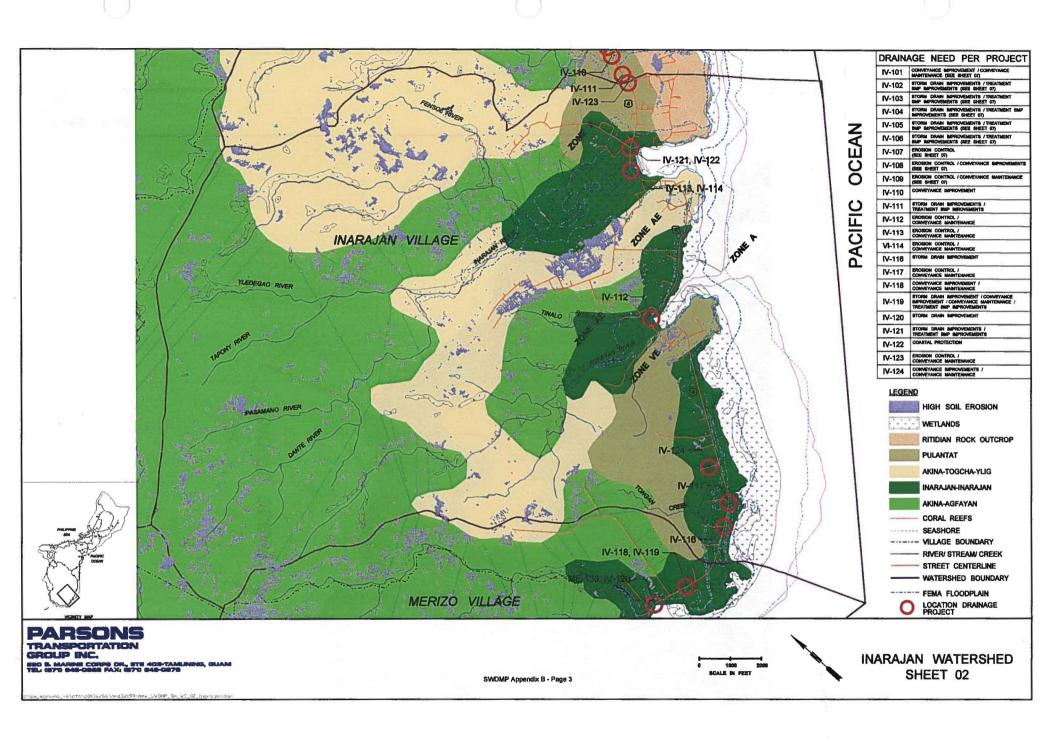


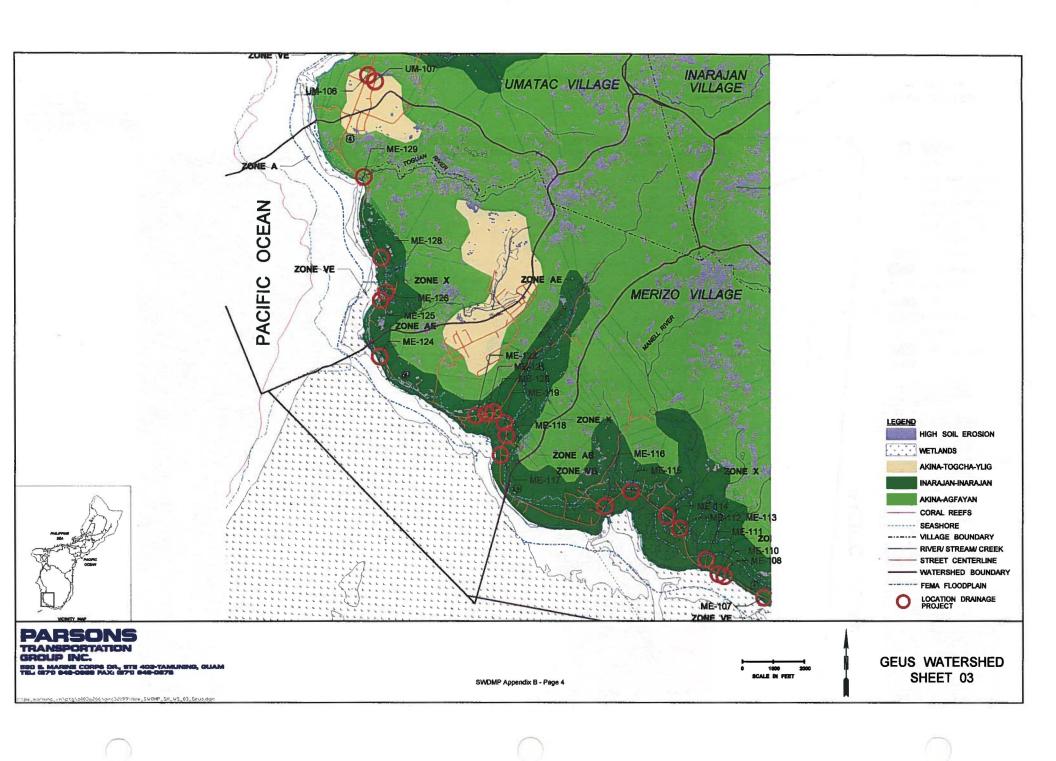
Appendix B Watershed Maps

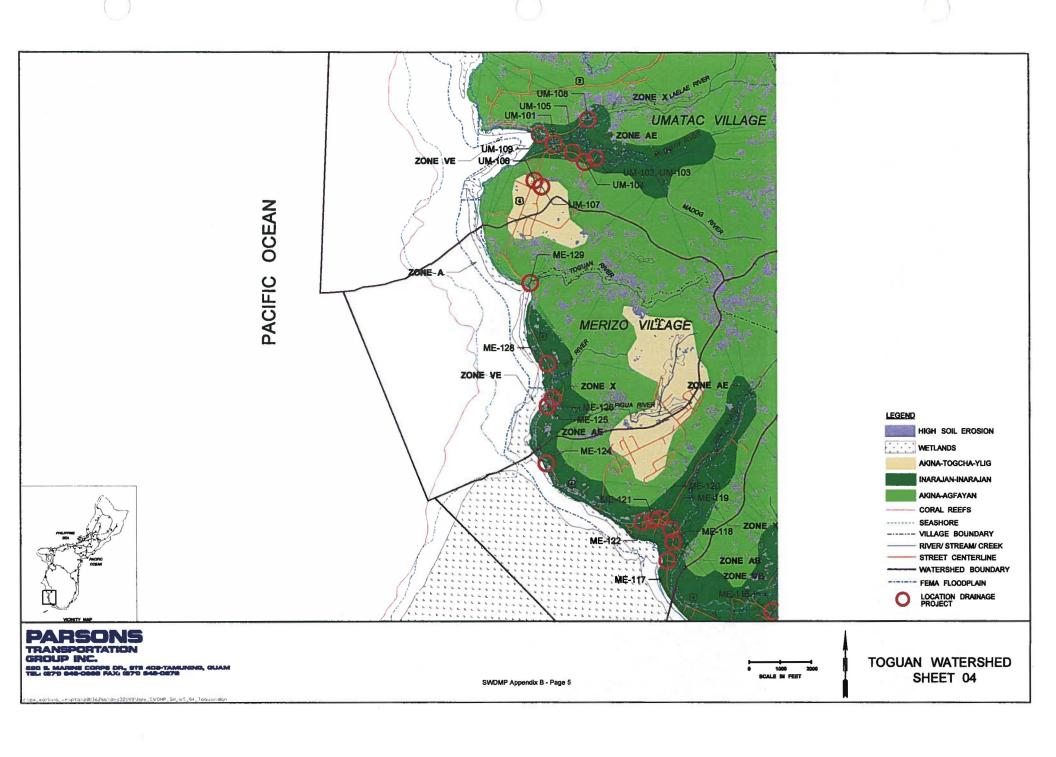


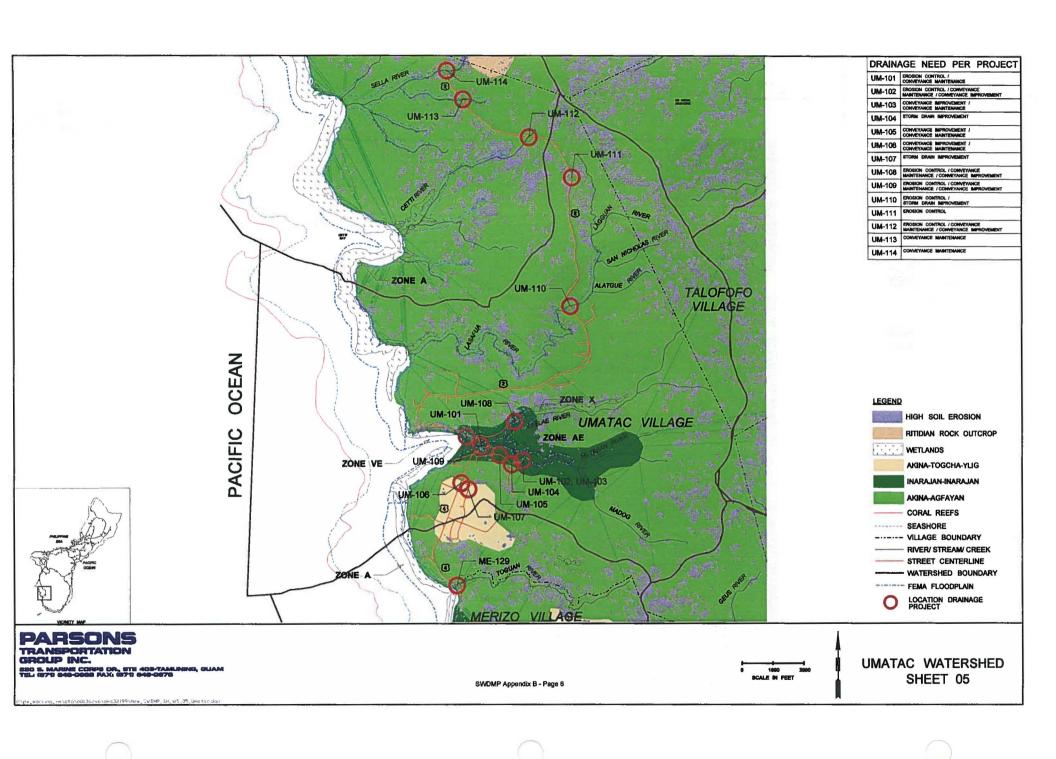


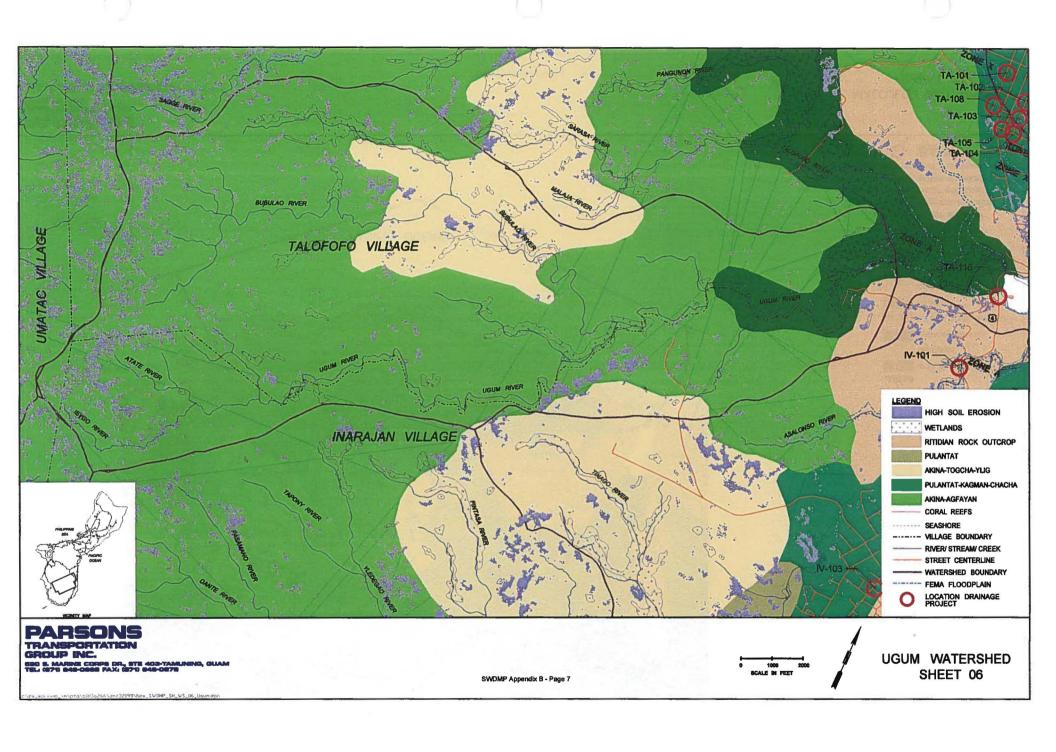


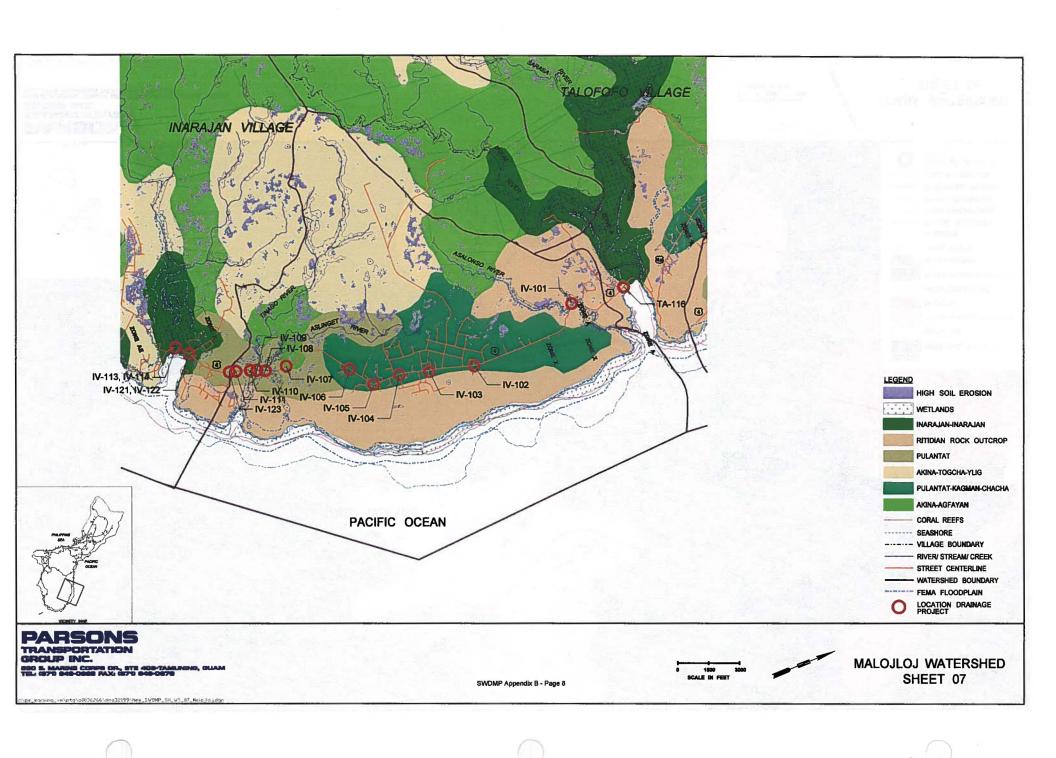


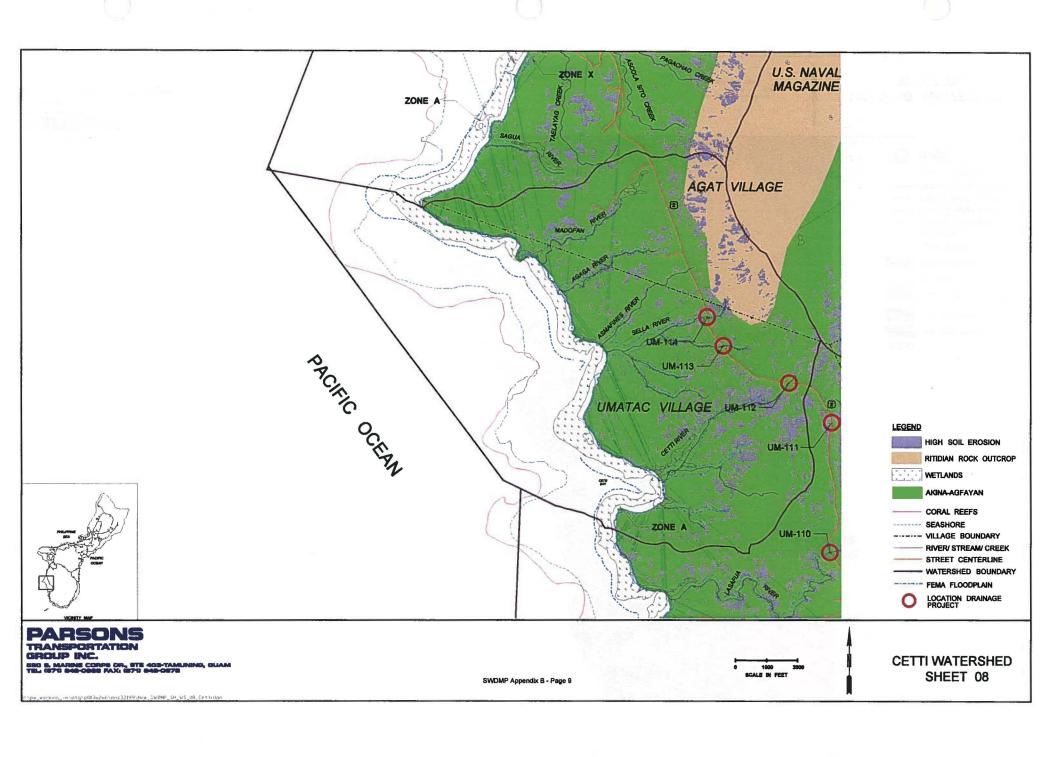


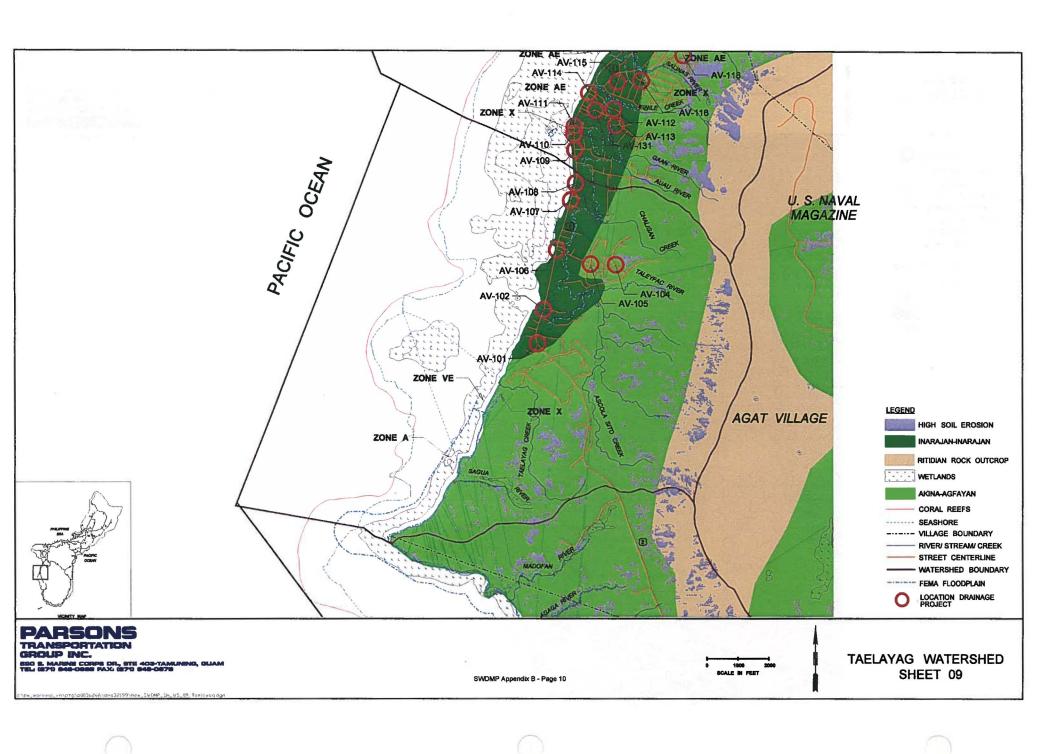


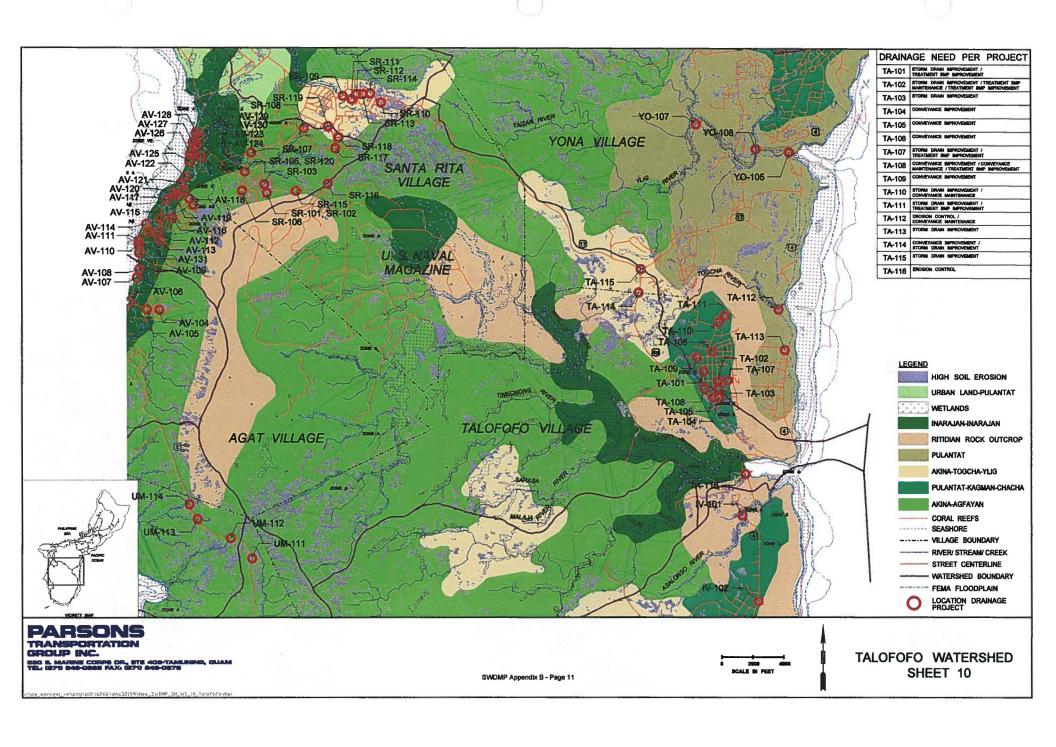


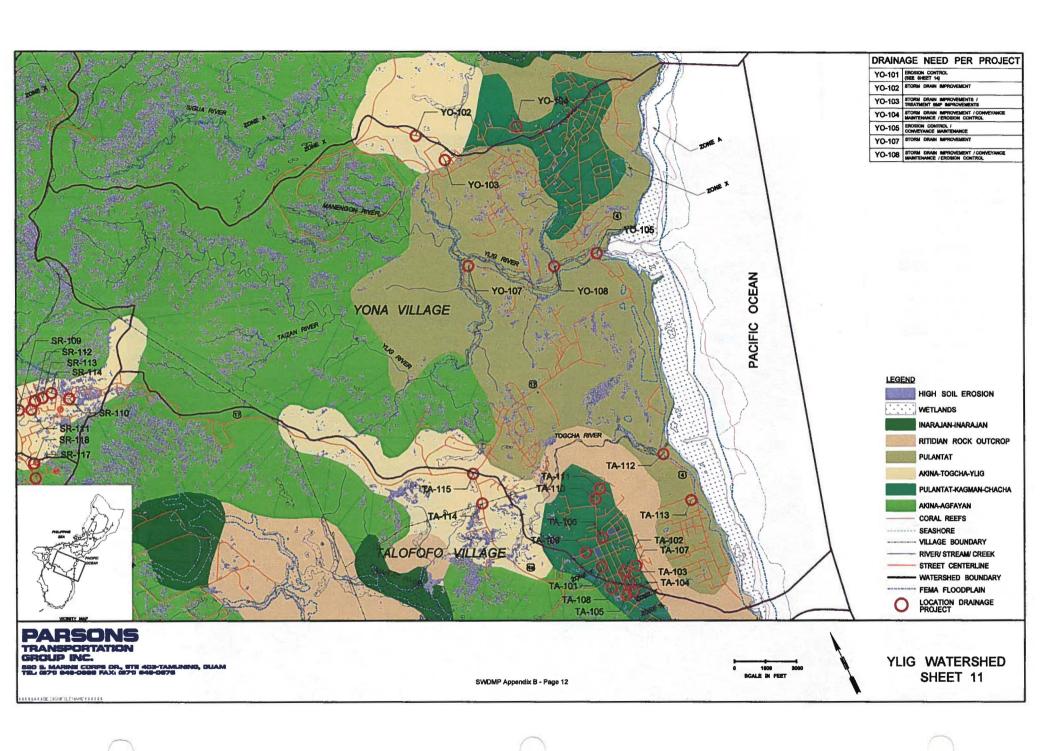


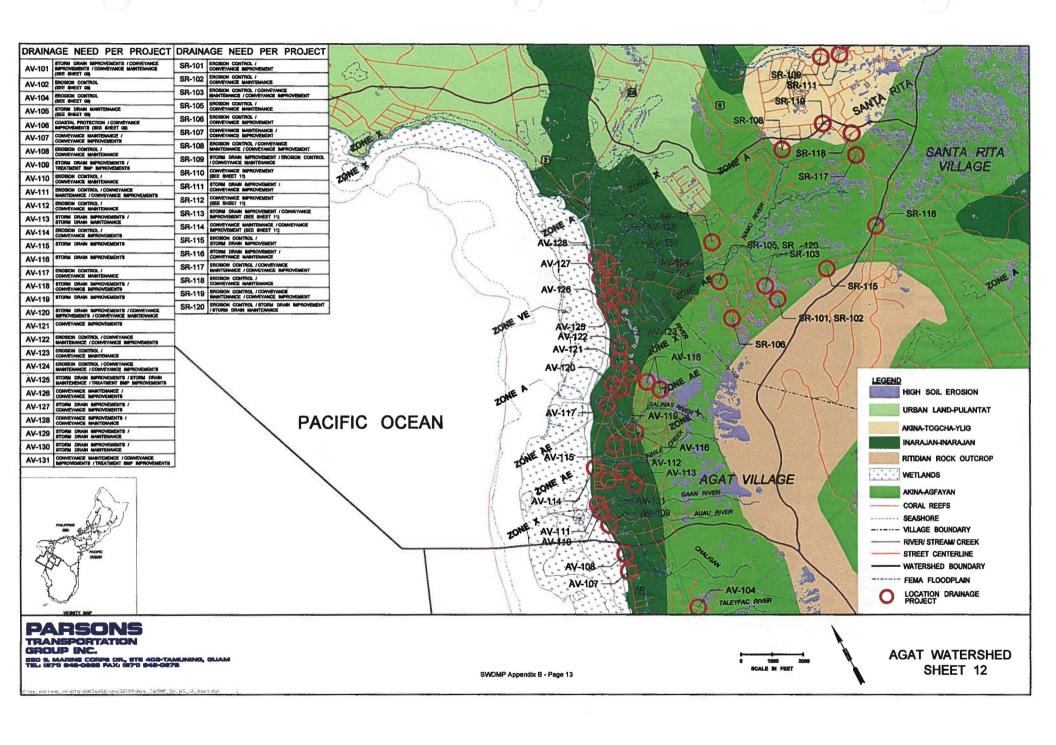


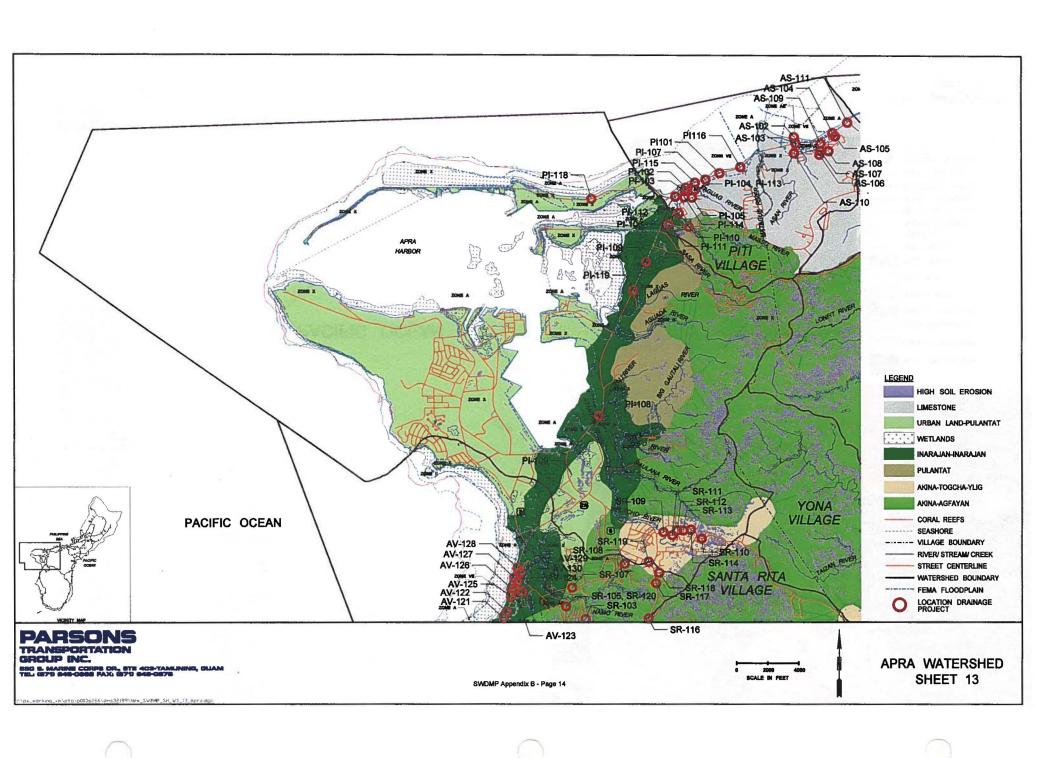


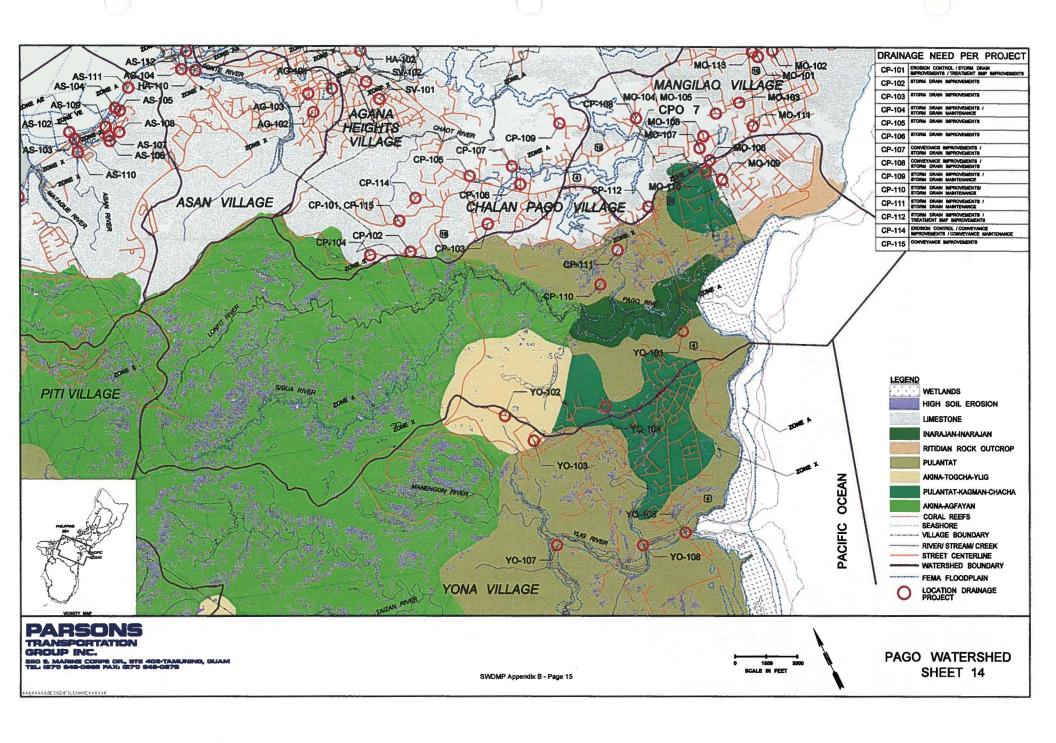


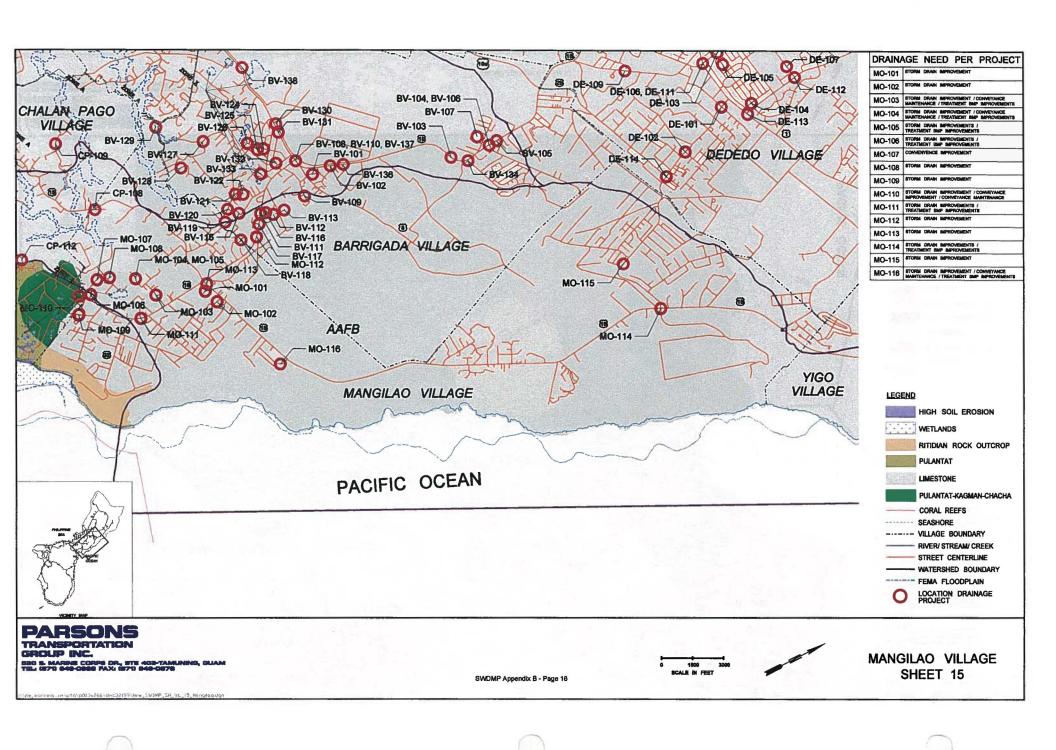


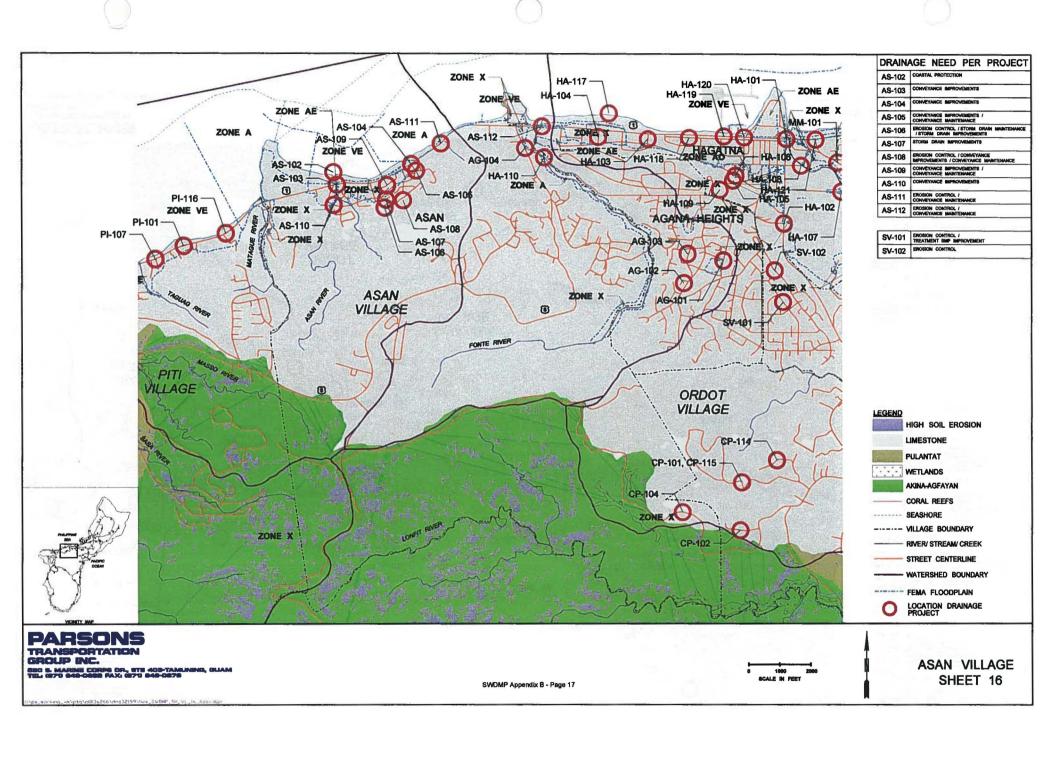


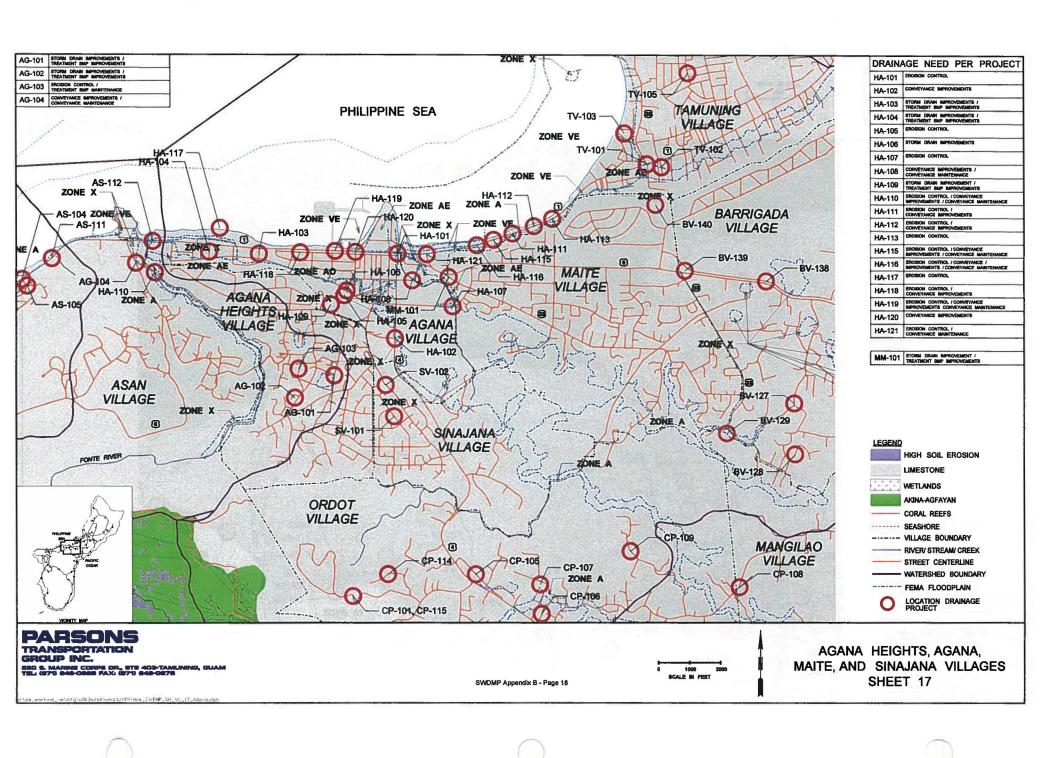


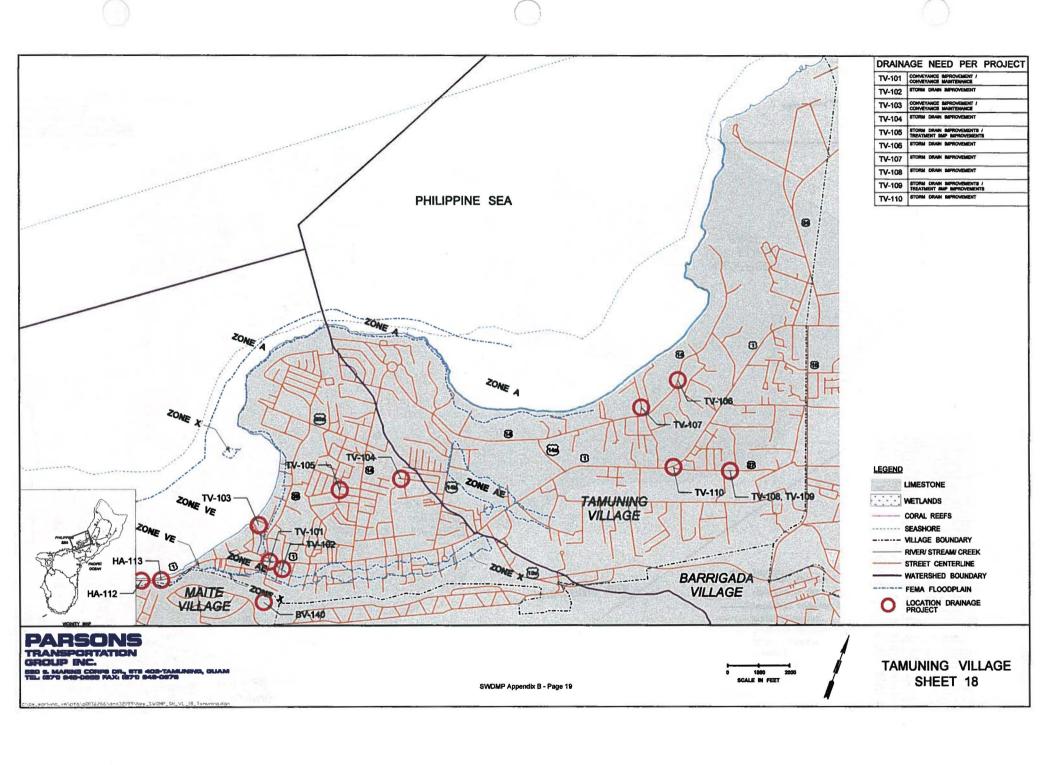


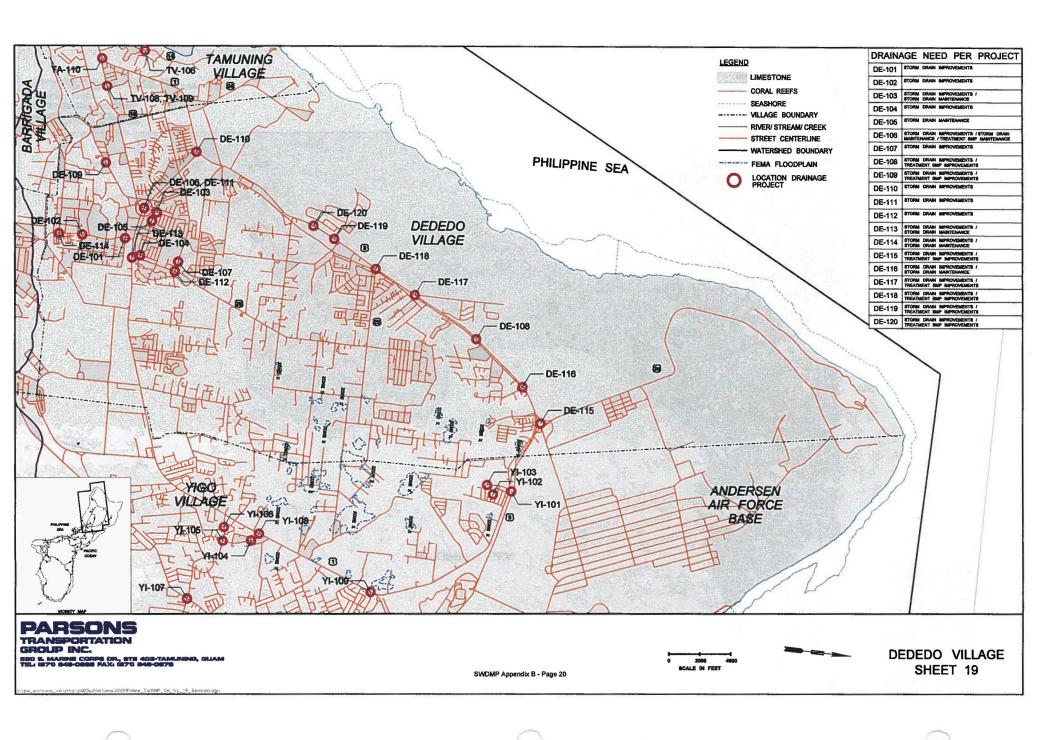


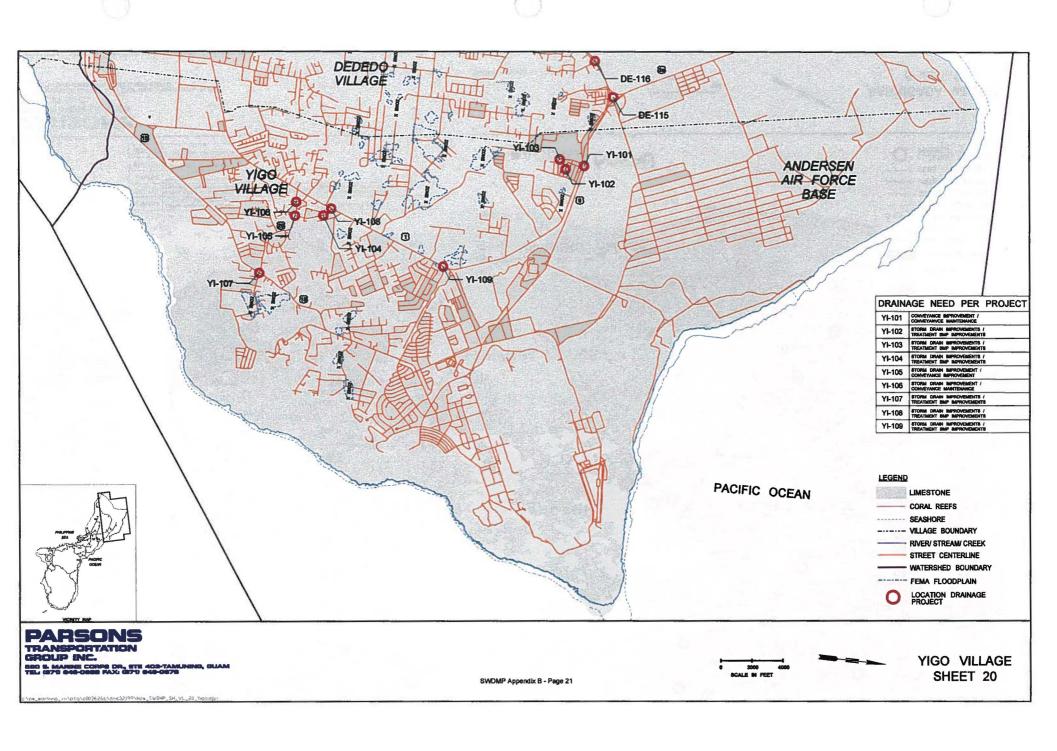


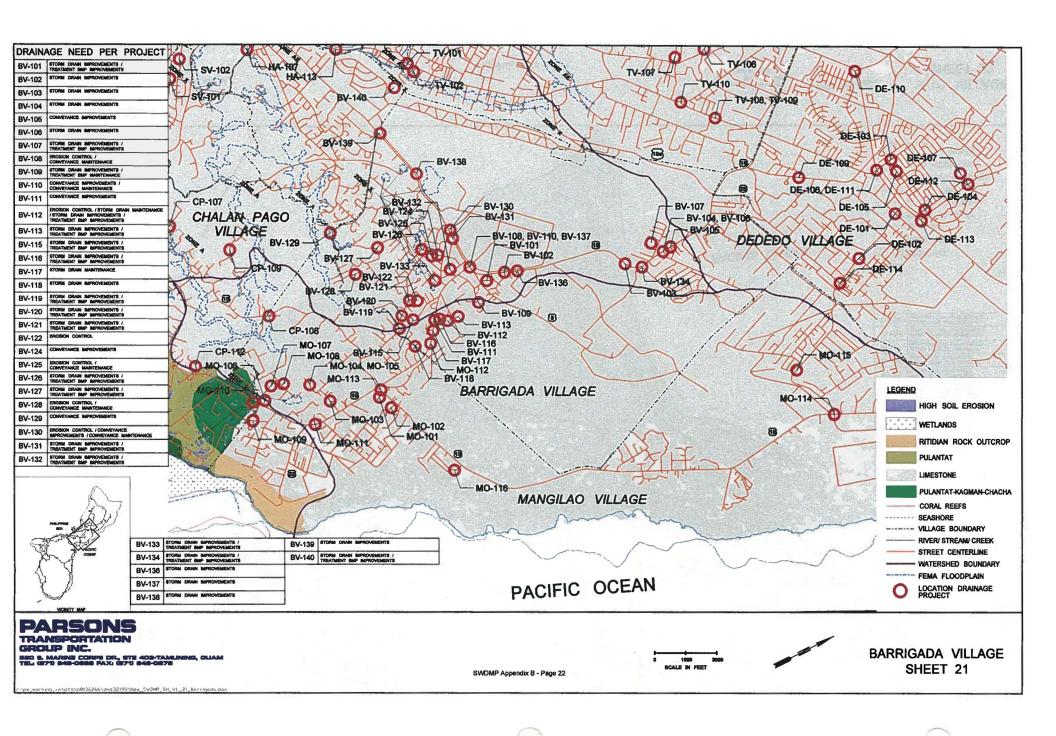


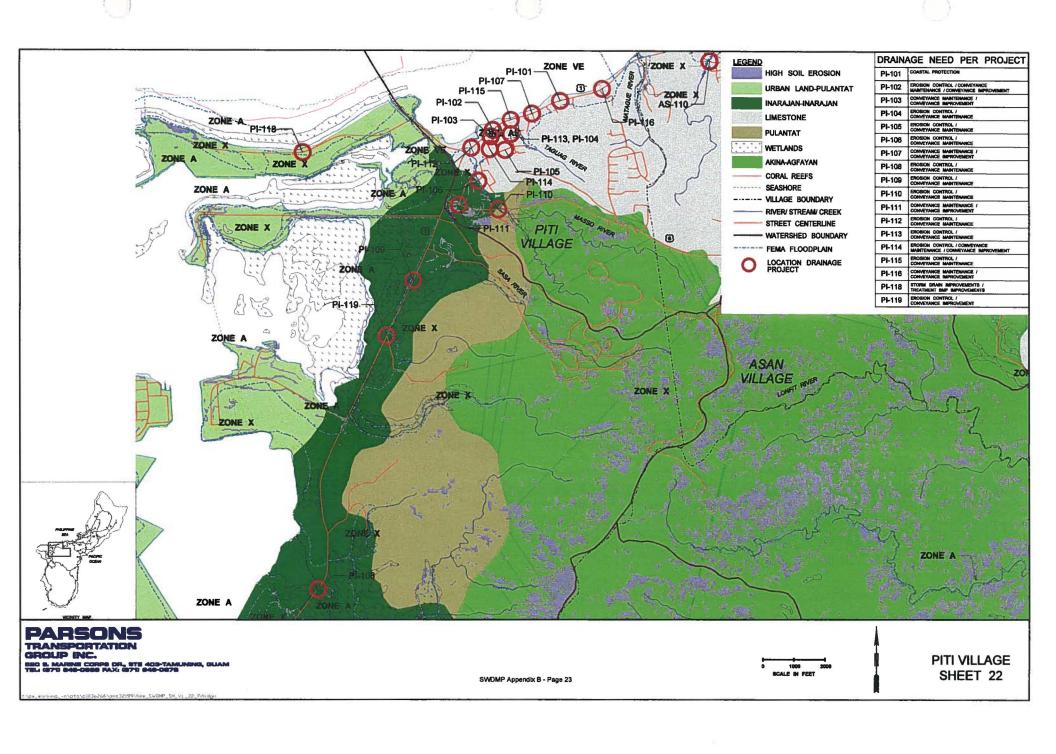














Appendix C Project Summary Data Sheets



AGANA HEIGHTS



AG-101

LOCATION:

San Vicente Solomon Drive & Francisco Javier Ave

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is a ponding basin with dry wells. Ponding basin is undersized and more dry wells are needed. Surrounding home floods when basin overflows. High flows go to dry wells and low flows percolate. Much of Agana Heights runoff discharges to this basin.

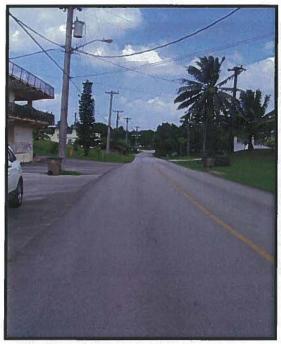
RECOMMENDED

IMPROVEMENTS

Recommend placement of 6 new injection wells at this site along with an increase of the infiltration basin size by

5,000 square feet. This will accommodate the increase in capacity required to prevent flooding.

COST:



AG-102

LOCATION:

Joseph Cruz Ave & As Kotla Court

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Along this street, there is no drainage system and there is flooding of homes at the low point of the street. Also upstream from the low point at 439 Joseph Cruz Ave, the home's backyard gets flooded.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties, two 200 linear foot infiltration basins are recommended for construction along the crowned street at its low point.

COST:

\$70,100



AG-103

LOCATION:

Agana Heights Ponding Basin

MITIGATION TYPE:

Erosion Control/ Treatment BMP Maintenance (Infiltration Basin)

SITE ASSESSMENT:

There is significant erosion along basin fencing. On one side of the basin, an owner built a swimming pool very close to the limits of the basin, and this is causing more erosion. Need to stabilize with rip rap.

RECOMMENDED IMPROVEMENTS

Recommend placement of 500 SF of rip rap along embankment of basin in close proximity to neighboring pool along with placement of approximately 500 SF of rip rap along top edge of basin at fence line where erosion is occurring. Also recommend removal of debris within basin (approximately 1/4 Ac). This will clean up existing basin and stabilize embankments to prevent further erosion.

COST:

\$143,000



AG-104

LOCATION: RT 6 & RT 7

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

An RCB cross culvert under Route 6 and Route 7 is covered with debris and vegetation - more than half the depth is covered with sediment upstream and the embankment past the wingwalls is eroding. It needs debris and vegetation removal and embankment stabilization on the upstream side of the RCB. The downstream side has heavy vegetation that needs to be cleared and here it was impossible to check for erosion under the vegetation.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance is needed at this site. Remove one acre of debris removal including some sediment removal to promote drainage and place 500 square feet of rip rap for channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the existing culvert. Place headwall/wingwall structures on upstream and downstream sides of culvert.

COST:

\$182,000

AGAT VILLAGE



AV-101

LOCATION:

RT 2 & Chalan Josen Milagro

MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

The properties west from Rt2 between Chalan Josen Milagros and International Rd get flooded. Runoff from Rt2 is routed to a channel that runs parallel to Chalan Josen Milagro, then from this channel is routed through 2-24" PVC culverts that run under Chalan Josen Milagro and discharge to the private property at the northwest corner of Rt2 and Chalan Josen Milagro. To prevent flooding of all these properties, runoff from Rt2 should stay along Rt2 and runoff generated in the properties along Chalan Josen Milagros needs its own drainage conveyance system. A drainage conveyance system needs to be added along Rt2, west side starting south from Chalan Josen Milagros and discharging to Taleyfac River (about 1300' away). To take care of private properties within Chalan Josen Milagros, a drainage conveyance system needs to be added to capture runoff and route it the shoreline, a series of swales and cross culverts can be routed to an existing access easement at the end of a future cul-de-sac where prior to being discharged to the beach, runoff should outlet to a rip-rap lined channel to prevent erosion.

RECOMMENDED IMPROVEMENTS

A storm drain system is needed to collect and convey street runoff from Rte 2 at Chalan Josen Milagros to the Taleyfac River. Propose installation of approximately 1250' of dual 3'x5' RCB along the west side of Rte 2, conveying flow the river. Propose a headwall/wingwall structure equipped with 100 SF rip rap energy dissipator at outlet to the river. Propose 1200 ft ditch along Rte 2 outleting to catch basins (2 total) connected to proposed RCB below. Recommend 1/4 Ac debris removal at Chalan Josen Milagros and Rte 2. Recommend placement of drainage ditch to route flow with Chalan Josen Milagros Development to shoreline (approximately 800 feet long).

COST:

\$2,680,000



LOCATION: RT 2 & Tun Ramon Chele Rd

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Double 36" RCP Cross culvert under Tun Ramon Chele Rd routes runoff to Taleyfac River. The upstream channel

embankment needs stabilization.

REÇOMMENDED IMPROVEMENTS

Recommend placement of 1,000 square feet of rip rap channel stabilization along channel embankments for a distance of 50-ft upstream of double 36" cross culvert located at Tun Ramon Chele Rd to stabilize the channel

upstream of culvert.

COST:

\$141,000



LOCATION:

Pagachao Dr & Kalachucha St

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

At the intersection of Pagacho Dr and Kalachucha St. a concrete lined ditch discharges to the intersection. This ditch carries runoff and debris from the Pagachao subdivision - there is erosion all along the hillside above this subdivision. The runoff from this ditch continues along Kalachucha St. down to Manha St. where a curb inlet is located at the end of the cul-de-sac. Even where there is evident hillside erosion, along the ditch and street there are no signs of sediment issues or flooding.

RECOMMENDED IMPROVEMENTS

Recommend placement of hydroseed and bonded fiber matrix over 1 acre of hillside where soil is exposed to prevent further erosion.

COST:

\$74,100



LOCATION:

Pagachao Dr & Mike Cruz St

MITIGATION TYPE:

Storm Drain Maintenance

SITE ASSESSMENT:

There is a sinkhole along Pagacho Dr just west of Mike Cruz St. The sinkhole location is in line with a sewer line.

The broken sewer line needs to be fixed to stop undermining of the street.

RECOMMENDED IMPROVEMENTS

There is a broken sewer line on this site that needs to be fixed to stop the undermining of the roadway. One new sewer manhole and the placement of a 24" RCP for 20 linear feet will be needed to stop the undermining.

COST:

\$24,800



LOCATION:

RT 2 & Pagachao Dr

MITIGATION TYPE:

Coastal Protection/ Conveyance Improvements

SITE ASSESSMENT:

42" RCP cross culvert under Rt2 routes runoff from Pagachao Dr to Nimitz Beach. The upstream cross culvert needs a headwall/wingwall structure, and clearing of the channel; the cross culverts are not visible. Downstream, a sediment structure needs to be added to prevent sand from clogging the outlet, and coastal erosion control (riprap) is needed to prevent undermining of Route 2.

RECOMMENDED IMPROVEMENTS

Coastal protection is needed at this site along with improvements to the drainage conveyance system. A quarter acre of debris removal is needed both upstream and downstream of the culvert. A 1000 ft concrete ditch should be placed along the shoreline side of Rte 2, outleting to the channel located at the downstream side of the cross-culvert. This will protect Route 2 from being undermined during high tides and will promote drainage along the freeway. For further erosion protection, it is recommended that a half acre of hydromulch w/ bonded fiber matrix be used as needed over the land adjacent to the ditch.

COST:

\$80,800



LOCATION: RT 2 & north of Chalan Lada

MITIGATION TYPE: Conveyance Maintenance/ Conveyance Improvements

SITE ASSESSMENT: North of Chalan Lada, a 42" RCP cross culvert runs under Route 2 and discharges to Nimitz beach. Need to add

headwall/wingwall structures to both upstream and downstream, erosion stabilization (riprap), and

vegetation/debris upstream.

RECOMMENDED Maintenance and improvements are needed for the drainage conveyance system at this site. A quarter acre of IMPROVEMENTS debris removal is needed (both upstream and downstream) along with placement of headwall

structures and a 100 SF rip rap energy dissipator placed upstream and downstream of the culvert.

COST: \$64,100



LOCATION:

RT 2 & Chaligan Creek

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 11'x3.5' RCB routes Chaligan Creek across Route 2. There is erosion around the wingwalls; need to add erosion stabilization (riprap). Downstream, the existing concrete channel slab is being undermined, and needs to be

repaired, and a cutoff wall needs to be added along with riprap.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance to the drainage conveyance system are needed at this site. A quarter acre of debris removal is needed both upstream and downstream of the culvert. Approximately 50 sq feet of rlp rap should be placed along the upstream wingwalls to prevent further undermining. Approximately 50 sq feet of grouted rlp rap should be placed along the bottom and toe of slope of the downstream side of the culvert to prevent further undermining of the bottom slab.

COST:

\$143,000



LOCATION: RT 2 & Babauta Rd

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements (Infiltration Trench)

SITE ASSESSMENT:

At the intersection of Route 2 and Babauta Rd, three homes get flooded, there is no existing drainage

conveyance system and therefore the formation of ponding occurs. A swale needs to be added along Route 2 and

a cross culvert to route runoff to the beach.

RECOMMENDED IMPROVEMENTS

A storm drain system is needed to collect and convey street runoff from Rte 2 at Baubata under Rte 2. Propose 100' bioswale placed adjacent to Rte 2, conveying flow to a low point along Rte 2 where a grated catch basin will intercept the treated runoff and outlet it through approximately 100 feet of 24" RCP placed across Rte 2, outleting to a headwall/wingwall structure equipped with a 100 sq ft rip rap energy dissipator located along the shoreline.

COST:

\$134,000



LOCATION: RT 2 & Auau Creek

MITIGATION TYPE: Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT: A 6'x3' RCB cross culvert routes Agau Creek under Route 2 to Bangi Point. Removal of debrls/vegetation and of accumulated sediment is needed both upstream and downstream. There is a RCB that is clogged with sediment.

Dredging and riprap along the embankment downstream for approximately 50' towards the beach is needed.

RECOMMENDED IMPROVEMENTS

Recommend a quarter acre of debris removal, 1000 square feet of rip rap channel stabilization placed a distance of 50 feet downstream of the culvert and 400 cubic yards of dredging for a distance of 50 ft downstream of the

culvert.

COST: \$159,000



LOCATION:

RT 2 & Gaan River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvements

SITE ASSESSMENT:

A double 6'x4' RCB routes Gaan River under Route 2. Eroslon control (riprap) is needed adjacent to the wingwall structures to prevent further undermining of Route 2. Trash and sedlment needs to be removed from channels both upstream and downstream, and embankment stabilization (rlp rap) is needed.

RECOMMENDED IMPROVEMENTS

Recommend placement of new headwall/wingwall structures upstream and downstream of double 6'x4' RCB and placement of rip rap stabilization along the embankments of the river for a distance of 25 feet upstream and 25 feet downstream of the culvert (totaling 1000 sq ft of rip rap). A quarter acre of debris removal (upstream and downstream of the culvert) is also recommended.

COST:

\$177,000



LOCATION: Fin

Finile Dr

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Need bank stabilization and cleanup at inlet. 10' x 8' RCB at Inlet. Bank revetment at outlet side. Encase/protect

utility line (possibly sewer).

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance to the drainage conveyance system are needed at this site (Finile Drive and Rte 2). A quarter acre of debris removal is needed along with placement of 1000 square foot rlp rap embankment stabilization for a distance of 50-ft upstream of culvert and placement of a 100-ftx12-inch concrete encasement of an existing sewer line located at the upstream side of the culvert

COST:

\$201,000



LOCATION:

Orong Circle & Finile Dr

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance

SITE ASSESSMENT:

At the end of Orong Circle a low points exists and a 12" RCP cross culvert routes runoff from this low point to a natural flow path. This 12" cross culvert is not sufficient to route all the runoff generated in this area. Along Orong Circle a drainage conveyance system needs to be added and route it to the natural flow path.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the existing storm drain system along Orong Circle to stop flooding in street. The drainage system should include approximately 200 LF of ditch located adjacent to the road, routing flow to 2 grated catch basins located at the low points in the road, connecting to 100'x18" RCP that will route flow adjacent to a private residence to the natural flow path located behind the residence (an easement will most likely be required for the 18" RCP). Also recommend one quarter acre debris removal downstream of the 18" RCP outlet and placement of headwall/wingwall structure with 100 SF rip rap energy dissipator placed at the outlet of the storm drain.

COST:

\$159,000



LOCATION: RT 2 & Finile Creek

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements

SITE ASSESSMENT:

A 10'x8' RCB routes Finile Creek under Rt2. The upstream and downstream headwall and wingwalls need to be replaced. Sediment and debris need to be removed upstream. Stabilization (riprap) of the embankment and roadway along Route 2 both in the upstream channels and the downstream channels are needed. A lateral 24" RCP culverts runs under Finile Dr and discharges to Finile Creek, this culvert needs the removal of debris and sediment and the addition of headwalls.

RECOMMENDED IMPROVEMENTS

Recommend placement of 2,000 square feet of rip rap channel stabilization along Finile Creek channel embankment for a distance of 50-ft upstream and downstream of cross culvert located at Rte 2 to stabilize the channel embankment. Also recommend placement of new headwall/ wingwall structures at both ends of Finile Creek Culvert under Rte 2 and for adjacent 24" RCP lateral running along Finile Drive.

COST:

\$349,000



LOCATION:

Tomas Mesa St

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

A drainage conveyance system along the street is not working properly and street floods. Need to depress

existing grated inlets and replace existing gutters with wider gutters.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the existing storm drain system along Tomas Mesa Street to stop flooding in street. The drainage system should include concrete ditches adjacent to the road (4 ditches at 100-ft length) routing flow to new grated catch basins at the low point of the 2 sides of the crowned road. The grated catch basins should connect to a 100-ft x 24" RCP storm drain that will route the flow to the Finile Creek. Place a headwall structure equipped with 100 SF rip rap energy dissipator at outlet to river. May require easement to route flow to Finile Creek.

COST:

\$258,000



LOCATION:

San Vicente Ave & San Roque St

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

At the interchange of San Vicente Ave and San Roque St, four grated inlets exist - one at each corner. There are signs of runoff flooding the intersection - possible solution is to have double grated inlets instead of single grated.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the existing storm drain system at this intersection to stop flooding in street. Recommend adding 4-100-ft ditches routing flow to 2 and 2 existing catch basins. Connect the new catch basins with the existing catch basins via 100-ft of 24" RCP.

COST:

\$109,000



LOCATION: RT 2 & Salinas River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 4'x4' RCB cross culvert routes the flow from Salinas River under Route 2. Upstream, there is a trapezoidal concrete lined channel discharges to the RCB, there are no issues present with this channel. Downstream needs about 50' of embankment stabilization and debris/sediment removal.

RECOMMENDED IMPROVEMENTS

The downstream channel at this site needs stabilization for the embankment and removal of debris/sediment. Recommend a quarter acre of debris removal and the placement of 1,000 square feet of rip rap channel stabilization for a distance of 50-ft downstream of the culvert routing Salinas River under Rte 2.

COST:

\$143,000



LOCATION: E

Erskin Dr

MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Improvements

SITE ASSESSMENT:

Runoff from Erskin Dr and from teacher's housing along Commissioner Charfauros Ct flows down to all the streets perpendicular to Erskin Dr (Perry St, Cook St, Eugenio St, Marteres, Osbone St, Bruce St). All the runoff needs to be captured and routed along Erskin Dr. Add a v-ditch along south side of Erskin Dr and at each intersection route the runoff vla cross culverts across to an existing channel that runs along the north side of Erskin Dr. This channel begins at Commissioner Charfauros Ct and continues along Erskin Dr until it discharges to a 6'x3' RCB cross culvert that runs under Rt2.

RECOMMENDED IMPROVEMENTS

Recommend storm drain improvements along Erskin Drive from Commissioner Charfauros Ct to Bruce St including: 1) placement of a concrete ditch along south side of Erskin for a distance of 2500 feet, 2) placement of 50'x24" RCP cross culverts at each intersection (6 total equipped with headwalls) to route flow from conc ditch to channel located on opposite side of Erskin, 3) addition of 2 catch basins connecting to 100'x24" RCP storm drain at Commissioner Charfauros Ct routed to conc channel located on north side of Erskin.

COST:

\$363,000



LOCATION: Father Follard St & Bruce St

MITIGATION TYPE: Storm Drain Improvements

SITE ASSESSMENT: Runoff floods and ponds the north corner at the intersection of Father Follard St and Bruce St. Add a grated catch basin and tie into an existing catch basin at the south corner of Father Follard St and Route 2.

RECOMMENDED Recommend improvements to the existing storm drain system at this intersection to stop flooding in street.

IMPROVEMENTS Recommend placing new catch basin on north and south corners of Father Follard and Bruce St connecting to 100'x24" RCP to exist catch basin on south corner of Father Follard and Rte 2. Place 400-ft ditch adjacent to street to convey flow to new catch basins. Also recommend one quarter acre debris removal and placement of

1000 SF rip rap at outlet of system, downstream of Rte 2.

COST: \$252,000



LOCATION:

RT 2 & Father Follard St

MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

At the intersection of Rt2 and Father Follard St, two grated catch basins collect runoff from Route 2 and Father Follard St, discharging to a cross culvert under Rt2. The catch basin on the northeast corner is undersized and flooding/ponding is created - need to add another grated catch basin. At the downstream end of the cross culvert, the receiving channel needs embankment stabilization (riprap) and debris/vegetation removal.

RECOMMENDED IMPROVEMENTS

Recommend improving the drainage system along Father Follard Drive by replacing the undersized catch basin with 2 new catch basins connected by approximately 100 feet of 24" RCP and adding approximately 100' of ditch adjacent to road on both sides of the 2 new catch basins. The new system will connect to the existing crossculvert under Rte 2. A quarter acre of debris removal downstream of this culvert is needed (in the downstream channel). Also recommend placement of 1000 SF of rip rap along the embankments of the downstream channel for a distance of approximately 50 feet.

COST:

\$252,000



LOCATION:

RT 2 & Erskin Dr

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

A 6'x3' RCB cross culvert routes runoff collected upstream from Erskin Dr. Upstream, a concrete lined channel discharges to a RCB. Downstream, the RCB outlets to a channel, the addition of wingwalls, and stabilization (rip rap) of the embankment and roadway are needed. The Elite Bakery building adjacent to the downstream channel is being undermined by runoff from the channel - it needs to be protected with riprap to stop the undermining.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the existing drainage conveyance system located mainly on the west side of Rte 2 (downstream side of 6'x3' culvert at this site). Recommendations include: 1) placement of a new headwall/wingwall structure with 100 SF rip rap energy dissipator at the downstream side of the 6'x3' culvert, 2) placement of 1000' concrete ditch along west side of Route 2 (north of channel) outleting to a grated catch basin located upstream of Elite Bakery - catch basin to connect to 50' of 24" RCP routing flow southward to new headwall/wingwall structure at channel, and 3) placement of 400 ft long ditch located along west side of Route 2, south of channel, outleting to a grated catch basin that connects to 50' of 24" RCP storm drain conveying flow northward to headwall/wingwall structure proposed in channel.

COST:

\$182,000



LOCATION:

RT 2 & South of Atao Rd

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance improvements

SITE ASSESSMENT:

A 36" RCP cross culvert runs under Route 2. The upstream and downstream headwalls and wingwalls need to be replace. Vegetation and debris need to be removed in the upstream channel. Add embankment stabilization(riprap) along downstream channel. A lateral 24" RCP culvert discharges to the upstream channel to the 36" cross culvert, the upstream channel to the 24" RCP needs embankment stabilization(riprap).

RECOMMENDED IMPROVEMENTS

The upstream and downstream headwall/wingwall structures on this site need to be replaced and erosion control is needed. Recommend placement of 2,000 square feet of rip rap channel stabilization along channel embankments for a distance of 50-ft upstream and downstream of 36" cross culvert located at Rte 2 to stabilize the channel embankment. Also recommend placement of new headwall/ wingwall structures at both ends of culvert along with a quarter acre of debris removal within channel.

COST:

\$317,000



LOCATION:

V T Babauta Lane

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

VT Babauta Lane runs parallel to Togcha River. The river needs embankment stabilization to prevent undermining of road, and also needs removal of debris and vegetation.

RECOMMENDED

IMPROVEMENTS

Recommend a quarter acre of debris removal and placement of 1,000 square feet of rip rap channel stabilization along the embankment of Togcha River adjacent to Baubata Rd (approximately 100 ft in length).

COST:

\$143,000



LOCATION:

R R Cruz St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvements

SITE ASSESSMENT:

The Togcha River crosses the R R Cruz St at two locations where two 10'x10' RCB culverts route the river flow. At the upstream RCB, the downstream headwall has cracks and pieces of the structure are falling apart - the headwall and wingwalls need to be repaired or replaced. At the same location, a 60" HDPE lateral culvert needs a headwall. At both RCB locations, the river needs debris/sediment/vegetation removal and embankment stabilization.

RECOMMENDED IMPROVEMENTS

Recommend placement of new headwall/wingwall structures on the upstream and downstream sides of the 2 culverts located at the 2 crossings of the Togcha River. Recommend placing the 60" HDPE lateral through the wingwall of the upstream culvert. Also recommend removal of one quarter acre of debris throughout and placement of 1,000 square feet of rip rap channel stabilization (for a distance of 10 feet upstream and downstream of each culvert).

COST:

\$226,000



LOCATION:

Salinas Rd

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance/ Treatment BMP Improvements

SITE ASSESSMENT:

Along Salinas Rd there are about four homes that flood due to debris accumulation and overgrown vegetation next to the road. Remove debris and vegetation, add swales and culverts along the road, and route the runoff to the Togcha river.

RECOMMENDED

Recommend addition of a storm drain system along Salinas Road to stop flooding of homes. The drainage system should include swales adjacent to the road (2 bioswales at 50-ft length) routing flow to a catch basin at the low point in the road. The grated catch basin should connect to a 100-ft x 24" RCP storm drain that will route the flow to the Togcha River (at Salinas and Baubata intersection). Place a headwall/wingwall structure equipped with 100 SF rip rap energy dissipator at outlet to river.

COST:

\$134,000



LOCATION:

RT 2 & Togcha River

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvements

SITE ASSESSMENT:

A double cell RCB routes the Togcha River under Rt2. Overgrown vegetation upstream and downstream need to be removed. Upstream there is erosion around the RCB wingwalls, to prevent further undermining of the roadway embankment stabilization needs to be added. Downstream, the north embankment needs to be stabilized (riprap). A sewer line runs through the RCB, pipe should be concrete encased to prevent any spills.

RECOMMENDED IMPROVEMENTS

Maintenance and improvements to the drainage conveyance system is needed at this site. A quarter acre of debris removal will be needed, 1,000 square feet of rip rap channel stabilization 30 linear feet of concrete encasement, and two new headwall/wingwall structures will be needed.

COST:

\$235,000



LOCATION:

RT 2 & RT 12

MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Improvements

SITE ASSESSMENT:

At the intersection of Route 2 and Route 12 there is ponding on the two east corners. Add a drainage conveyance system and route the runoff to the north along Route 2 to an existing RCB or south to the Togcha

River

RECOMMENDED IMPROVEMENTS

Recommend addition of a drainage conveyance system at Rte 2 and Rte 12 to eliminate roadside ponding. The drainage system should include ditches adjacent to the road (totaling 400-ft length) routing flow to 2 catch basins connecting to 200 LF of 24" RCP storm drain equipped with a headwall/wingwall structure with 100 SF rip rap energy dissipator at the outlet. The flow will be routed to the Togcha River.

COST:

\$252,000



LOCATION:

RT 2 & north of RT 12

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

North of the Route 2 and Route 12 interchange, there are 3-36' RCP cross culverts that run under Route 2. Upstream there is a channel with a rock/concrete embankment that runs adjacent to Bay Dollar Mart and adjacent to private properties. Around this area six properties including the store become flooded, berms should be added next to the channel to stop the flooding. Both the upstream and downstream channels need removal of overgrown vegetation. The downstream channel also has rock/concrete embankments and sediment/debris that need to be removed.

RECOMMENDED IMPROVEMENTS

To minimize flooding of adjacent properties, a 2-ft high berm (5 ft wide) is recommended along both embankments of the channel on the upstream side of the culvert for a distance of approximately 100 feet. Remove one quarter acre of debris (on upstream and downstream sides of culvert). Place 500 square feet of rip rap for berm at the top of embankment on both sides of channel. Replace existing headwall on upstream culvert with taller headwall/ wingwall structure.

COST:

\$158,000



LOCATION:

north Perino St

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance / Conveyance Maintenance

SITE ASSESSMENT:

At the north end of Perino St there are 3-24" RCP cross culverts that run under the street. Both the upstream and downstream channels are covered with trash/debris/vegetation that need to be removed.. Add swales along Perino and route them to the cross culvert to prevent flooding of the street

RECOMMENDED IMPROVEMENTS

Recommend improvements to the existing storm drain system along Perino to stop flooding in street. The drainage system should include concrete ditches or swales adjacent to each side of the crowned road (2 ditches at 1000-ft length) routing flow to the triple 24" RCP culvert crossing Perino Street. Also recommend debris removal upstream and downstream of the culvert and placement of a 100 SF rip rap energy dissipator at culvert inlet and outlet.

COST:

\$56,700



south Perino st

LOCATION:
MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

At the south side of Perino St there is no drainage conveyance system to route roadway runoff. Add a drainage conveyance system and discharge it to the proposed drainage conveyance system at the intersection of Route 12

and Route 2

RECOMMENDED IMPROVEMENTS

A drainage conveyance system is needed along Perino Street that will route the street runoff to the proposed drainage conveyance system at the intersection of Route 12 and Route 2. Recommend placement of two catch basins placed at this street's low point connecting to a 24" RCP for 200 linear feet that routes the flow to the system at Rte 2 and Rte 12. Also a quarter acre of debris removal is needed at this site.

COST:

\$202,000



LOCATION:

Tun Leon Rd

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Along Tun Leon Rd, there is one property that becomes flooded - there is no drainage conveyance system along this street. Provide a drainage conveyance system along this road, and route it south to the Gaan River. An easement will be needed to route the drainage system to the Gaan River. Debris and overgrown vegetation needs to be cleaned along the street - this is also causing runoff to create flooding.

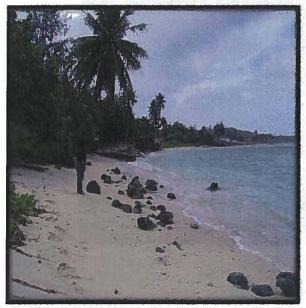
RECOMMENDED IMPROVEMENTS

Recommend addition of a drainage conveyance system along Tun Leon Road to stop flooding of homes. The drainage system should include swales adjacent to the road (2 bioswales at 100-ft length) routing flow to the south to a culvert conveyance system consisting of 300' x 24" RCP equipped with 2 headwall/wingwall structures outleting to a 100-ft rip rap energy dissipator at the Gaan River embankment. One quarter AC of debris removal will also be required.

COST:

\$337,000

ASAN VILLAGE



AS-102

LOCATION:

RT 1 & Fonte to Masso River

MITIGATION TYPE:

Coastal Protection

VILLAGE RANKING

SITE ASSESSMENT:

There is significant costal erosion from Masso River(south) to Fonte River (north). There still some home

foundations left along the coastline.

RECOMMENDED IMPROVEMENTS

To prevent further shoreline erosion, placement of 50,000 square feet of rip rap coastal stabilization (approximately 10-ft in width along the shoreline) from the Fonte River outlet to the Asan River outlet (approximately 5000 feet) is recommended.

COST:

\$7,030,000



AS-103

LOCATION:

RT 1 & Asan River Bridge

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

Bridge is in good condition, there is no erosion nor debris or overgrown vegetation. On the upstream side of the bridge a water main crosses the river, this water line is too low and may cause debris to accumulate on this

side of the bridge. Water line should be raised.

RECOMMENDED IMPROVEMENTS

Recommend replacing the existing 8" DIP Water Main obstructing flow upstream of the existing bridge with a new 8" DIP Water Main (equipped with air release valve) connected to the bridge deck in order to move the water line out of the flow path and prevent excessive sediment and debris deposition upstream of the bridge.

COST:

\$10,700



LOCATION:

RT 1 & Msgnr Jose A Leon Guerrero St

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

At the intersection of Rt1 and Msgnr Jose A Leon Guerrero St three grated inlets are located. Its not clear where these inlets outlet to, but they capture runoff from Rt1 and from Msgnr Jose A Leon Guerrero St. Two of these grated inlets are covered with sediment and debris. Per the FCD Document, a box culvert located here must be upsized.

RECOMMENDED **IMPROVEMENTS**

Improvements to the drainage conveyance system at this site are needed. There are three grated inlets located on this site, two of which are covered in debris. Recommend clearing debris and upsizing conveyance line (as per the Flood Control Document) to a 6'x4' RCB for 100 linear feet.

COST:

\$167,000



LOCATION:

Consolation St & Msgnr Jose A Leon Guerrero St

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

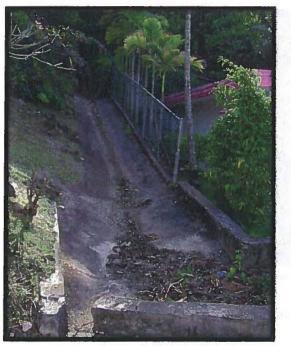
Existing 4'x3' RCB under consolidation St needs to be upsized. Upstream channel is heavily vegetated. Channel

needs to be cleared of vegetation and debris to prevent flooding of street.

RECOMMENDED **IMPROVEMENTS** The cross culvert at this site needs to be replaced with 100 linear feet of 4'x4' RCB equipped with upstream and downstream headwall structures along with 100 sq ft rip rap stabilization placed upstream and downstream of the culvert. Approximately one quarter acre of debris should be removed along the channel.

COST:

\$158,000



LOCATION:

Niño Perdido St & Santa Ana St

MITIGATION TYPE:

Erosion Control/ Storm Drain Maintenance/ Storm Drain Improvements

SITE ASSESSMENT:

A concrete lined channel discharges to an inlet located behind the sidewalk and this inlet discharges to a double grated inlet on the street. There is significant debris and sediment from hillside, the receiving inlet is clogged. Erosion control is needed upstream. As per the Flood Control Document, the connecting storm drain needs to be replaced with a 100'x24" RCP.

RECOMMENDED IMPROVEMENTS

Erosion control, maintenance and improvements to the storm drain system are needed at this site. A quarter acre of debris removal and placement of one acre of hydromulch with bonded fiber matrix is recommended along the hillside to eliminate further sedimentation and clogging of the downstream inlet. As per the Flood Control Document, the connecting storm drain needs to be replaced with a 100'x24" RCP.

COST:

\$170,000



LOCATION:

West San Carlos Ct & Msgnr Jose A Leon Guerrero St

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Existing drainage conveyance system along West San Carlos Ct needs to be upsized, there are signs of street

flooding

RECOMMENDED

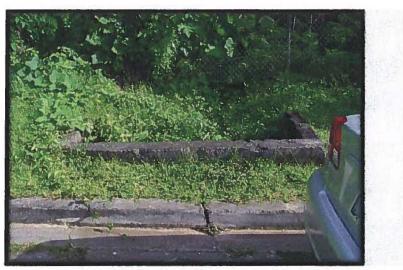
IMPROVEMENTS

Improvements to the storm drain at this site are needed. The existing drainage system needs to be upsized to a 30" RCP conveyance system (per FCD) for 1,000 linear feet and two catch basins are proposed to eliminate

existing street flooding issues.

COST:

\$1,170,000



LOCATION: Santa Ana St & Santa Ana Lane

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

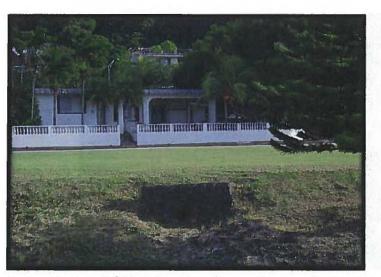
SITE ASSESSMENT:

An existing 18" Cross culvert crossing Santa Ana St is capturing runoff from hillside. The upstream culvert has a headwall that is submerged in water and debris. Hillside is heavily vegetated, and there are signs of erosion. Hillside needs to be stabilized for erosion and a debris basin should be added to the upstream side of the cross culvert to prevent clogging of pipe, possible the cross culvert should be upsized.

RECOMMENDED IMPROVEMENTS

The cross culvert at this site needs to be replaced with 100 linear feet of 3'x3' RCB equipped with headwalls upstream and downstream and 100 sq ft rip rap stabilization downstream of the culvert. Approximately one quarter acre of debris should be removed along the channel. Recommend placement of hydromulch w/ a bonded fiber matrix over approximately 1 acre of the adjacent hillside.

COST: \$170,000



LOCATION:
MITIGATION TYPE:

Sen Juan Tim Tovas St & Msgnr Jose A Leon Guerrero St Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

An existing 18" RCP culvert discharges to a channel located between Sen Juan Tim Tovas St and Msgnr Jose A Leon Guerrero St. Possible this culvert outlets runoff from Msgnr Jose A Leon Guerrero st. This culvert should be replaced with a 3'x3' RCB. The culvert is in good shape and its not causing any erosion along the channel embankment, but possibly is undersized and should be replaced at least with a 3'x3' RCB. There are signs of flooding of the channel, there is debris along the sides of the channel embankments.

RECOMMENDED IMPROVEMENTS

The cross culvert at this site needs to be replaced with 100 linear feet of 3'x3' RCB equipped with downstream headwall and 100 sq ft rip rap stabilization downstream of the culvert. Approximately one quarter acre of debris should be removed along the channel.

COST:

\$87,000



LOCATION: Msgnr Jose A Leon Guerrero St & Asan River

MITIGATION TYPE: Conveyance Improvements

SITE ASSESSMENT: There is 30" RCP culvert outleting to the Asan river, just north of the Asan River bridge over Msgnr Jose A Leon

Guerrero st. This culvert and headwall are in good shape, and there are no signs of erosion around outlet,

needs to be replaced with a 3'x3' RCB. The existing 30" RCP is undersized.

RECOMMENDED IMPROVEMENTS

The culvert at this site needs to be replaced with a 3'x3' RCB for 200 linear feet equipped with upstream and

downstream headwall structures outleting flow to a 100 square foot rip rap energy dissipator.

COST:

\$156,000



AS-111

LOCATION:

RT 1 & Church of Christ

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 24" to 36" cross culvert with headwall crosses Route 1. The upstream side lies next to the Church of Christ. Also the upstream side is covered with debris and overgrown vegetation, there is erosion along the toe of the hillside behind the church which runoff flows towards this cross culvert. Possibly this area also floods due to the clogged cross culvert. Debris and overgrown vegetation need to be cleared, and sediment control implemented on hillside and possibly a sediment basin added upstream of the cross culvert entrance.

RECOMMENDED IMPROVEMENTS

Recommend placement of hydromulch w/ a bonded fiber matrix over approximately 1 acre of the hillside behind the church in an effort to control mass erosion that contributes to sedimentation in the downstream culvert. Also recommend maintenance in the channel upstream of the culvert in the form of 1/4 acre of debris removal (and sediment removal in the existing culvert). Recommend adding headwall and wingwall structure to upstream side of culvert to alleviate potential erosion at culvert inlet.

COST:

\$101,000



AS-112

LOCATION:

RT 1 & Fonte River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance / Conveyance Improvements

SITE ASSESSMENT:

Fonte River bridge along Rt1 with signification erosion on the upstream side of the bridge, with accumulated debris and sediments. The upstream river embankment needs to be stabilized with riprap and debris removed. At this location next to the river on the east side lies Pigo Catholic cemetery, the river is eroding the cemetery and either the channel needs to channelized or riprap or gabions placed to prevent any further erosion.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, 1 acre of debris removal followed by rip rap channel stabilization 250 feet upstream and 50 feet downstream of Fonte River Bridge is required (totaling approximately 10,000 SF Rip Rap Stabilization).

COST:

\$142,000

BARRIGADA VILLAGE



BV-101

LOCATION:

Manibusan Rd

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Runoff flood s one property, existing infiltration trench can't handle volume of runoff. Need to maintain existing

infiltration trench.

RECOMMENDED IMPROVEMENTS

Recommend placement of a 200 linear foot infiltration trench adjacent to the existing infiltration trench along

ITS with maintenance of the existing infiltration trench to enable proper infiltration.

COST:



LOCATION:

RT 16 & Cepeda Way

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Along Rt16, adjacent to Cepeda way, there is an existing concrete ditch that runs parallel to Rt16, a portion of this ditch was covered with a concrete slab and a few openings left on top. Need to remove concrete top and replaced it with a metal grate (or replace system with a storm drain system with 3 catch basins and pipeline to outlet offsite). The existing concrete slabs prevents maintenance of the ditch and also does not allow runoff to enter ditch properly.

RECOMMENDED IMPROVEMENTS

Recommend replacement of the existing concrete drainage structure located along Route 16 adjacent to Cepeda Way with three catch basins connecting to a 24" RCP (approximately 100 linear feet in length) connecting to the existing Rte 16 storm drain via a manhole structure.

COST:

\$45,200



BV-103 LOCATION:

RT 16 & 261C

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Cross Culvert under Rt16 should carry flow from west to east, but most of the flow does not cross the street and continues flowing south along Rt16. Modify/add catch basins on upstream side of culvert to route flow to the

east more efficient.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the storm drain conveyance system along Rte 16, connecting to the existing crossculvert. improvements include placement of 2 catch basins north of the cross-culvert, connecting to approximately 100' of 24" RCP routing flow southerly to the upstream side of the culvert, outleting through a

headwall/wingwall structure and 100 SF rip rap energy dissipator.

COST:

\$137,000



LOCATION:

RT 16 & North Sabana

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

At the intersection of Rt16 and North Sabana ponding is created. There are two existing catch basins along North Sabana, but this is not sufficient and looks to be undersized. Add an additional grated catch basin along North Sabana on the north side of road, add an overside drain to the existing catch basin on the south side of North Sabana, and add two catch basins along RT16 east side to prevent flooding of area.

RECOMMENDED IMPROVEMENTS

To prevent further roadway flooding, recommend placement of an additional grated catch basin along North Sabana on the north side of road adjacent to the intersection with Rte 16, add an overside drain leading to the existing catch basin on the south side of North Sabana, and add two catch basins along the east side of Rte16 (along with approximately 100 LF of roadside ditch routing surface runoff to catch basins). Connect proposed catch basins to existing storm drain system using 100'x24" RCP.

COST:

\$117,000



LOCATION:

RT 16 & Mobil Gas Station

MITIGATION TYPE:

Conveyance improvements

SITE ASSESSMENT:

A cross culvert under Rt16 carries flow from the east to the west where a property is being developed. Upstream, a headwall and wingwalls should be added to existing cross culvert. Downstream, the new development will build

a structure to route flow to the north.

RECOMMENDED IMPROVEMENTS

Two new headwall/wingwall structures should be added to the existing cross culvert on this site, outleting flow

through a 100 square foot rip rap energy dissipator. This will route the flow to the north.

COST:

\$48,100



LOCATION:

RT 16 & North Sabana

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Private property off route 16. Property gets flooded by upstream runoff, a new development upstream has increased runoff discharging to private property. Need to add a drainage conveyance system.

RECOMMENDED

IMPROVEMENTS

Recommend placement of a storm drain system along Rte 16 to prevent flow from entering North Sabana. Two catch basins should be placed along Rte 16 (upstream and downstream of the entrance to N Sabana), connecting to a 24" RCP for 100 linear feet equipped with a headwall/wingwall structure, outleting the flow through a 100 square foot rip rap energy dissipator placed adjacent to Rte 16.

COST:

\$137,000



LOCATION:

Rosario Loop Rd & Pangelinan Way

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvement

SITE ASSESSMENT:

Rosario Loop is off Pangelinan Way and adjacent to the airport. This is a new development and street is not paved yet -it has a gravel surface. Three homes get flooded. A future cul-de-sac within the loop will be an ideal

location to build an infiltration basin or an infiltration trench.

RECOMMENDED **IMPROVEMENTS** Recommend placement of a 200'x200' infiltration basin at this site along with a drainage system along Rosario Loop. Two catch basins should be placed along the street to intercept and convey flow to a 24" RCP for 100 linear feet, outleting to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator placed at the infiltration basin. Recommend placement of 100 LF of ditch along each side of the crowned roadway to convey flow to proposed catch basins.

COST:

\$479,000



LOCATION:

RT 8 & RT 16

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Homes in the area along Rt8 and east of Rt16 get flooded. On the south side of Rt8 a berm keeps water from flowing south and floods all this area, under the berm there is a 8" pipe but this is not sufficient to drain all this area. There is also a cross culvert under the road but is not sufficient. Need to add a drainage conveyance system to prevent flooding of private properties and roadway.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the storm drain conveyance system along Rte 8, at the existing cross-culvert located east of Rte 16. Improvements include replacement of existing culvert with 50'x36" RCP equipped with upstream trash rack and downstream wingwall with 200 SF rip rap energy dissipator outleting to a new 200'x200' infiltration basin (located along the south side of Rte 8 approximately 50 feet east of culvert). A quarter acre of debris removal is also needed.

COST:

\$514,000



LOCATION:

Lizama St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Maintenance

SITE ASSESSMENT:

At the end of Lizama St there is a Cul-de-Sac where a temporary basin was created to take care of the flooding generated by the new development. Since this basin is at the low point, this temporary should be made into a permanent infiltration basin, need to acquire right of way for basin and for an access road to basin.

RECOMMENDED IMPROVEMENTS

Recommend making temporary infiltration basin into permanent infiltration basin to be owned and maintained by DPW (requires ROW acquisition and fencing for 800 linear feel around perimeter of the existing infiltration basin).

COST:

\$21,500



LOCATION:

RT 10 & RT 8

MITIGATION TYPE:

Conveyance improvements/ Conveyance Maintenance / Treatment BMP Maintenance

SITE ASSESSMENT:

Along Rt10 east side and south from Rt8 an infiltration basin has become a permanent wet basin. The infiltration basin is not draining the runoff anymore and has become a permanent lake and habitat for endangered species.

RECOMMENDED IMPROVEMENTS

The infiltration basin along Route 10 and south of Route 8 no longer drains the runoff and has turned into a permanent lake/habitat for endangered species. This area needs a quarter acre of debris removal and approximately 1,000 cubic yards of dredging (cut). In order for the maintenance to occur, an agreement between DPW and DFW will most likely be required.

COST:

\$48,700



LOCATION:

Vietnam, Veterans Highway (RT 10)

MITIGATION TYPE:

Conveyance Improvements / Conveyance Maintenance

SITE ASSESSMENT:

Along the west side of Rt10 an inlet to a cross culvert has been plugged, and another inlet to a cross culvert at an adjacent property is not sufficient to route all the runoff to the east side of Rt10 thus flooding these properties.

Need to unplug existing cross culvert.

RECOMMENDED **IMPROVEMENTS** Recommend placement of a storm drain system along Rte 10 connecting to the existing cross culvert including placement of 2 new catch basins along the west side of Rte 10 connecting to 100 LF of 24" RCP outleting to existing cross-culvert. Also recommend placement of a headwall/wingwall structure to the inlet of the existing cross-culvert along with 100 sq ft of rip rap to prevent further sedimentation of the culvert.

COST:

\$137,000



LOCATION: San Antonio St & Rte 10

MITIGATION TYPE: Erosion Control/ Storm Drain Maintenance/ Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT: Runoff from Route 10 discharges to this street and floods homes.

RECOMMENDED Recommend placement of a storm drain system along Rte 10 to prevent flow from entering San Antonio Street.

Two catch basins should be placed along Rte 10 (upstream and downstream of the intersection with San Antonio Street), connecting to a 24" RCP for 100 linear feet equipped with a headwall/wingwall structure, outleting the

flow through a 100 square foot rip rap energy dissipator and to a 200' long infiltration trench placed adjacent to

Rte 10.

COST: \$157,000



Ungkulu St

LOCATION:
MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Possible location for an infiltration basin or trench, this at a low point.

RECOMMENDED IMPROVEMENTS

Recommend placement of storm drain system in Ungkulu Street to assist in flood prevention along the street,

outleting to an infiltration trench (200' long) adjacent to the low point in the street. Propose intercepting roadway flow via catch basins (1 located on each side of the street) connected by 24" RCP (estimated length of 100-ft) outleting to headwall/wingwall structure and 100 SF rip rap energy dissipator located immediately

upstream of proposed infiltration trench.

COST:

\$45,800



BV-115 LOCATION:

Westbrooks St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

7 homes get flooded need to add a infiltration basin to take care of the runoff.

RECOMMENDED IMPROVEMENTS

Recommend placement of a 200'x200' infiltration basin at this site along with a drainage system along

Westbrooks Street. Two catch basins should be placed at the street's low points to intercept and convey flow to

a 24" RCP for 100 linear feet, outleting to a headwall/wingwall structure and a 100 square foot rip rap energy

dissipator placed at the infiltration basin.

COST:

\$479,000



LOCATION:

Limitiaco St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

An existing infiltration basin overtops and floods homes. Also concentrated flow entering the basin is eroding embankment next to a home. Erosion control needs to be provided to embankment next to private property, and basin needs to be resized to take care of all the runoff without flooding properties.

RECOMMENDED IMPROVEMENTS

Homes at this site become flooded due to an existing infiltration basin that overtops. Recommend placement of two 200-ft long infiltration trenches (or widening of the infiltration basin by 10-ft if right of way permits) along with rip rap added to the sides of the existing basin where erosion is occurring.

COST:

\$39,100



LOCATION: MITIGATION TYPE:

Storm Drain Maintenance

SITE ASSESSMENT:

There is a natural basin on side of Rt10, on the opposite side there is a cross culvert that needs to be maintained

to prevent roadway flooding.

RECOMMENDED **IMPROVEMENTS** In order to promote proper drainage and conveyance of flow through culvert, recommend placement of a new

headwall/wingwall structure equipped with trash rack to inlet of cross-culvert at this site.

COST:

\$20,400



BV-118 LOCATION:

Anderson St

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Existing grated channel needs to be dredged and cleared of overgrown vegetation to prevent flooding of street, also existing cross culvert upstream from this channel needs to be cleaned of any debris and headwall and

wingwalls added.

RECOMMENDED IMPROVEMENTS

Recommend placement of storm drain system in Anderson Street to assist in flood prevention along the street, outleting to existing channel that needs sediment removal (approximately 100 CY). Place 2 catch basins at the street's low point connecting to a 24" RCP (approximately 100 linear feet), routing flow to adjacent channel. Storm drain system should outlet into channel via a 100 square foot rip rap energy dissipator. Place headwall/wingwall structure at outlet of existing culvert located at upstream end of channel.

COST:

\$137,000



LOCATION:

Leyang Rd & Manibusan Ln

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

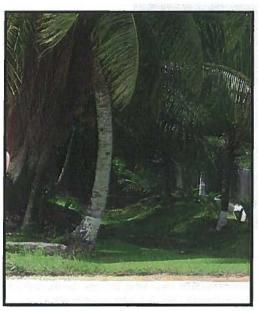
A house on the north side of Leyang Rd, east from Manibusan Lane gets flooded due to a cross culvert that is plugged downstream. The street pavements has collapsed and there are ponding, two signs that the cross culvert has collapsed. Need to replace the cross culvert and need to replace the catch basin upstream with a grated catch basin, downstream right-of-way needs to be acquired to route the outlet through a private property.

RECOMMENDED IMPROVEMENTS

A drainage conveyance system is needed along Leyang Rd to prevent future flooding of the street and surrounding private properties. Recommendations include placement of grated catch basins connected by 50 LF of 24" RCP, with runoff conveyed through an additional 50 LF of 24" RCP equipped with headwall/wingwall structure at outlet and 100 SF rip rap energy dissipator to natural flow path (easement may be required for this last segment of convevance line).

COST:

\$137,000



LOCATION:

#415 Leyang Rd

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

A catch basin discharges to a swale which outlets to a private property(#415 Leyang Rd) which gets flooded.

RECOMMENDED

To prevent further ponding at this site, a 200 linear foot infiltration trench should be placed at the outlet of the swale located adjacent to 415 Leyang Rd.

IMPROVEMENTS

COST:

\$19,600



LOCATION:

Leon Guerrero & Leyang Rd

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

A house gets flooded and as a temporary solution a berm was built to prevent flooding. Across the street, a wetland is located. To prevent flooding of the house, an Infiltration trench should be built parallel to the berm.

RECOMMENDED IMPROVEMENTS

To prevent further flooding, two 200' long infiltration trenches (one on each side of the crowned street) are

recommended.

COST:

\$39,100



LOCATION:

Leon Guerrero

MITIGATION TYPE:

Erosion Control / Treatment BMP Improvements

SITE ASSESSMENT:

At the end of Leon Guerrero St, an infiltration basin exists. A side of the basin has been eroded and the basin

fence has collapsed - need to stabilize erosion with rip-rap.

RECOMMENDED IMPROVEMENTS

To prevent further erosion and damage to the existing infiltration basin, rip rap stabilization of approximately

1000 SF is recommended along the embankment where erosion is occurring.

COST:

\$141,000



LOCATION:

Ungaguan Place

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

Existing concrete lined channel needs to be re-built to keep area from flooding - the existing channel was

damaged and, since sections have collapsed, is not functioning properly.

RECOMMENDED

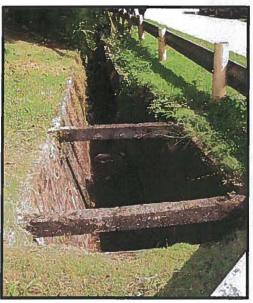
IMPROVEMENTS

To prevent further flooding of the roadway, the existing rectangular concrete lined channel at this site needs to be re-built. Recommend replacement of entire channel estimated at 10' width and 5' height for a distance of 200

linear feet.

COST:

\$79,800



LOCATION: Captain Reyes & Ungaguan Place

MITIGATION TYPE: Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT: At the intersection of Captain Reyes Way and Ungaguan Place runoff from the street is collected by a catch basin

located on the private property. Runoff from this catch basin is routed to a low area behind the property, need to work on doing a land exchange in order to use that low area as a infiltration basin. Area needs significant erosion

control and debris removal.

RECOMMENDED IMPROVEMENTS

Recommend making existing low area into permanent infiltration basin (will require ROW through possibly a land exchange) and improve site through 1/4 acre debris removal and applying site with hydroseed and bonded fiber

matrix where erosion is occurring (approximately 10,000 sq ft).

COST: \$112,000



LOCATION:

Captain Reyes

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Along the middle of Captain Reyes Way on both sides of the street, flooding exists. On the east side of the road there are existing infiltration trenches that are not working properly. Need to build new infiltration trenches along both sides of the street.

RECOMMENDED IMPROVEMENTS

To prevent further flooding, two new 200' long infiltration trenches (one on each side of the crowned street) are

recommended.

COST:

\$19,600



LOCATION:

Canada Toto Loop Rd & Dodo St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

An infiltration gallery is located where a baseball field used to be, but is not working properly and is causing flooding. New infiltration gallery needs to be built, and needs to be maintained in order to function properly.

RECOMMENDED IMPROVEMENTS

To prevent further flooding, two new 200' long infiltration trenches (one on each side of the crowned street) are

NTS recommended to replace existing infiltration trench located at baseball field.

COST:

\$39,100



LOCATION:

Lujan Way

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Two Concrete channels along Lujan Way need debris and vegetation removal. There is erosion around headwalls

and side of channel embankment, they need erosion control(riprap).

RECOMMENDED **IMPROVEMENTS**

To prevent further erosion and possible damage to the existing headwalls and channel embankment, 1/4 acre of debris removal followed by rip rap channel stabilization around headwalls and at top of concrete channel

(estimated at approximately 1000 SF of rip rap) is recommended.

COST:

\$143,000



LOCATION:

Canada Toto Loop Rd

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

A cross culvert located at the low point of Canada Toto Loop Rd is undersized for the amount of runoff that is

routing. Cross culvert needs to be upsized.

RECOMMENDED IMPROVEMENTS

The culvert located at the low point of Canada Toto Loop Rd needs to be upsized to a 36" RCP for 100 linear feet.

COST:

\$122,000



LOCATION:

RT 8 & San Vicente Dr

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Two catch basins on Route 8, just west of San Vicente Dr get clogged often and Route 8 gets flooded. One of the catch basins in in the center of one lane, and probably not capturing runoff. Need to cap the catch basin located in the middle of the lane, and need to add an additional catch basins along the shoulder of the roadway to capture more runoff and prevent flooding of the roadway.

RECOMMENDED IMPROVEMENTS

There are two catch basins on Route 8 that often become clogged causing Route 8 to become flooded. Two new catch basins to capture runoff need to be placed along the shoulder of the roadway and the existing catch basin located in the middle of the roadway needs to be capped. A quarter acre of debris removal is also needed. 100'x 24" RCP connecting to the newly placed catch basins is also required. The outlet should be equipped with a headwall/wingwall structure outleting flow to a 100 square foot rip rap energy dissipator.

COST:

\$142,000



LOCATION: RT 8 & 1000' West of RT 16

MITIGATION TYPE: St

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This area of Route 8 floods, there are no drainage system visible along this stretch of the roadway. Need to add a

drainage conveyance system and route runoff to the airport.

RECOMMENDED

IMPROVEMENTS

Route 8 at this site floods. Two new catch basins need to be placed along Rte 8 (approximately 1000 feet west of Rte 16) at the road's low point to intercept and route runoff through a new 24" RCP for 100 linear feet, conveying

flow to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator outleting toward the

airport.

COST:

\$137,000



LOCATION:

San Roque Drive

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

There is flooding of the street, created by the raised driveway at 196 San Roque DR. Because of this the Santos family property gets flooded. Need to add a drainage conveyance system to prevent water from ponding and flooding private property.

RECOMMENDED

IMPROVEMENTS

 $To \ prevent further flooding, two \ 200' \ long \ infiltration \ trenches \ (one \ on \ each \ side \ of \ the \ crowned \ street) \ are$

recommended at this site along San Roque Drive.

COST:

\$39,100



LOCATION:

As Chena Place

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

An existing infiltration trench is not working properly and also may not be enough to take care of the street runoff. A property gets flooded. Should extend length of infiltration trench and also maintain trench.

RECOMMENDED IMPROVEMENTS

Recommend placement of a 200 linear foot infiltration trench adjacent to the existing infiltration trench along

PROVEMENTS with maintenance of the existing infiltration trench to enable proper infiltration.

COST:

\$19,600



BV-134 LOCATION:

RT 16 & South Sabana

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Northeast corner of interchange shows signs of ponding. There may be enough right of way to place an

infiltration trench to take care of runoff.

RECOMMENDED IMPROVEMENTS

To prevent further ponding at this site, a 200 linear foot infiltration trench should be placed along the edge of

pavement at the NE corner of the intersection of Rte 16 and S Sabana.

COST: \$19,600



LOCATION: RT 16 & Pedang St

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Along the east side of Rt16 a series of graded ditches and 24" RCP culverts collect and route runoff generated along Rt16. There are signs of flooding along the road shoulder, ditches and culverts need to be upsized.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the storm drain system located along the east side of Rte 16 at Pedang Street including replacement of 24" culverts with 36" RCP culverts equipped with upstream and downstream wingwall/headwall structures (estimated culvert length = 100 LF and number of wingwall/headwall structures=4), and improvement of existing ditches located between culvert structures (approximately 200 LF of ditch along the Rte 16 edge of pavement).

COST:

\$192,000



RT 10 & RT 8

LOCATION:
MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

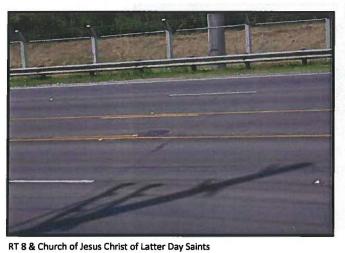
At the southeast corner of Rt10 and Rt8 intersection there are signs of ponding(76 Gas Station) and the ponding continues south along Rt10 east side. Need to add a drainage conveyance system added along Rt10 and route it to the existing infiltration basin located next to Rt10.

RECOMMENDED IMPROVEMENTS

To prevent roadway flooding, two catch basins need to be placed along the east side of Rte 10, south of Rte 8, routing flow to the existing infiltration basin located south of the 76 gas station. The catch basins will connect to a 24" RCP for 100 linear feet, routing the runoff to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator located at the infiltration basin.

COST:

\$137,000



LOCATION:

MITIGATION TYPE: Storm Drain Improvements

SITE ASSESSMENT: A storm drain Manhole cover in the middle of Rt8 pops out open when it rains.

RECOMMENDED Recommend upsizing Rte 8 storm drain system in vicinity of manhole (assume 100 LF of 36" RCP to replace

IMPROVEMENTS existing storm drain in area).

COST: \$122,000



LOCATION:

RT 8 & RT 33

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

At the interchange of Rt8 and Rt33 some of the runoff flows towards the southeast corner where this area functions as an infiltration basin. Need to add spillways along the edge of pavement to prevent ponding or regrade area to prevent ponding.

RECOMMENDED IMPROVEMENTS

To prevent further ponding at this site, one AC spillway, a 100 linear foot ditch that outlets flow through a 100 square foot rip rap energy dissipator is needed.

COST:

\$20,700



LOCATION:

Punzalan St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Along Punzalan St above Rt1 needs to add percolation basins to minimize the amount of runoff that flows down

to Rt1 near Pizza Hut.

RECOMMENDED

IMPROVEMENTS

Recommend placement of a 200'x200' infiltration basin along Punzalan Street to minimize runoff that flows

downstream to Tamuning Drainageway.

COST:

\$342,000

CHALAN PAGO VILLAGE



CP-101

LOCATION:

Chalan Famha & Leo Palace

MITIGATION TYPE:

Erosion Control/ Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Bridge leading to Cruz residence needs guardrail. Debris from channel along road causes flooding, this channel is tributary to Chaot river. Road is eroded is not paved, need right-of-way to add drainage conveyance systems along road.

а

RECOMMENDED IMPROVEMENTS

Recommend storm drain system along Leo Place at Ch Famha, routing flow to channel adjacent to Ch Famha. Recommend swale along Leo Palace (400 LF total) routing flow to double 24" RCP. The double 24" RCP should be equipped with headwall/ wingwall structures (upstream and downstream) and convey the flow for approximately 500 LF to channel adjacent to Ch Famha. Channel will require 1/4 acre debris removal and 200 sq feet of rip rap placed at the pipeline outlet for erosion control.

COST:

\$555,000



LOCATION: Victoriano Road & Dero Road

MITIGATION TYPE: Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT: At the end of Victoriano Road, three homes probably get flooded. Need to add swale to carry the flow along

the road to the end of the road.

RECOMMENDED Recommend placement of a storm drain system along Victoriano Road with a ditch on both sides (200' on each IMPROVEMENTS side) of the street routing flow to grated catch basins placed on both sides of street at the street's low point.

The two catch basins will connect to a 24" RCP for 100 linear feet conveying flow to the end of the road,

outleting through a headwall/wingwall structure to a 100 square foot rip rap energy dissipator.

COST: \$140,000



LOCATION:

Ramirez Drive & Judge Sablan St

MITIGATION TYPE:

Storm Drain Improvements / Conveyance Improvements

SITE ASSESSMENT:

A culvert from the school was discharging to a private property, the property has been raised and the culvert outlet clogged. Add a junction structure at the end of the culvert and route the flow with culvert along the north of Ramirez Dr to the intersection with Judge Sablan St where an existing cross culvert is located.

RECOMMENDED IMPROVEMENTS

Recommend storm drain improvements at Ramirez Drive including placement of 400 LF of ditch placed along the north of Ramirez Drive with placement of two catch basins (one at Judge Sablan Street cross-culvert and one connecting to culvert located along the school (where the culvert has been plugged), connected by 500' of 24" RCP. Also, place 1 headwall/wingwall structure and 100 SF rip rap at the existing school culvert inlet to control erosion that was observed at the upstream side of the culvert.

COST:

\$517,000



LOCATION:

Dero Rd & RT 4

MITIGATION TYPE:

Storm Drain Improvements Storm Drain Maintenance

SITE ASSESSMENT:

This intersection gets flooded, need to add drainage conveyance systems.

RECOMMENDED

IMPROVEMENTS

The intersection of Dero Road and Route 4 gets flooded. This site needs a drainage conveyance system. A quarter acre of debris needs to be removed, 2 catch basins should be place at the street's low points to capture flow that will travel through a 24" RCP for 100 linear feet, leading to one headwall/wingwall structure, outleting through a 100 square foot rip rap to a 400 linear foot ditch.

COST:

\$142,000



LOCATION:

Gogue Drive

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

This street is located in the flooding zone, and homes get flooded. There is no drainage conveyance systems.

Need to build drainage conveyance systems to route flow to Chaot river.

RECOMMENDED

IMPROVEMENTS

Recommend placement of a storm drain system in Gogue Drive to intercept and convey flow to Chaot river. Place ditches along both sides of the crowned road (200 LF each side) conveying flow to two grated catch basins located at the low point in the road, connecting 600 linear feet of 24"/ 36" pipeline. The new pipeline should route flow to a headwall/wingwall structure outleting to a 100 square foot rip rap energy dissipator at

the Chaot River.

COST:

\$765,000



LOCATION:

Chalan Totot & RT 4

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

At low point of Chalan Totot Street, the private owner built a berm to keep flow on the street. Runoff from Rt4 flows to this street. Water continues to flood this property and the property behind along Nakie St. Need to add a drainage conveyance system to collect runoff at low point and route it through these two private properties toward Nakie Street where an existing drainage conveyance system exists. Need to acquire an easement for the conveyance drainage system.

RECOMMENDED IMPROVEMENTS

Recommend placement of a storm drain system along Chalon Totot St with a ditch on both sides (200' on each side) of the street routing flow to grated catch basins placed on both sides of street at the street's low point. The two catch basins will connect to a 24" RCP for 100 linear feet and a 36" RCP for 500 linear feet, placed along the right of way between 2 properties (may require easement if one does not exist already) conveying flow to Nakie Street. Along Nake, the pipe will connect to an existing ditch via an outlet equipped with a headwall/wingwall structure and a 100 square foot rip rap energy dissipator.

COST:

\$765,000



LOCATION:

Nakie St & RT 4

MITIGATION TYPE:

Conveyance Improvements/ Storm Drain Improvements

SITE ASSESSMENT:

At the low point of this street a private property floods, flow from Rt4 also flows to this area. The property has a 36" Cross culvert at the north side of the property. This cross culvert carries flow to an earthen channel along Nakie St which eventually discharges to Apusento Garden development.

RECOMMENDED IMPROVEMENTS

Recommend improvement of the storm drain system along Nakie Street including placement of ditches (approximately 50-ft each) on both sides of the street to intercept and convey roadway runoff to 2 grated catch basins located at the street's low point (on both sides of the street). The catch basins should connect to a new, 100'x 36" RCP storm drain placed in the street that outlets to a concrete channel located at the downstream side of the existing 36" RCP culvert. The channel will route the flow along Nakie to an existing channel located immediately upstream of the Apusento Garden Development. 100 SF of rip rap should be placed at the outlet to the existing channel (which runs perpendicular to Nakie Street).

COST:

\$154,000



LOCATION:

Chalan Apusento & Maimai St

MITIGATION TYPE:

Conveyance Improvements/ Storm Drain Improvements

SITE ASSESSMENT:

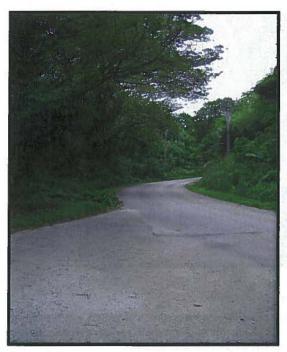
Apusento Garden development is blocking the natural flow from the Nakie St drainage system. Within the complex, a drainage system needs to be built to carry the runoff from Nakie to discharge to Rt 15.

RECOMMENDED IMPROVEMENTS

The natural flow from the Nakie Street drainage system is being blocked by the Apusento Garden development slightly downstream of the existing channel outlet for the Nakie Street drainage system (see CP-107). A drainage system needs to be built to carry the runoff from Nakie to a discharge point at Route 15. Recommend the following improvements to the drainage conveyance system at Apusento Garden Development: 1) placement of a 100 linear foot concrete channel routing runoff from Nakie Street to a 48" RCP (equipped with headwall/ wingwall structure) located at the upper limits of the Apusento Garden Development, 2) placement of 500'x 48" RCP storm drain system along edge of right of way for Apusento Garden Development (may require easement) routing flow to Rte 15 and across Rte 15 to natural flow path, 3) placement of 2 catch basins connecting to proposed 48" pipeline crossing Rte 15 approximately at the entrance to the Apusento Garden Development, 4) placement of 50' ditch routing flow along Rte 15 to proposed grated catch basins, and 5) placement of 100-SF rip rap energy dissipator at outlet of 48-inch pipeline.

COST:

\$682,000



LOCATION:

MITIGATION TYPE:

SITE ASSESSMENT:

RECOMMENDED

IMPROVEMENTS

COST:

Kongga Rd

Storm Drain Improvements Storm Drain Maintenance

Along this road there is no drainage conveyance system, the natural flow is from west to east and the road gets

flooded. Debris issues. No homes in the proximity of the road.

Recommend placement of a storm drain system in Kongga Rd to stop roadway flooding. Place ditches along both sides of the crowned road (200 LF each side) conveying flow to two grated catch basins located at the low point in the road, connecting to 100 linear feet of 24"pipeline. The new pipeline should route flow to a headwall/wingwall structure outleting to a 100 square foot rip rap energy dissipator. One quarter ac debris removal is also necessarv.

\$142,000



LOCATION:

Chalan Okso & Santa Cruz Dr

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance

SITE ASSESSMENT:

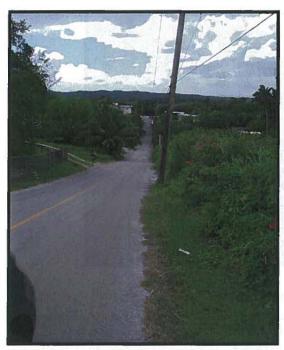
Along this road there is no drainage conveyance system, at the intersection with Juan M. Bernardo Ct a cross culvert is needed to prevent flooding of a property along Chalan Okso. Runoff needs to be routed to a tributary to Pago river to the east of Chalan Okso. Debris Removal Required.

RECOMMENDED IMPROVEMENTS

Recommend placement of a storm drain system along Ch Okso with a ditch on both sides (200' on each side) of the street routing flow to grated catch basins located at Juan Bernardo Court. The two catch basins will connect to a 24" RCP for 100 linear feet, equipped with headwall/wingwall structure at the outlet to a new 100' conc channel conveying flow to a tributary of Pago River, outleting through a 100 square foot rip rap energy dissipator. A quarter acre of debris removal is also needed.

COST:

\$196,000



LOCATION:

Manibusan Lane & Santa Cruz Dr

MITIGATION TYPE:

Storm Drain Improvements Storm Drain Maintenance

SITE ASSESSMENT:

Runoff from road cascades into private properties. Need to add curb road and add catch basins. Sections of the

road pavement is failing, probably from runoff undermining.

RECOMMENDED **IMPROVEMENTS** Recommend improvements to the storm drain system in Manibusan Lane including placement of ditches along both sides of the crowned road (200 LF each side) conveying flow to two grated catch basins located at the low point in the road, connecting to a 24" RCP for 100 linear feet. The new pipeline should route flow to a headwall/wingwall structure outleting to a 100 square foot rip rap energy dissipator.

COST:

\$142,000



LOCATION:

Chalan Chirik & RT 10

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Runoff from Rt10 floods three properties along Chalan Chirik. Need to add conveyance systems along Rt10 to

prevent runoff from entering Chalan Chirik. Place Infiltration trenches along Rt10.

RECOMMENDED IMPROVEMENTS

Three properties flood along Chalan Chirik due to the runoff from Route 10. A drainage conveyance system along route 10 to prevent runoff from entering Chalan Chirik is needed. Recommend 400 ft ditch placed upgradient of Chalan Chirik (to capture roadway runoff), placement of two grated catch basins (one at end of ditch and one immediately downgradient of Chalan Chirik along Rte 10). Connect via a 24" RCP for 100 linear feet and outlet to a headwall/wingwall structure and 100 square foot rip rap energy dissipator. A quarter acre of debris removal will be needed.

COST:

\$140,000



LOCATION:

Chalan Nganga & Leo Palace

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Existing Cross culvert under road, unknown size. Need Gabions on both sides of cross culvert to stabilize

embankment, need to removal debris/vegetation, and also upsize existing cross culvert.

RECOMMENDED IMPROVEMENTS

Recommend replacement of existing culvert with 100'x 5'x5' RCB, a quarter acre of debris removal (upstream and downstream), placement of 1,000 square feet of gabions along embankments upstream and downstream of culvert for a distance of 50-ft (approximately 5' high), placement of rip rap at base of gabions (400 square feet total), and placement of headwall/wingwall structures at both ends of culvert.

COST:

\$602,000



LOCATION:

Chalan Famha

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

On a street off Chalan Famha, existing 2-18" PVC cross culverts that were outleting to a low area were plugged. The property has been developed and the ground raised, now an adjacent property floods. The 2-18" PVC culverts should be replaced with 2-24" RCP or an RCB. Need to get an easement through private property to route these pipes to the existing earthen channel behind the property where all the runoff used to naturally flow.

RECOMMENDED IMPROVEMENTS

Recommend replacement of existing culvert with 100'x 2-24" RCP equipped with upstream and downstream headwall/wingwall structures, outleting to a new concrete channel, 100-feet long, routing flow along the right-of way of 2 properties (may require easement) to the natural flow path located at the back of the property. A 100 SF rip rap energy dissipator should be placed at the outlet of the channel.

COST:

\$555,000

DEDEDO VILLAGE



DE-101

LOCATION:

RT 26 & RT 1

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

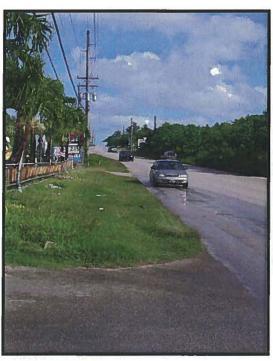
Runoff from Route 1 creates flooding along Route 26. There is a low point along Route 26 and cross W. Liguan street where two inlets are located. The flooding extends to Winchells donuts, possible 5-9 properties get flooded. Possible solution is to capture the flow generated on Route 1 before it flows into Route 26.

RECOMMENDED IMPROVEMENTS

To prevent further flooding along Route 26 at the low point, two catch basins are proposed along Rte 1 and 2 additional catch basins are proposed at the low point in Rte 26. The catch basins along Rte 26 should be routed to the system at Rte 1, connecting to the system with approximately 200 LF of 24" RCP and two manholes. Ditches are also proposed along Rte 26 to route the pavement flow to the catch basins at the low point (approximately 400 LF total).

COST:

\$225,000



LOCATION:

RT 26 & Magof Rd

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

This is a low point along Route 26, where ponding is created and possibly flooding one commercial property. There are no existing drainage systems at this location. Possible solution will be to add a drainage system that can route the flow to an existing infiltration basin near by.

RECOMMENDED IMPROVEMENTS

To prevent further ponding and possible flooding of one commercial property at the low point of this site, two catch basins connecting to a 24" RCP for 100 linear feet leading to one headwall/wingwall structure outleting flow to a 100 square foot rip rap energy dissipator is needed at this site to improve the storm drain system.

COST:

\$137,000



LOCATION:

Salisbury St

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

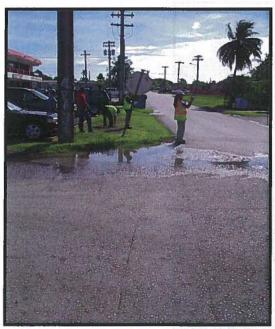
An existing concrete lined ditch discharges to a pipe with a trash rack. This pipe connects to a drainage system along Salisbury St. The channel is covered with trash and debris, which clogs the pipe and creating flooding for two adjacent homes. Trash and debris is a constant problem, as long as the pipe is clogged the homes will continue to get flooded.

RECOMMENDED IMPROVEMENTS

Recommend the following improvements to the existing storm drain system at the site: 1) remove a quarter acre of debris, 2) remove box culvert at site and extend existing channel to edge of Salisbury Street (this will improve maintainability) which will require approximately 100-feet of open concrete trapezoidal channel, and 3) connect to 2 new catch basin structures at Salisbury that connect to existing culvert in street.

COST:

\$23,500



LOCATION:

Loreta St & E. Sta Barbara Ave

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

At the intersection of these two streets, three infiltration trenches exist. This trenches are not sufficient to take care of all runoff and ponding is created, thus flooding one commercial property and three residential. An existing infiltration basin exist along E. Sta Barbara Ave, about 100 feet away from intersection. A possible solution is to add a drainage system and discharge to the existing infiltration basin.

RECOMMENDED IMPROVEMENTS

Recommend the addition of a storm drain system along Loleta Street including 2 catch basins connecting to a 24" RCP for 200 linear feet outleting to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator located at the existing infiltration basin at E Santa Barbara Ave.

COST:

\$232,000



LOCATION:

Redondo Luchan & W. Sta Barbara Ave

MITIGATION TYPE:

Storm Drain Maintenance

SITE ASSESSMENT:

An existing grated inlet gets clogged with debris, and this causes flooding of about three to four private properties in the area. A possible solution is to add a debris/trash rack that will take care of debris/trash and thus solve the flooding issue.

RECOMMENDED IMPROVEMENTS

Maintenance to the storm drain system at this site is needed to prevent further flooding of private properties in the area. 1,000 square feet of debris removal is needed to unclog the existing grated inlet, a 100 square foot apron and 1-ft high trash rack should be placed around the inlet to prevent further clogging.

COST:

\$5,670



LOCATION:

RT 1 & RT 27

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Maintenance

SITE ASSESSMENT:

An existing infiltration basin exist south from Route 1 and east of Route 27. Water is not infiltrating anymore, the basin needs to be dredged and all vegetation cleared. This situation creates major flooding around the perimeter of this basin, which in this area is mainly commercial properties.

RECOMMENDED IMPROVEMENTS

To prevent the continuation of major flooding around the perimeter of this basin, recommend roadway storm drain improvements along with improvements to the existing infiltration basin. Storm drain improvements include placement of two catch basins connecting to approximately 100 linear feet of 24" RCP that will convey the street runoff along Rte 27 and along the roadway south of the infiltration basin to the infiltration basin. Recommend the outlet to the infiltration basin be equipped with one headwall/wingwall structure and a 100 square foot rip rap energy dissipator. Improvements to the existing basin (which has been silted up and has limited infiltration capacity because of it) include dredging the bottom of the basin (approximately 4000 CY of sediment removal) along with approximately one acre of debris removal.

COST:

\$326,000



LOCATION:

RT 27A

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

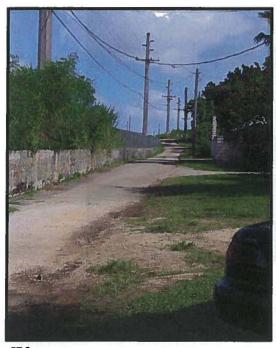
At this location there is a low point on Route 27A, where the roadway runoff is discharged to the south to a private property. No apparent flooding or ponding occurs. There is an existing infiltration basin on the north side of this location. In order to route the runoff to the infiltration basin, a drainage system needs to be built.

RECOMMENDED IMPROVEMENTS

There is a low point on Route 27A where the runoff is discharged to the south of a private property. There are no signs of flooding or ponding, however improvements to the current storm drain system are needed. The runoff needs to be re-routed to the infiltration basin located on the north side of this property. Two catch basins need to be placed at the low points on the street, connecting to a 24" RCP, outleting to a headwall/wingwall structure with a downstream 100 square foot rip rap energy dissipator located at the infiltration basin.

COST:

\$137,000



LOCATION:

RT 3

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Runoff from Route 3 roadway flows offsite to the adjacent properties on the east side. Where the low point is located and ponding occurs thus flooding two properties. One of these properties home is already abandon due to flooding. A solution will be to have an infiltration basin where this house is located.

RECOMMENDED IMPROVEMENTS

To prevent further ponding and property flooding, a new infiltration basin is needed at the location of the abandoned house or adjacent to the house within public right of way (though some right of way will most likely be required). A 200'x200' infiltration basin is proposed at this location as an outlet for a storm drain system along Rte 3 including two catch basins connecting to a 24" RCP for 100 linear feet, outleting to a 100 square foot rip rap energy dissipator at the infiltration basin.

COST:

\$462,000



LOCATION:

Ukudo St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

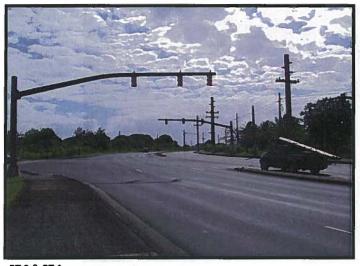
Here, a low point is located along this street where ponding is created - flooding two properties. Within this low area, the lowest point is located at the corner of one of the properties where possibly two injection wells could be built to take care of the flooding. There is an existing fuel line easement within the street.

RECOMMENDED IMPROVEMENTS

Recommend placement of a 100' x 100' infiltration basin with 3 injection wells for outleting flow generated along Ukudo Street. The infiltration basin can be placed within public right of way. Recommend placement of bioswales adjacent to the road to pre-treat runoff prior to outleting to injection wells/ infiltration basin (200 linear ft total). Bioswale will outlet to proposed infiltration basin through small 24" culvert (approximately 10-ft in length equipped with headwall upstream and downstream) and outleting to infiltration basin through a 100 square foot rip rap energy dissipator.

COST:

\$666,000



LOCATION:

RT 3 & RT 1

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Low points along Rt3 on both sides of the road. Need to add catch basins and connect to Rt1 existing drainage

system. There is an existing catch basin at RT1 where Rt3 connects to Rt1.

RECOMMENDED IMPROVEMENTS

Low points are located on both sides of the road along Route 3. Recommend placement of a storm drain system along Rte 3 that will connect to existing storm drain system along Rte 1. Storm drain system will include two catch basins connecting to 100 linear ft of 24" RCP conveying flow to a new manhole connecting to the Rte 1 drainage system. Roadside ditches should be placed upstream of each catch basin (approximately 100 LF in length each).

COST:

\$112,000



LOCATION:

RT 27A & RT 1

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

There are signs of ponding at the south corner of Rt1 and Rt27A intersection, there is a Mobil Gas station at that location. At the west corner of the intersection there is an curb catch basin, and two more west along Rt27A. Solution for the ponding is to add a catch basin and pipe and routed across to the catch basin in the corner.

RECOMMENDED IMPROVEMENTS

To avoid further ponding at the intersection of Route 1 and Route 27A, recommend placing one catch basin at the southeast corner of the intersection, connecting to a 24" RCP for 100 linear feet, connecting to the existing storm drain system located across the street via a manhole structure.

COST:

\$105,000



LOCATION:

RT 27A & RT 28

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

Intersection of Route 27A and Route 28 floods on all four corners. There is only one catch basin in the west corner. Need to re-grade corners and add catch basins to other three corners and connect to existing inlet. Or place cross gutter and route the flow to the existing catch basin.

RECOMMENDED IMPROVEMENTS

Recommend improvements to the storm drain system at this intersection including placement of 4 catch

basins connecting to a 24" RCP for 100 linear feet, routing flow to an outlet equipped with a

headwall/wingwall structure and a 100 square foot rip rap energy dissipator.

COST:

\$222,000



LOCATION:

Buena Vista Ave & Y-Seng Song Rd(RT 28)

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance

SITE ASSESSMENT:

There is an existing Infiltration Basin at the north West Intersection of Route 28 and Route 1, it needs maintenance(vegetation clearance), runoff from both route discharge directly to the basin but due to overgrown vegetation runoff is ponding on street. West from Route 28 along Buena Vista Ave an existing catch basin at the low point of the street is on the sidewalk, should be on street and an additional catch basin added.

RECOMMENDED

IMPROVEMENTS

Recommend 1/4 acre debris removal at the infiltration basin located at the north west corner at Route 28 and Route 1. Also recommend improvements to the storm drain system along Buena Vista Ave which will require two new catch basins connecting to a 24" RCP for 100 linear feet, outleting to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator located at the infiltration basin. Roadside ditches will be required to convey flow to the new catch basins (estimated at approximately 400 LF in total length).

COST:

\$142,000



LOCATION:

RT 26 & Lily St(RT 25)

MITIGATION TYPE:

Storm Drain Improvements/ Storm Drain Maintenance

SITE ASSESSMENT:

This intersection possibly floods. Along Rt26 on the southwest of the intersection a concrete lined channel routes runoff from Rt26 from the south and ends at the intersection where possibly an inlet exists but is not visible under a pile of debris. The property across the street at the northwest corner of the intersection could be possible an existing infiltration basin, overgrown vegetation in that property makes it hard to verify. A double 18" RCP cross culverts discharge to the possible infiltration basin location, these cross culverts run under Rt26 and carry flow from the northeast corner of the intersection. A solution will be to clear vegetation in the possible infiltration basin, add catch basins along the north west corner along Route 26 and clear debris from existing concrete lined channel.

RECOMMENDED IMPROVEMENTS

To prevent further flooding at this site, debris first needs to be removed from the existing concrete lined channel and infiltration basin. A quarter acre of debris will need to be removed. A new storm drain system including two catch basins will need to be added at the northwest corner of Rte 26 and Rte 25, connecting to a 24" RCP (for approximately 100 linear feet). This system should route flow to the infiltration basin through a headwall/wingwall structure and a 100 square foot rip rap energy dissipator.

COST:

\$139,000



LOCATION: RT 9 & RT 3a

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At the intersection of Route 9 and Route 3a, there is a low point along Rt3a. There is no existing drainage

conveyance systems, need to add a conveyance to prevent flooding of area.

RECOMMENDED IMPROVEMENTS

Recommend a drainage conveyance system along Rte 3a at the intersection with Rte 9. Recommend placement of 2 catch basins located at the low point along Route 3a, connecting to a 24" RCP for 100 linear feet outleting into a 100 square foot rip rap energy dissipator equipped with an upstream headwall/wingwall

structure and finally to a 200 LF bioswale (or infiltration trench) located adjacent to the road.

COST:

\$169,000



LOCATION:

Chalan Kareta & RT 3

MITIGATION TYPE:

Storm Drain Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

At the northwest intersection of Chalan Kareta and Rt3 there are signs of flooding. A 10'x5' RCB runs under Kareta, and is clogged about 50% and does not seem to have zero longitudinal slope. RCB needs to be cleared of debris and entrance and exit of cross RCRB needs to be grated to prevent clogging of RCB.

RECOMMENDED IMPROVEMENTS

Recommend the following improvements to the existing conveyance structure: 1) remove a quarter acre of debris and sediment from culvert and upstream and downstream channels, 2) Add two headwall/wingwall structures on the upstream and downstream side of the culvert, 3) add a 100 sq ft rip rap pad upstream and downstream of the culvert headwall/wingwall structures, and 4) add a trash rack at the inlet and outlet side of the culvert.

COST:

\$70,900



LOCATION:

RT 3 & Bullard Ave

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

The intersection of Rt3 and Bullard Ave is a low point area. There is no drainage conveyance system. Need to add a drainage conveyance system to prevent flooding. Need to add three catch basins, two at Boullard low points and one along Rt3 south side where another low point is located(Shell entrance).

RECOMMENDED IMPROVEMENTS

Recommend placement of a new storm drain system along Bullard Ave and Rte 3 consisting of two new grated catch basins along Bullard at the low point (both sides of the crowned road) and one located at Rte 3 (south side adjacent to the Shell entrance where another low point exists). The three catch basins should connect to a 24" storm drain (approximately 150 ft in length) routing flow to a 200-ft bioswale (or infiltration trench) located along Rte 3. The 24" storm drain outlet to the bioswale should consist of a headwall/wingwall structure and a 100 SF rip rap energy dissipator.

COST:

\$222,000



LOCATION:

RT 3 & RT 28

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Ponding at the northeast corner of Rt3 and Rt28. Need to re-grade corner and add an infiltration trench along

Rt3 where the runoff can be routed.

RECOMMENDED **IMPROVEMENTS** Recommend improvements to the storm drain system at the corner of Rte 3 and Rte 28 including two catch basins along Rte 3 connecting to a 24" RCP for 100 linear feet conveying the flow to an outlet structure consisting of a 100 square foot rip rap energy dissipator equipped with an upstream headwall/wingwall structure and a downstream bioswale (100 ft length) or a downstream infiltration trench.

COST:

\$174,000



LOCATION:

RT 3 & Royal Palm Drive

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At the intersection of Rt3 and Royal Palm, ponding occurs. A solution is to build a cross gutter at Royal Palm Drive to continue runoff down Rt3. Another solution is to add a catch basin on Royal Palm Drive and route the flow via a cross culvert under Rt3 to the east where there may be room to build an infiltration trench.

RECOMMENDED IMPROVEMENTS

To prevent further ponding at this site, recommend placement of a catch basin on Royal Palm Drive (at the intersection with Rte 3), connecting to 100'x 24" RCP storm drain routing flow under Rte 3 to a 200 LF bioswale (or infiltration trench). The outlet of the storm drain system should consist of a headwall/wingwall structure with a downstream energy dissipator (100 sq ft rip rap pad).

COST:

\$68,800



LOCATION:

RT 3 & Control Tree Drive

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Runoff from Rt3 is entering Royal Palms. Need to add a drainage conveyance system to capture flow from Rt3.

Add a cross gutter to force the flow from Rt3 to continue along Rt3.

RECOMMENDED IMPROVEMENTS

A drainage conveyance system needs to be added to this site to capture the flow from Route 3 prior to entering the Royal Palms site. Two catch basins should be placed along Rte 3 on both sides of the entrance to Royal Palms with a concrete cross gutter placed at the entrance to route flow along Rte 3 to the downstream catch basin. The catch basins should connect to a 50'x24" RCP conveying flow along Rte 3 from the upstream catch basin to the downstream catch basin then to another segment of 50'x24" RCP routing flow to a bioswale

(or infiltration trench) located along the edge of Rte 3.

COST:

\$147,000

HAGATNA VILLAGE



HA-101

LOCATION:

RT 4 & RT 1

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

A RCB outleting into the Hagatna river just south from the Bank of Guam building needs erosion control at the

channel embankment(riprap).

RECOMMENDED

IMPROVEMENTS

Recommend placement of a 10'x10' rip rap energy dissipator at the outlet of the culvert at Hagatna River for

erosion control.

COST:

\$14,100



LOCATION: RT 4

RT 4 & RT 7B

MITIGATION TYPE:

Conveyance Improvements

SITE ASSESSMENT:

A graded channel on the north side of Rt7B, west of Route 4 a channel is covered in silt and has become a percolation pond. The outlet RCB that runs under Rt4 is plugged with sediment, and the property adjacent to channel gets flooded. This cross RCB needs to be resized to accommodate runoff and to prevent sediment accumulation.

RECOMMENDED IMPROVEMENTS

To prevent further silt buildup and ponding at this site, recommend replacement of existing cross-culvert under Rte 4 with a 200'x4'x4' RCB equipped with upstream headwall and 100 SF rip rap for channel stabilization.

COST:

\$245,000



HA-103 LOCATION:

RT 7A & 6th St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At the intersection of Rt7A and 6th Street four catch basins are located that probably discharge to Rt1 drainage systems or to Hagatna river. Dry wells are located on the northeast corner and are not functioning properly during high tide and heavy storms. These dry wells only work with low flows, they are about 150' deep. These drywells are collecting runoff that is contaminating the ground water. Runoff needs to be treated before entering these existing drainage systems.

RECOMMENDED IMPROVEMENTS

Recommend storm drain improvements at the intersection of Route 7A and 6th St consisting of 2-100' long bioswales placed adjacent to the roadways, routing surface flow to 2 new catch basins located at the intersection. Note that the 2 bioswales are being proposed since this area is considered a "hotspot". Connect the 2 new catch basins to a new storm drain pipeline in Route 7A routing flow to the Hagatna River via 1000-ft of 30" RCP. There are a total of 6 dry wells which, according to DPW, need to be abandoned and the site.

COST:

\$1,240,000



LOCATION:

RT 7A & Aniceto St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Grated catch basins at the intersection of Rt7A and Aniceto St are silted up with soils that are contaminated and ponding is created. In the proximity there are car maintenance shops that probably discharge contaminants to street. These inlets probably discharge to drainage systems along Rt1. Need remove debris from inlets, and provide a runoff treatment.

RECOMMENDED IMPROVEMENTS

Recommend storm drain improvements at the intersection of Route 7A and Aniceto Street consisting of 4-100' long bioswales placed adjacent to the roadways, routing surface flow to 2 existing catch basins located at the intersection (note that both these existing catch basins will need to be unclogged) and to 2 new catch basins located across the street from the existing catch basins. Note that the 4 bioswales are being proposed since this area is considered a "hotspot". Route the 2 new catch basins to the existing storm drain system in Route 7A via 200' of 24" RCP.

COST:

\$254,000



LOCATION:

RT 7A & Detention Facility

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Hillside above Rt7A and across from detention facility is being eroded by runoff from an percolation basin above

hillside, also this runoff is causing to flood Rt7a and carries debris to the street.

RECOMMENDED IMPROVEMENTS

To prevent further hillside erosion above Route 7A across from the detention facility, 1/4 acres of debris removal and rip rap channel stabilization 50 feet upstream and 50 feet downstream of existing culvert is required.

COST:

\$143,000



LOCATION:

RT 7A & O'Brien Drive

MITIGATION TYPE:

Storm Drain Improvements

SITE ASSESSMENT:

The existing drainage system along Rt7A and across from the detention facility needs to be upsized in order to

handle the street and hillside runoff.

RECOMMENDED

IMPROVEMENTS

The drainage system that currently runs along Route 7A needs to be upsized. Recommend placement of 4,000 linear feet of a 48" RCP outleting to a new headwall/wingwall structure and a 100 square foot energy dissipator.

COST:

\$5,100,000



LOCATION:

RT 7A & Minondo Bridge

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Minondo bridge along Rt7A is being undermined at the approach slabs.

RECOMMENDED IMPROVEMENTS

To prevent further undermining at the approach slabs, four new wingwall structures at the abutment are needed

and a 400 square foot rip rap energy dissipator is needed.

COST:

\$90,300



LOCATION:

Chalan Santo Papa Juan Pablo Dos & Agana River Bridge

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge over Hagatna river along Chalan Santo Papa Juan Pablo Dos. The bridge embankment needs maintenance and vegetation clearing. Runoff from the street goes through private properties, need to add drainage conveyance system to capture runoff before enters the private properties.

RECOMMENDED IMPROVEMENTS

Recommend placement of a drainage conveyance system along Ch Santo Papa Juan Pablo Dos to capture the runoff (prior to it going through the private properties) and route to Hagatna River including 100'x24" RCP with headwall/wingwall structure. Also recommend one acre of debris removal upstream and downstream of bridge.

COST:

\$119,000



LOCATION:

RT 7 & RT 33

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance improvement /Treatment BMP Improvements

SITE ASSESSMENT:

An infiltration gallery above Rt7A does not have enough capacity to handle all the runoff that is being routed to the gallery and the excess runoff flows downstream to Rt7A and is eroding hillside and floods Rt7A. Need to upsize the infiltration gallery.

RECOMMENDED IMPROVEMENTS

The present infiltration gallery above Route 7A does not have enough capacity to handle all the runoff it receives. Need to expand infiltration basin by 5,000 square feet (50'x100') and add 6 injection wells within the basin.

COST:

\$2,360,000



LOCATION:

RT 7 & Fonte River

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

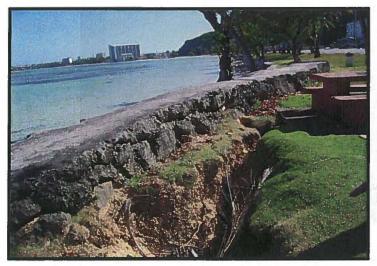
A three cell RCB cross culvert under Rt7 routes Fonte River, this cross culvert is undersized and as a result debris and sediment accumulates upstream and the river has eroded the south embankment next to a private property. Need to upsize cross culvert and need to provide erosion stabilization upstream and downstream (riprap) and need to clear debris and overgrown vegetation.

RECOMMENDED IMPROVEMENTS

Recommend a quarter acre of debris removal at the site, replacement of the existing culvert with two 200'x9'x4' RCB's under Rte 7, placement of wingwall/headwall structures on upstream and downstream sides of structure and placement of 500 SF of rip rap placed along channel embankments for a distance of 25 ft both upstream and downstream of the culvert.

COST:

\$1,180,000



LOCATION: RT 1 & East Hagatna Beach

MITIGATION TYPE:

Erosion Control/ Coastal Protection

SITE ASSESSMENT:

Cross culvert under Rt1 discharging north of East Hagatna Beach. Need erosion control along coastline, and need

to modify outlet headwall to a sediment basin structure to prevent sand from clogging outlet.

RECOMMENDED IMPROVEMENTS

To prevent further erosion of the shoreline and clogging of the outlet, a new headwall/wingwall structure with 100

square feet of rip rap outlet pad is recommended at downstream side of culvert.

COST: \$31,100



HA-112

LOCATION:

RT 1 & Chen's Furniture

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements

SITE ASSESSMENT:

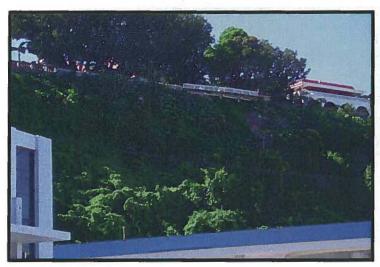
Cross culvert RCB under Rt1 discharging to Trinchera Beach. This RCB carries runoff from Rt1 and from Chen's Furniture store proximity and from above cliffs. Need to modify outlet headwall to a sediment basin structure to prevent sand from clogging outlet. Also need to control erosion along coastline with riprap. Behind the furniture store at the toe of the cliffs, a concrete ditch should be built to route all the runoff from the cliffs, and a rock fence or wire mesh added to control debris from cliffs.

RECOMMENDED IMPROVEMENTS

Recommend placement of 10,000 square feet of rock blanket placed behind Chen's Furniture Store on east side of Rte 1 for erosion control along the bluffs. Place conc ditch (200 LF) at toe of bluffs to route flow to cross culverts. Place new headwall/wingwall structure at culvert outlet with 100 SF rip rap for stabilization at the RCB outlet.

COST:

\$178,000



LOCATION:

RT 1 & Mobil Gas Station

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Cross culvert RCB under Rt1 discharging to Trinchera Beach. This RCB carries runoff from Rt1 and from the Mobil gas station proximity and from above cliffs. Need to modify outlet headwall to a sediment basin structure to prevent sand from clogging outlet. Also need to control erosion along coastline with riprap. At the toe of the cliffs, a concrete ditch should be built to route all the runoff from the cliffs, and a rock fence or wire mesh blanket need to be added to toe of cliffs to control rocks falling.

RECOMMENDED IMPROVEMENTS

Recommend placement of 10,000 square feet of rock blanket placed behind Mobil Gas Station on east side of Rte 1 for erosion control along the bluffs. Place conc ditch (200 LF) at toe of bluffs to route flow to cross culverts. Place new headwall/wingwall structure at culvert outlet with 100 SF rip rap for stabilization at the RCB outlet.

COST:

\$178,000



LOCATION: RT

RT 1 & Citibank

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Cross culvert RCB under Rt1 discharging to East Hagatna Beach. This RCB carries runoff from Rt1 and from the Citibank proximity and from above cliffs. Need to modify outlet headwall to a sediment basin structure to prevent sand from clogging outlet. Also need to control erosion along coastline with riprap. At the toe of the cliffs a concrete ditch should be built to route all the runoff from the cliffs, and a rock fence or wire mesh blanket need to be added to toe of cliffs to control rocks falling.

RECOMMENDED IMPROVEMENTS

Recommend placement of 10,000 square feet of rock blanket placed behind Citibank on east side of Rte 1 for erosion control along the bluffs. Place conc ditch (200 LF) at toe of bluffs to route flow to cross culverts. Place new headwall/wingwall structure at culvert outlet with 100 SF rip rap for stabilization at the RCB outlet.

COST: \$178,000



LOCATION:

RT 1 & Shell Gas Station

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Runoff from the cliffs above the Shell station and from the station proximity flows towards a lot just south of the gas station. From the property, a grated catch basin collects the runoff and discharges it to the city drainage systems which outlets to the East Hagatna Beach to the north. The area upstream where the grated catch basin is located needs significant trash and debris removal, and it needs to be improved to properly collect and route runoff - add two additional grated inlets. At the toe of the cliffs, a concrete ditch should be built to route all the runoff from the cliffs, and a rock fence or wire mesh blanket needs to be added to toe of cliffs to control rocks falling.

RECOMMENDED IMPROVEMENTS

Recommend placement of hydromulch and bonded fiber matrix (or rock blanket) along approximately 10,000 SF of embankment behind the Shell Station to control erosion on the east side of Rte 1. Place conc ditch (200 LF) at toe of bluffs behind retaining wall to route flow to catch basin connecting to cross culvert. Place new 10'x10' concrete apron around catch basin grate. Remove approximately 1 AC of debris.

COST:



LOCATION: West Hagatna Beach & Dulce Nombre de Maria Dr

MITIGATION TYPE:

Coastal Protection

SITE ASSESSMENT:

Need shoreline erosion stabilization(riprap), and need to provide drainage outlets where concentrated runoff from

Dulce Nombre de Maria Dr discharge to coast.

RECOMMENDED

IMPROVEMENTS

To prevent further shoreline erosion, rip rap channel stabilization for a distance of 50 feet downstream of existing

culvert (1000 SF rip rap total) is recommended.

COST:

\$141,000



LOCATION: RT 1 & District Court House

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements

SITE ASSESSMENT:

Cross culvert under Rt1 outlets to West Hagatna Beach. Outlet structure is covered with sand, need to modify outlet structure to a sediment basin structure to prevent sand from clogging outlet. Also need shoreline erosion

control(riprap).

RECOMMENDED IMPROVEMENTS

To prevent further erosion of the shoreline and clogging of the outlet, a new headwall/wingwall structure with 100 square feet of rip rap outlet pad is recommended at downstream side of culvert.

square feet of rip rap outlet pag is recommended a

COST:

\$31,100



LOCATION:

RT 1 & Sewage Treatment Plant

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Double 24" RCP cross culverts under Rt1 discharge just north of Sewage Treatment Plant driveway. Need embankment stabilization(riprap) for about 20' on the downstream end, also debris removal and dredging of channel. Also need to stabilize coastline with riprap at this location.

RECOMMENDED IMPROVEMENTS

A quarter acre of debris removal is needed at this site along with placement of 1,000 square feet of rip rap channel stabilization placed along the downstream embankments for a distance of 20 feet.

COST: \$143,000



LOCATION:

RT 1 & Gregorio Perez Marina

MITIGATION TYPE:

YPE: Conveyance Improvements

SITE ASSESSMENT:

Two 36" RCP cross culverts discharge to the Marina docking area, these culverts probably carry flow from Rt1. Headwall for the cross culverts need to be replaced, and a trash rack also added. Per the Flood Control Document, this RCB is to be increased in size to a 4'x4' RCB.

RECOMMENDED IMPROVEMENTS

The RCB at this site needs to increased in size to a 4'x4' RCB for 200 linear feet (as per the Flood Control Document) routing flow from Rte 1 to the Marina. A new headwall located at the Marina is also required

COST:

\$231,000



LOCATION:

RT 1 & Padre Palomo Memorial Park

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance / Conveyance Improvement

SITE ASSESSMENT:

A 5'x4' RCB cross culvert under Rt1 discharges to the north of Padre Palomo Memorial Park. The outlet channel embankment needs erosion stabilization(riprap) and debris removal for about 200'. Also the bottom of the channel needs to be cleaned of sediment.

RECOMMENDED IMPROVEMENTS

Recommend erosion stabilization (rip rap) and one half acre of debris removal along with sediment removal from the channel's bottom. Place 2,000 square feet of rip rap channel stabilization for a distance of 100' along channel

embankments.

COST:

\$285,000

INARANJAN VILLAGE



IV-101

LOCATION:

RT 4 & Asalonso River

MITIGATION TYPE:

Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

Existing cross culvert under Rt4 does not handle all the runoff that receives. This cross culvert needs to be upsized to a RCB cross culvert. Road alignment is within a private property R/W, the road needs to be realigned to be taken out of private property. River needs embankment stabilization(riprap) to stop erosion.

RECOMMENDED IMPROVEMENTS

Recommend replacement of cross-culvert routing flow from Asalonso Rive under Rte 4 to a 100'x6'x6' RCB with upstream and downstream headwall/wingwall structures. Placement of 1,000 square feet of rip rap is recommended for a distance of 25 feet upstream and downstream of the crossing. A quarter acre of debris removal is also required.

COST:

\$427,000



IV-102 LOCATION:

RT 4 & Ates Ln

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Inarajan Mayor placed infiltration trenches along Rt4 at low point close to Ates St, but they are not working

properly. Infiltration trenches were not built per standards - need to be rebuilt.

RECOMMENDED IMPROVEMENTS

Infiltration trenches at this site were not constructed properly and need to be re-built. Recommend

replacement with 2 standard infiltration trenches (200 LF each).

COST:



LOCATION:

RT 4 & Dan Dan Store

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At this location, infiltration trenches can be built on both sides of Rt4 to take care of runoff and prevent

flooding and ponding.

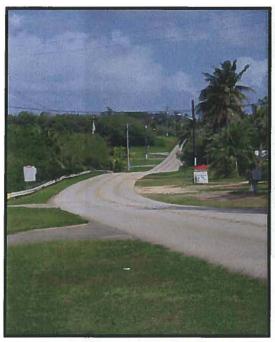
RECOMMENDED

IMPROVEMENTS

To prevent future flooding at this site, placement of two 200 ft infiltration trenches are recommend along Rte 4 $\,$

(both sides of road) at this site.

COST:



LOCATION:

RT 4 & North of Malojloj wall

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements
At low point add an infiltration trench on both sides of road.

SITE ASSESSMENT: RECOMMENDED

To prevent future flooding at this site, placement of two 200 ft infiltration trenches are recommend along Rte 4

IMPROVEMENTS

(both sides of road) at this site.

COST:



LOCATION:

RT 4 & Chalan Tun Pedro Rivera Dr.

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Opposite side of Mayor's office - need to build an infiltration trench to prevent runoff from flooding private

property.

RECOMMENDED

IMPROVEMENTS

To prevent further flooding, recommend placement of a 200 linear foot infiltration trench along road.

COST:

\$22,600



LOCATION:

RT 4 & Chargala

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Add infiltration trenches along Rt4 to capture runoff.

RECOMMENDED IMPROVEMENTS

To prevent future flooding at this site, placement of two 200 ft infiltration trenches are recommend along Rte 4

(both sides of road) at this site.

COST:



LOCATION: RT 4 & North Aslinger River

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Along Rt4 just north of the Aslinger River hillside are eroding and probably the sediment from these hillside runs

down to the river. Need to take care of the erosion adjacent to Rt4.

RECOMMENDED

IMPROVEMENTS

To prevent further erosion of the hillside upstream of Aslinger River, recommend placement of hydroseed and

bonded fiber matrix in areas devoid of vegetation (estimated at one acre).

COST:

\$111,000



IV-108 LOCATION:

RT 4 & Aslinger River

MITIGATION TYPE:

Erosion Control/ Conveyance Improvements

SITE ASSESSMENT:

This is a three cell RCB under Rt4 that routes the Aslinger River. Upstream channel needs debris and vegetation removal to prevent clogging of RCB. Downstream wingwalls need to be extended to improve the conveyance of flow and to control the embankment erosion. Roadway is being undermined, need to add riprap on the downstream embankment.

RECOMMENDED IMPROVEMENTS

Erosion control is needed for the embankment at this site. Recommend replacement of downstream headwall/wingwall with new headwall/wingwall structure with wingwalls extended to avoid further embankment erosion. Also recommend placement of 2,000 square feet of rip rap along downstream embankment for a distance of 100 feet. Also recommend one half acre of debris removal upstream of the culvert.

COST:

\$302,000



LOCATION:

RT 4 & Tinago River

MITIGATION TYPE:

Erosion Control, Conveyance Maintenance

SITE ASSESSMENT:

At this location along Rt4 a bridge runs over the Tinago River. Both upstream and downstream need debris and vegetation removal. Upstream a 36" RCP is discharging on the southwest corner of bridge where the embankment is slope pave on the northwest corner the slope paving is falling apart and it needs to be redone to prevent erosion. Downstream both the north and south wingwalls need to be extended to stop erosion and prevent roadway undermining.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance is needed at this site. Remove one half acre of debris. Place 2,000 square feet of rip rap for channel stabilization for a distance of 50 feet upstream and 50 feet downstream of bridge. Replace existing slope paving at bridge corners.

COST:

\$305,000



LOCATION:

RT 4 & Jamieann's Grill

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

An existing 2' base trapezoidal channel runs along the west side of Route 4 then discharges into a 36" RCP which outlet to the Tinago River on the southwest corner. The channel is in good shape but it should be upsized to a 4' base for easier maintenance. Multiple water lines cross the channel, these water lines should be routed under box or protected since they will break easily with any debris entering the channel when flowing at full capacity.

RECOMMENDED IMPROVEMENTS

Recommend replacing 2' wide rectangular channel at this site with a 4' wide channel (1000' in length). Also recommend routing existing water lines under new channel.

COST:

\$287,000



LOCATION: F

RT 4 & South Tinago River

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Along Rt4 between Tinago River and Apman Dr, a low point is located where ponding is created. Need to build

an infiltration trench to prevent ponding.

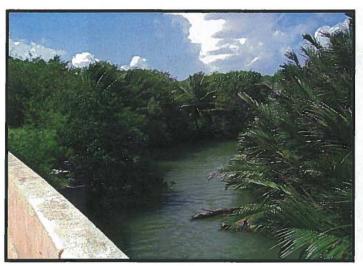
RECOMMENDED

To avoid ponding at the low point at this site, recommend installation of a 200 linear foot infiltration trench

IMPROVEMENTS adjacent to Rte 4.

COST:

\$22,600



LOCATION: RT 4 & Agfayan River

MITIGATION TYPE:

Erosion Control, Conveyance Maintenance

SITE ASSESSMENT:

At this location along Rt4 a bridge crosses the Agfayan River. There are Nipa trees on both the upstream and downstream of the river, these are protected trees. These trees grow in the water and cause debris to accumulate, a permit is needed to remove these trees. There is erosion on both the upstream of the river, need embankment stabilization (riprap). There is undermining of the Rt4 at the approach slabs of the bridge, need to stabilized the road embankment with riprap.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance is needed at this site. Remove one quarter acre of debris. Place 1,000 square feet of rip rap for embankment stabilization adjacent to the roadside approach slabs for a distance of 25 feet upstream and 25 feet downstream of bridge.

COST:

\$143,000



LOCATION:

RT 4 & Inarajan River (north)

MITIGATION TYPE:

Erosion Control, Conveyance Maintenance

SITE ASSESSMENT:

Rt4 crosses two branches of the Inarajan River. On the north branch there are Nipa trees on both the upstream and downstream of the river, these are protected trees. These trees grow in the water and cause debris to accumulate, a permit is needed to remove these trees. There is erosion on both the upstream of the river, need embankment stabilization (riprap) also to stop the undermining of Rt4.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance is needed at this site. Remove one half acre of debris. Place 2,000 square feet of rip rap for channel stabilization for a distance of 50 feet upstream and 50 feet downstream of bridge

COST:

\$285,000



LOCATION: RT 4 & Inarajan River (South)

MITIGATION TYPE:

Erosion Control, Conveyance Maintenance

SITE ASSESSMENT:

Rt4 crosses two branches of the Inarajan River. On the south branch there are Nipa trees on both the upstream and downstream of the river, these are protected trees. These trees grow in the water and cause debris to accumulate, a permit is needed to remove these trees. There is erosion on both the upstream of the river, need embankment stabilization (riprap) also to stop the undermining of Rt4.

RECOMMENDED IMPROVEMENTS

Erosion control and maintenance is needed at this site. Remove one half acre of debris. Place 2,000 square feet of rip rap for channel stabilization for a distance of 50 feet upstream and 50 feet downstream of bridge

COST:

\$285,000



LOCATION:

RT 4 & Tun Mariano D. Leon Guerrero Rd

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

Along Rt4 and on the proximity of Tun Marino D. Leon Guerreo Rd three homes get flooded. Need to add a drainage conveyance system to route runoff to the north where it can be discharged to the Tongan Creek.

RECOMMENDED IMPROVEMENTS

To prevent homes from being flooded, improvements to the storm drain system are needed. Recommend placing two catch basins along Rte 4, connecting to 100 linear feet of 24" RCP conveying flow northerly to Tongan Creek. Equip outlet with one headwall/wingwall structure and a 100 square foot rip rap energy dissipator. Recommend 200 LF of roadside ditch to convey flow to catch basins along Rte 4.

COST:

\$139,000



LOCATION:

RT 4 & Tongan Creek

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

At this location a cross culvert carries the Tongan Creek under Rt4. This cross culvert consists of 3-36" RCP and a 4'x3' RCB, the structure is in good shape. Need sediment removal upstream and downstream, and embankment stabilization (riprap). Need to modify outlet headwall to a sediment basin structure to prevent sand from clogging outlet, currently portion of downstream culverts are clogged.

RECOMMENDED IMPROVEMENTS

Sediment removal upstream and downstream is needed at this site along with embankment stabilization. A quarter acre of debris/sediment removal is needed along with the placement of 1,000 square feet of rip rap channel stabilization for a distance of 25' upstream and downstream of the culvert. Also recommend placement of wingwalls adjacent to headwalls on the upstream and downstream sides of the culvert.

COST:

\$177,000



LOCATION:

RT 4 & Bibesbes

MITIGATION TYPE:

Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

At this location 2-24" RCP cross culverts run under Rt4. These culverts are partially clogged with sediment and trash. There is embankment erosion on both sides of the culverts and ponding along the sides of the road. Downstream bottom needs to be dredged, embankments need to be stabilized with riprap, cross culverts replaced with a 6'x3' RCB with wingwalls on both ends.

RECOMMENDED IMPROVEMENTS

To prevent further erosion of the embankment and to unclog the culverts at this site, improvements and maintenance will need to be made to the drainage conveyance system. Recommend replacing existing culvert with 100'x3'x6' RCB equipped with upstream and downstream headwall/wingwall structures, and 100 SF rip rap energy dissipators placed upstream and downstream of the culvert. A quarter acre of debris removal along with some sediment removal to promote proper drainage will be required.

COST:

\$189,000



LOCATION:

RT 4 & South of Bibesbes

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Improvement/ Conveyance Maintenance/ Treatment BMP

Improvements

SITE ASSESSMENT:

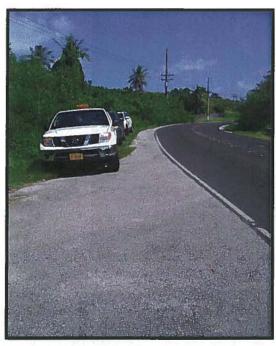
Existing 3-24" RCP cross culverts with headwall and wingwalls cross Rt4. There is ponding along roadway adjacent to cross culverts, also significant debris/trash/sediment accumulated both upstream and downstream, culverts are clogged and erosion around headwalls. Need to replace cross culverts with a 6'x3' RCB cross culvert with wingwalls, need to dredge upstream and downstream channel, clear vegetation, add rip rap on channel embankments for erosion control, and add an infiltration trench along Rt4 to prevent ponding.

RECOMMENDED IMPROVEMENTS

Erosion control is needed at this site and measures need to be taken to prevent future ponding along roadway. Recommend replacement of existing culvert with 100'x6'x3' RCB equipped with upstream and downstream headwall/wingwall structures and 100 sq ft rip rap energy dissipators at the culvert inlet and outlet. Also recommend placement of a 200 linear foot infiltration trench along Rte 4 and a quarter acre of debris removal throughout area.

COST:

\$209,000



LOCATION:

RT 4 & Ahayan way

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

Property south of Ahayan way on Rt4 westside floods. Need to add a drainage conveyance system to route

runoff to the creek north of Ahayan way.

RECOMMENDED IMPROVEMENTS

To avoid further flooding of a property on this site, it is recommended that a drainage conveyance system be added to this site, routing all runoff to the creek north of Ahayan Way. Recommend placement of 2 catch basins along Rte 4 connecting to 100 linear feet of 24" RCP storm drain routing flow northerly along Rte 4, outleting to the creek located north of Ahayan Way. Outlet at the creek should consist of one

headwall/wingwall structure and a 100 square ft rip rap energy dissipator. Recommend 200 LF of roadside ditch

to convey flow to catch basins along Rte 4.

COST:

\$139,000



LOCATION:

RT 4 & Belen Ave

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Intersection of Rt4 and Belen Ave gets flooded, as a result two properties get flooded. At the intersection of Rt4 and Belen Ave three corners have grated inlets, there is another grated inlet along Belen Ave west side; these catch basins outlet to the Inarajan Bay via an outlet structure that needs debris removal. The northeast corner is a wetland. Need to add swales along Rt4 and Belen to route runoff to existing catch basins, also need to add another grated catch basin along Rt4 adjacent to the existing catch basin on the northwest corner.

RECOMMENDED IMPROVEMENTS

To prevent further ponding at this site, recommend placement of 2-200 linear foot infiltration trenches along Rte 4 (both sides of Belen) or place 2 additional catch basins connecting to existing catch basins at site.

COST:

\$45,300



LOCATION: Chagamn Lago Ave
MITIGATION TYPE: Coastal Protection

SITE ASSESSMENT: Along Chagamn Lago Ave the roadway is being undermined by the Inarajan Bay. Need shoreline protection

(about 2000' of riprap) and debris removal along coastline.

RECOMMENDED To prevent further shoreline erosion as a result of high tides along Chagamn Lago Ave, maintenance including 1

IMPROVEMENTS acre of debris removal followed by installation of 20,000 square feet of rip rap coastal stabilization

(approximately 10-ft in width along the shoreline at Inarajan Bay, adjacent to the road for a distance of 2000

feet) is recommended.

COST: \$2,820,000



LOCATION:

Apman Dr

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

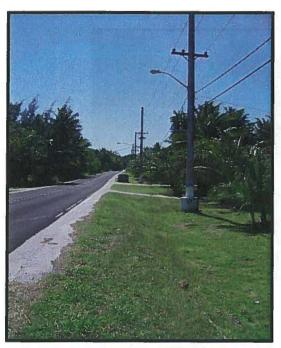
A 36" RCP cross culvert with upstream and downstream headwall and wingwalls is located at the low point of Apman Dr. Cross culvert is 1/3 clogged with debris/trash/vegetation, and there is erosion around headwalls. One property gets flooded on the proximity of the cross culvert. Need to remove excessive debris/vegetation/trash from both upstream and downstream and provide embankment stabilization(riprap).

RECOMMENDED IMPROVEMENTS

To prevent further erosion and flooding, recommend 1/4 acre of debris removal and placement of 1000 SF of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of existing culvert along the channel embankments.

COST:

\$143,000



LOCATION:

Tun Enemecio & Regina Diego Dr & RT 4

MITIGATION TYPE:

Conveyance Improvements/ Conveyance Maintenance

SITE ASSESSMENT:

Properties along Tun Enemecio & Regina Diego Dr get flooded, creek north of the street also floods these homes. Homeowners placed a 36" cross culvert to route runoff to the south towards Tongan Creek but flooding still prevails. During the last year this area has been flooded three times. There used to be a CMP cross culvert that carried the runoff under Rt4 towards the ocean, but that cross culvert was taken out and now there is no outlet. A solution will be to build a concrete trapezoidal channel (6' base and 6' depth) parallel to Rt4 along the west side of Rt4 and discharge it to the Tongan Creek.

RECOMMENDED IMPROVEMENTS Recommend maintenance and improvements to the drainage conveyance system throughout this area. Place a concrete trapezoidal channel (6' base, 6' depth, 24' top width) adjacent to the west side of Rte 4 to route flow from a channel located north of the property southward to Tongan Creek (approximately 1500 feet long). Two culverts will be required for conveyance under a driveway and under Regina Drive (50'x 48" RCP each, equipped with headwall/wingwall structures on both sides). An existing 36" CMP currently routes flow under Regina Drive, in another channel that flows southerly to Tongan Creek behind the properties. Recommend replacement of this culvert with new double 36" culvert (50 linear feet with headwall/wingwall structure both sides). Entire area will require 1 AC debris removal and dredging (approximately 100 CY) of the channel located north of the property to promote drainage to the proposed concrete channel along with placement of 1000 SF rip rap at the upstream and downstream sides of the proposed conc channel.

COST:

\$1,390,000

MANGILAO VILLAGE



MO-101

LOCATION:

Spanish Lane & RT 15

MITIGATION TYPE:

Storm Drain Improvement

VILLAGE RANKING

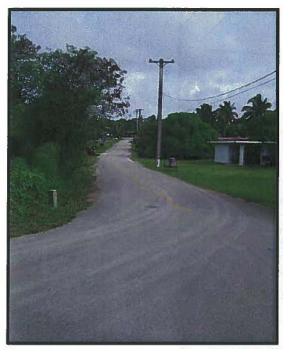
SITE ASSESSMENT:

Concentrated flow from Route 8 on and off ramps discharge to Rt33 at a location where the apartment complex at 105 Roy T. Damian is located. Building gets flooded from runoff. Need to add catch basins with a pipe outletting to the Hagatna river, which is located behind this apartment complex. Need to add underground infiltration chamber or media filter to system (assume underground infiltration chamber @ \$500,000)

RECOMMENDED **IMPROVEMENTS** Recommend placement of a storm drain system along Route 15 to prevent flow from entering Spanish Lane. Place 2 catch basins along Rte 15 connecting to 100 linear feet of 24" RCP storm drain routing flow to the Rte 10 drainage system. Also recommend a quarter acre of debris remove and placement of 200 LF of roadside ditches to route surface flow to catch basins.

COST:

\$139,000



LOCATION:

Farfan Street & RT 15

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

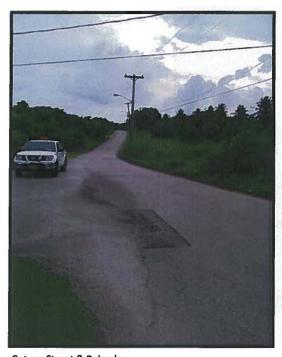
This is a low point along Farfan street, where runoff from Route 15 creates ponding and thus flooding of properties until starts to flow towards Spanish Lane. The possible solution is to add a curb to Route 15 and add drainage conveyance system that can tie in to the existing sytem along Route 10. This will take care of all the runoff generated from Route 15.

RECOMMENDED IMPROVEMENTS

To avoid future flooding of area properties a drainage conveyance system needs to be added along Rte 15 to prevent flow from entering Farfan Street. Recommend placement of 2 catch basins (one on both sides of Farfan, along Rte 15), connected by 100 linear feet of 24" RCP storm drain, outleting to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator. Also recommend placement of roadside ditches to convey flow to catch basins (200 linear foot total).

COST:

\$139,000



MO-103

LOCATION:

MITIGATION TYPE:

SITE ASSESSMENT:

RECOMMENDED IMPROVEMENTS

COST:

Cotpus Street & Pelowky

Storm Drain Improvement/ Conveyance Maintenance/ Treatment BMP Improvements

At this location a low point along the street exists, this creates ponding thus flooding four properties. A possible

Reroute the flow at this site to an infiltration basin at the end of Chargualat Street (within an existing City easement) to avoid future flooding of adjacent properties at this site. Recommend placement of two catch

\$450,000



LOCATION: Chargualaf Street & Chalan Kareta

MITIGATION TYPE: Storm Drain Improvement/ Conveyance Maintenance/ Treatment BMP Improvements

SITE ASSESSMENT: At this location, a low point along the street exists. This creates ponding, thus flooding of about three

properties. Also, this is known to be a location for mosquito breeding due to the stagnant water. A possible solution is to add a drainage conveyance system that can route flow downstream at the end of this street

where an infiltration basin can be built at the lowest location.

RECOMMENDED IMPROVEMENTS

Recommend placement of a 50'x400' infiltration basin with 900' of fencing at the end of the street along with grading the edge of pavement along Chargualaf Street to drain toward the basin Also recommend 1 AC of debris

removal throughout area.

COST: \$463,000



LOCATION:

Chargualaf Street

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is the end of the street and is also the lowest point along the street. At this location, there is ponding and flooding of one property. Here, an infiltration basin can be built within an existing city easement - all runoff from

this street and from Kotpus Street can be routed to this infiltration basin.

RECOMMENDED **IMPROVEMENTS** Recommend placement of a 200'x200' infiltration basin (with 800 LF of fencing) at the end of Chargualaf Street. Also recommend placement of a storm drain system in Chargualaf consisting of two catch basins connecting to 100 linear feet of 24" RCP storm drain and a quarter acre of debris removal. The pipeline should route the runoff

to the proposed infiltration basin.

COST:

\$779,000



LOCATION:

Tangerine Lane & RT 10

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is a low point along Tangerine Lane where significant runoff has created in the past significant ponding and thus flooding approximately six properties at this location, including properties along Manderine Lane (parallel street to tangerine). There is no existing drainage conveyance system at this location. A possible solution is to build an infiltration basin with about eight injection wells at the end of the street in an empty lot. This basin will take care also of runoff from Manderine Lane, and it is possible that the basin can also be accessible from Manderine Lane.

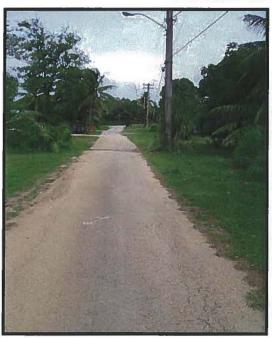
RECOMMENDED IMPROVEMENTS

Recommend placement of a 200'x200' infiltration basin with 800 linear feet of fencing 8 injection wells toll improve the current drainage problems in the area. Recommend grading along the edge of pavement along

Tangerine Lane to drain to infiltration basin.

COST:

\$1,190,000



LOCATION:

Mandarine Lane & Chero Lane

MITIGATION TYPE:

Conveyance Improvement

RECOMMENDED

IMPROVEMENTS

Recommend placement of a 1000 LF ditch along the edge of roadway for Mandarine Lane, routing roadway runoff to the infiltration basin along Tangerine Lane (MO-106).

COST:

\$86,400



LOCATION:

Lemon Lane & Chero Lane

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

There is a low point at this interchange. There is no existing drainage conveyance system and therefore ponding occurs and thus flooding of four properties. A possible solution will be to add a drainage conveyance system which can outlet to the proposed infiltration basin at Tangerine Lane.

RECOMMENDED IMPROVEMENTS

To avoid future flooding of the properties in the area a drainage conveyance system along Lemon Lane needs to be constructed. Recommend placement of two catch basins connecting to 100 linear feet of 24" RCP storm drain outleting to the proposed infiltration basin along Tangerine (MO-106). The outlet should be equipped with a headwall/wingwall structure and a 100 square foot rip rap energy dissipator. Also recommend placement of roadside ditches (200 LF total) to route runoff to catch basins.

COST:

\$139,000



LOCATION:

Aga Lane & Mangga Lane

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

At the location, a low point is located at the end of the street where ponding is created, flooding three properties. Within this low area, the lowest point is located between two homes. A possible solution is to build a drainage conveyance system to outlet to the back of one of the properties where a natural depressed area exists. An easement will need to be created to build this system.

RECOMMENDED IMPROVEMENTS

To avoid future flooding recommend placing two catch basins along Aga Lane connecting to 100 linear feet of 24" RCP storm drain, routing flow between 2 properties to a natural sink located behind the properties (most likely requiring an easement). The outlet should be equipped with one headwall/wingwall structure and a 100 square foot rip rap energy dissipator. Recommend placement of 200 linear ft of roadside ditch adjacent to Aga Lane to route flow to catch basins.

COST:

\$139,000



LOCATION:

Kita L G Court & Mangga Lane

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

At this end of this street a natural local depression exists within private properties where all runoff from the street drains to. There is no flooding of properties, since the lowest point is not developed and water infiltrates without causing permanent ponding or flooding of adjacent properties. There is significant erosion within the perimeter of this depression, which happens within private properties. A possible solution to stop erosion is to build a retaining wall and a concrete lined channel.

RECOMMENDED IMPROVEMENTS

To prevent further erosion from occurring it is recommended that an 8000 SF retaining wall (approximately 20 feet tall by 400 feet long) be placed along the eroding hillside with a 1,000 linear foot concrete channel placed at the road edge, immediately adjacent to the wall. The conc channel will route flow to the existing sink located at the downstream side of the property. A quarter acre of debris removal throughout the area will also be needed along with placement of hydromulch and bonded fiber matrix placed along the embankments devoid of vegetation (estimated at approximately 1000 square feet).

COST:

\$1,590,000



LOCATION:

Manha Lane & RT 10

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Significant runoff from Route 10 flows to this street and creates flooding of possibly three homes. There is no existing drainage conveyance system along this street. A solution is to add drainage conveyance system along Route 10 to prevent runoff from Route 10 from entering Manha Lane, and adding infiltration trenches at the lowest point of the street to capture just street runoff.

RECOMMENDED IMPROVEMENTS

To prevent further flooding at this site, recommend interception of Rte 10 flows upstream of Manha Lane and placement of an infiltration trench at the low point in Manha Lane. Along Rte 10, recommend placement of one catch basin placed immediately upgradient of Manha Lane, connecting to 100 linear feet of 24" RCP conveying flow past Manha Lane and outleting flow to a headwall/wingwall structure and a 100 square foot rip rap energy dissipator along Rte 10. Also recommend placement of a 200 linear foot infiltration trench along Manha Lane with roadway ditches (200 LF total) routing flow to infiltration trench.

COST:

\$151,000



LOCATION: Lalo

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

At this interchange ponding occurs due to a high point along the entrance to Lalo Street from Route 10. A

solution is to re-grade this area and to add a cross gutter to maintain the runoff along route 10.

RECOMMENDED IMPROVEMENTS

To avoid future ponding, recommend placement of a 100 linear foot concrete cross gutter along Rte 10 at the

intersection with Lalo Street in order to maintain drainage along Rte 10.

COST:

\$19,900



LOCATION:

RT 10 & RT 15

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

Signs of ponding/flooding exists on the north east corner of this interchange. A drainage conveyance system already exists at interchange, one grated inlet on north west corner and another one on the north east corner, and possibly another grated inlet has been covered with asphalt on the north east corner along Route 10. The solution to this situation is to add more grated catch basins on the interchange to prevent ponding and

RECOMMENDED IMPROVEMENTS

To prevent further ponding/flooding, recommend improvements to the existing storm drain system located at the Rte 10/ Rte 15 intersection. Place 3 catch basins (one on northeast corner and 2 on northwest corner)

connecting to 200 linear feet of 24" RCP.

COST:

\$206,000



LOCATION:

RT 15 & RT 26

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At this interchange there are signs of ponding on all four corners, and possibly flooding of one property on the

north west corner. A possible solution is to re-grade corners to prevent ponding and add swales.

RECOMMENDED IMPROVEMENTS

To prevent flooding, recommend along edge of shoulders at all 4 corners and placement of 100-ft bioswales

routing flow from Rte 15 to Rte 26 on all four corners.

COST:

\$63,500



LOCATION:

RT 15 & Old RT 26

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

At this location ponding is created along west side of Route 15, and there is significant trash and debris along the old Route 26. Possible solution for ponding is to create a drainage conveyance system to outlet runoff to the south along west side of Route 15 where a grated area exists. The debris and trash along the old Route 26 is probably from illegal dumping.

RECOMMENDED IMPROVEMENTS

To avoid future ponding along west side of Route 15 at this site, a storm drain system is recommended. Place 2 catch basins along the west side of Rte 15 at Old Rte 26, connecting to 100 linear feet of 24" RCP storm drain routing flow southerly to an outlet structure along the west side of Rt 15. The structure should include a headwall/wingwall structure with a 100 square foot rip rap energy dissipator. Recommend placement of 200 linear feet of roadside ditch to convey flow to catch basins. Also recommend removal of debris along Old Rte 26.

COST:

\$139,000



MO-116

LOCATION:

RT 15 & Southern Cross Lane

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance/ Treatment BMP Improvements

RECOMMENDED IMPROVEMENTS

To prevent flooding of this area, recommend placement of a storm drain system including construction of 2 catch basins connected to a 24" RCP storm drain for 100 linear feet, conveying flow to an infiltration basin (200'x200') requiring 800 LF of fencing or to an infiltration trench. A quarter acre of AC debris removal is also needed.

COST:

\$779,000

MERIZO VILLAGE



ME-101

LOCATION:

RT 4 & Asmaile Creek

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Three cross culverts under Rt4 route Asmalle Creek to Ajayan Bay. 2-36" RCP and 1-24" cross culverts with straight headwalls. Both upstream and downstream need debris/vegetation removal, dredging of channel base and

embankment stabilization with riprap for about 100' upstream and downstream.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one half acre of debris. Place 2,000 square feet of rip rap for channel stabilization for a distance of 100 feet upstream and 100 feet downstream of culvert.

COST:

\$285,000



ME-102

LOCATION:

RT 4 & Asgado Creek

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Two 36" RCP cross culverts with headwalls under Rt4 route Asgadao Creek to Asgadao Bay. Upstream culverts are clogged with sediment and debris, downstream they are about 2/3 covered with sediment. Road is been undermined in the proximity of the cross culverts. Need to remove debris/sediment/vegetation and add enbankment stabilization for about 50' both upstream and downstream.

SITE IMPROVEMENTS: To prevent further clogging of culverts and further undermining of the road near the cross culverts, maintenance including 1/4 acre of debris removal followed by placement of a 10'x10' rip rap energy dissipator (both upstream and downstream) along with installation of a headwall/ wingwall structure at the culvert outlet is recommended.

COST:

\$47,100



ME-103

LOCATION:

RT 4 & Lyog River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt4 over Lyog river. All four approach slabs corners are undermined, and both upstream and downstream of the river there is significant accumulation of sediment and debris. Both upstream and downstream need debris and sediment removal, and need to provide enbankment stabilization upstream and downstream for

about 50'.

SITE IMPROVEMENTS: To prevent further undermining of all four approach slabs at the bridge along Route 4 over Lyog River, maintenance consisting of a quarter acre of debris removal along with 100 cubic yards of excavation and installation of 1,000 square feet rip rap channel stabilization for a distance of 50' upstream and 50' downstream of the bridge is recommended.

COST:

\$147,000



LOCATION:

RT 4 & south of Sumay river

MITIGATION TYPE:

Coastal Protection

SITE ASSESSMENT:

South from Sumay river the roadway has eroded next to the shoreline, it needs shoreline protection for about

200' from Sumay river.

SITE IMPROVEMENTS: To prevent further shoreline erosion as a result of high tides, maintenance including 1/2 acre of debris removal followed by installation of 5,000 square feet of rip rap coastal stabilization (approximately 10-ft in width along the

shoreline) from Sumay River to 500 feet south of the river is recommended.

COST:

\$711,000



LOCATION:

RT 4 & south of Sumay river

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

South from Sumay river a 4'x4' RCB cross culvert runs under Rt4 and discharges to Sumay Bay. Needs erosion stabilization upstream and downstream for about 50', and also along RT4 next to the headwalls. Also needs debris

and vegetation removal upstream and downstream.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris. Place 1,000 square feet

of rip rap for channel stabilization for a distance of 50 feet upstream and 50 feet downstream of culvert.

COST:



LOCATION:

RT 4 & Sumay River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge over Sumay river. Need erosion stabilization along approach slabs and also upstream and downstream

along the river enbankment. Also needs upstream and downstream debris/sediment/vegetation removal.

SITE IMPROVEMENTS: To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 50 feet upstream and 50 feet downstream of the

bridge is required.

COST:



LOCATION:

RT 4 & north of Sumay river

MITIGATION TYPE:

Coastal Protection

SITE ASSESSMENT:

North of Sumay river along the shoreline Rt4 needs erosion stabilization to prevent erosion during high tides for

sand to cross roadway.

SITE IMPROVEMENTS: To prevent further shoreline erosion as a result of high tides, maintenance including 1/2 acre of debris removal followed by installation of 5,000 square feet of rip rap coastal stabilization (approximately 10-ft in width along the

shoreline) from Sumay River to 500 feet north of the river is recommended.

COST:

\$711,000



LOCATION:

RT 4 & South of Suyafe River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Un-named tributary at this location. Standing water observed on the upstream side. Downstream side needs bank stabilization along the culvert and roadway. Along Route 4 there are 4 cross culverts with un-named tributaries

that need bank stabilization on the upstream and downstream sides.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one half acre of debris and place 250 square feet rip rap for channel stabilization for a distance of 25 feet upstream and 25 feet downstream of 4 culverts (2,000

square feet total).

COST:

\$285,000



LOCATION:

RT 4 & Suyaje river

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A double 6'x3' RCB cross culvert routes Suyaje river to Sumay Bay. It needs about 100' of enbankments stabilization upstream, and about 50' downstream. Also needs roadway stabilization along the two headwalls, about 50' on both sides of headwalls to stop the undermining of Rt4. Need dredging of river bottom both upstream and downstream.

SITE IMPROVEMENTS: To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 100 feet upstream and 50 feet downstream of the culvert is required.

COST:



LOCATION:

Emma Reyes St

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Home 100' away from Rt4 floods. The Suyaje river floods property, need to add a berm to raise the Suyaje river

enbanment and prevent flooding of property.

SITE IMPROVEMENTS: To minimize flooding of the adjacent home, a 1.5-ft high berm (5 ft wide) is recommended along both embankments of the river on the upstream side of the culvert for a distance of approximately 200 feet. Remove one quarter acre of debris. Place 1,000 square feet of rip rap along inner side of berm and 3,000 cubic feet of fill.

COST:

\$144,000



LOCATION:

RT 4 & South of Juan Babauta St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 6'x4' RCB cross culvert under Rt4, just south of Juan Babauta St. The RCB is in good condition, there is erosion around the upstream headwall. Need to extend headwall (or add rip rap) upstream to include a 36" RCP that is

discharging to the side of the headwall, and also need to add rirap for erosion control.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris and place 1,000 square feet of rip rap for channel stabilization for a distance of 50 feet upstream of existing culvert and around 36" RCP

culvert outlet located immediately upstream of cross culvert.

COST:



LOCATION:

RT 4 & Juan Babauta St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Double 6'x3' RCB cross culvert. Upstream three grated inlets discharge to RCB, these inlets are adjancent to a home. There is also a lateral cross culvert discharging to RCB from the north. Downstream channel needs

debris/trash/vegetation removal and enbankment stabilization(riprap).

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris and place 1,000 square feet of rip rap for channel stabilization for a distance of 50 feet upstream of existing culvert and around 36" RCP

culvert outlet located immediately upstream of cross culvert.

COST:



LOCATION:

RT 4 & Manell Channel

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A 20'x8'(estimated dimensions) rectangular concrete channel runs paralle to Rt4 along the east side, it carries the manell river flow. The channel is covered with sediment. Need to clean channel of sediment and stabilize upstream Manell river to prevent sediment to continue covering the channel. Probably upstream from the concrete lined channel a sediment basin needs to be built to capture all the sediment. Downstream from this channel there are two outlets that are completely covered with sediment that needs to be cleared of debris. Segments of the channel's east wall are collapsing, they need to be replaced with new walls.

SITE IMPROVEMENTS: To prevent the continuation of sediment falling and covering the channel and to stabilize the Manell River, maintenance in the form of a quarter acre of debris removal, removal of 4,000 cubic yards of rock, placement of 5,000 square feet of rip rap channel stabilization (upstream of the concrete channel for an estimated 250 feet), 20 cubic yard of soil excavation, and replacement of portions of the existing concrete rectangular channel (approximately 2000 feet approximated by 10,000 sq ft of retaining wall) is recommended.

COST:

\$7,630,000



LOCATION:

RT 4 & North of Manell Channel

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

North of Manell Channel along Rt4 three existing 5'x3' RCB cross culverts need improvements on the upstream and

downstream channels. Need debris removal and embankment stabilization for about 20' upstream and

downstream.

SITE IMPROVEMENTS: Embankment stabilization and maintenance are needed at this site. Remove one quarter acre of debris and place

330 square feet of rip rap for a distance of approximately 20' both upstream and downstream of each culvert

COST:



LOCATION:

RT 4 & Achang River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

6'x3' RCB cross culvert under Rt4 carries Achang river flow to Achang Bay. Upstream and downstream need

sediment and debris removal.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris. Place 1,000 square feet

of rip rap for channel stabilization for a distance of 25 feet upstream and 25 feet downstream of culvert.

COST:



LOCATION:

RT 4 & South of Geus river

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A double 24" RCP cross culvert under Rt4 just south of Geus river. Upstream channel is in good condition except for

vegetation clearing, downstream channel needs debris/sediment removal and enbankment stabilization.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris and place 1,000 square

feet of rip rap for channel stabilization for a distance of 50 feet downstream of existing culvert.

COST:



LOCATION:

RT 4 & Geus river

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 4 cell 12'x8' RCB under Rt4 carries Geus river flow. Needs debris/sediment/vegetation removal and enbankment

stabilization both upstream and downstream.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one half acre of debris. Place 2,000 square feet of

rip rap for channel stabilization for a distance of 50 feet upstream and 50 feet downstream of culvert.

COST:

\$285,000



LOCATION:

RT 4 & south of Benny Espinoza Ave

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 3-36" RCP cross culvert under Rt4 south of Benny Espinoza Ave. At the upstream of these culverts a house has been built on top of the headwall. It needs debris/sediment removal, and enbankment stabilization(riprap) both

upstream and downstream channels.

SITE IMPROVEMENTS: Maintenance and channel stabilization for the area adjacent to and upstream of the house is required. Remove one quarter acre of debris. Place 1,000 square feet of rip rap for channel stabilization for a distance of 50 feet

upstream and 50 feet downstream of culvert.

COST:



LOCATION:

RT 4 & Benny Espinoza Ave

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenanc

SITE ASSESSMENT:

A concrete lined channel parallel to Rt4 needs sediment removal. It discharges to the 3-36" RCP cross culverts.

SITE IMPROVEMENTS: Maintenance is needed at this site. Remove one quarter acre of debris and sediment from channel.

COST:

\$1,940



LOCATION:

RT 4 & north of Benny Espinoza Ave

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 10'x5' RCB cross culvert under Rt4. This RCB needs sediment/debris/vegetation removal and enbankment stabilization(riprap) both upstream and downstream. Along the downstream base also riprap need to be placed to

stop the undermining of the RCB wingwalls.

SITE IMPROVEMENTS: To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 50 feet upstream and 50 feet downstream of the

COST:



LOCATION:

RT 4 & Chalan Joseph A Cruz

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

10'x5' RCB cross culvert under Rt4, just south of Chalan Joseph A. Cruz. This RCB routes runoff from a channel along the south side of Chalan Joseph A. Cruz. The RCB is in good condition, upstream channel needs debris/sediment

removal and enbankment stabilization.

SITE IMPROVEMENTS: Erosion control and maintenance is needed at this site. Remove one quarter acre of debris and place 1,000 square

feet of rip rap for channel stabilization for a distance of 50 feet upstream of existing culvert.

COST:



LOCATION:

RT 4 & south Merizo Catholic Cemetary

MITIGATION TYPE:

Erosion Control/ Conveyance Improvement

SITE ASSESSMENT:

A mixed of cross culverts cross Rt4 south of Merizo Catholic Cementary. The upstream side consits of 4-36" RCP and 4-24" RCP cross culverts, the 4-24" cross culverts sit on top of the 4-36" cross culverts. The upstream side is a RCB cross culvert. This system should be replaced with a 12'x6' RCB cross culvert with wingwalls on both ends. The

upstream and downstream channels need debris/sediment/vegetation removal, and enbankment stabilization(riprap) to stop the undermining of Rt4.

SITE IMPROVEMENTS: To stop the undermining of Route 4, the placement of approximately 100 linear feet of 12'x6' RCB, with two headwall/wingwall structures (one upstream and one downstream), and 1,000 square feet of channel stabilization

are required.

COST:

\$677,000



LOCATION:

RT 4 & north of Merizo Catholic Cemetary

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

North of Merizo Catholic cementary, there is a 36" RCP cross culvert runs under Rt4. The upstream end of the cross culvert has a catch basin that needs an apron and trash rack, the downstream end couldn't be located (it is possibly

covered with sediment).

SITE IMPROVEMENTS: To prevent further erosion, maintenance including 1/4 acre of debris and sediment removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 50 feet downstream of the culvert is

required. Add apron and trash rack to existing catch basin at the site.

COST:

\$16,200



LOCATION:

RT 4 & Pigua river

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement/ Erosion Control

SITE ASSESSMENT:

A 6'x12' RCB under Rt4 routes Pigua River. This cross culvert RCB needs to be widenen and debris/vegetation removal and embankment stabilization(riprap or gabions) is needed on both upstream and downstream channels.

SITE IMPROVEMENTS: The cross culvert at this site needs to be widened, and embankment stabilization is needed upstream and downstream. Recommended improvements include 100 cubic yard of excavation, placement of 100 square feet of rip rap stabilization along the base (10 feet upstream and 10 feet downstream of the culvert), 800 square feet of gabions placed along the embankments (400 sq ft upstream and 400 sq ft downstream of culvert), and placement of a 100'x6'x12' RCB.

COST:

\$543,000



LOCATION:

RT 4 & north of Bile river

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A single 36" RCP cross culvert runs under Rt4 north of Bile river. This cross culvert should be replaced with a 5'x3'

RCB with wingwalls, and the upstream and downstream channels need debris/vegetation removal and

enbankment stabilization(riprap).

SITE IMPROVEMENTS: The cross culvert at this site needs to be replaced with 100 linear feet of 5'x3' RCB, a headwall/wingwall structure with 100 sq ft rip rap stabilization upstream and downstream of the culvert, excavation of approximately 20 cubic

yards and maintenance including a quarter acre of debris removal.

COST:

\$167,000



LOCATION:

RT 4 & Toguan river

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Bridge along Rt4 over Toguan river. The upstream river is routed along a trapezoidal concrete lined channel, this channel ends with the bridge. Portions of the upstream concrete enbankment are broken and need to be fixed. Bottom of the concrete channel needs to extend under bridge and downstream to stop the undermining of the bridge abutments. Need to add enbankment stabilization(riprap) along the approach slabs, and also need to add riprap downstream base of river to stop erosion.

SITE IMPROVEMENTS:

COST:

\$196,000



LOCATION:

RT 4 & Ajayan river

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt4 over Ajayan river. Approach slabs are been undermined, need to stabilize roadway enbankment

with riprap.

SITE IMPROVEMENTS: To prevent further undermining of the approach slabs, maintenance consisting of a quarter acre of debris removal

along with installation of 1,000 square feet rip rap channel stabilization is recommended.

COST:

MONGMONG VILLAGE



MM-101

LOCATION:

Sergeant Roy T. Damian (RT 33) & RT 8

MITIGATION TYPE:

Storm Drain Improvement/ Treatment BMP Improvements

SITE ASSESSMENT:

Concentrated flow from Route 8 on and off ramps discharge to Rt33 at a location where the apartment complex at 105 Roy T. Damian is located. Building gets flooded from runoff. Need to add catch basins with a pipe outletting to the Hagatna river, which is located behind this apartment complex. Need to add underground infiltration chamber or media filter to system (assume underground infiltration chamber @ \$500,000)

RECOMMENDED IMPROVEMENTS

To prevent the continuation of flooding at 105 Roy T. Damian, improvements to the storm drain system need to be made to the Rte 8/ Rte 33 intersection. The proposed improvements are to add 2 catch basins connected by 200'x24" RCP, conveying flow from Rte-8 to the east side of Rte 33, across Rte 33 to the west side where it can outlet to an existing drainage flow path along the Agana River. In order to treat the runoff, it is recommended that an underground infiltration vault be constructed under Rte 33 to accommodate the water quality volume of the roadway runoff. It is apparent that sufficient right of way is unavailable for placement of a bioswale downstream of the proposed drainage network. The outlet of the drainage system will consist of a headwall/wingwall structure, leading flow to a 100 square foot rip rap energy dissipator.

COST:

\$1,008,000

PITI VILLAGE



Pi-101

LOCATION:

RT 1 & Masso River to 1000' North

MITIGATION TYPE:

Coastal Protection

SITE ASSESSMENT:

There is significant coastline erosion, if not taken care of will undermine Route 1. Need to add riprap all along the

coastline.

RECOMMENDED

IMPROVEMENTS

To prevent further shoreline erosion, maintenance including 1 acre of debris removal and placement of 10,000 square feet of rip rap coastal stabilization (approximately 10-ft in width along the shoreline) from Masso River to

1000 feet north of the river is recommended.

COST:

\$1,430,000



LOCATION:

RT 1 & Santos Memorial Park

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A double 36" cross culverts runs under Route 1 and outlets on the north side of Pedro Santos Park. These culverts are under sized and there is significant sediment blocking the downstream end, they carry runoff from the south side of Route 1 from Mary Pling St. This double cross culvert should be replaced with a RCB with wingwalls, downstream debris and sediment should be removed also.

RECOMMENDED IMPROVEMENTS

In order to provide sufficient conveyance capacity, the existing culvert should be replaced with 200 linear feet of a 3'x5' RCB equipped with headwall/wingwall structureson the upstream and downstream sides of the culvert. To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is required.

COST:

\$394,000



PI-103

LOCATION:

Mary Pelen & J.M. Tuncap St

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

This area flows to the 2-36" cross culverts at Rt1. A 24" RCP cross culverts carries from from the area to the 2-36" RCP cross culverts. Homes have encroached into the earthen swales. Need to improve the drainage system in order to prevent the flooding of homes, also this area is in the flooding zone. Need to clear earthen channel of debris and vegetation and replace the 24" RCP cross culvert with a double 36" cross culverts with headwalls on both ends.

RECOMMENDED IMPROVEMENTS

In order to provide sufficient conveyance capacity, the existing 24" culvert should be replaced with 100 linear feet of double 36" RCP culvert with headwall/wingwall structures on the upstream and downstream sides of the culvert. To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including a 200 sq ft energy dissipator located at the downstream side of the culvert is recommended.

COST:

\$186,000



LOCATION:

A Quenga St & Assumption Drive

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

This area flows to the 2-36" cross culverts at Rt1. There is a double 36" RCP cross culvert that crosses under A Quenga St, upstream there is an earthen channel and downstream an concrete lined channel, both need debris and vegetation removal with slope stabilization at earthen channel.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is

recommended.

COST:



LOCATION: **Assumption Drive**

MITIGATION TYPE: **Erosion Control/ Conveyance Maintenanc**

SITE ASSESSMENT: Cross culvert under Assumption Drive discharges to a tributary to Masso River. Need to clear overgrown vegetation

at the downstream end and provide outlet energy dissipation to prevent flooding.

RECOMMENDED To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 **IMPROVEMENTS**

square feet of rip rap stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is

recommended.

COST: \$143,000



LOCATION: **Assumption Drive & Masso River**

MITIGATION TYPE: Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT: Masso river bridge along Assumption drive. The river overtops and it has been undermining the approach slabs -

need to clear all the overgrown vegetation upstream and downstream of the bridge to prevent flooding of bridge.

The street pavement at the approach slabs needs to be fixed.

RECOMMENDED **IMPROVEMENTS** To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the bridge

is required.

COST: \$143,000



LOCATION:

Chalan Soling & RT 1

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A concrete/rock channel along Chalan Soling discharges into a triple cross culverts 18"-24" which runs under Rt1 and discharges to the Tepungan Beach. The outlet at the beach is covered with sediment. These cross-culverts should be replaced with a RCB with headwall and wingwalls at both upstream and dowsntream, and riprap at the downstream end to prevent erosion. Neighboring homes get flooded especially during high tides.

RECOMMENDED IMPROVEMENTS

In order to provide sufficient conveyance capacity, the existing culvert should be replaced with 100 linear feet of 3'x3' RCB equipped with headwall/wingwall structures on the upstream and downstream sides of the culvert. To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including a 200 sq ft energy dissipator located at the downstream side of the culvert is recommended.

COST: \$129,000



LOCATION:

RT 1 & Atantano River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt1 over Atantano river. Approach slabs are sinking, there is erosion at approach slabs, and parts of wingwalls missing. Upstream of channel there is significant erosion along embankment. Need to add erosion control(riprap) along upstream embankment and wingwalls.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 50 feet upstream of the bridge is required.

COST:



LOCATION:

RT 1 & Sasa River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt1 over Sasa river. There is undermining of approach slabs and under a water line that runs paralle to the bridge on the downstream side. Need to incorporate wingwalls to bridge on the downstream side to stop the

undermining of road and erosion.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the bridge

is required.

COST:



LOCATION:

RT 6 & Masso River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenanc

SITE ASSESSMENT:

Where Masso river crosses Rt6 there are signs of flooding of Rt6. River was not visible.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the bridge

is required.

COST:



PI-111

LOCATION:

RT 6 & Assumption Drive

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

At the intersection of Rt6 and Assumption Drive there is a 18" cross culvert that runs parrallel to Rt6 under Assumption Drive. This cross culvert carries flows from Assumption Drive and from Rt6. This culvert should be replaced with a 2'x3' minimum RCB to handle the flow. The runoff from the culvert and a swale from Assumption Drive are collected by a double 18" cross culverts at the interchange of Rt6 and Rt1(northeast corner), the entrance has a straight headwall it needs wingwalls added and debris removal.

RECOMMENDED IMPROVEMENTS

In order to provide sufficient conveyance capacity, the existing culvert should be replaced with 100 linear feet of 24" RCP equipped with headwall/wingwall structures on the upstream and downstream sides of the culvert. To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is required.

COST:

\$158,000



LOCATION:

RT 1 & Masso River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt1 over Masso River. Significant erosion on upstream river embankment, need to add riprap to stabilize area. There is a earthen graded ditch that enters the river on the north east side of the bridge, there is a lot of debris and also erosion undermining the wingwall. Need to clean the debris and line the channel with riprap to stop the undermining of wingwalls.

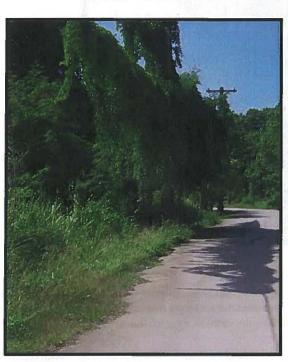
RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap channel stabilization for a distance of 25 feet upstream and 25 feet downstream of the bridge

is required.

COST:

\$143,000



LOCATION:

A Quanga St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

There is a cross culvert under this street that couldn't be located, both sides of the road are heavily vegetated with

some erosion evident.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is

recommended.

COST:

\$143,000



LOCATION:

J.C. Santos & J.M. Tuncap St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A graded swale runs along J.C. Santos and discharges to a 24" metal cross culvert that runs under J.M. Tuncap St and discharges at peling St. A house exteded its patio into the graded swale, and the cross culvert has about 1/3 of sediment and debris. Cross culvert should be increased to a 36" RCP and headwall added, and the house patio taken out of the graded swale.

RECOMMENDED

In order to provide sufficient conveyance capacity, the existing 24" culvert should be replaced with 100 linear feet of 36" RCP culvert with headwall/wingwall structures on the upstream and downstream sides of the culvert. To prevent further erosion, maintenance including 1/4 acre of debris/ sediment removal (and removal of the patio in the flow path) along with erosion control including 1000 sq ft of rip rap channel stabilization placed 50 feet upstream and 50 feet downstream of the culvert is recommended.

COST:

\$507,000



LOCATION:

RT 1 & Taguag River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Cross culvert RCB under Rt1, this is possibly the Taguag river. RCB in good shape, downstream channel needs to remove a palm tree that is growing on the side of the concrete/rock embankment and repair the embankment.

RECOMMENDED IMPROVEMENTS

To prevent further erosion, maintenance including 1/4 acre of debris removal and erosion control including 1,000 square feet of rip rap stabilization for a distance of 25 feet upstream and 25 feet downstream of the culvert is

recommended.

COST:

\$143,000



LOCATION:

RT 1 & Tepungan Beach Park

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvemen

SITE ASSESSMENT:

A double 36" Cross culvert runs under Rt1 and discharge to the Tepungan Beach Park, just south from the Tepungan Beach Parking lot. The two pipes are covered with sand, one is about 2/3 covered and the other close to 100%. The

sand needs to be removed and the area graded so flow can continue to the beach.

RECOMMENDED IMPROVEMENTS

Maintenance and improvements need to be made to the existing drainage conveyance system to allow for the flow to be adequately conveyed to the shore. Maintenance including one quarter acre of debris and sediment removal is required. Replacement of the double 36-inch pipes under the parking lot may be required (approximately 100 linear feet of 2 - 36" RCP) and upstream and downstream headwall/wingwall structures with a 200 square foot rip rap outlet energy dissipator is recommended.

COST:

\$186,000



LOCATION:

RT 11 & Commercial Port

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Existing catch basin next to Rt11, it discharges directly to the beach. There is a concern of oil spills from trucks

entering and leaving the commercial port. Add a grassed swale to hold any spills.

RECOMMENDED

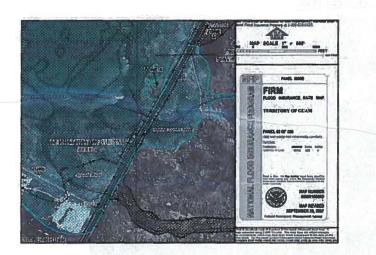
IMPROVEMENTS

In order to mitigate water quality concerns along the road, 2-100 linear foot bioswales are proposed for conveyance of runoff along the west side of the road to a grated inlet with a 100 square foot apron located at the

low point of the road. The bioswales will be located on both sides of the inlet.

COST:

\$37,900



LOCATION:

RT 1 & Polaris Point

MITIGATION TYPE:

Erosion Control/ Storm Drain Improvements/ Conveyance Improvements/ Treatment Improvements

SITE ASSESSMENT:

Raise Rt1 over Sasa, Laguas, Agueda and Atantano River flood plains by 1' for Zone X areas and by 2' for Zone A areas. Place grass strips along edges of pavement with gabion walls along raised portions of roadway. Add rip rap stabilization 50' upstream and downstream of each crossing. Place media filters at each side of 4 bridges for on-site drainage system. Add storm drain network (22 catch basins, 6500' of 24" storm drain to media filters).

RECOMMENDED IMPROVEMENTS

Raise Rt1 over Sasa, Laguas, Agueda and Atantano River flood plains for a total distance of 13,000 feet (raise 1 ft for a distance of 4000' at Sasa River, raise 2' for a distance of 4000' at Atantano River and raise 2' for a distance of 5000' at Aguada and Laguas Rivers). Place gabions along the edge of right-of-way where necessary to raise roadway elevation (estimated 13,000 CY). Replace an estimated 30,000 SY of pavement along entire length. Add rip rap stabilization of channels for a distance of 50' upstream and downstream of each crossing (estimated 1200 CY of rip rap). Construct storm drain network along raised portion of roadway (estimated 22 catch basins and 6500' of 24" RCP). Where roadway flow is not concentrated, place biostrips along edges of pavement for treatment. Where flow enters storm drain system, add media filters at outlets to treat runoff prior to outleting into offsite waterways (estimated 8 media filters). Bioswales may be an option instead of media filters if right of way is available. Cost estimate assumes media filters.

COST:

\$32,300,000

SANTA RITA VILLAGE



SR-101

LOCATION:

#746 Obispo Olano(RT 12) & Pale Medina St

MITIGATION TYPE:

Erosion Control/ Conveyance Improvement

SITE ASSESSMENT:

Private property at 746 Obispo Olano has water seeping through the back hillside. This continous runoff has been eroding property. Needs a concrete lined channel or a riprap channel to channeliz runoff and stop the erosion. This is probably a water of the U.S. and will need EPA and DPW involvement. Uphill from this property is Santa Rita Spring, which is probably where this water is coming from.

RECOMMENDED IMPROVEMENTS

This property will require approximately 200 linear feet of concrete trapezoidal channel to convey flow from what appears to be overflow from a spring located at the back of the property to the front of the property along the edge of right of way. Approximately 1000 SF of rip rap stabilization is also needed at this site for erosion control.

COST:

\$142,000



LOCATION:

Obispo Olano(RT 12) & Pale Medina St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Adjacent to 746 Obispo Olano, a new drainage structure and a lined concrete ditch is under construction to route runoff from Pale Medina St. to an existing RCB cross culvert under Obispo Olano. This is a 6'x3' RCB which outlets on the north side of Obispo Olano. Runoff on the downstream end has eroded the natural ground and now there is a 20' drop from the street down to the bottom of the channel. This area needs to be stabilized with riprap or gabions and on top of the box, a fence should be built to protect people from falling into the channel.

RECOMMENDED IMPROVEMENTS

Recommend placement of 20' high gabion walls on each side of the culvert outlet for a distance of 50 feet downstream along with 1000 cubic feet of rip rap placed at the channel bottom for the same distance for erosion control at the site. One quarter acre of debris removal is also needed at this site.

COST:

\$166,000



LOCATION:

Pale Ramon St

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A 2-36" cross culvert under Pale Ramon St carry the flow from Obispo Olane. These culverts should be replaced with a 8'x5' RCB, and upstream and downstream needs embankment stabilization (riprap or gabions for about 200') and debris/vegetation removal.

RECOMMENDED IMPROVEMENTS

The double 36" RCP cross culvert at this site needs to be replaced with 100 linear feet of 8'x5' RCB and a headwall/wingwall structure with 2000 sq ft rip rap stabilization along the channel bottom and 1000 sq ft gabion placement along the channel sides for a distance of 200 feet upstream and downstream of the culvert. One quarter acre of debris removal is also needed at this site for maintenance and approximately 1000 sq ft of hydromulch with bonded fiber matrix is recommended at the top of the channel.

COST:

\$1,010,000



LOCATION: Namo Falls Park & Obispo Olano(RT 12)

MITIGATION TYPE: Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

A 36" RCP cross culvert under Namo Falls Rd carries flow from a rock/concrete lined channel upstream which probably carries flow from Rt12 upstream. At this location four homes get flooded. This 36" RCP cross culvert is not sufficient for all the runoff that is routed through the rock/concrete channel - it needs to be upsized to a double 36" RCP cross culvert with headwall upstream and downstream. Also the rock concrete channel sides should be raised, channel embankments upstream and downstream need to be stabilized with riprap, and the road should have curb or dike and overside drains added. There is also another low point along Namo Falls that needs a catch basin and cross culvert added.

RECOMMENDED IMPROVEMENTS

Recommend placement of 100 linear feet of 36" RCP adjacent to existing cross-culvert in order to improve conveyance capacity across roadway at this location. The new cross-culvert should be equipped with new headwall/wingwall structures upstream and downstream of the culvert. Namo Falls Road should also have a storm drain conveyance system consisting of 3 grated catch basins connecting to 100 linear feet of 24" RCP that will connect to the cross-culvert in Namo Falls Road. Channel stabilization of approximately 500 sq ft of rip rap is recommended upstream and downstream of the culvert crossing.

COST:

\$407,000



LOCATION:

Chalan Pale Duenas Haya & Sgt. Quenga St

MITIGATION TYPE:

Erosion Control/ Conveyance Improvement

SITE ASSESSMENT:

Existing 36" RCP cross culvert under Chalan Pale Duenas, street gets flooded and downstream embankment has

been eroding road. Need to add another 36" RCP cross culvert and stabilize downstream embankment.

RECOMMENDED

IMPROVEMENTS

The cross culvert at this site needs to be replaced with 100 linear feet of 5'x3' RCB and a headwall/wingwall

structure with 100 sq ft rip rap stabilization upstream and downstream of the culvert.

COST:

\$284,000



LOCATION:

Pale Ferdinan Way(RT 12A) & High School

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

An onsite drainage system within the school discharges to a dry well that is not handling all the runoff and excess runoff flows to football field. The drainage system consists of a 24" RCP cross culvert that runs under a driveway, then outlets to a concrete lined channel which discharges to the dry well at the southwest corner of the highschool. The solution is to replace the concrete channel to a grass swale and outlet it to a grated catch basin which can connect via a 36" RCP culvert to a City system along Pale Ferdinan Way.

RECOMMENDED IMPROVEMENTS

Recommend maintenance at the site including one quarter acre of debris removal, placement of a headwall/wingwall structure with a 100 sq ft rip rap energy dissipator located at the existing 24" RCP outlet, replacement of the existing concrete channel with a swale, placement of a 100-sq ft energy dissipater at the downstream end of the swale connecting to a new double 5'x3.5' RCB approximately 100' in length (sized per the Flood Control Document) and equipped with a headwall/wingwall structure. The new culvert will connect to the City system in Pale Ferdinan Way.

COST:

\$191,000



LOCATION:

Sumay Memorial St (RT 12A)

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

An existing 24" RCP cross culvert runs at an angle under Sumay Memorial St. This cross culvert is broken and is causing the roadway to collapse, also due to the alignment of the culvert the upstream headwall does not seem to be capturing all the runoff and the downstream end is covered with excessive debris and trash. Cross culvert should be replaced with a double 36" RCP cross culvert and aligned perpendicular to road and add a new headwalls upstream and downstream also with embankment stabilization both upstream and downstream.

RECOMMENDED IMPROVEMENTS

The cross culvert at this site needs to be replaced with 100 linear feet of 36" RCP, a headwall/wingwall structure with 500 sq ft rip rap stabilization (approximately 25 feet in length) upstream and downstream of the culvert and maintenance including a quarter acre of debris removal.

COST:

\$298,000



LOCATION:

RT 17 & Aplacho River

MITIGATION TYPE:

Storm Drain Improvement/ Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Bridge along Rt17 over Aplacho river. There is undermining of approach slabs and ponding, also embankment erosion. Need to add overside drains at all four corners of bridge to prevent ponding and embankment stabilization both upstream and downstream(riprap), along with debris and vegetation removal.

RECOMMENDED IMPROVEMENTS

To prevent further undermining of approach slabs and ponding, placement of 2 overside drains is recommended along with one quarter acre of debris removal upstream and downstream of the bridge and 1,000 square feet of rip rap channel stabilization placed a distance of 50 feet upstream and downstream of the bridge.

COST:

\$146,000



LOCATION:

RT 17

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

All existing CMP cross culverts under Rt17 need to be replaced with RCP cross culverts.

RECOMMENDED

IMPROVEMENTS

An estimated 5 CMP cross-culverts along Rte 17 (North of Aplacho River) from Iseke Street to Bishop FC Flores Street within the Village of Santa Rita must be replaced with RCP. Each crossing will require the addition of headwalls upstream and downstream of the culverts and an estimated 100-ft of culvert. For cost estimating purposes, all cross-culverts are assumed to be 36-inch RCP (totaling 500 linear feet of 36" RCP).

COST:

\$693,000



LOCATION:

Vicente S Borja Dr & RT 17

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Improvement

SITE ASSESSMENT:

An existing double 12" cross culvert routes flow under Vicente S. Borja Dr and discharges to an RCB that runs under a house, which outlets to Aplacho river. Upstream, a concrete ditch was enclosed and now is functioning as an RCB. The double 12" cross culverts should be replaced with a 4'x4' RCB and existing swales along the street need to be improved in order to function properly.

RECOMMENDED IMPROVEMENTS

The dual 12" RCP cross culvert at this site needs to be replaced with 100 linear feet of 4'x4' RCB equipped with a headwall and 100 sq ft rip rap channel stabilization at the upstream and downstream ends.

COST:

\$165,000



LOCATION:

Felix T Pangelinan Dr & RT 17

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

A 12" RCP cross culvert runs under Felix T Pangelinan Drive. The downstream used to be a 15' wide easement where the runoff will continue down to Vicente S. Borja Dr via a 36" RCP behind two properties. Two properties have encroached into the 15' eastment - they have built two concrete block walls and now only about 1.5' is left to route runoff. Between the two retaining walls, a well defined concrete channel that can handle the runoff should be built.

RECOMMENDED IMPROVEMENTS

The 36" RCP cross culvert at this site needs to be replaced with 100 linear feet of 6'x4' RCB (sized in accordance with the Flood Control Document) equipped with a headwall/wingwall structure at the upstream and downstream ends. Recommend an 18" rectangular concrete ditch (estimated at 500 feet in length) be placed between the existing retaining wall structures that will convey the flow to the upstream side of the 6'x4' RCB.

COST:

\$219,000



LOCATION:

Felix T Dydasco Dr & RT 17

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Improvement

SITE ASSESSMENT:

Felix Dydasco Dr does not have any drainage conveyance sytem to outlet runoff properly and it ponds the street. Runoff from this street flows to Felix T. Pangelinan Dr. Need to add a cross gutter across street to prevent

ponding, and to allow runoff flow downstream.

RECOMMENDED IMPROVEMENTS

Place a storm drain system along Felix Dydasco Dr consisting of 100' of concrete ditch, 100 linear feet of a 6'x4' RCB (per Flood Control Document) with a headwall/wingwall structure upstream and downstream of the culvert.

COST:

\$259,000



LOCATION:

RT 17 & Felix T Dydasco Dr

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Runoff from Rt17 flows towards Felix T. Dydasco Dr. Need to add swales along Rt17 to keep runoff from entering

Felix T. Dydasco Dr, and outlet the swales towards Felix T. Pangelinan Dr where the runoff can be routed.

RECOMMENDED IMPROVEMENTS

Recommend grading a 1,000 linear foot ditch along Rte 17 to convey flow downstream of Felix T. Dydasco Drive toward Felix T. Pangelinan Dr. Recommend placing a 36" culvert under Felix T. Dydasco Drive to convey flow upstream of the road to the ditch downstream of the road. The culvert should include approximately 100'x36" RCP and headwalls with 100 sq ft rip rap stabilization placed upstream and downstream of the culvert.

COST:

\$174,000



LOCATION:

RT 12 & Navy

MITIGATION TYPE:

Erosion Control/ Storm Drain Improvement

SITE ASSESSMENT:

Runoff from the Navy is being routed via cross culverts under Rt12. Need to add headwalls to these existing cross culverts, a connecting storm drain system and embankment stabilization upstream and downstream of these

cross culverts.

RECOMMENDED IMPROVEMENTS

Recommend adding headwall/wingwall structures with 100 sq ft rip rap energy dissipators to the upstream and downstream ends of the existing cross culverts at Rte 12. A storm drain system connecting to these cross culverts is needed along Rte 12 consisting of a 200 linear foot ditch adjacent to both sides of the crowned road conveying flow to a catch basin located at the low point on both sides of the road. The catch basins will connected to a new 24" RCP in the road that will route flow to the cross culvert.

COST:

\$168,000



SR-116

LOCATION:

RT 12 & Navy Base Entrance

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

A trapezoidal concrete channel at the entrance of the navy base needs debris removal, couldn't locate outlet.

RECOMMENDED IMPROVEMENTS

A quarter acre of debris removal and the replacement of one catch basin is recommended at the end of the concrete trapezoidal ditch at this site. The system is assumed to connect to an existing storm drain system in the

road.

COST:

\$7,890



LOCATION:

Juan P Sarmento Dr & Pedro Roberto Dr (Rt12)

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Two 48" RCP cross culverts run under Juan P. Sarmento Dr. These two culverts are on top of each other there is significant embankment erosion both upstream and downstream. Replace cross culverts with a 8'x5' RCB cross culvert with headwall and wingwalls both upstream and downstream. Need also to clear debris and vegetation upstream and downstream.

RECOMMENDED IMPROVEMENTS

The double 48" RCP cross culvert at this site needs to be replaced with 100 linear feet of 8'x5' RCB and a headwall/wingwall structure with 500 sq ft rip rap stabilization upstream and downstream of the culvert. One quarter acre of debris removal is also needed at this site.

COST:

\$465,000



LOCATION:

Vicente D. Lizama Dr & Pedro Roberto Dr (RT 12)

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Along the north side of Vicente D. Lizama Dr a series of 24" RCP cross culverts and swales route runoff towards a junction structure at Rt12. The upstream channel need debris removal and embankment stabilization, the receiving junction structure outlets to a channel that needs debris and vegetation removal and embankment stabilization.

RECOMMENDED IMPROVEMENTS

In order to provide sufficient erosion control, the channel located upstream of Route 12 (along the north side of Vicente D. Lizama Drive) should be stabilized with 500 sq ft of rip rap for a distance of approximately 25 feet and the channel located downstream of the structure should be stabilized for a distance of 25 feet with 500 sq ft of rip rap A quarter acre of debris removal, and placement of two headwalls with wingwalls (one upstream of Rte 12 and one downstream of Rte 12) are also recommended.

COST:

\$177,000



LOCATION:

Pedro Roberto Dr (Rt12) & RT 17 & RT 5

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A 36" CMP under Rt17 routes flow from an upstream channel along Pedro Roberto Dr and discharges to another channel downstream. This 36" CMP cross culvert needs to be replaced with a 33'x3' RCB along with the upstream headwall. Both upstream and downstream channels need debris and vegetation removal and embankment stabilization.

RECOMMENDED IMPROVEMENTS

The 36" CMP cross culvert at this site needs to be replaced with 100 linear feet of 3'x3' RCB equipped with a headwall/wingwall structure and 500 sq ft rip rap channel stabilization at the upstream and downstream ends.

COST:

\$242,000



LOCATION:

Obispo Olano(RT 12) & Namo Falls Park

MITIGATION TYPE:

Erosion Control/ Storm Drain Improvement/ Storm Drain Maintenance

SITE ASSESSMENT:

Along Rt12 at a curve just north of Namo Falls Park the roadway is being undermined. Need to stabilize roadway

embankment with riprap and need to add ac overside drains.

RECOMMENDED IMPROVEMENTS

Recommend placement of an AC Spillway along Rte 12 at this location and 2,000 square feet of rip rap stabilization for erosion control. Maintenance in the form of one quarter acre debris removal is also needed.

COST

\$285,000

SINAJANA VILLAGE



SV-101

LOCATION:

Chalan Gumayuus & Pipino Ct

MITIGATION TYPE:

Erosion Control/ Treatment BMP Improvement

SITE ASSESSMENT:

Infiltration basin where runoff entering the basin from the street has been eroding adjacent property. Need to stabilize basin embankment next to the private property with gabions.

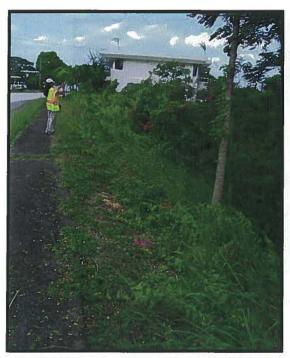
RECOMMENDED

IMPROVEMENTS

To prevent further erosion of infiltration basin embankment and to the adjacent property at this site, a quarter acre of debris removal followed by placement of 400 SF of gabions along the infiltration basin embankment and placement of approximately 100 square feet of rip rap at the bottom of the gabions is recommended.

COST:

\$72,300



SV-102

LOCATION:

RT 24A

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Street embankment on the east side needs stabilization, the slope is very steep and embankment has been

eroding and may begin undermining roadway.

RECOMMENDED

IMPROVEMENTS

To prevent further erosion, a quarter acre of debris removal followed by placement along the road embankment

of approximately 500 square feet of rip rap stabilization is needed.

COST:

\$52,400

TALOFOFO VILLAGE



TA-101

LOCATION:

E Johny S Taitague St & San Miguel St

MITIGATION TYPE:

Strom Drain Improvement/ Treatment BMP Improvement

VILLAGE RANKING

14

SITE ASSESSMENT:

24" RCP cross culvert under E Johny S Taitague St needs headwalls upstream and downstream. Possible floods one

property and also street. Add drainage system to street.

RECOMMENDED IMPROVEMENTS

To prevent flooding, construct a storm drainage system along E Johny S Taitague Street consisting of 500' of channel located on both sides of low point. At low point, add 1 catch basin equipped with apron connecting to existing 24"

RCP cross-culvert outletting flow into a 100 square foot rip rap energy dissipator to a bioswale.

COST:

\$134,000



LOCATION:

Ignacio P Quitugua & Jose P Cruz St

MITIGATION TYPE:

Strom Drain Improvement/ Treatment BMP Maintenance/ Treatment BMP Improvemen

SITE ASSESSMENT:

At low point of Ignacio P Quitugua St south of Jose P Cruz St the existing infiltration basin does not work. Need to clear infiltration basin of debris and overgrown vegetation in order to make it work. Also increase depth of basin to

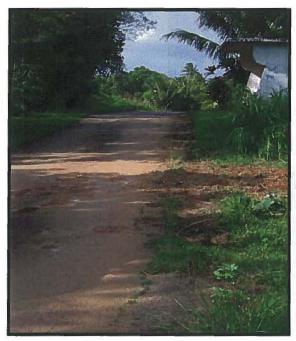
add more capacity.

RECOMMENDED IMPROVEMENTS

Existing infiltration basin is under capacity. Propose a new, deeper infiltration basin at the same site with a depth of 6 feet, width of 50 feet, and length of 200 feet with 500 linear feet of fencing. Also add an AC spillway to route street runoff into new infiltration basin at this site.

COST:

\$120,000



LOCATION:

Ignacio P Quitugua

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

Add a drainage conveyance system to collect street runoff, and route to the infiltration basin.

RECOMMENDED IMPROVEMENTS

A storm drain system is needed to collect and convey street runoff along Ignacio P Quitugua Street. Propose one catch basin placed at the street's low point, and convey flow to the proposed infiltration basin via 300 linear feet of 24" RCP. Pipeline outlet shall consist of a headwall/wingwall structure with a 100 square foot rip rap energy

dissipator located at the infiltration basin.

COST:

\$320,000



LOCATION:

Francisco A Reyes Ave & Ignacio P Quitugua

MITIGATION TYPE:

SITE ASSESSMENT:

Add swales and cross gutters along north side of Francisco A Reyes Ave. East of Ignacio P. Quitugua will be routed to the infiltration basin at Ignacio P. Quitagua. West of Ignacio P. Quitugua runoff will be routed to the 36" RCP cross

culvert at David Gorton St.

Conveyance Improvement

RECOMMENDED IMPROVEMENTS

A conveyance system is needed to collect and convey street runoff along the north side of Francisco A. Reyes Ave.

The system will consist of approximately 1,000 linear ft of concrete ditch with interim culverts located at driveways (consisting of approximately 100 linear foot of 12" RCP and 6 headwall/wingwall structures). The ditch will route

flow to the infiltration basin at Ignacio P. Quitugua.

COST:

\$173,000



LOCATION:

Francisco A Reyes Ave & Leonardo C Tenorio St

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

Add a drainage conveyance system along Francisco A Reyes Ave and route to will be routed to the 36" RCP cross

culvert at David Gorton St.

RECOMMENDED

IMPROVEMENTS

A conveyance system is needed to collect and convey street runoff along Francisco A. Reyes Ave. (West of Ignacio P. Quitugua). The system will consist of approximately 2,000 linear ft of concrete ditch with interim culverts located at driveways (consisting of approximately 200 linear foot of 12" RCP and 12 headwall/wingwall structures). The ditch

will route flow to the 36" RCP cross culvert at David Gorton Street.

COST:

\$390,000



LOCATION: Leonardo C Tenorio & Jose P Cruz St

MITIGATION TYPE: Conveyance Improvement

SITE ASSESSMENT: Add a drainage conveyance system(swales and cross culverts) along Leonardo C Tenorio St towards Jose P. Cruz St.

From Jose P.Cruz add another drainage conveyance system and bring it west to the fire station where runoff can

outlet towards the Togcha river.

\$390,000

RECOMMENDED

IMPROVEMENTS

A conveyance system is needed to collect and convey street runoff along Leonardo C Tenorio Street. The system will consist of approximately 2,000 linear ft of concrete ditch with interim culverts located at driveways (consisting of approximately 200 linear foot of 12" RCP and 12 headwall/wingwall structures). The ditch will route flow toward Jose P Cruz, then westerly to the fire station, outleting to an existing flow path toward the Togcha River.

COST:



LOCATION: Jose P Cruz St & N. San Miguel St

MITIGATION TYPE:

Strom Drain Improvement/ Treatment BMP Improvement

SITE ASSESSMENT:

Along Jose P. Cruz St just east of N. San Miguel St a street low point is located and one house gets flooded. Need to add a drainage conveyance system(swales and cross culverts) to route runoff to the west along Jose P Cruz

St(towards the fire station).

RECOMMENDED IMPROVEMENTS

To prevent future flooding, construct a storm drain system along Jose P. Cruz Street. Place two catch basins at the

street's low point connecting to 100 linear feet of 24" RCP (routing flow westerly) equipped with a headwall/wingwall structure and a 100 square foot rip rap energy dissipator at its outlet. Add a 100 linear foot

bioswale to the end of the energy dissipator.

COST:

\$153,000



LOCATION:

David Gorton St & Jose P Cruz St

MITIGATION TYPE:

Conveyance Improvement/ Conveyance Maintenance/ Treatment BMP Improvement

SITE ASSESSMENT:

A 36" RCP cross culvert runs under David Gorton St where a low point is located(south of Jose P. Cruz St). This is the lowest point of Talofofo village and most of the village runoff is routed to this low point. The cross culvert is clogged with debris and sediment. It floods about four properties. Need to upsize system to accommodate all runoff and clear upstream and downstream of debris and overgrown vegetation.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of area properties it is necessary to upsize the current conveyance system. The 36" RCP clvert should be replaced with 100 linear foot of 48" RCP equipped with headwall/wingwall structures on the upstream and downstream side. Downstream, a 100 sq ft rip rap energy dissipator and 200-ft bioswale is recommended.

COST:

\$188,000



LOCATION:

Juan P Mantanona St & David Gorton St

MITIGATION TYPE:

Conveyance Improvement

SITE ASSESSMENT:

Add swales on both sides of Juan P Mantanona St to route runoff from David Gordon St and also from Juan P

Mantanona to an existing wetland at the end of the street.

RECOMMENDED IMPROVEMENTS

Construct a conveyance system to route runoff from David Gordon Street and Juan Mantanona Street to an exisiting wetland at the end of Juan Mantanona Street. Construct ditches along both streets (totaling approximately 2,000 linear ft of concrete ditch), with interim culverts located at driveways (consisting of approximately 200 linear foot of

12" RCP and 12 headwall/wingwall structures).

COST:

\$390,000



LOCATION:

Ernest P Santos St & Siguansa

MITIGATION TYPE:

Conveyance Maintenance/ Storm Drain Improvement

SITE ASSESSMENT:

An existing catch basin at the intersection of Ernest P Santos St and Siguansa has been plugged. The 36" RCP outlet pipe needs to be unplugged and extended along Siguansa for about 200' to an existing wetland (federal easement).

RECOMMENDED IMPROVEMENTS

Replace existing catch basin and connect 300 linear feet of 24" RCP to existing RCP. Equip outlet with a headwall/wingwall structure and a 100 square foot rip rap energy dissipator.

COST:

\$320,000



LOCATION:

Pasaderun Francisco Diego & Ernest P Santos St

MITIGATION TYPE:

Strom Drain Improvement/ Treatment BMP Improvement

SITE ASSESSMENT:

Runoff from Ernest P Santo St floods five homes along Pasaderun Francisco Diego. Add a drainage conveyance system (Catch basin and 24" culverts) along Ernest P Santos St from its street high point(nort of Pasaderun Francisco Diego) and route it to Siguenza to the existing wetland, this will capture all runoff from Ernest P. Santo St and should prevent flooding of Pasaderun Francisco Diego.

RECOMMENDED IMPROVEMENTS

Runoff floods several homes at this site. A drainage conveyance system needs to be added along Ernest P Santos street conveying runoff from its high point to the wetlands at Siguenza. The flow will be captured with two catch basins (one on each side of the street) at the low point in the road. The catch basins will connect to approximately 200 linear feet of 24" RCP with a headwall/wingwall structure and 100 square foot rip rap energy dissipator at its outlet. Construct a 100 linear foot bioswale downstream prior to conveyance to the wetland.

COST:

\$247,000



LOCATION:

RT 4 & Togcha River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenancee

SITE ASSESSMENT:

Bridge along Rt4 over Togcha river. There is erosion on bridge embankment both upstream and downstream, need

to add embankment stabilization (riprap), and need to clear debris and overgrown vegetation.

RECOMMENDED IMPROVEMENTS

To prevent further erosion on the bridge embankment at this site, remove approximately 1,000 square feet of debris at bridge embankments and add approximately 1000 sq ft of rip rap (500 sq feet along each embankment) for

embankment stabilization.

COST:

\$143,000



TA-113

LOCATION:

RT 4 & Pacifico Drive

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

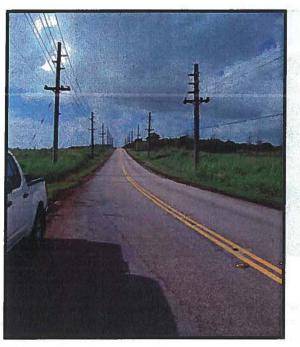
At the intersection of Rt4 and Pacifico Drive two properties gets flooded(Pacifico Drive #108 and #113). Need to add a catch basin at each corner of Pacifico Drive and connect them via a 24" RCP then route it via another 24" RCP to the low point along Rt4 where another cross culvert with headwall will route runoff to the east where it will outlet to the Pacific ocean.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties at this site, construct a storm drain system consisting of 4 catch basins (one at each corner of Pacifico Drive) connected by approximately 400 linear feet of 24" RCP routing flow easterly to an outlet equipped with a headwall/wingwall structure outletting to a 100 square foot rip rap energy dissipator prior to outleting to the Pacific Ocean.

COST:

\$432,000



LOCATION:

RT 4A

MITIGATION TYPE:

Conveyance Improvement/ Storm Drain Improvement

SITE ASSESSMENT:

Low area along Rt4A and water ponds. Need to add a drainage conveyance system to the south side of the road.

RECOMMENDED IMPROVEMENTS

To prevent future ponding at the Rte 4A low point, construct a drainage conveyance system along both sides of the road consisting of approximately 3000 LF of ditch on both sides of the low point. Capture flow with two catch basins and convey flow to the south using approximately 50' of 24" RCP.

COST:

\$86,800



LOCATION:

RT 4 & Golf Course

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

At a low point along Rt4 next to the golf course, two grated catch basins need to be improved to be more effective.

Depress grate and add a concrete apron.

RECOMMENDED

IMPROVEMENTS

There are currently 2 catch basins at this site that need to be replaced with 2 new grated catch basins with aprons to

improve interception capacity.

COST:

\$11,900



LOCATION:

RT 4 & Talofofo Beach Park

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Need to extend and raise existing jetty and extend riprap to talofofo beach to stop erosion of beach.

RECOMMENDED IMPROVEMENTS

To prevent further shoreline erosion as a result of high tides, install 20,000 square feet of rip rap coastal stabilization (approximately 10-ft wide along the shoreline) for a distance of approximately 2000 feet along Talofofo Beach at Rte

4.

COST:

\$2,810,000

TAMUNING VILLAGE



TV-101

LOCATION:

RT 1 & Jalaguac wy

MITIGATION TYPE:

Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

Runoff from the airport floods the area around the Pizza Hut along Rt1 and Jalagua way. Need to capture runoff at airport to prevent this flooding. Also clear debris and add channel to route flow to Tamuning Drainageway. Add

erosion control downstream of bluffs.

RECOMMENDED IMPROVEMENTS

To prevent future flooding in this area, construction of a 200 linear foot concrete trapezoidal channel routing flow from Jalagua Way to the Tamuning Drainageway is proposed. A quarter acre of debris removal will be needed along

with erosion control at the channel outlet in the form of 1,000 square feet of rip rap.

COST:

\$314,000



LOCATION:

Tun Josen Tovas Way

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

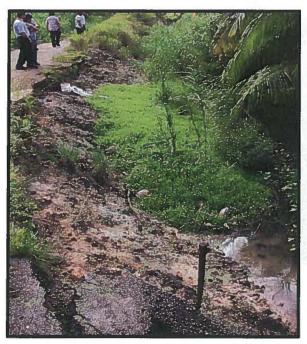
Runoff from the airport floods this area along Tun Josen tovas Way. Need to capture runoff at airport to prevent this

flooding. Add drainage system to prevent flooding in road.

RECOMMENDED IMPROVEMENTS

To prevent future flooding in this area, construction of a storm drainage system in this area is required. Construction of 2 catch basins along Tun Josen Tovas Way, connected to 100' of 24" RCP which routes flow to a double 3'x5' RCB is recommended. Approximately 200 linear feet of the RCB will be required to convey flow southerly toward the proposed concrete trap channel at Jalagua Way. An easement will be required for this RCB.

COST: \$315,000



LOCATION:

Tamuning Outlet Channel

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Tamuning Drainage Way Channel is highly eroded and needs stabilization for entire length to coast along with debris

removal.

RECOMMENDED IMPROVEMENTS

Conveyance maintenance and improvement is needed along the entirety of the Tamuning Drainage Way Channel from Rte 1 to the coast (approximately 2500 feet). Maintenance including approximately five acres of debris removal is needed along with emabnkment stabilization for both embankments along the 2500 ft length (estimated at 50,000 sq ft of rip rap along each embankment).

COST:

\$14,100,000



LOCATION:

Estrellita Court

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

A storm drain discharges to a private property. Need to route storm drain to a drainage conveyance system along Rt1.

RECOMMENDED IMPROVEMENTS

At this site, a storm drain at the end of Estrillita Court discharges to a private property. It is recommended that a storm drain pipeline be installed at the outlet of the pipe to convey flow westerly (requiring an easement on the existing parcel) to a utility/ street easement located on the west side of the parcel. Along this existing easement, the pipeline should be routed southerly to outlet to the natural flow path of the terrain that eventually drains to the corner of Rte 14 and Pale Leon Murphy Street. The proposed improvements include 400 linear feet of pipeline (24 to 36 inch), 2 junction structures, and an outlet consisting of a headwall/wingwall with a 100 square foot rip rap energy dissipator.

COST:

\$420,000



LOCATION:

N. Sgt David Camacho St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

There is no drainage conveyance system along this street. Need to add a drainage conveyance system (and possibly infiltration trenches to outlet flow) in order to prevent flooding of street and private properties.

RECOMMENDED IMPROVEMENTS

A drainage conveyance system is needed along N. Sgt David Camacho Street to prevent future flooding of the street and surrounding private properties. Recommendations include placement of approximately 200 linear feet of ditch adjacent to the street routing flow to a 200 linear ft infiltration trench.

COST:

\$21,000



LOCATION:

Sand Castle & Pale San Vitores Rd

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

The back of San Castle property gets flooded since a new development is under construction in the back and has created a low point where water ponds. Owners of Sand Castle have installed a pump to pump the water out to Pale San Vitores(Rt14) via a pvc pipe. The pump is a temporary solution.

RECOMMENDED IMPROVEMENTS

A new development that is being constructed behind the Sand Castle property has created a low point in the back of the property causing flooding. It is recommended that the runoff at the back of the property be intercepted and conveyed to the front of the property and connected to the existing storm drain system in Pale San Vitores Rd. The system would consist of 2 catch basins connecting to 100 feet of 24" RCP that would route the runoff to the existing storm drain system.

COST:

\$106,000

LOCATION:

Fujita Rd

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

This road does not have a drainage conveyance system and runoff flows to Tumon Bay without treatment. Need to add

a drainage conveyance system along road to capture and treat runoff before being discharged to bay.

RECOMMENDED

IMPROVEMENTS

Fujita Rd has no drainage system in this area. A drainage conveyance system is needed along the road to capture and convey the runoff to the Fujita Ponding Basin. The system consists of 2 grated catch basins placed at the low point of the crowned roadway (on both sides of the road), connecting to 100 linear feet of 24" RCP outleting to the adjacent ponding basin with a headwall/ wingwall structure and a 100 square foot rip rap energy dissipator placed at the outlet.

COST:

\$137,000



LOCATION:

RT 27 & McDonalds

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

 $There is no drainage conveyance system along this route. \ Need to build a drainage conveyance system. \ Possible$

solution will be to build infiltration trenches along the route.

RECOMMENDED IMPROVEMENTS

A storm drain system along this section of Rte 27 is required to alleviate flooding at this site. In order to capture and convey flow at this site, a system including two catch basins connecting to approximately 400 linear feet of 36" RCP

routing flow to the storm drain system in Rte 16 is recommended.

COST:

\$597,000



LOCATION:

RT 27 & Anthurium Ln

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At the intersection of Rt27 and Anthurum Ln no drainage conveyance system exists and this interchange constantly floods. Need to build a drainage conveyance system, possible solution will be to build infiltration trenches along Rt27 and along Anthurium Ln.

RECOMMENDED IMPROVEMENTS

The lack of a drainage conveyance system along Rte 27 in this area causes constant flooding. A storm drainage system is recommended in Rte 27, capturing runoff at the low point in the crowned roadway with two catch basins connecting to 400 linear feet of 24" RCP outletting to a 100 square foot rip rap energy dissipator. At the outlet, installation of a 200 foot infiltration trench is proposed to resolve the flooding problems that currently take place at this site.

COST:

\$423,000



LOCATION:

RT 27 & RT 1

MITIGATION TYPE:

Strom Drain Improvement

SITE ASSESSMENT:

There is a local depression at the interchange of Rt27 and Rt1. Need to add a drainage conveyance system to capture runoff at the low point(catch basin) and connect this system to existing system along Rt1. The low point is creating ponding of retail/commercial properties.

RECOMMENDED IMPROVEMENTS

To avoid further ponding of retail/commercial properties at this intersection, a storm drainage system is needed to intercept and convey flow from Rte 27 to Rte 1. The system will consist of 2 grated catch basins located at the low point along Rte 27 (on both sides of the street), connecting into the existing Rte 1 drainage system via 200 linear feet of 24" RCP.

COST:

\$140,000

UMATAC VILLAGE



UM-101

LOCATION:

RT 2 & Umatac River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

River bed and bay need to be dredged. Need embankment stabilization upstream of bridge(riprap, gabions), need to clear all overgrown vegetation and debris. Due to the accumulation of sediment on the river bed the river capacity has diminished and is causing homes within the river proximity to get flooded, on the last flooding two homes were flooded on the south side of the river.

RECOMMENDED IMPROVEMENTS

To prevent further loss of the river bed and flooding of surrounding homes, approximately two acres of debris removal to clear out all overgrown vegetation and accumulated debris and approximately 2,000 cubic yards of sediment removal is required at the site. Embankment stabilization (both sides) is required from the shoreline upstream for approximately 1000 feet (totaling 20,000 square feet of rip rap placement) as a means of implementing erosion control and to maintain the conveyance system.

COST:

\$2,820,000



LOCATION:

Finona St & Madog River

MITIGATION TYPE:

Erosion Control/Conveyance Improvement/Conveyance Maintenance

SITE ASSESSMENT:

A home has been flooded by the river at the end of Finona St. Soils and rocks were brought to the property to keep the river from flooding the home. This is a temporary solution to the problem. The river alignment needs to be realigned to prevent continued flooding of this property, and the river bottom should also be dredged at this location to remove the accumulated sediment. Other two homes have been flooded in this area but not as bad as the home at the end of the street.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of area properties/homes, recommend one acre of debris removal along with 1000 cubic yards of sediment removal within the channel to minimize meandering and improve capacity. Also recommend stabilization of the river embankment through the placement of 10,000 square feet of rip rap channel stabilization for a distance of approximately 400 feet downstream of the site and 100 feet upstream of the site.

COST:

\$1,420,000



LOCATION:

Finona St & Jose A Quintana St

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

2-24" RCP cross culverts run under Finona St. These two culverts route runoff to the Umatac river, and the downstream side of the culverts have significant erosion. Need to remove debris both upstream and downstream, and also clear any overgrown vegetation and the downstream side of the culverts need embankment stabilization(riprap).

RECOMMENDED IMPROVEMENTS

A quarter acre of debris removal is needed to clear accumulated debris and any overgrown vegetation uprstream and downstream of the existing culverts crossing Finona Street. It is also recommended that an additional 100 linear feet of 24" RCP be placed adjacent to the existing dual 24" RCP culverts to improve capacity and the upstream and downstream headwalls be replaced with new headwall/wingwall structures accommodating all 3 culverts with 100 SF rip rap placed on the upstream and downstream sides. Downstream, approximately 1000-ft of concrete channel outleting to the Umatic River through a 100 sq ft rip rap energy dissipator is recommended.

COST:

\$158,000



LOCATION:

Finona St & Jose A Quintana St

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

There is an existing cross-gutter routing runoff upstream from Finona St and crosses Jose A Quintana St, and discharges to the west of Fiona St which outlets into the Umatac river. This cross-gutter has a non defined configuration, it needs to be replace with a cross gutter that has a defined alignment and cross section that will be capable of routing flow as intended.

RECOMMENDED IMPROVEMENTS

Improvements to the strom drain system at Finona Street and Jose A Quintana Street are needed. Recommend replacement of the cross-gutter located at the site with one that has a defined alignment and cross section capable of routing the expected flow. A 1,000 linear foot concrete ditch needs to be constructed leading to a 100 square foot rip rap energy dissipator to satisfy these needs.

COST:

\$55,900



LOCATION:

Jose A Quintana St & Finona St

MITIGATION TYPE:

Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

A 24" RCP cross culvert runs under Jose A Quintana St. The upstream end of the culvert is not visible, and the downstream end is more than half its depth covered with sediment. This culvert need embankment stabilization upstream and downstream(riprap) and its needs to be extended to the Umatac river. Also it needs debris, sediment, and overgrown vegetation removed upstream and downstream.

RECOMMENDED IMPROVEMENTS

To prevent further erosion of the channel embankments and sedimentation of the existing culverts, erosion control and conveyance maintenance and improvements are required. The existing culvert under Jose A Quintana St. should be replaced with a larger 30" culvert (approximately 100- feet long) equipped with upstream and downstream headwall/wingwall structures with 100 SF rip rap energy dissipation placed on the downstream side. One quarter acre debris/ sediment removal will be required as part of the improvements.

COST:

\$144,000



LOCATION:

RT 2 & Jagar Dr

MITIGATION TYPE:

Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

At the interchange of Route 2 and Jagar Drive a two drainage systems need to be modified to prevent homes from flooding downstream. There is a 36" RCP cross culvert that crosses RT2 and discharges to the west of Rt2, this culvert has headwalls both upstream and downstream which both end have excessive overgrown vegetation. There is another 30" RCP culvert coming from Jagar Drive, this culvert ends with a headwall and then runoff continues on a ditch along RT2 east side flowing north. Both of this systems are causing homes to get flooded downstream, a solution will be to abandon the 36" RCP and route that flow to a new 36" cross culvert that will run under Jagar DR and connect to the 30" Headwall(this headwall will need to be modified). Then downstream from the 30" Cross culvert the existing ditch will be replaced with 100' of trapezoidal concrete lined channel that will route runoff to the Umatac river.

RECOMMENDED IMPROVEMENTS

Recommend modification of the 2 drainage systems located at Route 2 and Jagar Drive in order to minimize future flooding of homes located west of Route 2. Improvements would include abandonment of the existing 36" RCP under Rte 2, placement of a new 36" RCP (estimated at 200 LF in length) under Jagar Drive at its intersection with Route 2 (routing flow northerly along the east side of Rte 2). The outlet of the new 36" RCP would be adjacent to the outlet of the existing 30" RCP that runs diagonally under Jagar Drive. Recommend replacement of the outlet structure with a new, larger headwall/wingwall stucture that can accomodate the 30" and 36" RCP. Recommend replacement of the downstream ditch (conveying flow northerly to the Umatac River) with a concrete trapezoidal channel (estimated at 100 feet in length) and a 100 sq ft rip rap energy dissipator located at the outlet of the concrete ditch. A quarter acre of debris removal is also needed to clear out debris and vegetation that have accumulated around the upstream and downstream headwalls of the existing culverts. A headwall/wingwall structure will also be required at the upstream end of the new 36" RCP culvert.

COST:

\$379,000



LOCATION:

Road A

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

At the end of this Cul-de-sac, there is an existing catch basin that can not handle all the runoff that is routed to this inlet and floods 4 homes. This catch basin besides being undersized, gets clogged with debris. A solution to prevent the homes from getting flooded is to build a small wall behind the sidewalk to keep the runoff on the street, and to add more grated inlets adjacent to the existing inlet.

RECOMMENDED IMPROVEMENTS

Place a storm drain system at the cul de sac of Road A consisting of 4 catch basins connected by 150 LF of 12" - 24" RCP, outleting to 1000' of concrete ditch that routes flow around the existing homes in an existing drainage easement. A culvert may be required at the downstream end of the channel (assume 50' of 24" RCP equipped with headwall/wingwall structures). This system will ultimately route the flow to the system at Jagar Drive.

COST:

\$288,000



LOCATION:

Jose Q Aguon St & Laelae River

MITIGATION TYPE:

Erosion Control/ Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

Along the end of Jose Q Aguon St, the Laelae River is encroaching into the road and eventually it will undermine the road. Embankment stabilization(riprap) is needed to prevent the river from undermining the street. The river floods the street but it has not flooded homes.

RECOMMENDED IMPROVEMENTS

To prevent further encroachment of the Laelae River into Jose Q Aguon Street, maintenance consisting of a quarter acre of debris removal along with installation of 1,000 square feet rip rap channel stabilization along the river embankment is recommended.

COST:

\$143,000



LOCATION:

RT 2

MITIGATION TYPE:

Erosion Control/ Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

At a location along Route 2 north of the Umatac river there is a 5'x5' RCB cross culvert. Both upstream and downstream it needs embankment stabilization, and debris and overgrown vegetation removal. Downstream it needs about 200' of embankment stabilization, and upstream probably around 50' of embankment stabilization. Roadway is undermined on both sides of the RCB, roadway also needs to be stabilized.

RECOMMENDED IMPROVEMENTS

One acre of debris removal is needed to clear out accumulated debris and the overgrown vegetation. Embankment stabilization of the channel upstream and downstream of the existing culvert under Rte 2 is needed for a distance of 200 linear feet downstream (requiring approximately 4000 sq ft of rip rap stabilization) and about 50 linear feet upstream (requiring approximately 1,000 square feet of rip rap stabilization).

COST:

\$741,000



LOCATION:

RT 2 & La Sa Fua River

MITIGATION TYPE:

Storm Drain Improvement/ Erosion Control

SITE ASSESSMENT:

Along Route 2 the road has a low area with step grades, at this location the roadway only has one overside drain and the upstream side of La Sa Fua river the roadway embankment needs stabilization. More overside drains need to be added to roadway in order to discharge all the runoff from the roadway at more than one location and prevent any flooding of the roadway.

RECOMMENDED IMPROVEMENTS

Recommend placement of four AC spillways along Route 2 with approximately 100 SF of rip rap stabilization placed downstream of the spillways for energy dissipation. The additional spillways and stabilization will prevent further erosion and flooding of the road at the outlet to the La Sa Fua River.

COST:

\$61,600



LOCATION:

RT 2 & Observation Rest Area

MITIGATION TYPE:

Erosion Control

SITE ASSESSMENT:

Along Route 2 by the observation rest area, on the west side of the road the hillside has mass erosion. This erosion needs to be stabilized with probably filter fabric and ground cover in order to stop the erosion and preventing

sediment to run down the road.

RECOMMENDED IMPROVEMENTS

Recommend placement of hydroseed w/ a bonded fiber matix over approximately 1 acre of the hillside where

groundcover does not exist in an effort to control mass erosion along the hillside.

COST:

\$636,000



LOCATION:

RT 2 & Cetti River

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance/ Conveyance Improvement

SITE ASSESSMENT:

Route 2 over the Cetti river is being undermined, half of the road(west side) is undermined that it can collapse at any time. At this location a new bridge is needed (note this is part of another contract) and culverts need to be extended

along with erosion control (gabions) along embankment.

RECOMMENDED IMPROVEMENTS

To prevent further undermining of the roadway over the Cetti River, erosion control and conveyance maintenance and improvements are required. Existing culverts must be extended to a stabilized embankment. For cost estimating purposes, the extension is estimated at 200-feet and the culvert size is estimated at 5- 48" diameter pipelines. For embankment stabilization, placement of 8000 sq ft of gabions and 1000 sq ft of rip rap at the bottom. An outlet structure (headwall and 2 wingwalls) has also been included.

COST:

\$661,000



LOCATION:

RT 2 & Tributary to Sella River

MITIGATION TYPE:

Conveyance Maintenance

SITE ASSESSMENT:

A cross culvert under Route 2 routes runoff from a tributary to the Sella River. This cross culvert is in good condition,

and no erosion issues are visible; it only needs vegetation removal to prevent any clogging.

RECOMMENDED

IMPROVEMENTS

To prevent future clogging of the cross culvert at this site it is recommended that a quarter acre of debris/ sediment

be removed to promote proper drainage.

COST:

\$1,940



LOCATION:

RT 2 & Sella River

MITIGATION TYPE:

Conveyance Maintenance

SITE ASSESSMENT:

A 48" RCP cross culvert routes Sella River flow under Route 2 towards Sella bay. The cross culvert and

Headwall/wingwalls are in good condition. Vegetation removal is needed to prevent any debris accumulation and

clogging.

RECOMMENDED

IMPROVEMENTS

To prevent future clogging of the cross culvert at this site it is recommended that a quarter acre of debris/ sediment

be removed to promote proper drainage.

COST:

\$1,940

YIGO VILLAGE



YI-101

LOCATION: RT

MITIGATION TYPE: Conveyance Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

36" CSP cross culvert under Rt 9. The upstream earthen channel to this cross culvert overtops and floods neighboring 2-3 properties. The channel base seems to be a few inches lower than the 36" CSP cross culvert. This reason for the flooding is that the receiving drainage system downstream at the airforce base is not maintained properly and the system clogs, creating the channel upstream to overtop. The solution will be to regularly maintain the systems

downstream within the airforce base.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of neighboring properties at this site, approximately 1,000 square feet of debris removal along the downstream side of the culvert (on airforce base property) is needed along with drainage improvements at the culvert inlet including the addition of a headwall and two wingwalls with a 100 square foot rip rap energy dissipator.

COST:

\$41,500



YI-102

LOCATION:

Azud St

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is a low point along the street where ponding creates the flooding of 5-9 properties. There are no existing drainage systems at this location. The solution will be to add infiltration trenches along the street at the lowest

location, on both sides of the street.

RECOMMENDED IMPROVEMENTS

 $To \ prevent \ further \ flooding \ of \ properties, \ two \ 200 \ linear \ foot \ infiltration \ basins \ are \ recommended \ for \ construction$

along the crowned street at its low point.

COST:

\$39,100



YI-103

LOCATION:

Chalan Santa Bernardita

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is a low point along the street where ponding creates the flooding of 5-9 properties. There are no existing drainage systems at this location. The solution will be to add infiltration trenches along the street at the lowest location, on both sides of the street.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties, two 200 linear foot infiltration basins are recommended for construction

along the crowned street at its low point.

COST:

\$39,100



YI-104

LOCATION:

Chalan Tun Luis Duenas & Kiko Isabela loop

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

This is a low point along the street, thus creating ponding and flooding of one property. There are no existing drainage systems at this location. A possible solution will be to add infiltration trenches along the street at the

lowest location, on both sides of the street.

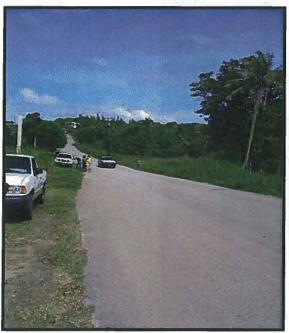
RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties, two 200 linear foot infiltration basins are recommended for construction

along the crowned street at its low point.

COST:

\$39,100



LOCATION: Cha

Chalan Tun Luis Duenas & RT 29

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Improvement

SITE ASSESSMENT:

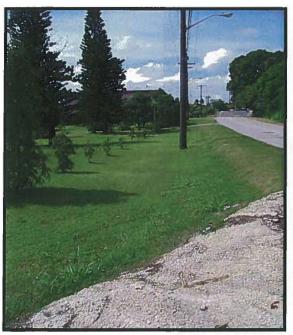
This is a low point along the street thus creating ponding and flooding 2-4 properties. There are no existing drainage systems at this location. A possible solution will be to route the flow via a conveyance drainage system to an existing infiltration behind a school's football field, an easement will be needed to run the conveyance line through a private property.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties at this site, construct a storm drain system consisting of 2 catch basins (placed at the low point of the crowned road) connected by approximately 100 linear feet of 24" RCP routing flow to a drainage ditch approximately 1000 feet in length to an existing infiltration basin located adjacent to a school yard (requiring an easement along the edge of a private property). Place a 100 sq ft rip rap energy dissipator at the outlet to the infiltration basin.

COST:

\$171,000



LOCATION:

RT 29 & Chalan tun Jose Anaco

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance

SITE ASSESSMENT:

This is a low point along the street thus creating ponding and flooding 3-4 properties. There are no existing drainage systems at this location. A possible solution will be to add a conveyance system at the low point and route the runoff through a private property where in the backyard there is an existing natural depression.

RECOMMENDED IMPROVEMENTS

To prevent further flooding of properties at this site, construct a storm drain system consisting of 2 catch basins (placed at the low point of the crowned road) connected by approximately 200 linear feet of 24" RCP routing flow along the edge of a private property (requiring an easement) to outlet to a sink located behind the property. The outlet shall include a headwall and approximately 1/4 acre of of debris removal will be needed for construction and to promote drainage.

COST:

\$225,000



LOCATION:

Gayinero Dr(RT 29) & Chalan Padiron Lagu(RT 15)

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

At this intersection all four corners flood, and possibly one property. No existing drainage conveyance systems. Add

infiltration trenches along both streets.

RECOMMENDED

IMPROVEMENTS

 $To \ prevent \ further \ flooding \ of \ properties, \ two \ 200 \ linear \ foot \ infiltration \ basins \ are \ recommended \ for \ construction$

(one along each street at its low point).

COST:

\$39,100



LOCATION:

Tun Luis Duenas Rd & RT 1

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

There is a low point along Tun Luis Duenas Rd where a home gets flooded. Need to add infiltration trench to prevent

ponding, will need to acquire r/w.

RECOMMENDED

IMPROVEMENTS

To prevent further flooding, one 200 linear foot infiltration basin is recommended for construction along the street

at its low point.

COST:

\$19,600



LOCATION: RT 1 & Chalan Chamorri

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

Low point along Route 1. There is no existing drainage conveyance system along Rt1. Chalan Chamorri is higher than

Rt1. No obvious solution to ponding.

RECOMMENDED

IMPROVEMENTS

To prevent further flooding, one 200 linear foot infiltration basin is recommended for construction along the street

at its low point.

COST:

\$19,600

YONA VILLAGE



YO-101

LOCATION:

RT 4

MITIGATION TYPE:

Erosion Control

VILLAGE RANKING

3

SITE ASSESSMENT:

New development along Rt4. Major grading of slopes, no visible signs of temporary erosion control measures.

Sediment will go to the bay downstream if no control measures implemented.

RECOMMENDED

IMPROVEMENTS

Recommend improvements to the existing stormwater pollution prevention strategy for this existing construction site in the form of 1 acre of hydromulch and 2000 LF of silt fence to prevent sediment from entering downstream

waters.

COST:

\$11,300



LOCATION:

Chalan Telefofo

MITIGATION TYPE:

Storm Drain Improvement

VILLAGE RANKING

6

SITE ASSESSMENT:

At low point of street six homes get flooded, homes are lower than the road. Need to add a drainage conveyance system along road and route it to the natural flow path, inside a private property where easement will need to be

acquired.

RECOMMENDED

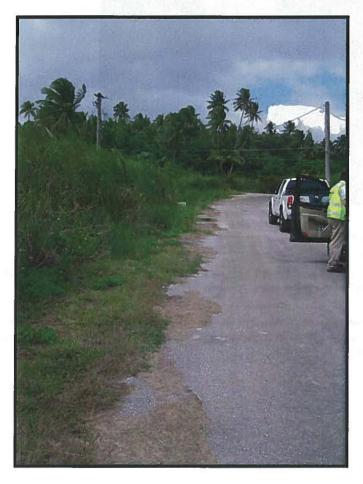
IMPROVEMENTS

Recommend placement of a storm drain system along the road. Place 2 catch basins at low point, connected by 100 LF of 24" RCP outleting to natural drainage path through a headwall/wingwall structure equipped with a 100 SF rip

rap energy dissipator.

COST:

\$137,000



LOCATION:

Jesus Santos Rd

MITIGATION TYPE:

Storm Drain Improvements/ Treatment BMP Improvements

SITE ASSESSMENT:

The low area of this street is flat and five properties get flooded. Add a drainage conveyance system along road

and route it to existing ponds at the end of the street.

RECOMMENDED **IMPROVEMENTS** Recommend placement of a storm drain system along the road. Place 2 catch basins at low point, connected by 400 LF of 24" RCP outleting to an existing infiltration system located at the end of the street. Equip outlet with

COST:

\$427,000



LOCATION:

Balajadia Rd

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance/ Erosion Control

VILLAGE RANKING

-

SITE ASSESSMENT:

Road embankments are very steep. To prevent erosion from continuing, asphalt dikes should be added on both

sides of road at low point of road and overside drains with riprap added.

RECOMMENDED IMPROVEMENTS

Recommend placement of a storm drain system along the road. Place 2 overside drains (AC spillways) at low points

in road, each outletting to a 100 SF rip rap energy dissipator at bottom of embankment.

COST:

\$33,500



LOCATION:

RT 4

MITIGATION TYPE:

Erosion Control/ Conveyance Maintenance

SITE ASSESSMENT:

Ylig bridge, undermining of approach slabs on both north and south embankments. Need to add more gabions to

approach slabs embankments, north section is in worse conditions.

RECOMMENDED IMPROVEMENTS

Embankment stabilization is needed in the vicinity of the bridge approach slabs. Recommend the placement of approximately 400 sq ft of gabions along the north and south embankments and 500 sq ft of rip rap at the bottom of each embankment. A quarter acre of debris removal is required for maintenance.

COST:

\$215,000



LOCATION: Salas Road

MITIGATION TYPE:

Storm Drain Improvement

SITE ASSESSMENT:

Constant undermining of roadway from proximity to Ylig river. Need permanent soil stabilization, possibly riprap

along roadway.

RECOMMENDED

IMPROVEMENTS

Recommend soil stabilization along roadway edge (where undermining is occuring) and placement of a storm drain system along the road. Place 2 catch basins at low point, connected by 100 LF of 24" RCP outleting to stabilized

embankment of Ylig River.

COST:

\$134,000



LOCATION:

Chalan Aguon

MITIGATION TYPE:

Storm Drain Improvement/ Conveyance Maintenance/ Erosion Control

SITE ASSESSMENT:

Just east of Ylig river crossing at a roadway curve a low point is created inside the curve and ponding is created and erosion evident. Need to add an overside drain with riprap to route flow to the Ylig river downstream and remove

debris.

RECOMMENDED IMPROVEMENTS

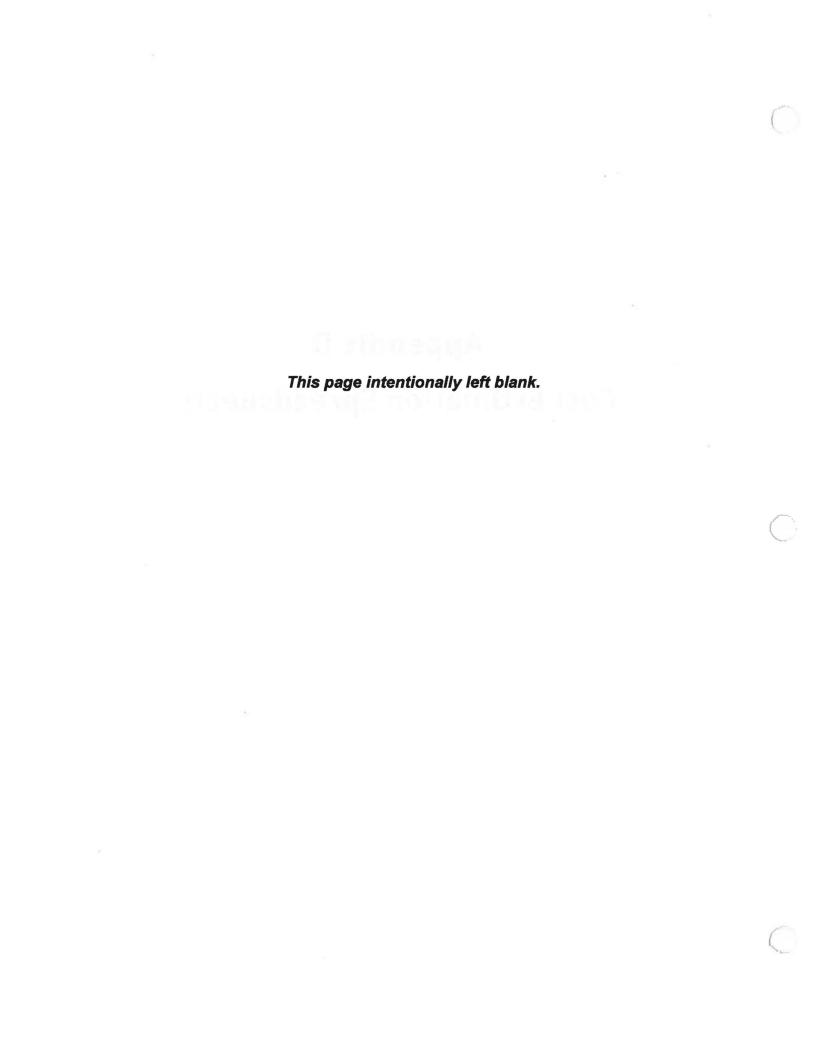
Recommend placement of a storm drain system along the road. Place an overside drain along inside of curve outleting to a rip rap channel approximately 50 feet in length, routing flow to Ylig River. Remove approximately

1000 SF of debris at site.

COST:

\$141,000

Appendix D Cost Estimation Spreadsheets



			AGANA	HEIGHTS VILLAGE	75				
LC	CATION			COST ESTIN	MATES				
MAP DESIGNATION	STREET/ROUTE	n	RECOMMENDATIONS		QUANTITIES UNITS	COST / UNITS	COST	TOTAL COST	TOTAL COST W/ENGINEERING & CONTINGENCIES
		6 NEW INJECTION WELLS	INJECTION WELLS		1200 LF	\$1,000.00 / LF	\$1,200,000.00		
AG-101	AG-101 San Vicente Solomon Street & Francisco Javier Ave	INCREASE BASIN SIZE BY 5000 SF (6' DEEP)	F (6' DEEP) INFILTRATION BASIN	EXCAVATION	1111.11 CY	\$27.53 / CY	\$30,588.86	\$1,386,473.02	\$2,357,004.13
	& FISKLOCU JAVRI AVE	INCREASE BASIN SIZE BY SOUD SP (6" DEEP)	INFILIRATION BASIN	FENCING	10448 LF	\$14.92 / LF	\$155,884.16		
CONTRACTOR	Joseph Cruz Ave	A solution and the second		EXCAVATION	222.22 CY	\$27.53 / CY	\$6,117.72		
AG-102	NEAR	2 INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111.02	\$41,228.74	\$70,088.85
	As Kotla Court			EROSION CONTROL (HYDROSEED)	5200 SF	\$5.00 / SF	\$26,000.00	是我们的自己的	
	1	10,000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562.38		
AG-103	Rte 6 & Rte 7	3,000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$107,316.00	\$182,437.19
		2-HEADWALL/W WINGWALL	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000.00		
The Property of the	White the market paradition is the Property of the	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	\$83,894.21	\$142,620.16
AG-104	Agana Heights Ponding Basin	3000 CF RIP RAP	RIP RAP	CHARGE BURNEY OF THE PARTY OF T	111.11 CY	\$744.79 / CY	\$82,753.62	363,694.21	3147.647.10

			AGAT	VILLAGE					
LOC	CATION			COST ESTIN	MATE				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
AV-102	Tun Rumon Chele Rd and Rte 2	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$82,753.62	\$140,681.15
ACTIVITY AND A ROLL OF THE	MACCONDICTION OF THE PROPERTY OF THE PARTY O	100' BIOSWALE	BIOSWALE	EXCAVATION	48.14 CY	\$27.53 / CY	\$1,325.29	ELEMENTO SPARATO CASALI	Management of the participation of
AV-109, AV-125 (Cost		and control and and and and and and	The state of the s	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000.00	1	
Estimate for Each	Baubata Road (AV-109),	100'x24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	\$78,960.72	\$134,233.22
Project)	Salinas Rd (AV-125)	1 CATCH BASIN	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500.00		
		HEADWALL W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	4	
- Commission of the Commission		300 CF RSP	ROCK SLOPE PROTECTION (RSP) METHOD B 1/4 TON (AKA RIP RAP)	Control Control Control Control Control	11.11 CY	\$59.05 / CY	\$656.05		
		2500°x3°x5° RCB	REINFORCED CONCRETE BOX CULVERT		1388.89 CY	\$1,103.85 / CY	\$1,533,126.23		
	Chalan Josep	2 HEADWALLS/WINGWALLS 1000 SF DEBRIS REMOVAL	HEADWALL W/WINGWALL		2 EA 0.25 AC	\$10,000.00 / EA	\$20,000.00		
AV-101	Milagro	2 CATCH BASINS	DEBRIS REMOVAL CATCH BASIN	A STATE OF THE PARTY OF THE PAR	0.25 AC 2 EA	\$4,562.38 / AC \$5,500.00 / EA	\$1,140.59 \$7,000.00	\$1,577,698.30	\$2,682,087.11
		2000' DITCH	DITCH		296.29 CY	\$27.53 / CY	\$8,156.86		
		300 CF RIP RAP	RIP RAP		11.11 CY	\$27.53 / CY \$744.79 / CY	\$8,136.86		
AV-104	Pagacho Drive and Kalachucho	1 AC HYDROMULCH W/BFM	HYDROMULCH (BFM)		43560 SF	\$1.00 / SF	\$43,560.00	\$43,560.00	\$74,052.00
VERONAGRICULA SUCCE	Father Follard	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	THE CHARLEST CONTRACTOR	0.25 AC	\$4,562.38 / AC	\$1,140.59	ENGLACIENTE ALCOHOL	ORDERNE ANALYSIS DE LES
V-119, AV-120, AV-	& Bruce Street (AV-119),	3000 CF RIP RAP	RIPRAP		111.11 CY	\$744.79 / CY	\$82,753.62		
27 (Cost Estimate for	Father Follard & Route 2 (AV-	2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	\$148,005.02	\$251,608.53
Each Project)	120), Rte 2 & Rte 12 (AV-	1005/24° RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	The section of the se	THE RESERVE
	127)	400' DITCH	DITCH WITH THE PARTY OF THE PAR		59.26 CY	\$27.53 / CY	\$1,631.43		
NAMES OF STREET	SENTENCE LINES IN CONTRACTOR	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	-	1
	Fi-11- O	100'x18" RCP	18" RCP		100 LF	\$536.16 / LF	\$53,616.49	-{	
AV-113	Finile Orong Circle	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$96,580.94	\$164,187.59
	Circle	300 CF RIP RAP	RIP RAP	+	11.11 CY	\$744.79 / CY	\$8,274.62	1	
		600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549.23	1	
C 1174-2075-51 WY1-CT2-104	Auau Creek	3000 CF RIP RAP	RIP RAP	of Personal Architecture operated from Alberta	111.11 CY	\$744.79 / CY	\$82,753.62	electronical tests select	Sattración de la company de la
AV 110	& Route 2	400 CY EXCAVATION	EXCAVATION		400 CY	\$27.53 / CY	\$11,012.00	\$93,765.62	\$159,401.55
Care Day and International	AL STREET, WILLIAM STREET, STR	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		
		600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549.23	1	
AV-129	North Perino			EXCAVATION	96.3 CY	\$27.53 / CY	\$2,651.14	\$33,340.97	\$56,679.64
		200 LF BIOSWALE	BIOSWALE	EROSION CONTROL (HYDROSEED)	2600 SF	\$5.00 / SF	\$13,000.00	1	
STATISTICAL PROPERTY.	G-81295088177577817281	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	H WENNERS BY SERVICE OF	0.25 AC	\$4,562.38 / AC	\$1,140.59		athern september of the
		0.5 AC HYDROMULCH W/BFM	HYDROMULCH (BFM)		21780 SF	\$1.00 / SF	\$21,780.00		\$80,803.15
AV-106	Pagachao Road	Experience 对AEA 地面景色设计		EXCAVATION	74.07 CY	\$27.53 / CY	\$2,039.15	\$47,531.27	\$80,803.15
		1000 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,571.52	法部加加金额	
		1000 LF CONCRETE DITCH	CONCRETE DITCH	EXCAVATION	74.07 CY	\$27.53 / CY	\$2,039.15		
		1000 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,571.52		
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	100	
AV-121	Rte 2 and Erskin	100'x24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	\$106,996.10	\$181,893.36
		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	1	
	1	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	1	1
		400 LF DITCH	DITCH		59.26 CY	\$27.53 / CY	\$1,631.43		
Notification and support	BUTTER TO THE PROPERTY OF THE PERSONAL PROPERT	100 LF 12" CONCRETE ENCASEMENT	MINOR CONCRETE (PIPE ENCASEMENT)	The second second second	100 CY	\$345.65 / CY	\$34,565.00	· 经产品的公司	THE STATE OF THE S
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	A COLD THE PERSON OF	0.25 AC	\$4,562.38 / AC	\$1,140.59	\$138,459.21	\$235,380.66
AV-126	Togcha River	2 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	CONTROL WESTERNAME	2 EA	\$10,000.00 / EA	\$20,000.00	\$150,439.21	\$133,384.66
	a supplied Editor	3000 CF RIP RAP	RIP RAP DESERVED THE COMMENT OF THE PROPERTY O	· Production of the Contract	111.11 CY	\$744.79 / CY	\$82,753.62		
AV-123	VT Baubata Lane	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$83,894.21	\$142,620.16
AV-123	VI BAUDATA LANG	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	J0J,074.21	71-12,020.10
AV-108	Part 20 Carlos Carl	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	\$83,894,21	\$142,620.16
AV-108	Route 2 @ Chaligan Creek	3000 CF RIP RAP	RIP RAP	理性研究性知识	111.11 CY	\$744.79 / CY	\$82,753.62	Electronic Control	MINANESCHER
	Route 2 @	100 LF 12" CONCRETE ENCASEMENT	MINOR CONCRETE (PIPE ENCASEMENT)		100 CY	\$345.65 / CY	\$34,565.00	1	
AV-112	Finite Road	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	\$118,459.21	\$201,380.66
	I IIIME ROBO	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	L	1

LOC	ATION			COST ESTIM	ATE				
AAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERIN CONTINGENCIE
WATE BEIN		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	NEW MARKETERS	1 EA	\$10,000.00 / EA	\$10,000.00	和公司等	7072015424033
AV-128	Rte 2, North of Rte 12	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$92,753.62	\$157,681.15
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		
		100 LF 24" RCP	24" RCP	-	100 LF	\$554.79 / LF	\$55,479.38	1	
AV-115	Tomas Mesa Street	1 HEADWALL	HEADWALL		1 EA	\$5,000.00 / EA	\$5,000.00	\$151,864.42	\$258,169.52
\$25K FA0013		400 LF DITCH	DITCH		59.26 CY	\$27.53 / CY	\$1,631.43	1	POSSES POSSESSES IN
		3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	1	
destruction of	Route 2 N O	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	CONTROL BORESSON CONTROL OF	0.25 AC	\$4,562.38 / AC	\$1,140.59	SAACHENDAY ALLE	STATE STATES AND STATES
AV-107	Marina & S O	500 CF RIP RAP	RIP RAP OF THE STREET, THE PART OF THE STREET, THE STR	a graph Charles a natural control to out	22.22 CY	\$744.79 / CY	\$16,549.23	\$37,689.83	\$64,072,71
	Chalan Lata	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	STATE OF THE PROPERTY OF STREET	SAMESTANTED A SEA WITHOUT	\$10,000.00 / EA	\$20,000.00		
	RR Cruz &	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62		PLANTING TO SERVICE HERE
AV-124	Baubata Lane	5 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		5 EA	\$10,000.00 / EA	\$50,000.00	\$132,753.62	\$225,681.15
MINTAL OF STREET	District Tener ENEWS	3000 CF RIP RAP	RIP RAP	STATES AND THE RESIDENCE	111.11 CY	\$744.79 / CY	\$82,753.62	- erason-nuksasi	INTERNATIONAL PROPERTY.
AV-111	Gaan River & Route 2	1/4 AC DEBRIS REMVAL	DEBRIS REMOVAL	STATE OF THE PERSON AND THE PERSON AND THE	0.25 AC	\$4,562,38 / AC	\$1,140,59	\$103,894.21	\$176,620.16
		2 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	March of the Control of the Control	CHARLES AND A SEA LONG.	\$10,000.00 / EA	\$20,000.00		NEW TOTAL
	Salinas River &	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	C LUMP CONTRACTOR OF THE CONTR	
AV-117	Route 2	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$83,894.21	\$142,620.16
HISTORY HERE IN WHICH	SAFESTED COCCUMUM SAFESTED AND SAFESTED	2 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	SOUTH TO TO SELECT WATER THE THE TOTAL THE TOT	THE REPORT OF 2 EASIERS	\$10,000.00 / EA	\$20,000.00	S POWER WASHINGTON	STREET, STREET
AV-122	Route 2 South of Atao Rd	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	PARTITION OF THE PARTIT	0.25 AC	\$4,562.38 / AC	\$1,140,59	\$186,647.83	\$317,301.31
	CONTRACTOR AND A	6000 CF RIP RAP	RIP RAP PROBLEMS AND THE RESERVE OF		222.22 CY	\$744.79 / CY	\$165,507.23		
CHANGE CONTINUES AND	acto and south and are active.	400 LF DITCH	рпсн	THE PAST AND AND SECURING SECURING	59.26 CY	\$27.53 / CY	\$1,631.43	M. Section St. M. Chester St. Co.	SID BANK OF THE OWNER OF BETTE
		100 LF 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	-	
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	-	
AV-116	San Roque Street							\$64,110.81	\$108,988.37
新的图象的课度的最高		2 CATCH BASINS	CATCH BASIN	新疆域。2019年8月20日 1919年	A DESCRIPTION 2 EATER	\$3,500.00 / EA	\$7,000.00	a support the same	TENEDED PROPERTY.
AV-130	South Perino	200 LF 24" RCP	24° RCP		200 LF	\$554.79 / LF	\$110,958.76	\$119,099.35	\$202,468.90
		1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	AND REPORT OF THE PROPERTY OF THE PERSON OF	0.25 AC	\$4,562.38 / AC	\$1,140.59		
AV-114	Rte 2 and Finile Creek	4 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		4 EA	\$10,000.00 / EA	\$40,000.00	\$205,507.23	\$349,362.30
AV-114	Kte 2 and rinue Creek	6000 CF RIP RAP	RIP RAP		222.22 CY	\$744.79 / CY	\$165,507.23	\$203,307.23	\$349,302.30
THE REPORT OF THE PARTY OF		1 MANHOLE	MANHOLE	阿尔斯尔 古世纪代圣斯文美国 国有相及 到	SUPERIOR LANGE	\$3,500.00 / EA	\$3,500.00	\$14,595.88	\$24,812.99
AV-105	Pagacho Drive and Mike Cru	20 LF 24" RCP	24° RCP	1500年前,即居住民地區的各位區域的地方提到	20 U	\$554.79 / LF	\$11,095.88	344,393.00	TABLE AND DESCRIPTION OF THE PARTY OF THE PA
		1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		
		300 LF 24" RCP	24" RCP		300 LF	\$554.79 / LF	\$166,438.14	7	
AV-131	Tun Leon Road	200 LF BIOSWALE	BIOSWALE	EXCAVATION	96.3 CY	\$27.53 / CY	\$2,651.14		\$337,457.63
**********		2 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000.00	1	
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	7	
and a state of the state of the	1-250 was to result his position	300 LF 24" RCP	24° RCP	REMAIN SERVICE SERVICES	300 UF	\$554.79 / LF	\$166,437.00	N Devictors Inch	CHARLES DO LANGE
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		
AV-118	Erskin	6 HEADWALL	HEADWALL		6 EA	\$5,000.00 / EA	\$30,000.00	\$213,623.10	\$363,159.27
Carried Williams		2500 LF CONC DITCH	ртсн		370 CY	\$27.53 / CY	\$10,186.10		STATE OF STA

ASAN VILLAGE

	LOCATION			COST ESTIMA	ATE			
MAP DESIGNATION	STREET/ROUTE	RECOM	MENDATIONS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
	MEST CONTRACTOR STREET	100' x 8" DIP WATER	DIP WATER	100 LF	\$52.77 / LF	\$5,277.00	公司 日用 7.000年3.05	
AS-103	Leon Guerrero @ Asan River Bridge	AIR RELEASE VALVE	AIR RELEASE VALVE	1 EA	\$1,000.00 / EA	\$1,000.00	\$6,277.00	\$10,670.90
		100'x3'x3' RCB (PER FCD)	REINFORCED CONCRETE BOX CULVERT	33.33 CY	\$1,103.85 / CY	\$36,791.32		
46 400	Company Time Town Street	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59	År4 400 00	407.000.44
AS- 109	Senator Juan Tim Toves Street	NEW HEADWALL	HEADWALL	1 EA	\$5,000.00 / EA	\$5,000.00	\$51,199.08	\$87,038.44
		100 SF RIP RAP	RIP RAP	11.1 CY	\$744.79 / CY	\$8,267.17		
		100'x3'x3' RCB (PER FCD)	REINFORCED CONCRETE BOX CULVERT	33.33 CY	\$1,103.85 / CY	\$36,791.32	福 经额待期间	
		1 AC HYDROMULCH (BFM)	HYDROMULCH (BFM)	43560.17 SF	\$1.00 / SF	\$43,560.17		
AS-108	Santa Ana Street	2 NEW HEADWALLS	HEADWALL	2 EA	\$5,000.00 / EA	\$10,000.00	\$99,759.25	\$169,590.73
		1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59		
		100 SF RIP RAP	RIP RAP	11.1 CY	\$744.79 / CY	\$8,267.17		
45 107	W See Seder Street Marriage Street	1000 LF 30" RCP (PER FCD)	30" RCP	1000 LF	\$679.63 / LF	\$679,625.40	\$686,625,40	£1 167 363 10
AS-107	W. San Carlos Ct and Msgr Leon Guerrero St	2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000.00	\$000,023.40	\$1,167,263.18
n (w. collector)	I was provided the second of the second of	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59		经过程的
AS-106	Santa Ana & Nino Perdido	1 AC HYDROMULCH (BFM)	HYDROMULCH (BFM)	43560.17 SF	\$1.00 / SF	\$43,560.17	\$100,180.14	\$170,306.25
		100 LF 24" RCP (PER FCD)	24" RCP	100 LF	\$554.79 / LF	\$55,479.38		
AS-104	Msgr. Leon Guerrero Street	100 LF 6'x4' RCB (per FCD)	REINFORCED CONCRETE BOX CULVERT	88.89 CY	\$1,103.85 / CY	\$98,121.23	\$98,121.23	\$166,806.09
	CASE TO THE PERSON	100 LF 4'x4' RCB (PER FCD)	REINFORCED CONCRETE BOX CULVERT	59.26 CY	\$1,103.85 / CY	\$65,414.15		
AS-105	Consolacion & Msgr. Leon Guerrero Street	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59	\$93,103.98	\$158,276.77
A3-103	Consolation a wage, Leon Guerrero Street	2 HEADWALLS	HEADWALL	2 EA	\$5,000.00 / EA	\$10,000.00	335,203.30	
		200 SF RIP RAP	RIP RAP	22.22 CY	\$744.79 / CY	\$16,549.23		
		10,000 SF RIP RAP STABILIZATION	RIP RAP	111 CY	\$744.79 / CY	\$82,753.62	602 002 06	6142 455 04
AS-112	Route 1 @ Fonte River	10,000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.23 AC	\$4,562.38 / AC	\$1,049.35	\$83,802.96	\$142,465.04
ere de la company	Participation of the last	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59		AND THE PROPERTY AND ADDRESS.
	Route 1; north of Church and in-between	1 AC HYDROMULCH (BFM)	HYDROMULCH (BFM)	43560.17 SF	\$1.00 / SF	\$43,560.17	\$59,700.76	\$101,491.30
AS-111	property @ 176 Route 1.	1 HEADWALL	HEADWALL	1 EA	\$5,000.00 / EA	\$5,000.00	\$39,700.76	\$101,491.50
		2 WINGWALLS	WINGWALL	2 EA	\$5,000.00 / EA	\$10,000.00		
		200'x3'x3' RCB	REINFORCED CONCRETE BOX CULVERT	66.67 CY	\$1,103.85 / CY	\$73,593.68		
AS-110	Route 1 @ Asan River	2 HEADWALLS	HEADWALL	2 EA	\$5,000.00 / EA	\$10,000.00	\$91,868.30	\$156,176.10
		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,274.62		
AS-102	Coast Line Along Route 1 Masso River to Fonte River	50,000 SF RIP RAP	RIP RAP	5,556 CY	\$744.79 / CY	\$4,137,725.53	\$4,137,725.53	\$7,034,133.41

9				BARRIGADA VILI	.AGE					
LOCA	ATION			cos	T ESTIMATES					
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATION	ıs	QUANTITIES	UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
SANSAR MAR	新兴级社 证据证	3 CATCH BASINS	CATCH BASIN		医巴斯尔特斯斯斯图 数	EA	\$3,500.00 / EA	\$10,500.00		
8V-102	Route 16 & Cepeta Way	100 LF x 24" RCP	24" RCP		。 10年末後或年間/2	U SAME	\$554.79 / LF	\$13,315.05	\$26,615.05	\$45,245.59
	国内部的基础的	1 MANHOLE	MANHOLE	2012年 12位元文32000 1200 1200 1200 1200 1200 1200 1200	MIX SOUTH	EA	\$2,800.00 / EA	\$2,800.00		
		2 CATCH BASINS	CATCH BASIN			EA	\$3,500.00 / EA	\$7,000.00		
BV-106	Route 16 & N. Bana	100 LF x 24" RCP	24" RCP		10	LF	\$554.79 / LF	\$55,479.38	\$80,754.00	\$137,281.79
BV-100	Drive	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			EA	\$10,000.00 / EA	\$10,000.00	\$80,754.00	\$137,281.79
		300 CF RIP RAP	RIP RAP		11.1	CY	\$744.79 / CY	\$8,274.62		
				EXCAVATION	111.1	CY	\$27.53 / CY	\$3,058.86		
BV-134	to property No. 261 C	200' LONG INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.1	CY	\$41.00 / CY	\$4,555.51	\$11,514.37	\$19,574.43
				FILTER FABRIC	260) SF	\$1.50 / SF	\$3,900.00 \$6,117.72		
		2,200' LONG INEIL TRATION TRENCHES		EXCAVATION	222.2	CY	\$27.53 / CY	\$6,117.72		
BV-116	Limtiaco Street	2-200' LONG INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.2	CY	\$41.00 / CY	\$9,111.02	\$23,028.74	\$39,148.85
				FILTER FABRIC	520) SF	\$1.50 / SF	\$7,800.00		
		2 CATCH BASINS	CATCH BASIN			EA	\$3,500.00 / EA	\$7,000.00	0	
BV-103, BV-111, BV-		100 LF x 24" RCP	24" RCP		10) LF	\$554.79 / LF	\$55,479.38		
118, BV-119, BV-131	Anderson St, Leyang St, Rte 8	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			I EA	\$10,000.00 / EA	\$10,000.00	\$80,754.00	\$137,281.79
		300 CF RIP RAP	RIP RAP		11.1	l CY	\$744.79 / CY	\$8,274.62		
		2 CATCH BASINS	CATCH BASIN			2 EA	\$3,500.00 / EA	\$7,000.00		
		100 LF x 24" RCP	24" RCP		10) LF	\$554.79 / LF	\$55,479.38		
BV-115	Westbrook (Westbrook; #239	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			L EA	\$10,000.00 / EA	\$10,000.00	\$282,037.59	\$479,463.90
BA-112	Kaminga Area, 7 homes affected	300 CF RIP RAP	RIP RAP		11.1	r CA	\$744.79 / CY	\$8,274.62	3202,037.33	\$479,463.30
		200'x200' INFILTRATION BASIN	INFILTRATION BASIN	EXCAVATION	6851.8	S CY	\$27.53 / CY	\$188,631.43		
		200 IZDD INFILINATION BASIN	INFILITATION BASIN	FENCING	84	B LF	\$14.92 / LF	\$12,652.16		
8V-109	Lizama Street (Radio; #214 Dimalanta residence)	800' FENCE AROUND BASIN	FENCING		84	i U	\$14.92 / LF	\$12,652.16	\$12,652.16	\$21,508.67
BV-124	Ungaguan Place	200'x5'x10' CONC CHNL	CONCRETE CHNL		7	4 CY	\$633.32 / CY	\$46,865.68	\$46,865.68	\$79,671.66
	Ungaguan Place(Village;	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.2	5 AC	\$4,562.38 / AC	\$1,140.59		
BV-125	Gumabon, Ricalde and Mendiola area over to		gramma which	EROSION CONTROL (HYDROSEED)	10,00	o SF	\$5.00 / SF	\$50,000.00	\$66,140.59	\$112,439.01
	Capt Reyes Wy and Aguon Store)	10,000 SF HYDROSEED W/BFM	HYDROSEED W/BFM	EROSION CONTROL (BFM)	1000	O SF	\$1.50 / SF	\$15,000.00		

LOCA	ATION				COST ESTIMATES		45		12	
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES	UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIE
	Canada Toto Road &			EXCAVATION	222.22	CY	\$27.53 / CY	\$6,117.72		
BV-121 & BV-127	Dodo St (BV-127), Leon Guerrero &	2-200' LONG INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22	CY	\$41.00 / CY	\$9,111.02	\$23,028.74	\$39,148.85
	Leyang (BV-121)			FILTER FABRIC	5200) SF	\$1.50 / SF	\$7,800.00		
BV-128	ப்புள் Way (Canada; #239)	3000 CF RIP RAP	RIP RAP		111.15	ια	\$744.79 / CY	\$82,753.62	\$82,753.62	\$140,681.15
IN THE PERSON NAMED IN	MARKATON SALVENIAN	NOT THE RESIDENCE OF THE PROPERTY OF THE PROPE		EXCAVATION	111.1	L CY	\$27.53 / CY	\$3,058.86	MS-SEV-NUIS-TS-VARQUE-G	AN ADMINISTRACE PARTY.
BV-133		200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11	L CY	\$41.00 / CY	\$4,555.51	\$11,514.37	\$19,574.43
	and Santos area)	area)		FILTER FABRIC	2600) SF	\$1.50 / SF	\$3,900.00		
				EXCAVATION	222.22	CY	\$27.53 / CY	\$6,117.72		
BV-132	#196 San Roque Drive	que Drive 2-200' LONG INFILTRATION TRENCHES	INFILTRATION TRENCH	D.75" ROCK	222.2	CY	\$41.00 / CY	\$9,111.02	\$23,028.74	\$39,148.85
				FILTER FABRIC	520) SF	\$1.50 / SF	\$7,800.00		
	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25	AC .	\$4,562.38 / AC	\$1,140.59			
	14 S	1 TRASH RACK	TRASH RACK			L EA	\$2,000.00 / EA	\$2,000.00 \$188,631.43	Y	
	Manibusan Road (Radio; George,			EXCAVATION	6851.8	S CY	\$27.53 / CY	\$188,631.43		
BV-108	Bamba, Palomo and Carnacho area leading	200'x200' INFILTRATION BASIN	INFILTRATION BASIN	FENCING	84	B LF	\$14.92 / LF	\$12,652.16	\$302,473.42	\$514,204.81
	to E. Rte 8, 9 homes + condominium	100'x36" RCP	36" RCP		100) LF	\$715.00 / LF	\$71,500.00		
	residences affected)	1 WINGWALL/HEADWALL	HEADWALL W/WINGWALL		:	L EA	\$10,000.00 / EA	\$10,000.00		
		600 CF RIP RAP	RIP RAP		22.2	2 CY	\$744.79 / CY	\$16,549.23		
				EXCAVATION	111.1	1 CY	\$27.53 / CY	\$3,058.86		
BV-101	Manibusan Street -	200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.1	ı cy	\$41.00 / CY	\$4,555.51	\$11,514.37	\$19,574.43
	Leyang - Gumabon			FILTER FABRIC	260	0 SF	\$1.50 / SF	\$3,900.00		
	SHALL AMERICAN STRAIN	THE CONTROL OF THE PERSON OF THE CONTROL OF THE CON	THE REAL PROPERTY OF THE PARTY	EXCAVATION	111.1	ı cy	\$27.53 / CY	\$3,058.86		THE RESERVE AND ADDRESS OF THE PARTY OF THE
BV-120	Leyang Road, #415 - Mafinas Residence	200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.1	1 CY	\$41.00 / CY	\$4,555.51	\$11,514.37	\$19,574.43
	Maintas Residence			FILTER FABRIC	260	D SF	\$1.50 / SF	\$3,900.00		
SE PESICO LENGT	# # # # # # # # # # # # # # # # # # #	APPENDICULAR PROPERTY OF A		EXCAVATION	12.200 PM V 20.11.1	107	\$27.53 / CY	\$3,058.86		
BV-126	Captain Reyes Way	200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.1		\$41.00 / CY	\$4,555.51	\$11,514.37	\$19,574.43
SECULIE VIEW	Vietnam Veterans		A CONTRACTOR OF THE PROPERTY O	FILTER FABRIC	260		\$1.50 / SF	\$3,900.00		PROPERTY OF STREET, ST. DO.
	Highway (Route 10; from Wendy's fronting	1 WINGWALL/HEADWALL	HEADWALL W/WINGWALL			1 EA	\$10,000.00 / EA	\$10,000.00		
BV-117	the highway to Sgt. Robert Mendiola St.	1 TRASH RACK	TRASH RACK			1 EA	\$2,000.00 / EA	\$2,000.00	\$12,000.00	\$20,400.00
	Robert Mendiola St. and the Angel and Amanda Santo area				THE RESERVE TO SERVE THE PERSON NAMED IN COLUMN TO SERVE THE PERSO	218 18 18 12				

LOCA	ATION				COST ESTIMATES					
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS	5	QUANTITIES	UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
				EXCAVATION	111.1	CY	\$27.53 / CY	\$3,058.86		阿斯斯德 格斯
		200' LONG INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.1	l CY	\$41.00 / CY	\$4,555.51		
	Ignacio area to Intersection of Cepeda			FILTER FABRIC	2600) SF	\$1.50 / SF	\$3,900.00		
BV-112	Wy and E. Route 8, needs drainage	2 CATCH BASINS	CATCH BASIN			2 EA	\$3,500.00 / EA	\$7,000.00	\$92,268.37	\$156,856.22
	clearing) - slated for	100 LF x 24" RCP	24" RCP	经营业的基本	100) LF	\$554.79 / LF	\$55,479.38		
	Restoration paving	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			L EA	\$10,000.00 / EA	\$10,000.00		
	and the New York	300 CF RIP RAP	RIP RAP	ALC MADE STREET	11.1	l CY	\$744.79 / CY	\$8,274.62	elite the tex	
				EXCAVATION	6851.8	5 CY	\$27.53 / CY	\$188,631,43		18
BV-140	Punzalan Street	200'x200' INFILTRATION BASIN	INFILTRATION BASIN	FENCING		B LF	\$14.92 / LF	\$12,652.16	\$201,283.59	\$342,182.10
	200 mars	2 CATCH BASINS	CATCH BASIN		LATER DEPOSITE SERVICE	EA	\$3,500.00 / EA	\$7,000.00	Salara de La Caractería d	
		100 LF x 24" RCP	24" RCP		10	O LF	\$554.79 / LF	\$55,479.38		
8V-107	to the same	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	海南 网络斯斯里尔德斯		L EA	\$10,000.00 / EA	\$10,000.00		100
		300 CF RIP RAP	RIP RAP		11.1	104	\$744.79 / CY	\$8,274.62	\$282,037.59	\$479,463.90
			INFILTRATION BASIN	EXCAVATION	6851.8	5 CY	\$27.53 / CY	\$188,631.43		
		200'x200' INFILTRATION BASIN	INFILINATION BASIN	FENCING	84	B LF	\$14.92 / LF	\$12,652.16		
		2 CATCH BASINS	CATCH BASIN			2 EA	\$3,500.00 / EA	\$7,000.00		
		100 LF x 24" RCP	24" RCP		10	O LF	\$554.79 / LF	\$55,479.38	600 754 00	4437 304 70
BV-137	Rte 8 East of Rte 10	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			1 EA	\$10,000.00 / EA	\$10,000.00	\$80,754.00	\$137,281.79
		300 CF RIP RAP	RIP RAP		11.1	1 CY	\$744.79 / CY	\$8,274.62		
		2 CATCH BASINS	CATCH BASIN			2 EA	\$3,500.00 / EA	\$7,000.00		
		100 LF x 24" RCP	24" RCP		10	O LF	\$554.79 / LF	\$55,479.38		
BV-130	Rte 8 & San Vicente	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL			1 EA	\$10,000.00 / EA	\$10,000.00	\$83,507.00	\$141,961.89
		300 CF RIP RAP	RIP RAP		11.1	1 (7	\$744.79 / CY	\$8,274.62		
		100 CY CUT	EXCAVATION			0 CY	\$27.53 / CY	\$2,753.00		
BV-129	Canada Toto Loop (Canada; Flores and Blas residences; culverts thru out snake road vicinity needs cleaning affects 4 homes)	100'x36"RCP	36" RCP		10	O LF	\$715.00 / LF	\$71,500.00	\$71,500.00	\$121,550.00

LOCA	ATION		COST ESTIMATES										
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS	QUANTITIES	UNITS	COST / Unit	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES				
acapital special		2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000.00						
BV-105	Rte 16 @ Mobil Sta	100 SF RIP RAP	RIP RAP	11.11	.o cv	\$744.79 / CY	\$8,274.62	\$28,274.62	\$48,066.85				
		4 CATCH BASINS	CATCH BASIN		4 EA	\$3,500.00 / EA	\$14,000.00		THE RESERVE OF THE PARTY OF THE				
BV-104	Rte 16 @ N Sabana	100'x24" RCP	24" RCP	10	O LF	\$554.79 / LF	\$55,479.00	\$69,886.44	\$118,806.95				
		100 LF DITCH	DITCH	14.	8 CY	\$27.53 / CY	\$407.44						
BV-122	Leon Guerrero St.	1000 SF RIP RAP	RIP RAP	1, 1 111.1	10	\$744.79 / CY	\$82,753.62	\$82,753.62	\$140,681.15				
		1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.2	5 AC	\$4,562.38 / AC	\$1,140.59						
BV-110	Southeast corner of Route 8 and Route 10	1000 CY DREDGING (CUT)	EXCAVATION	100	10 CY	\$27.53 / CY	\$27,530.00	\$28,670.59	\$48,740.01				
		AGREEMENT W/DFW											
		3 CATCH BASINS	CATCH BASIN		3 EA	\$3,500.00 / EA	\$10,500.00						
BV-113	Ungkulu Street	100 LF x 24" RCP	24" RCP		14 LF	\$554.79 / LF	\$13,315.05	\$26,615.05	\$45,245.59				
		1 MANHOLE	MANHOLE		1 EA	\$2,800.00 / EA	\$2,800.00						
		100 LF x 36" RCP	36" RCP	10	00 LF	\$715.00 / LF	\$71,500.00						
BV-136	Rte 16 @ Pedang	4 HEADWALL/WINGWALLS	HEADWALL W/WINGWALL		4 EA	\$10,000.00 / EA	\$40,000.00	\$113,140.79	\$192,339.34				
		400 LF DITCH	рітсн	59.	.6 CY	\$27.53 / CY	\$1,640.79		Į.				
		1 CATCH BASIN	CATCH BASIN	HARLEST ANTHERS	1 EA	\$3,500.00 / EA	\$3,500.00						
BV-139	Rte8 at Rte 33	100 LF DITCH	рпсн	14	.8 CY	\$27.53 / CY	\$407.44	\$12,182.06	\$20,709.50				
		100 SF RIP RAP	RIP RAP	11.1	11 CY	\$744.79 / CY	\$8,274.62						

		· · · · · · · · · · · · · · · · · · ·		DEDEDO VII	LLAGE				
LOC	ATION				COST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIO	NS .	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING & CONTINGENCIES
William Control	地位是他的是"现 "	4 CATCH BASIN	CATCH BASIN	SAGERAL PROPERTY.	4 EA	\$3,500.00 / EA	\$14,000.00		NETSCHEEN WAR
DE 101	Route 1 (from Route 26	200 LF 24" RCP	24" RCP		200 LF	\$554.79 / LF	\$110,958.76		
DE-101			DITCH		59.26 CY	\$27.53 / CY	\$1,631.43	\$132,190.19	\$224,723.32
		2 MANHOLES	MANHOLE		2 EA	\$2,800.00 / EA	\$5,600.00		
		100' CONCRETE CHANNEL	CONCRETE CHANNEL	EXCAVATION CONCRETE (DITCH LINING)	29.63 CY	\$27.53 / CY	\$815.71		
DE-103	Salisbury Street	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	CONCRETE (DITCH LINING)	7.704 CY 0.25 AC	\$633.32 / CY	\$4,879.10	\$13,835.41	\$23,520.19
		and the same of th	CATCH BASIN		0.25 AC	\$4,562.38 / AC	\$1,140.59		
10-100 of Early 411 S (100 a)	in the Germanication		CATCH BASIN	IMPONING CANADA CARACTER CARAC		\$3,500.00 / EA	\$7,000.00	descontagneros), he	Ways for the property of the second second
			24" RCP	SEASON OF THE PROPERTY OF THE	2 EA 200 LF	\$3,500.00 / EA \$554.79 / LF	\$7,000.00 \$110,958.76		
DE-104	Loreta					THE RESIDENCE OF THE PARTY OF T		\$136,233.38	\$231,596.74
			HEADWALL W/WINGWALL RIP RAP		1 EA	\$10,000.00 / EA	\$10,000.00 \$8,274.62		
PREMINENT DESIGNATION	2,716(1)114(1)11(2)2)(1)2.17(1)		DEBRIS REMOVAL	HERESTAL MASSESSES IN SOME PICTOR	11.11 CY 0.25 AC	\$744.79 / CY \$4,562.38 / AC	\$1,140.59	NEW CONTRACTOR STATES	PERSONAL PROPERTY AND INC.
DE-105	Redondo Luchon		APRON	CONCRETE (DITCH LINING)	0.309 CY	\$633.32 / CY	\$1,140.59	\$3,336.29	\$5,671.69
DE-105 Redondo Lucnoi	Redolido Edicion	1 TRASH RACK	TRASH RACK	WHICKETE (DITCH LINING)	1 EA	\$2,000.00 / EA	\$2,000.00	\$3,336.29	\$3,071.03
	UNICEDENTAL PROPERTY OF THE		CATCH BASIN	NESCHART THE RESERVE AND ADDRESS OF THE PERSON NAMED AND ADDRE	2 EA	\$3,500.00 / EA	\$7,000.00	SALUTING CHARLES	ELECTRONISMO, MODERNI STERNI
			24" RCP		100 UF	\$5,500.00 / EA	\$55,479.38		SERVEY OF T
			HEADWALL W/WINGWALL	APA A SOUTH SANCE DE L'AND A CONTRACTOR	1 FA	\$10,000.00 / EA	\$10,000.00	克斯拉拉斯	
DE-106	Route 1 at Route 27		RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	\$192,014.59	\$326,424.81
			DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		
			DREDGING (CUT)	EXCAVATION	4000 CY	\$27.53 / CY	\$110,120.00		
and a security of	THE STREET STREET, STR	4000 CT DREDGING (COT)	DALDGING (COT)	EXCAVATION	6851.85 CY	\$27.53 / CY	\$188,631.43	STEEL CONTRACTOR STREET	BRUSESO MEDICARE ENGLISHED
		200'x200' INFILTRATION BASIN	INFILTRATION BASIN	FENCING	848 LF	\$14.92 / LF	\$12,652.16		
DE-108	Route 3	2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	\$272,037.59	\$462,463.90
		100'x24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	1	
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
	是以75000000000000000000000000000000000000	3 INJECTION WELLS	INJECTION WELLS	CIDH PILE (16")	300 LF	\$1,000.00 / LF	\$300,000.00	阿斯林斯斯斯斯	等的用数图像数据证据
	THE A CHARLES	100'x100' INFILTRATION BASIN	INCH TRATION BACIN	EXCAVATION	1574 CY	\$27.53 / CY	\$43,332.22		
		100 X100 INFILIKATION BASIN	INFILIRATION BASIN	FENCING	448 LF	\$14.92 / LF	\$6,684.16		
DE-109	Ukudo	200 LF BIOSWALE	BIOSWALE	EXCAVATION	96.96 CY	\$27.53 / CY	\$2,669.31	\$391,960.31	\$666,332.52
		200 LF BICSWALE	BIOSTALE	EROSION CONTROL (HYDROSEED)	3200 SF	\$5.00 / SF	\$16,000.00		
		3 HEADWALLS	HEADWALL		3 EA	\$5,000.00 / EA	\$15,000.00		
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		
DE-110 Route 1	Route 1 and Route 3	1 MANHOLE	MANHOLE		1 EA	\$2,800.00 / EA	\$2,800.00	\$66,095.09	\$112,361.66
	noute 1 and noute 3	200 LF DITCH	DITCH		29.63 CY	\$27.53 / CY	\$815.71	\$00,033.03	7112,501.00
		100 LF 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38		
	电台外运行性的对应	1 CATCH BASIN	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500.00		
DE-111	Route 1 and Route 27A	100 LF 24" RCP	24" RCP	Walling to the second	100 LF	\$554.79 / LF	\$55,479.38	\$61,779.38	\$105,024.95
		1 MANHOLE	MANHOLE		1 EA	\$2,800.00 / EA	\$2,800.00		

MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIO	NS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING & CONTINGENCIES
		2 CATCH BASIN	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		
		400 LF DITCH	DITCH		59.26 CY	\$27.53 / CY	\$1,631.43		
DE-113	Route 1 and Route 28	100 LFx24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	\$83,526.02	6141 004 22
DE-113	Noute 1 and Noute 28	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	\$63,526.02	\$141,994.23
		300 SF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00		
	Taring salations	200 LE BIOCHIALES	BIOSWALE	EXCAVATION	96.96 CY	\$27.53 / CY	\$2,669.31		表示制计设计机构图形 的
		200 LF BIOSWALES	BIOSWALE	EROSION CONTROL (HYDROSEED)	3200 SF	\$5.00 / SF	\$16,000.00		
DE-115	Route 3 A and Route 9	2 CATCH BASIN	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	600 400 00	4100 000 00
DE-113	Route 3 A and Route 9	100 LFx24" RCP	24" RCP	SANSHERS WHEATERS IN	100 LF	\$554.79 / LF	\$55,479.38	\$99,423.31	\$1 69 ,019.62
		300 CF RIP RAP	RIP RAP	A SECURITY PUBLICATION OF	11.11 CY	\$744.79 / CY	\$8,274.62		
		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	TEMPS - PER BANGUES AND	LEADER 1 EATTER	\$10,000.00 / EA	\$10,000.00		
		3 CATCH BASINS	CATCH BASIN		3 EA	\$3,500.00 / EA	\$10,500.00		
		150 LF x 24" RCP	24" RCP		150 LF	\$554.79 / LF	\$83,219.07		
DE 117	Route 3 and Bullard	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	4420 552 00	4222 427 00
DE-117	Avenue	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$130,663.00	\$222,127.09
		200 LF BIOSWALES	BIOSWALE	EXCAVATION	96.96 CY	\$27.53 / CY	\$2,669.31	1	
		200 LF BIOSWALES	BIOSWALE	EROSION CONTROL (HYDROSEED)	3200 SF	\$5.00 / SF	\$16,000.00		
计区别性图形 成		2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL	Part of the control of the second	2 EA	\$10,000.00 / EA	\$20,000.00		Market Market
	Route 3 and Chalan	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	STREET, STREET	0.25 AC	\$4,562.38 / AC	\$1,140.59	644 600 00	\$70.872.71
DE-116	Kareta	600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549.23	\$41,689.83	\$70,872.71
		2 TRASH RACKS	TRASH RACK	是. (Can Dec) 是 (Can Dec)	2 EA	\$2,000.00 / EA	\$4,000.00	ALIMAN STREET	
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	=	
		AGO LE CONCRETE DITCH	CONCRETE DITCH	EXCAVATION	7.41 CY	\$27.53 / CY	\$204.00	1	
		100 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	3.56 CY	\$633.32 / CY	\$2,254.62		
DE-120	Route 3 and Control Tree Drive	100 LF x 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	\$86,407.31	\$146,892.42
	THEO DITYE	1 MANHOLE	MANHOLE		1 EA	\$2,800.00 / EA	\$2,800.00	- 2	
		200 LF BIOSWALES	BIOSWALE	EXCAVATION	96.96 CY	\$27.53 / CY	\$2,669.31		
46		200 LF BIOSWALES	BIOSWALL	EROSION CONTROL (HYDROSEED)	3200 SF	\$5.00 / SF	\$16,000.00	i .	
	Martin College	1000 LF BIOSWALES	BIOSWALE	EXCAVATION	484.8 CY	\$27.53 / CY	\$13,346.54	ALE GROWING	the resemble forces
		TOOL IL BIO2MWIE2	STATE OF THE STATE	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000.00		
	Route 3 and Route 28	2 CATCH BASINS	CATCH BASIN	BULLING ASSESSMENT	2 EA	\$3,500.00 / EA	\$7,000.00	\$102,100.54	\$173,570.92
DE-118	noute 5 and route 28	100 LF x 24" RCP	24" RCP	1001-25-5-28-6-3	100 LF	\$554.79 / LF	\$55,479.38	\$102,100.34	7113,310.32
		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00		
		300 CF RIP RAP	RIP RAP	MINOR REPORT SERVICES	11.11 CY	\$744.79 / CY	\$8,274.62		

MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING & CONTINGENCIES
		2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000.00		
	Route 26	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,140.59		
DE-114		100 LF x 24" RCP	24" RCP	100 LF	\$554. 79 / LF	\$55,479.38	\$81,894.59	\$139,220.81
	Route 25	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000.00	4421	
		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,274.62		
为型。5世15年18日	200 April 200 Ap	4 CATCH BASINS	CATCH BASIN	4 EA	\$3,500.00 / EA	\$14,000.00	MORNING TO SERVICE	
DE-112	Route 27 A and Route 28	2 MANHOLES	MANHOLE	2 EA	\$2,800.00 / EA	\$5,600.00	\$130,558.76	\$221,949.89
	28	200 LF x 24" RCP	24" RCP	200 LF	\$554.79 / LF	\$110,958.76		
		2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000.00		
DF 102	Route 26	100 LF x 24" RCP	24" RCP	100 LF	\$554.79 / LF	\$55,479.38	600 TE4 00	A427 204 70
DE- 102	NEAR MAGOF Rd	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000.00	\$80,754.00	\$137,281. 79
		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,274.62	121	
CHANGE THE	The State of the S	2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000.00	September 500	MENT OF THE PERSON NAMED O
DE-107		100 LF x 24" RCP	24" RCP	100 LF	\$554.79 / LF	\$55,479.38		
	Route 27A	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	I EA	\$10,000.00 / EA	\$10,000.00	\$80,754.00	\$137,281.79
		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,274.62		

				DISTRICT	CHALAN PAGO &	OKDOI					
	LOCATION				C	OST ESTIMATE				-	
MAP DESIGNATION	STREET/	ROUTE		RECOMMENDATI	ONS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ ENGINEERING CONTINGENCIES	
CHROSTORY SHEET		ALCOHOLD WATER	500 LFx2-24" RCP	24" RCP	Bell David Care of the Control	500 LF	\$554.79 / LF	\$277,396.90	Value of the state		
			2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL	OF BUILDINGS ARE SEED	HAMMED ROOMS EA STORY	\$10,000.00 / EA	\$20,000.00			
CP-101	Chalan Famha	Leo Palace	600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549.23	\$325,545.35	AFF2 427.00	
CP-115	Chaish ratifile	DEU PAIACE	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	MEET STORY STEEDERS STORY STORY	0.25 AC	\$4,562.38 / AC	\$1,140.59	\$323,343.33	\$553,427.09	
			海峡市区10000 河流域		EXCAVATION	193.92 CY	\$27.53 / CY	\$5,338.62			
	等。在是 对		400 LF BIOSWALE	BIOSWALE	EROSION CONTROL (HYDROSEED)	6400 SF	\$0.80 / SF	\$5,120.00			
	· · · · · ·		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		T	
			100' 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38		1	
CP-102	Victoriano Road	Dero Road	HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$82,385.42	\$140,055.22	
			400' DITCH	рисн		59.26 CY	\$27.53 / CY	\$1,631.43		1	
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	103		
	The state of the s		2 CATCH BASINS	CATCH BASIN	以中,把创创。也是在 是 所以的特殊的问题	2 EA	\$3,500.00 / EA	\$7,000.00	美国特益公司政治 安		
	Ramirez Drive - Chalan		500' 24" RCP	24" RCP	ONE BUILDING COMPANY AND RESE	500 LF	\$554.79 / LF	\$277,396.90			
CP-103	Pago	Judge Sablan St	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$304,302.94	\$517,315.01	
	A Principle		400' DITCH	DITCH	计算性 机并均衡设置加至现实的物理和现代	59.26 CY	\$27.53 / CY	\$1,631.43			
			300 CF RIP RAP	RIP RAP	THE RESIDENCE WHEN THE PROPERTY OF	11.11 CY	\$744.79 / CY	\$8,274.62			
			1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		1	
			2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00			
			100'x24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38	******		
CP-104	Dero Road	Route 4	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$83,526.02	\$141,994.23	
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62			
			400' DITCH	рітсн		59.26 CY	\$27.53 / CY	\$1,631.43			
CASH SENTERS COLUMN	unional exercisions	A SECULO DE LA COMPANSIONE	2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL	TANK COMMENSATION OF THE PARTY	2 EA	\$10,000.00 / EA	\$20,000.00	William Edica	Helphone Credition A. A.	
			400' DITCH	рітсн		59.26 CY	\$27.53 / CY	\$1,631.43			
									\$8,274.62		
CP-105	Gogue Drive		2 CATCH BASINS	CATCH BASIN	error British Salah Barran Belle	Z EA STORE	\$3,500.00 / EA	\$7,000.00	\$449,885.42	\$764,805.22	
			500'x36" RCP	36" RCP	enan senso are a salida e sensu	500 LF	\$715.00 / LF	\$357,500.00			
	SESTIMATE AND A		100'x24" RCP	24" RCP	Section Control of Con	100 LF	\$554.79 / LF	\$55,479.38			
	- and and a part of the last		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00			
			500'x36" RCP	36" RCP		500 LF	\$715.00 / LF	\$357,500.00	14.		
			100 LFx24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38			
CP-106	Chalan Totto	Route 4	2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000.00	\$449,885.42	\$764,805.22	
			400' DITCH	рітсн		59.26 CY	\$27.53 / CY	\$1,631.43			
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62			
Local State Cont.	HEALER ENGINEER POSTER		2 CATCH BASINS	CATCH BASIN	MANAGEMENT OF THE STATE OF THE	THE STREET LANGE EAST AND LESS	\$3,500.00 / EA	\$7,000.00	SAVENCE PARENCE A	AND PARTY OF	
			100°x36" RCP	36" RCP	and engage with the Ambin	100 LF	\$715.00 / LF	\$71,500.00			
			300 CF RIP RAP	RIP RAP	Wast Wasterstand Bearing Committee	11.11.07	\$744.79 / CY	\$8,274.62			
CP-107	Naki Street	Route 4	a agranti de la composita de l	THE SHOPP HE WAS BROWNED TO	EXCAVATION	29.63 CY	\$27.53 / CY	\$815.71	\$90,436.47	\$153,742.00	
			100' CONCRETE CHANNEL	CONCRETE CHANNEL	CONCRETE (DITCH LINING)	3.85 CY	\$633.32 / CY	\$2,438.28			
			100, DLLCH	DITCH	Mary Assessment menural control	14.815 CY	\$27.53 / CY	\$407.86	CHOCKEL WALL		
HART TENEDS		The second secon			EXCAVATION	29.63 CY	\$27.53 / CY	\$815.71			
			100' CONCRETE CHANNEL	CONCRETE CHANNEL	CONCRETE (DITCH LINING)	3.85 CY	\$633.32 / CY	\$2,438.28	T-7-4		
			100, DILCH	DITCH	*	14.815 CY	\$27.53 / CY	\$407.86			
CP-108	Maimal Road and	Chalan Apusento	2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00	\$401,185.02	\$682,014.53	
	Route 15		500'x48" RCP	48" RCP		500 LF	\$744.50 / LF	\$372,248.55		1	
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62			
			1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00			



LOCATION					C	OST ESTIMATE				
MAP ESIGNATION	STREET,	/ROUTE	RECOMMENDATIONS			QUANTITIES UNITS	COST / UNIT	cost	TOTAL COST	TOTAL COST W/ ENGINEERING CONTINGENCIES
the section of the section of	WATER TO THE RE	Englished to	2 CATCH BASINS	CATCH BASIN	TO DESIGNATION OF THE PERSON	2 EA	\$3,500.00 / EA	\$7,000.00	0 m 2 m 1 m 1 m 2 m 2 m 2 m 2 m 2 m 2 m 2	Treatment and the second
			100'x24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38		
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
CP-109	Kongga Road		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$115,520.69	\$196,385.17
			400' DITCH	рисн	BUSINESS TO SEE STREET	59.26 CY	\$27.53 / CY	\$1,631.43		
		经是新加州的	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	Paradia Vertuka para arak alah dari	0.25 AC	\$4,562.38 / AC	\$1,140.59		
			2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000.00		
			100'x 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479.38		
			300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
	Chalas Olsas	C	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	****	
CP-110	Chalan Okso	Santa Cruz Dr	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59	\$115,520.69	\$196,385.17
i			400' DITCH	рисн		59.26 CY	\$27.53 / CY	\$1,631.43		1
Ī					EXCAVATION -	311 CY	\$27.53 / CY	\$8,561.83		
			100' CONCRETE CHANNEL	CONCRETE CHANNEL	CONCRETE (DITCH LINING)	37 CY	\$633.32 / CY	\$23,432.84		1
Mary State	NEADA TAKABI	SHOW THE REAL PROPERTY.	2 CATCH BASINS	CATCH BASIN	CONTRACTOR SERVICES	2 EA	\$3,500.00 / EA	\$7,000,00		House to State and a
	Manibusan Lane		100'x24" RCP	24" RCP	A SINCE CHARACTER CHARACTER	100 LF	\$554.79 / LF	\$55,479.38		
			300 CF RIP RAP	RIP RAP	ACRISC TERRITORISTA	11.11.07	\$744.79 / CY	\$8,274.62		
CP-222		n Lane Santa Cruz Dr	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	NEW YORK OF THE PARTY OF THE PA	1 EA	\$10,000.00 / EA	\$10,000.00	\$83,526.02	\$141,994.23
			1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.59		
			400' DITCH	рпсн		59.26 CY	\$27.53 / CY	\$1,631,43		
	AND DESCRIPTION OF THE PARTY OF	the second of the section of	2 CATCH BASINS	CATCH BASIN	HILLION BERGIN TEACOLE SET JOSEPONINGO MICH.	2 EA	\$3,500.00 / EA	\$7,000.00	THE REAL PROPERTY OF	AL PERSONAL PROPERTY OF THE PERSON NAMED IN COLUMN 1
1			100'x24" RCP	24° RCP		100 LF	\$554.79 / LF	\$55,479.38		
CP-112	Chalan Chirik	Route 10	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274,62	\$82,385.42	\$140,055,22
			1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000,00		
			400' DITCH	рітсн		59.26 CY	\$27.53 / CY	\$1,631.43		
SCHEROLOGISCHOOL	a restaura de la composition de	TERRETE ENGL	100'x5'x5' RCB	REINFORCED CONCRETE BOX CULVERT	ALERSON MARKET STREET	92.59 CY	\$1,103.85 / CY	\$102,205.47	STEEN SHIP TO A STATE OF	a ethologistadent
W681 - 15 14			1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL	No. of the Contract of the Con	0.25 AC	\$4,562.38 / AC	\$1,140.59		
			1000 SF GABIONS	GABION	THE SPECIAL OF THE WAR STORY	92.9 CY	\$629.66 / CY	\$58,495,67		
		126753 30467	1200 CF RIP RAP	RIP RAP		44.44 CY	\$744.79 / CY	\$33,098.47		
			2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALL	REWINDER STREET	TENERS OF 2 EASTERN	\$10,000.00 / EA	\$20,000.00		
			100'x3'x5' RCB	REINFORCED CONCRETE BOX CULVERT	TO RESIDENCE OF THE STATE OF TH	55.55 CY	\$1,103.85 / CY	\$61,318.87		
CP-114	Chalan Nganga	Leo Palace	300 CF RIP RAP	RIP RAP	SCHOOL BUNGATURE	11.11 CY	\$744.79 / CY	\$8,274.62	\$354,336.78	\$602,372.52
为是是公司的法			E WARRANT STREET	MANUAL SEARCH STORE SEASON PROS	EXCAVATION	29.63 CY	\$27.53 / CY	\$815.71		
		ASSESSED OF THE PARTY OF THE PA	100' CONCRETE DITCH	CONCRETE CHANNEL	CONCRETE (DITCH LINING)	7.7 CY	\$633.32 / CY	\$4,876.56		
			400' DITCH	DITCH WITH MARKET AND THE SERVICE AND THE SERV	SECURITY PROPERTY OF THE PARTY.	59.26 CY	\$27.53 / CY	\$1,631.43		
			2 CATCH BASINS	CATCH BASIN	Processor and the College College	2 EA	\$3,500,00 / EA	\$7,000.00		
			100'x24" RCP	24" RCP	Caracavan III Selection	100 UF	\$554.79 / LF	\$55,479.38		

			Haga	atna Village					
LC	CATION			COST ESTIMATES					
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / UNITS	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
HA-101	Route 4 & Route 1	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	\$8,275	\$14,100
		200°x4°x4° RC8	RCB The school of the second s	HOUSE THE SEASON HOUSE TO SEASON	118.52 CY	\$1,103.85 / CY	\$130,828.30	學認為學問題	
HA-102	Route 2 & Route 78	1 HEADWALL	HEADWALL	DWELL TENERS SERVED IN	1 EA	\$5,000.00 / EA	\$5,000.00	\$144,103	\$245,000
Self-Franch	Office South Barriers	300 CF RIP RAP	RIP RAP	MERCHANIST SERVICE AND ASSESSMENT OF THE SERVICE AND ASSESSMENT OF	11.11 CY	\$744.79 / CY	\$8,274.62	基件的基础	
		2-100' BIOSWALES (HOTSPOT)	BIOSWALE	EXCAVATION EROSION CONTROL (HYDROSEED)	96.3 CY 2600 SF	\$27.53 / CY \$5.00 / SF	\$2,651.14 \$13,000.00		
HA-103	Sixth Street	ABANDON DRY WELLS (6 TOTAL)	ABANDON DRY WELLS	ABANDON WATER WELL	6 EA	\$5,500.00 / EA	\$33,000.00	\$728,277	\$1,240,000
		UPSIZE PIPE IN Rte 7A (1000'x30")	UPSIZE PIPE	30" RCP	1000 LF	\$679.63 / LF	\$679,625.40	1	
edis Enviro	WITH A LONG WELLING	POST (POST DE PORT LES RESENTANTES	(2) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	EXCAVATION	192.6 CY	\$27.53 / CY	\$5,302.28	STREET	AND DESCRIPTION OF SHAPE
		4-100' BIOSWALES (HOTSPOT)	BIOSWALE	EROSION CONTROL (HYDROSEED)	5200 SF	\$5.00 / SF	\$26,000.00		
HA-104	Anicato Street	2 CATCH BASINS	CATCH BASIN	t 1900 His DANSAL SPEED AND SILE OF	2 EA	\$3,500.00 / EA	\$7,000.00	\$149,261	\$254,000
		200'x24" RCP	24° ROP & SERVICE STATE OF THE	retroved the semidocoustered substitute	200 LF	\$554.79 / LF	\$110,958.76		
		1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,140.60		
HA-105	Route 7A & Detention Facility	3,000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$83,894	\$143,000
		UPSIZE PIPE IN Rts 7A (4000'x48")	UPSIZE PIPE	48" RCP 10 12 (1) 0 X 5 Y 10 T 10	4000 LF	\$744.50 / LF	\$2,977,988.40	RELIEF STREET	NEED TO BE SHOULD BE SHOULD BE
HA-106	Route 7 A and O'Brien Drive	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$2,996,263	\$5,100,000
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
		4 NEW WINGWALLS @ ABUTMENT	WINGWALL		4 EA	\$5,000.00 / EA	\$20,000.00		
HA-107	Minondo Bridge	1200 CF RIP RAP	RIP RAP		44.44 CY	\$744.79 / CY	\$33,098.47	\$53,098	\$90,300
nging Auges	WINDS OF SEPARATE AND	1 AC DEBRIS REMOVAL	DEBRIS REMOVAL	A PERCENT TO SELECT A PROPERTY OF THE PERCENT OF TH	A LACE TO ACCURATE	\$4,562.38 / AC	\$4,562.38	Wilestern Transfer	POST TO STANDARD
HA-108	Agana River Bridge	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$70,042	\$119,000
		100'x24" RCP	24" RCP 147	。例如:1000 FIFTH TO CHEST () 是 例 中国 () 图 []	100 LF	\$554.79 / LF	\$55,479.38		
HA-109	Route 7 & Route 33	ADD 5,000 SF to INFILTRATION BASIN (6' DEEP)	INFILTRATION BASIN	EXCAVATION FENCING	1111.11 CY 10.448 LF	\$27.58 / CY \$14.92 / LF	\$30,588.86 \$155,884.16	\$1,386,473	\$2,360,000
		INSTALL 6 INJECTION WELLS (200 LF EA)	INJECTION WELL		1200 LF	\$1,000.00 / LF	\$1,200,000.00		
CHAPTED AND	SCHOOL STREET	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	E-tracked and the sale to assure to	0.25 AC	\$4,562.38 / AC	\$1,140.60	03610147543113	Balling at the same
		3,000 CF RIP RAP	RIP RAP	Markey actions and the	111.11 07	5744.79 / CY	\$82,753.62		
HA-110	Route 7 & Fonte River	2 - 200'n9'x4' 8CB	808 E1943FE	SELECTION OF THE PARTY OF THE P	533,33 CY	\$1,103.85 / CY	\$588,716.32	\$692,611	\$1,180,000
		2 HEADWALL/WINGWALL STRUCTURES	HEADWALL/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000.00		
T. SECTION S. SECTION S.	Personal Interest of the sample of	300 CF RIP RAP	RIP RAP	A CONTRACTOR OF THE PARTY OF TH	11.11 CY	\$744.79 / CY	\$8,274.62		Control of the Contro
HA-111	Route 1 & East Hagatna Beach	1 HEADWALL/WINGWALL STRUCTURE	HEADWALL/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$18,275	\$31,100
Control of the	POLICE CONTRACTOR CONTRACTOR CONTRACTOR		ROCK BLANKET	AMERICAN STREET, IND. CO. CO. CO. C.	1111.11 SY	\$73.51 / SY	\$81,677.70	mercinal processing	HAVE BEEN ASSESSED.
		10,000 SF ROCK BLANKET 300 CF RIP RAP	RIP BAP		11.11 C4	\$744.79 / CY	\$8,274.62		
HA-112	Chen's Furniture	1 HEADWALL/WINGWALL STRUCTURE	HEADWALL/WINGWALL	man may / 1500 by a second second second	1 EA	\$10,000.00 / EA	\$10,000.00	\$104,876	\$178,000
		T HEREWALLY WHILE WALL STROET ON E	NOTE THE REPORT OF THE PROPERTY OF THE PROPERTY OF	EXCAVATION	14.81 CY	\$27.53 / CY	\$407.72		
		200 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	7.13 CY	\$633.32 / CY	\$4,515.57		
rather full strike	A MANAGEMENT CONTRACTOR CONTRACTOR	10,000 SF ROCK BLANKET	ROCK BLANKET		1111.11 SY	\$73.51 / SY	\$81,677.70		**
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62		
HA-113	Route 1	1 HEADWALL/WINGWALL STRUCTURE	HEADWALL/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$104,876	\$178,000
	Mobil Gas Station	200 LF CONCRETE DITCH	CONCRETE DITCH	EXCAVATION CONCRETE (DITCH LINING)	14.81 CY 7.13 CY	\$27.55 / CY \$633.32 / CY	\$407.72 \$4,515.57	1	
CONTRACTOR AND STATE	COMPANIES DE PROGRAMA PAR SESTA	10,000 SF ROCK BLANKET	ROCK BLANKET	(CONTRACT (DITATION (CONTRACT)	1111.11 SY	\$73.51 / 5Y	\$81,677.70		DATE OF THE PARTY
		300 CF RIP RAP	RIP RAP	PERSONAL SERVICE PROPERTY OF THE	11.11 (7	\$744.79 / CY	\$8,274.62	SCHOOL SERVICE	
HA-115	Route 1	1 HEADWALL/WINGWALL STRUCTURE	HEADWALL/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$104,876	\$178,000
	Citibank	a mounty windows a since tone	APPER OF THE RESIDENCE OF THE PROPERTY OF THE	EXCAVATION	14.81 CY	\$27.53 / CY	\$407.72	计算程序设置性的	
		200 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	7.13 CY	\$633.52 / CY	\$4,515.57		
2-7/4/19/14/12/0	STATE OF THE PERSON NAMED IN COLUMN	1 AC DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562.38	1	
				EXCAVATION	14.81 CY	\$27.53 / CY	\$407.72	1	İ
HA-116	Shell Gas Stn and Route 1	200 LF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	7.13 CY	\$633.32 / CY	\$4,515.57	\$26,992	\$45,900
		10'x10' APRON AROUND EXIST CATCH BASIN	APRON	CONCRETE (DITCH LINING)	4.17 CY	\$1,800.00 / CY	\$7,506.00	100,000	
		10,000 SF HYDROMULCH W/BFM	HYDROMULCH (BFM)		10,000 SF	\$1.00 / SF	\$10,000.00	1	
HA-117	Route 4 & Route 1	3000 CF RIP RAP	RIP RAP	ACRES - THE CASE OF SAME OF SAME OF SAME	111.11 CY	\$744.79 / CY	\$82,753.62	\$82,800	\$141,000

ro	CATION			COST ESTIMATES	i				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / UNITS	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
HA-118	Route 1 &	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,274.62	\$18,275	£74.400
HA-118	District Court House	1 HEADWALL/WINGWALL STRUCTURE	HEADWALL/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000.00	\$18,275	\$31,100
HA-119	Route 1 &	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	West Committee of the C	0.25 AC	\$4,562.38 / AC	\$1,140.60	THE SALINIA SECTION	WAR CHARGE BUILDING TO
WENT WITH	Sewage Treatment Plant	3,000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,753.62	\$83,894	\$243,000
HA-120	Route 1 &	200'x4'x4' RCB	RCB		118.52 CY	\$1,103.85 / CY	\$130,828.30	f 127 120	£224.000
HA-120	Gregorio Perez Marina	1 HEADWALL	HEADWALL		1 EA	\$5,000.00 / EA	\$5,000.00	\$135,828	\$231,000
Interview Control	Route 1 & Padre Palomo	1/2 ACRE DEBRIS REMOVAL	DEBRIS REMOVAL	AND THE PERSON OF THE PARTY OF	0.5 AC	\$4,562.38 / AC	\$2,281.19	用些多电话的表情	分析的研究 及整点的基础
HA-121	Memorial Park 6,000 CF RIP RAP RIP RAP		AGUHU HURASHEKASALKAKAN	222.22 CY	\$744.79 / CY	\$165,507.23	\$167,788	\$285,000	

100	MOLTA								
LOC	CATION			\$ C	OST ESTIMAT	E \$			
MAP DESIGNATION	STREET/ROUTE	RECOMMENDATIONS			QUANTITIES UNITS	COSTS / UNITS	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
	getti sagrali Salid Lissa.	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	sale of the sale	0.25 AC	\$4,562.38 / AC	\$1,141		
IV-112	Agfayan River Bridge	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$83,894	\$142,620
ALCOHOL POR SACRAFIA	MINISTRAL STREET, TANKS AND SECURITIONS	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	The Samuel San Children	0.25 AC	\$4,562.38 / AC	\$1,141	Political Agents Thereigh	THE REAL PROPERTY OF THE PARTY
IV-117	Route 4 and Tongan Creek		RIP RAP					\$103,894	A475 500
14-777	Route 4 and Tongan Creek				111.11 CY	\$744.79 / CY	\$82,754	\$103,894	\$176,620
		4 WINGWALLS	WINGWALL		4 EA	\$5,000.00 / EA	\$20,000		
IV-113	Route 4 near Tun Santiago N		DEBRIS REMOVAL	Market Market State of the Control o	0.5 AC	\$4,562.38 / AC	\$2,281	\$167,788	\$285,240
IV-114	Paulino	3,000 CF RIP RAP	RIP RAP	基本的基本的基本的	222.22 SF	\$744.79 / SF	\$165,507	SAME AND RESIDENCE	提出指揮在於海内。 由中國
		1/2 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.5 AC	\$4,562.38 / AC	\$2,281	****	
IV-109	Route 4 at Tinago River	1,000 SF CHANNEL LINING	CONCRETE CHANNEL LINING		18.5 CY	\$633.32 / CY	\$11,716	\$179,505	\$305,158
No. 7 a a interest		6,000 CF RIP RAP	RIP RAP	A COMPANY OF THE PARTY OF THE P	222.22 CY	\$744.79 / CY	\$165,507		
IV-107	Route 4 & Aslinger River	250,000 SF HYDROSEED (W/BFM)	HYDROSEED (W/BFM)	WITH THE PROPERTY OF THE PARTY	250000 SF	\$1.50 / SF	\$375,000	\$375,000	\$637,500
IV-102, IV 103, IV-	Rte 4 & Ates Ln, Rte 4 @ Dan Dan Store, Rte 4 & NO			EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118		
104, IV-106	Malojloj Wall, Rte 4 &	2-200 INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$26,629	\$45,269
	Chargala			FILTER FABRIC	7600 SF	\$1.50 / SF	\$11,400		
- walles, the secretary	CHICAL SANGER AND EXCUSED AND	6,000 CF RIP RAP	RIP RAP	SAME THE REAL PROPERTY.	222 CY	\$744.79 / CY	\$165,507	SOLD FORWARD OF STREET	DIGHTSHITWHEN THE THE
IV-108	Route 4 at Aslinger River	1/2 ACRE DEBRIS REMOVAL	DEBRIS REMOVAL		0.5 AC	\$4,562.37 / AC	\$2,281	\$177,788	\$302,240
	建筑建设设置的	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALLS	- Company of the same	1 EA	\$10,000.00 / EA	\$10,000		
		100'x6'x6' RCB	REINFORCED CONCRETE BOX CULVERT		133.33 CY	\$1,103.85 / CY	\$147,176		
	Route 4 at unnamed	2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALLS		2 EA	\$10,000.00 / EA	\$20,000	1	
IV-101	tributary near Asalonso	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$251,071	\$426,820
	River	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	1	
PARTITION OF THE	MENANTE EL PONTES DEL	PASSES AND DESCRIPTION OF THE PROPERTY OF THE PASSES.	TOWER PRINTED AND THE PARTY OF	EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118	Section of the State of the Sta	
IV-121	Route 4 at Belen Avenue	2-200' INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$26,629	\$45,269
				FILTER FABRIC	7600 SF	\$1.50 / SF	\$11,400		使與於學物理學是
N. A. H. A. Carroll, The Carrol	And Million is they bring bring the	100'x3'x6' RCB	REINFORCED CONCRETE BOX CULVERT	FILTER FABRIC	66.67 CY	\$1,103.85 / CY	\$73,594	me and marginal states	The second second second
		2 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALLS		2 EA	\$10,000.00 / EA	\$20,000	500.000.000	200000000000000000000000000000000000000
IV-11B	Route 4 at Bisbesbes	600 CF RIP RAP	RIP RAP	 	22.22 CY	\$744.79 / CY	\$16,549	\$111,284	\$189,182
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	1	
LCARTITUDE N-U-CACA	Route 4 at Chagaminlago	1 AC DEBRIS REMOVAL	DEBRIS REMOVAL	THE STORY LINE THE TO	1 AC	\$4,562.38 / AC	\$4,562	independent Property and	SOMEOUT PROPERTY OF A
IV-122	Street	60,000 CF RIP RAP	RIP RAP		2222.22 CY	\$744.79 / CY	\$1,655,087	\$1,659,650	\$2,821,404
IV-110	Route 4 at Jamie Ann's	1,000'x4' RECTANGULAR CONCRET	All the Control of th		266.5 CY	\$633.32 / CY	\$168,780	\$168,780	\$286,926
Electric party	HACKET STREET STREET STREET, STREET STREET, ST	2 CATCH BASINS	CATCH BASIN	近ちは別ないない。	2 EA	\$3,500.00 / EA	\$7,000		unatures as a second service
		100 LF 24" RCP	RCP HAVING A STATE OF THE REPORT OF THE RESERVE AND THE RESERV	PROBERT PROCES	100 LF	\$554.79 / LF	\$55,479		
IV-120	Route 4 at Ahayan River	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALLS	erejugaren en Applant	THE PARTY OF THE P	\$10,000.00 / EA	\$10,000	\$81,569	\$138,668
		300 CF RIP RAP	RIP RAP	n magicipa participati	11.11 CY	\$744.79 / CY	\$8,275	5- T	
		200 LF DITCH	рггсн	Salara Maria Cara Cara	29.63 CY	\$27.53 / CY	\$816		对自己的
2000 0000		1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	*****	4442.622
IV-123	Apman Dr	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$83,894	\$142,620
		100'x6'x3' RCB	RCB		65.00 CY	\$1,103.85 / CY	\$71,750		
		2-HEADWALL/WINGWALLS	HEADWALL W/WINGWALLS		2 EA	\$10,000.00 / EA	\$20,000		
IV-119	Route 4 S O Bisbesbes	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$122,754	\$208,682
		600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549		
	Steres day 1	1-200' INFILTRATION TRENCH	INFILTRATION TRENCH		1 EA	\$13,314.00 / EA	\$13,314		



LOC	CATION		\$ COST ESTIMATE \$									
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COSTS / UNITS	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES			
	Rte 4 & Chalan Tun Pedro			EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059					
IV-105 IV-111	Riviera Dr.	1-200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556	\$13,314	\$22,634			
10-222	Rte 4 & S. Tinago River			FILTER FABRIC	3800 SF	\$1.50 / SF	\$5,700	1	- 1			
		2 CATCH BASINS	CATCH BASIN	La Evandada	2 EA	\$3,500.00 / EA	\$7,000					
		100 LF 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479					
IV-116	Rte 4 & Tun Mariano D. Leon Guerrero Rd.	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALLS		1 EA	\$10,000.00 / EA	\$10,000	\$81,570	\$138,669			
		300 CF RIP RAP	RIP RAP	ESP CONTRACTOR DESIGNATION	11.11 CY	\$744.79 / CY	\$8,275					
		200 LF DITCH	рисн		29.63 CY	\$27.53 / CY	\$816					
Marie Company				EXCAVATION	4000 CY	\$27.53 / CY	\$110,120					
		1500' CONCRETE CHANNEL	CONCRETE CHANNEL	CONCRETE (DITCH LINING)	833 CY	\$633.32 / CY	\$527,556	(ETT)	7			
		1 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562	1 1				
	Enemicio & Regina Diego	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	1				
IV-124		100 LF 48" RCP	48" RCP		100 LF	\$146.00 / LF	\$14,600	\$816,945	\$1,388,806			
		6 HEADWALLS/WINGWALLS	HEADWALL W/WINGWALLS		6 EA	\$10,000.00 / EA	\$60,000]				
		100 CY CUT	EXCAVATION		100 CY	\$27.53 / CY	\$2,753	1				
		100 LF 36" RCP	36" RCP		100 LF	\$146.00 / LF	\$14,600					

				MANGILAO VIL	LAGE				
LOCA	ATION				COST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE	REC	COMMENDATIONS		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
STEP SHIRTS			CATCH BASIN	HE SHEET SHEET WAS	2 EA	\$3,500.00 / EA	\$7,000		Will making the first
		2 Catch Basins; 100 LF 24" RCP; 1	24" RCP	S THE SERVICE SERVICES	100 UF	\$554.79 / LF	\$55,479		
MO-101	Spanish Lane & Rt 15		HEADWALL/WINGWALL	OF SEVERY START	1 EA	\$10,000.00 / EA	\$10,000	\$81,569	\$139,000
		Ditch	RIP RAP	os i Rosela em para pero	11.11 CY	\$744.79 / CY	\$8,275		
			DITCH	THE PERSON NAMED IN COLUMN	29.6 CY	\$27.53 / CY	\$815		
	multiplication and decrease see the laborate sequence of	The second secon	CATCH BASIN	PROPERTY OF THE PARTY OF THE PA	2 EA	\$3,500.00 / EA	\$7,000	men constitue and of the Stant	FREIDELD-KADICH-HEIMANI-MI
	2 Catch Basins; 100 LF 24" RCP; 1/4 AC		24" RCP		100 LF	\$554.79 / LF	\$55,479		
MO-103	Kotpus Street		DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$264,904	\$450,000
		800' Fence	INFILTRATION BASIN	EXCAVATION	6851.85 CY	\$27.53 / CY	\$188,631		
			FENCE		848 LF	\$14.92 / LF	\$12,652	1	
and the State of	Chargualaf Street		INFILTRATION BASIN	EXCAVATION	9210 CY	\$27.53 / CY	\$253,551	INCHES OF	\$463,000
MO-104	&	& Debris Removal	FENCE	LO MERCENIA	948 LF	\$14.92 / LF	\$14,144	\$272,258	
	Chalan Kareta		DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562		
		WELL THE STATE OF STREET CO. ST. ST. S.	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000		
		2 Catch Basins: 100 LF 24" RCP: 1/4 AC	24" RCP		100 LF	\$554.79 / LF	\$55,479		
MO-105	Chargualaf Street		INFILTRATION BASIN	EXCAVATION	6851.85 CY	\$27.53 / CY	\$188,631	\$263,763	\$448,000
		800' Fence	FENCE		848 LF	\$14.92 / LF	\$12,652		
THE ALL PROPERTY OF THE	Tangerine Lane	2005/200' INFILTRATION BASIN	INFILTRATION BASIN	EXCAVATION	6851.85 CY	\$27.53 / CY	\$188,631	BUTTON STATE	
MO-106	A 1	800' FENCE	FENCING	ent ett. Ett ett stelle e	848 LF	\$14.92 / LF	\$12,652	\$701,284	\$1,190,000
	Rt 10	8 INJECTION WELLS	INJECTION WELLS	16" INJECTION WELL	500 LF	\$1,000 / LF	\$500,000		
	Mandarine Lane		EXCAVATION		74 CY	\$27.53 / CY	\$2,037	dra one	405 400
MO-107	& Chero Lane	1000 LF CONCRETE DITCH	CONCRETE (DITCH LINING)		77.04 CY	\$633.32 / CY	\$48,791	\$50,828	\$86,400
in the state of	A DECEMBER OF THE PARTY OF THE	S CHEST AND STREET AND A STREET	EXCAVATION	tan kasilengan, 201	1777.78 CY	\$27.53 / CY	\$48,942	2.020,012,474,012	0 9254 45454
		1000 LF CONCRETE TRAP CHANNEL	CONCRETE (DITCH LINING)	DE DESTRUCTIONS	718.52 CY	\$633.32 / CY	\$455,053		
MO-110	Kita L G Court	8000 CF RETAINING WALL	RETAINING WALL		296.3 CY	\$1,003.50 / CY	\$297,337	\$934,749	\$1,590,000
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
		1000 SF HYDROMULCH W/BFM	HYDROMULCH (BFM)		1000 SF	\$1.00 / SF	\$1,000		

EXCAVATION

0.75" ROCK

FILTER FABRIC

Concrete (Ditch Lining)

1 CATCH BASIN

100 LF 24" RCP 1 HEADWALL/WINGWALL

300 CF RIP RAP

200'x24" RCP

200' LONG INFILTRATION TRENCH

100' CONCRETE CROSS GUTTER

Manha Lane

Route 10 & Lalo Street

Appendix D - Page 18

Route 10

Intersection of Route 15 & 3 CATCH BASINS

MO-111

MO-112

MO-113

CATCH BASIN

CATCH BASIN

24" RCP

HEADWALL W/WINGWALL

INFILTRATION TRENCH

CONCRETE CROSS GUTTER

24" RCP

RIP RAP

\$3,500.00 / EA

\$554.79 / LF

\$744.79 / CY

\$27.53 / CY

\$41.00 / CY

\$1.50 / SF

\$633.32 / CY

\$3,500.00 / EA

\$554.79 / LF

\$10,000.00 / EA

\$3,500

\$55,479

\$10,000

\$8,275

\$3,059 \$4,556

\$3,900

\$11,716

\$10,500

\$110,959

\$88,768

\$11,716

\$121,459

\$151,000

\$19,900

\$206,000

1 EA

1 EA

100 LF

11.11 CY

111.11 CY

111.11 CY

2600 SF

18.5 CY

3 EA

LOC	ATION			COST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE	T/ROUTE RECOMMENDATIONS		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
alles a services		2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000	SE STAIN SE	
		400 LF 24" RCP	24° RCP	400 LF	\$554.79 / LF	\$221,918		
MO-116	Southern Cross Lane	100 SF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
MO-118	Southern Cross cane	2 HEADWALL/WINGWALL	HEADWALL/WINGWALL	2 EA	\$10,000.00 / EA	\$20,000	\$458,476	\$779,000
		200'x200' INFILTRATION BASIN	INFILTRATION BASIN	6851.85 CY	\$27.53 / CY	\$188,631		
		800' FENCE	FENCING	848 LF	\$14.92 / LF	\$12,652		
MO-114	Intersection of Route 15 &	4- 200 LF Bioswales (800 LF BiOSWALE)	EXCAVATION	533.33 CY	\$27.53 / CY	\$14,683	4	
MIU-114	Route 26 (Carnation Lane)	4- 200 LF BioSWales (800 LF BIOSWALE)	EROSION CONTROL (HYDROSEED)	15100 SF	\$1.50 / SF	\$22,650	\$37,333	\$63,500
	SELECTION - PLANT	2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000	The state of the	
	MO-115 Old Route 26	100 LF 24" RCP	24" RCP	100 UF	\$554.79 / LF	\$55,479		
MO-115		1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000	\$81,570	\$139,000
		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
	CAN CHES	200 LF DITCH	DITCH	29.63 CY	\$27.53 / CY	\$816		
			CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000	\$81,569	
		2 Catch Basins: 100 LF 24" RCP: 1	24" RCP	100 LF	\$554.79 / LF	\$55,479		
MO-102	Farfan St & Rt 15	Headwall/Wingwall, 100 SF Rip Rap, 200 LF	HEADWALL/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000		\$139,000
		Ditch	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
			DITCH	29.6 CY	\$27.53 / CY	\$815		
		THE REPORT OF THE PARTY OF THE	CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000		A ROLL DE STREET
		2 Catch Basins; 100 LF 24" RCP; 1	24° RCP	100 LF	\$554.79 / LF	\$55,479		
MO-108	Lemon Lane & Chero Lane	Headwall/Wingwall, 100 SF Rip Rap, 200 LF	HEADWALL/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000	\$81,569	\$139,000
		Ditch	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
		And the second of the second	DITCH	29.6 CY	\$27.53 / CY	\$815		数是2008年
***			CATCH BASIN	2 EA	\$3,500.00 / EA	\$7,000		
		2 Catch Basins; 100 LF 24" RCP; 1	24" RCP	100 LF	\$554.79 / LF	\$55,479		
MO-109	Aga Lane & Mngga Lane	Headwall/Wingwall, 100 SF Rip Rap, 200 LF	HEADWALL/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000	\$81,569	\$139,000
		Ditch	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
			DITCH	29.6 CY	\$27.53 / CY	\$815		

			MERIZO VIL	LAGE				
LO	CATION			COST ESTIMA	TE			
MAP DESIGNATION	STREET/ROUTE	RECON	1MENDATIONS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING 8 CONTINGENCIES
ME-113	Rt 4 & Juan Baubata St	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0 AC	\$4,562.38 / CY	\$1,141		
ME-119 ME-121 ME-122	Rt 4 & SO Benny Espinoza Ave Rt 4 & NO Benny Espinoza Ave Rt 4 & Chalan Joseph A Cruz	3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / LF	\$82,754	\$83,894	\$142,620
ME-101	Rt 4	1/2 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.5 AC	\$4,562.38 / AC	\$2,281	\$167,788	\$285,240
1012.201	Asmaile Creek	6000 CF RIP RAP	RIP RAP	222.22 CY	\$744.79 / CY	\$165,507	\$107,760	\$283,240
15年1日 日本 15年1日	entro tempo de Pellenio la	100'x12'x6' RCB	REINFORCED CONCRETE BOX CULVERT	266.67 CY	\$1,103.85 / CY	\$294,364		THE STATISTICS OF STATE
ME-124	Culvert at Mobil Station	2 HEADWALL/WINGWALLS	HEADWALL W/WINGWALL	2 EA	\$10,000.00 / EA	\$20,000	\$398,258	\$677,038
	Convert at Wisch Station	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	7336,230	J077,036
SEAR PROPER		3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754		53 10 8 20 15 4 5 2 5 2 14 14
ME-130	Rt 4 &	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$83,894	\$142,620
	Ajayan River	3000 CF RIP RAP	RIP RAP	111.11 CY	\$744,79 / CY	\$82,754		T
T Herman		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		
ME-111	Emma Juan Reyes Street	3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754	\$84,429	\$143,529
		3000 CF FILL	STRUCTURAL FILL	11.11 CY	\$48.14 / CY	\$535		
		4000 CY ROCK REMOVAL	ROCK REMOVAL	4000 CY	\$14.53 / CY	\$58,120		
		1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$4,487,587	
ME-114	Mannell Channel	15000 CF RIP RAP	RIP RAP	555.56 CY	\$744.79 / CY	\$413,776		\$7,628,897
		20 CY CUT	EXCAVATION	20 CY	\$27.53 / CY	\$551		
		4000 CY RETAINING WALL	RETAINING WALL	4,000 CY	\$1,003.50 / CY	\$4,014,000		
ME-115	North of Mannel Channel	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$6,489	\$11,032
Supplied to	HOIGH OF WARRING CHARRES	3,000 CF RIP RAP	RIP RAP	111.11 CY	\$48.14 / CY	\$5,349		
		2 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL	2 EA	\$10,000.00 / EA	\$20,000		
ME-128	N O Bile River	600 CF RIP RAP 1/4 AC DEBRIS REMOVAL	RIP RAP DEBRIS REMOVAL	22.22 CY 0.25 AC	\$744.79 / CY \$4,562.38 / AC	\$16,549 \$1,141	\$98,466	\$167,393
MIC-120	IA O DIIC IAVEI	100'x5'x3' RCB	RCB	54.56 CY	\$1,103.85 / CY	\$60,226	755,100	440,700
		20 CY CUT	EXCAVATION	20 CY	\$27.53 / CY	\$551		
ME-117	N O Geus River	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$83,894	\$142,620
	N O GEUS RIVE	3000 CF RIP RAP	RIP RAP	111.11.07	\$744.79 / CY	\$82,754		
ME-116	Rte 4 and Achang River at Jesus R	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$9,415	\$16,006
1916-220	Quinene	300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275		
ALC: U		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		
ME-102	Rte 4 and Asgado Creek	600 CF RIP RAP	RIP RAP	22.22 CY	\$744.79 / CY	\$16,549	\$27,690	\$47,073
		1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000		

LO	CATION			COST ESTIMA	TE			
MAP DESIGNATION	STREET/ROUTE	RECO	MMENDATIONS	QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
ME-120	Rte 4 & Benny Espinoza Ave	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$1,141	\$1,939
		100 CY CUT	EXCAVATION	100 CY	\$27.53 / CY	\$2,753		
ME-103	Rte 4 and Liyog River	3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754	\$86,647	\$147,300
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		
-		100 CY CUT	EXCAVATION	100 CY	\$27.53 / CY	\$2,753		
V-2		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275	1	
ME-126	Rte 4 and Pigua River	100'x6'x12' RCB	RCB	266.67 CY	\$1,103.85 / CY	\$294,364	\$319,653	\$543,410
		800 CF GABIONS	GABIONS	22.65 CY	\$629.66 / CY	\$14,262		
		1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.00 / AC	\$1,141		
ME-106	Rte 4 and Sumay River	3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / AC	\$82,754	\$83,894	\$142,620
		3000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754		4440.000
ME-110	Rte 4 and Suyafe River	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	D.25 AC	\$4,562.38 / AC	\$1,141	\$83,894	\$142,620
ME-118	Rte 4 and Geus River	1/2 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.5 AC	\$4,562.38 / AC	\$2,281	\$167,788	\$285,240
	機能。這一個一個大學的學家與	6000 CF RIP RAP	RIP RAP	222.22 CY	\$744.79 / CY	\$165,507	建设计划	
ME-104	Rte 4 Coastal Issues	1 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	1 AC	\$4,562.38 / AC	\$4,562	\$418,338	\$711,174
ME-107	Rice 4 Chastal Issues	15000 CF RIP RAP	RIP RAP	555.56 CY	\$744.79 / CY	\$413,776	3420,330	3/11,1/4
	政治 下加斯巴特迪拉斯克	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		
ME-125	Rte 4 & NO Merizo Catholic Church	300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79 CY	\$8,275	\$9,513	\$16,172
		100 SF APRON	CONCRETE (DITCH LINING)	0.1543 CY	\$633.32 / CY	\$98		
ME-112	Rte 4 S O Baubata	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$83,894	\$142,620
MIE-112	Rice 4 3 O Baudaca	3000 SF RIP RAP	RIP RAP	111.11 CY	\$744.79 / LF	\$82,754	400,00 1	V212,025
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$83,894	\$142,620
ME-105	Rte 4 S O Sumay River	3,000 CF RIP RAP	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754	7.07	
	Children Children Children	1/2 AC DEBRIS REMOVAL	DEBRIS REMOVAL	0.5 AC	\$4,562.38 / AC	\$2,281	£167.700	£205.240
ME-108	Rte 4 S O Suyafe River	6000 CF RIP RAP	RIP RAP	222.22 CY	\$744.79 / CY	\$165,507	\$167,788	\$285,240
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		
ME-129	Toguan River	600 CF RIP RAP	RIP RAP	22.22 CY	\$744.79 / CY	\$16,549	\$115,411	\$196,199
		10000 SF Ditch Lining	CONCRETE (DITCH LINING)	154.3 CY	\$633.32 / CY	\$97,721		

			MONGMON	G VILLAGE							
LOCA	ATION		COST ESTIMATE								
MAP DESIGNATION	STREET/ROUTE	RECON	1MENDATIONS	QUANTITIES UNITS	COST	/ UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES		
7000011111		2 CATCH BASINS	CATCH BASIN	2 EA	\$3,500.00	/ EA	\$7,000				
	Sergeant Roy T. Damian (Rt 33)	200' - 24" RCP	RCP	200 LF	\$554.79	/ LF	\$110,959				
MM-101		300 CF RIP RAP	RIP RAP	11.11 CY	\$744.79	/ CY	\$8,275	\$636,233	\$1,081,597		
	Rt 8	1 HEADWALL/WINGWALL	HEADWALL W/WINGWALL	1 EA	\$10,000.00	/ EA	\$10,000				
		UNDERGROUND INFILTRATION CHAMBER	INFILTRATION CHAMBER	1 EA	\$500,000.00	/ EA	\$500,000				



## RECOMMENDATIONS QUANTITIES UNITS COST / UNIT COST		LOCATION			C	OST ESTIMA	TE			340	
## 116 ## 1500 ## 150		STREET/ROUTE		RECOMMENDATIONS		QUANTITIES	UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
## 1316 ## 1500000 Ph. 1000000000000000000000000000000000000			2 - 100' - 36" RCP	36" RCP		100	LF	\$715.00 / LF	\$71,500		
Tripurque Nate Print 14 AC DESIS REMOVAL	PI-116		2 HEADWALL/WINGWALLS	HEADWALL W/WINGWALL		2	EA	\$10,000.00 / LF	\$20,000	\$109,190	\$185,623
Post 100		Tepungan Beach Park	1/4 AC DEBRIS REMOVAL	DEBRIS REMOVAL		0.25	AC	\$4,562.38 / AC	\$1,141	,,,,,,,	3103,023
P-131 Commonston Private P-132			600 CF RIP RAP	RIP RAP		22.22	CY	\$744.79 / CY	\$16,549		199
P-102 Squares Prove SQC CE BE ADP SP ADP 2.2.2 CT STM-TP / CT 516,549			100°124° RCP	24" RCP		100	IF STATE	\$554.79 / LF	\$55,479		
Source Dive Source Dive State	PL111	c/o Assumption Drive	2 HEADWALL/WINGWALLS	HEADWALL W/WINGWALL		2	EA	\$10,000.00 / EA	\$20,000		
Pub		Spruance Drive	600 CF RIP RAP	RIP RAP		22.22	CY	\$744.79 / CV	\$16,549	\$93,169	\$158,388
P-100			1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25	AC	\$4,562.38 / AC	\$1,141	Survey and the	Constitution in the second
## 19-00 Assumption Drive A Most on Price 19-100 Rt. 1.6 Assertation Price 19-100 1/4 AC CERES REMOVAL DIRECT REMOVAL	PI-104					111.11	CY.	\$744.79 / CV	\$82.754		
P-114	PI-106	Assumption Drive & Masso River (PI-106)								\$83,894	\$142,620
P-118	77-200		100/-35° DCD	26° DCD (00120012) 25° 00120 0	A STATE TAXABLE AND STREET OF THE PARTY OF T	STREET, STREET, 100	i e udanto virtuo	\$715.00 / UE	671 FAD	THE RESERVE OF THE PARTY OF THE	
P-115 Route 1 & Tagung Rev	0.114		6000 CF RIP RAP	RIP RAP	4 States and antiparent of					\$298,366	6567 333
Place					C (COST-CHAPTER)					\$298,366	\$507,223
P-101 Route 1 Inguig Note SOO OF RIP RAP RIP RAP 111.11 C' 374.79 C' \$62.754	CONTRACTOR SECURIOR S				a street a funditional construction attributes					Paternia Artesta primagera	CV Process That STREET THE STREET
Pk-101 Route 1 D,000 CF RP RAP RP RAP 1111.11 CY \$744.79 / CY \$327.544 Pk-109	N-112	Route 1 & laguag River	3000 CF RIP RAP	RIP RAP						\$83,894	\$142,620
Pi-109	AND THE REST		10,000 SF DEBRIS REMOVAL	DEBRIS REMOVAL			AC	\$4,562.38 / AC	\$4,562		
Ph-109 P	PI-101	M-101. Route 1	30,000 CF RIP RAP	RIP RAP		1111.11	CY	\$744.79 / CY	\$827,544	\$842,106	\$1,431,580
Pilo			HEADWALL/WINGWALL	HEADWALL W/WINGWALL		1	EA	\$10,000.00 / EA	\$10,000		
P-133	PI-110	Route 1 @ Masso River	3000 CF RIP RAP	RIP RAP						\$83,894	\$142,620
Pi-103 Marin Peling Street Character	PI-113		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25	AC	\$4,562.38 / AC	\$1,141		
P-103			100'x 2-36" RCP	36" RCP	CALL THE SECOND SECOND	100	LF	\$715.00 / LF	\$71,500		
1/4 Ac DEBRIS REMOVAL	0.100	Marin Peling Street	2 HEADWALL/WINGWALLS	HEADWALL W/WINGWALL		2	EA	\$10,000.00 / EA	\$20,000	\$109,190	\$185,623
Fig.		(Mary Pelen)	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25	AC	\$4,562.38 / AC	\$1,141		
PH-118 R111 A COMMERCIAL PORT Route 1 at Chalan Soling PH-107 Route 1 at Chalan Soling R111 A COMMERCIAL PORT R111 ROUTE 1 at Chalan Soling R111 ROUTE 1 at Chalan Soling R111 ROUTE 1 at Chalan Soling R11 R012 R11 R11 R11 R11 R020 SAPRON APRON CATCH BASIN REINFORCED CONCRETE BOX CULVERT R11 R11 R11 R11 R11 R11 R11			Contains the beauty and the contract of the co	DID BAD		22.22	CY	\$744.79 / CY	\$16,549		
PH-118 Commercial Port 100 SF APRON APRON CONCRETE (DITCH LINING) 3200 SF \$5.00 / SF \$16,000	ALTERNATION PROPERTY.				EXCAVATION	96.96	CY	\$27.53 / CY	\$2,669		
1 CATCH BASIN CATCH BASIN 1 EA \$3,500.00 / EA \$3,500	PI-118									\$22,267	\$37,854
PH-107 Route 1 at Chalan Soling Route 1 at		Commercial Port			CONCRETE (DITCH LINING)						
PI-107 Route 1 at Chaian Soling 2 HEADWALL/WINGWALLS 600 CF RIP RAP R	THE RESERVE OF THE PARTY OF THE	STOCKET SEPARATE PROBLEMS AND AND ADDRESS OF THE PROBLEMS OF T	CONTRACTOR OF THE PARTY OF THE	and their relationship to the control of the contro	District Control of the Control of t					CONSTRUCTION OF THE	IN COURSE INC. TO STATE
Pi-107 Route 1 at Chalan Soling 600 CF RIP RAP RIP RAP 22.22 CY \$744.79 / CY \$16,549 1/4 Ac DEBRIS REMOVAL DEBRIS REMOVAL 0.25 AC \$4,562.38 /-AC \$1,141 2005/37%5 RCB REINFORCED CONCRETE BOX CULVERT 111.11 CY \$1,153.35 / CY \$128,149 2 HEADWALL/WINGWALLS HEADWALL WININGWALL 2 EA \$10,000.00 / EA \$20,000 1/4 Ac DEBRIS REMOVAL DEBRIS REMOVAL 0.25 AC \$4,562.38 / AC \$1,141 3000 CF RIP RAP RIP RAP 111.11 CY \$744.79 / CY \$82,754 6500°24" RCP 6,500 UF \$554.79 / CY \$3,606,160 22 CATCH BASINS CATCH BASIN 2 CATCH BASIN 2 EA \$30,000.00 / EA \$3,200.000 Pi-119 B A SPOINTS Point 43,000 CY \$1,183,790 Pi-119 A 3,000 CY FILL FILL FILL 43,000 CY \$27.53 / CY \$1,183,790 22 CY \$744.79 / CY \$1,183,790 23 EA \$4,000.000 / EA \$3,200.000 24 RCP 8 BASINS CATCH BASINS 2 EA \$4,000.000 / EA \$3,200.000 25 CATCH BASINS CATCH BASIN 43,000 CY \$27.53 / CY \$1,183,790 26 CATCH BASINS CATCH BASIN 43,000 CY \$27.53 / CY \$1,183,790 27 EA \$3,000 CY \$1,183,790 28 EA \$4,000.000 / EA \$3,200.000 28 EA \$4,000.000 / EA \$3,200.000 29 EA \$3,000 CY \$1,183,790 20 EA \$1,183,790 20 EA \$4,562.38 / AC \$1,141 20 EA \$1,163,790 20 EA \$1,183,790 20 EA						-	The second second second second	THE RESERVE TO SERVE THE PARTY OF THE PARTY			
1/4 Ac DEBRIS REMOVAL	PI-307	Route 1 at Chalan Soling	the light design over the many and a strong						Calculation of the Calculation o	\$76,131	\$129,423
PI-102 R11 207x3'x5' RCB REINFORCED CONCRETE BOX CULVERT 111.11 CY \$1,153.35 / CY \$128,149 2 HEADWALL/WINGWALLS HEADWALL W/MINGWALL 2 EA \$10,000.00 / EA \$20,000 1/4 Ac DEBRIS REMOVAL DEBRIS REMOVAL 0.25 AC \$4,562.38 / AC \$1,141 3000 CF RIP RAP RIP RAP 111.11 CY \$744.79 / CY \$82,754 6500'x24'' RCP 24'' RCP 6,500 LF \$554.79 / CY \$3,606,160 22 CATCH BASINS CATCH BASIN 22 EA \$3,500 / EA \$77,000 Rt 1 Rt 1 AB Media Filters or Underground Vaults Polatris Point 43,000 CF FILL FILL 43,000 CY \$27.53 / CY \$1,183,790			William Company of the Company of th						COMPANY AND ADDRESS OF THE PARTY OF THE PART		
PI-102 R11 2 HEADWALL/WINGWALLS HEADWALL W/WINGWALL 2 EA \$10,000.00 / EA \$20,000 1/4 Ac DEBRIS REMOVAL DEBRIS REMOVAL 0.25 AC \$4,562.38 / AC \$1,141 3000 CF RIP RAP RIP RAP 111.11 CY \$744.79 / CY \$82,754 6500°24" RCP 24" RCP 6,500 UF \$554.79 / CY \$3,606,160 22 CATCH BASINS CATCH BASIN 22 EA \$3,500 / EA \$77,000 Rt 1 Rt 1 A \$400,000.00 / EA \$3,200,000 Vaults P-lais Points Point 43,000 CY FILL FILL 43,000 CY \$27.53 / CY \$1,183,790		STORY INVESTIGATION OF THE PROPERTY OF THE STORY							The second secon		
PI-102 RE1 1/4 Ac DEBRIS REMOVAL S1,141 S000 CF RIP RAP RIP RAP DEBRIS REMOVAL RIP RAP DEBRIS REMOVAL DEBRIS REMOVAL DEBRIS REMOVAL S1,141 DEBRIS REMOVAL S1					<u> </u>	2	EA	\$10,000.00 / EA	\$20,000		
3000 CF RIP RAP 111.11 CY	PI-102	Rt1				0.25	AC	\$4,562.38 / AC	\$1,141	\$232,043	\$394,473
6500°±24° RCP 24° RCP 6,500 LF \$554.79 / CY \$3,606,160			•			111.11	CY	\$744.79 / CY	\$82,754		
P1-119 8 Media Filters or Underground WEDIA FILTERS 8 EA \$400,000.00 / EA \$3,200,000 Vaults 8 Polaris Point 43,000 CV FILL FILL 43,000 CV \$27.53 / CV \$1,183,790		Made and the constraint of the constraint			a lendariti di skulisa	6,500	U. T.	\$554.79 / CY	\$3,606,160	100 2 4 7	P SENTATERA MA
Pt-119 & 43,000 CY FILL FILL 43,000 CY \$27.53 / CY \$1,183,790		Rel	8 Media Filters or Underground	of Patrick Community and Patrick Community		750mLet 320 totales	AND PROPERTY.	OFFICE SECURISES	Charlet Ship and the		
12 per disease per la librar de la companya del companya del companya de la companya del la companya de la comp	PI-119		SECURIO PROGRAMMA DA PER PER C	是		A Control of the Cont	STREET, TOPING	OF THE PERSON NAMED IN COLUMN	Ć1 182 700	\$19,006,989	\$32,311,880
CONT. PERMITTER AND ADDRESS OF THE PERMITTER ADDRESS OF THE PERMITTER AND ADDRESS OF THE PERMITTER ADDRESS		Polaris Point									
11,000 CY GABIONS GABIONS 11,000 CY \$629.66 / CY \$6,926,291											

	ATION								
				cos	T ESTIMATE				
MAP ESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
SR-101	4	200' conc ditch	CONCRETE DITCH	CONC LINING	1.5 CY	\$633.32 / CY	\$950	\$83,704	\$142,296
	Pale Medina	1000 SF Rip Rap	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754		
		20'x100' gabion wall	GABION		22.22 CY	\$629.66 / CY	\$13,991		
SR-102	DS of Pale Medina	111 CF Rip Rap	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$97,885	\$166,405
		0.009290304 HA Debris Removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
a was disable to	ALUTA VERTERNI MIRESTA	100'x6'x4' RCB (per FCD)	REINFORCED CONCRETE BOX CULVERT		88.89 CY	\$1,153.35 / CY	\$102,521	remarkable and the second	(FEB) (022/65/91/60)
		100' conc ditch, 2:1 SIDE SLOPES, 4'	Charles and the second second second	EXCAVATION	178 CY	\$27.53 / CY	\$4,900		
SR-113	Felix T Dydasco	deep	CONCRETE DITCH	CONCRETE (DITCH LINING)	39 CY	\$633.32 / CY	\$24,699	\$152,121	\$258,606
		2 headwalls/wingwalls	HEADWALL W/WINGWALL	HERO SCHOOL BOOKS OF THE SEC	2 EA	\$10,000.00 / EA	\$20,000	Salta and	
		100'x6'x4' RCB (per FCD)	REINFORCED CONCRETE BOX CULVERT		88.89 CY	\$1,153.35 / CY	\$102,521		
SR-112		500' ditch	DITCH		222.22 CY	\$27.53 / CY	\$6,118	\$128,639	\$218,686
	ALDED ACCESSOS CANCES	2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000		
estrengins encongri	The state of the s	1/4 Ac Debris Removal	DEBRIS REMOVAL	WENT THE REAL PROPERTY OF THE	0.25 AC	\$4,562.38 / AC	\$1,141		CONTRACTOR OF THE PARTY OF THE
SR-116	Gate Entry	Add 1 catch basin	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500	\$4,641	\$7,889
	The state of the s	100'X8'X5' RCB	REINFORCED CONCRETE BOX CULVERT		148.15 CY	\$1,153.35 / CY	\$170,869	110 300 110 110 100 100	LIFE SELECTION OF THE SELECTION OF T
SR-117	Jose Sarmiento	1/4 Ac RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$273,622	\$465,158
	Drive_Gregoria Barajo	2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000	4,	V,200
castro-literal.	DARSHED OCCUPATION	100' x 36" RCP	36" RCP	PRODUCTION CONTRACTOR OF THE PRODUCTION OF THE PROPERTY OF THE	100 LF	\$715.00 / LF	\$71,500	ekota Vigi-sizoka kideje usita	Visiting # Parish and Facility Study
		2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000		
	CONTRACTOR NAMED DESIGNATION OF THE PROPERTY O	1/4 Ac Debris Removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
SR-105		3 catch basins	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500	\$239,268	\$406,755
2K-103	White the strain and a second		24" RCP		100 LF	\$554.79 / LF	\$55,479	3239,200	,,,,,,,
		100'x24" RCP					\$82,754		
	AND THE PROPERTY OF THE PROPER	1000 SF Rip Rap	RIP RAP		111.11 CY	\$744.79 / CY			
SALURE SELD	BESTEWN STEAKER IN SHE	400 LF Ditch	рисн	PERSON DESCRIPTION OF STATEMENT OF STATEMENT	177.78 CY	\$27.53 / CY	\$4,894	AND THE SHAPE OF SHAPE OF	HUMBSHOW SHABING HILD
		RCB 100' x double 5'x3.5' (per FCD)	REINFORCED CONCRETE BOX CULVERT		64.81 CY	\$1,153.35 / CY	\$74,749		
SR-107	Pale Ferinan_SR 2	2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000	\$112,438	\$191,145
			DEBRIS REMOVAL		0.25 AC 22.22 CY	\$4,562.38 / AC	\$1,141 \$16,549		
mount lies water to a		1/4 Ac Debris Removal, 200 SF Rip Ra		Carter State When Death Helicard	22.22 CY	\$744.79 / CY	\$16,549		With the Control of the Control
		100' x 8'x5' RCB	REINFORCED CONCRETE BOX CULVERT			\$1,153.35 / CY			
A SHIP SHIP		2 headwalls/wingwalls	HEADWALL W/WINGWALL	THE REPORT OF THE PROPERTY OF THE PARTY OF T	2 EA	\$10,000.00 / EA	\$20,000		
SR-103	Pale Roman	4000 CF Gabions	GABION CONTRACTOR OF THE PARTY		113.27 CV 444.44 CY	\$629.66 / CY	\$71,322 \$331,014	\$595,346	\$1,012,088
		4000 SF rip rap	RIP RAP			\$744.79 / CY			
		1/4 Ac Debris Removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
or construction of the second	(19) MATTER STEEL	1000 SF Hydromulch w/ BFM	HYDROMULCH (BFM)	PALSE MALTINEST CHILD PASS SEE	1000 SF 33,33 CY	\$1.00 / SF	\$1,000 \$38,441	MEGRICAL DESCRIPTION	Elidoli O IS25 MEGA IUCCIONA
		100'x 3'x3' RCB	REINFORCED CONCRETE BOX CULVERT			\$1,153.35 / CY			1
SR-119	Route 5 and Route 17	2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000	\$142,335	\$241,970
		1/4 Ac Debris Remval	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
		1000 SF Rip Rap	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	THE RESERVE THE PERSON NAMED IN COLUMN	The Section of the Se
SR-110	Route 17 Cross Drains	500'x36" RCP	36" RCP		500 LF	\$715.00 / LF	\$357,500	\$407,500	\$692,750
	ha transfer by some	10 HEADWALLS	HEADWALL	are promoted and specific all an artists.	10 EA	\$5,000.00 / EA	\$50,000	RETAINS HAVE BEEN AL	HARLEST BENEFIT A
	Route 12 and Namo	1 Ac Spillway	AC SPILLWAY		1 EA	\$1,000.00 / EA	\$1,000		4000 400
SR-120	Falls Road	2000 SF Rip Rap, 1/4 Ac Debris	RIP RAP		222.22 CY	\$744.79 / CY	\$165,507	\$167,648	\$285,001
		Removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		
の対抗性が変数		2 headwalls/wingwalls	HEADWALL W/WINGWALL	Bulletin and the Victorian English to the	2 EA	\$10,000.00 / EA	\$20,000		
SR-115	Route 12 W	200 SF Rip Rap, 400 LF Ditch	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549	\$99,029	\$168,349
		2 CATCH BASINS 100 LF 24" RCP	CATCH BASIN 24" RCP	NAME OF STREET	2 EA 100 LF	\$3,500.00 / EA \$554.79 / LF	\$7,000 \$55,479		The state of



LOC	ATION				COST ESTIMATE				
MAP ESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
			1000 LF DITCH	DITCH	148.15 CY	\$27.53 / CY	\$4,079		
SR-114	Rt 17	1000 LF DITCH, 2 HEADWALLS, 200 SF	2 HEADWALLS	HEADWALLS	2 EA	\$5,000.00 / LF	\$10,000	\$102,128	\$173,617
3N-114	Felix T Dydasco Dr	RIP RAP, 100 LF 36" RCP	600 CF RIP RAP	RIP RAP	22.22 CY	\$744.79 / EA	\$16,549	\$102,126	\$1/3,61/
			100 LF 36" RCP	RCP	100 LF	\$715.00 / CY	\$71,500		
	SULPHIA STREET	100 LF 3'x5' RCB	REINFORCED CONCRETE BOX CULVERY	RALL PROPERTY AND THE	55.56 CY	\$1,153.35 / CY	\$64,080	DESTRUCTION AND A SECOND	STATE OF THE PARTY OF
SR-106	Sgt Quenga and Pale Duenas Hava	1000 SF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$166,834	\$283,617
		2 headwalls/wingwalls	HEADWALL W/WINGWALL	NATE OF WHITE OR STREET	Maria de la companya de la Carlo	\$10,000.00 / EA	\$20,000		ALC: USE PAR
		2 AC Spillways	AC SPILLWAY		2 EA	\$1,000.00 / EA	\$2,000		
SR-109	SR 7	1/4 Ac Debris Removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$85,894	\$146,020
		1000 SF Rip Rap	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754		
自25年1196年	15 FORTH 141章	100'x36"RCP	36" RCP	end editions who ex	100 LF	\$715.00 / LF	\$71,500		
SR-108	Sumay Memorial Street	1000 SF Rip Rep	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$175,394	\$298,170
	Sullay melional street	1/4 Ac debris removal	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	31/3,554	3238,170
	2000年2月11日	2 headwalls/wingwalls	HEADWALL W/WINGWALL	于100mm (100mm) (100mm)	2 EA	\$10,000.00 / EA	\$20,000		
		200 LF ditch	рітсн		88.89 CY	\$27.53 / CY	\$2,447		
SR-111	Vicente Boria	100'X4'X4' RCB	REINFORCED CONCRETE BOX CULVERT		59.26 CY	\$1,153.35 / CY	\$68,348	\$97,344	\$165,485
2K-111	Vicente Borja	2 HEADWALLS	HEADWALL		2 EA	\$5,000.00 / EA	\$10,000	257,344	3103,403
		200 SF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549		
	TO STATE OF BUILDING	1/4 Ac Debris Removal	DEBRIS REMOVAL	White the object to distill	0.25 AC	\$4,562.38 / AC	\$1,141	尼尼·斯特·斯特	
SR-118	Vicente Lizama	1000 SF Rip Rap	RIP RAP	AND PALED PROPERTY	111.11 CY	\$744.79 / CY	\$82,754	\$103,894	\$176,620
		2 headwalls/wingwalls	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000		

			S	INJANA VILLAG	iE .						
LOCATION COST ESTIMATE											
MAP DESIGNATION	STREET/ROUTE	RECOMMENDATIONS		QUANTITIES UNITS	COST / UNIT	cost	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES			
		400 SF Gabions, 1/4	GABION	34 CY	\$629.66 / CY	\$21,409					
SV-101	Chalan Guma Yuos	Ac Debris Removal,	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$30,824	\$52,400			
		100 SF Rip Rap	RIP RAP	11.11 CY	\$744.79 / CY	\$8,275					
SV-102	Pouto 24A	1/4 Ac Debris	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141	\$42,521	\$72,286			
34-105		Removal, 500 SF Rip Rap	RIP RAP	55.56 CY	\$744.79 / CY	\$41,381		712,200			

			TA	LOFOFO VILLAGE					
L	OCATION			C	OST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE	F	ECOMMENDATIONS		QUANTITIES UNIT	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
TA-116	Rt 4 & Talofofo Beach Park	50,000 CF RIP RAP	RIP RAP		2222.22 CY	\$744.79 / CY	\$1,655,087	\$1,655,087	\$2,813,648
		100°x48" RCP	48° RCP	BOOK SURPLEMENT OF THE	100 LF	\$744.50 / LF	\$74,450		
		2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000		
TA-108	David Gorton Street S O JP Cruz	200' BIOSWALE	BIOSWALE	EXCAVATION	48.48 CY	\$2.00 / CY	\$97	\$110,821	\$188,396
		200 SIOSWALE	BIOSWALE	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000		
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275		
TA-112	Rte 4 & Togcha River	3000 CF RIP RAP	RIP RAP		111.11 CY	\$744.79 / CY	\$82,754	\$83,894	\$142,620
		1/4 Ac Debris Removal	DEBRIS REMOVAL		0.25 EA	\$4,562.38 / AC	\$1,141		Assessment of the second of th
		1 CATCH BASIN	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500		
	Ernest Santos Street	300'x24" RCP	24", RCP		300 LF	\$554.79 / LF	\$166,438		
TA-110	Siguenza Court	1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000	\$188,213	\$319,962
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275		
	A CONTRACTOR OF THE CONTRACTOR	1000' CONCRETE CHANNEL	CHANNEL	EXCAVATION	296.3 CY	\$27.53 / CY	\$8,157		
		1000 CONCRETE CHANNEL	CHANNEL	CONCRETE (DITCH LINING)	77 CY	\$633.32 / CY	\$48,766	1	
	E Johnny Taitague	1 CATCH BASIN	CATCH BASIN		1 EA	\$3,500.00 / EA	\$3,500		
TA-101		1 APRON	APRON	CONCRETE (DITCH LINING)	1 CY	Y \$633.32 / CY \$633 \$78,665	\$78,665	\$133,731	
		1 BIOSWALE	BIOSWALE	EXCAVATION	48.48 CY	\$27.53 / CY	\$1,335		
		I BIOSWALE	DIOSVANLE	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000		
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275		
	建工程的共享的 自然的最后是	NEW INFILTRATION BASIN (6' DEEP)	INFILTRATION BASIN	EXCAVATION	2222 CY	\$27.53 / CY	\$61,172		
TA-102	Ignacio Quinata Street S O JP Cruz	HEM WHEN WANDER BYSHE TO DEEL!	INTICI RATION BASIN	FENCING	548 LF	\$14.92 / LF	\$8,176	\$70,348	\$119,591
		AC SPILLWAY	AC SPILLWAY		1 EA	\$1,000.00 / EA	\$1,000		
	n — Yang	1000' CONCRETE DITCH	CONCRETE DITCH	EXCAVATION	37 CY	\$27.53 / CY	\$1,019		
TA-104	Francisco Reyes East			CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,572	\$101,590	\$172,703
		100 LF 12" RCP	12" RCP		100 LF	\$300.00 / LF	\$30,000		
		6 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL	A THE RESIDENCE OF THE PARTY OF	6 EA	\$8,000.00 / EA	\$48,000		
		2000' CONCRETE DITCH	CONCRETE DITCH	EXCAVATION	148.14 CY	\$27.53 / CY	\$4,078		
4-105, TA-106, TA-109	Francisco Reyes West, Tenorio, David	and probably and the second	新聞的時間時間	CONCRETE (DITCH LINING)	71.28 CY	\$633.32 / CY	\$45,143	\$229,221	\$389,676
	Gordon Street	200 LF 12 RCP	12° RCP		200 LF	\$300.00 / LF	\$60,000		
		12 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL		12 EA	\$10,000.00 / EA	\$120,000	[1] [1] [1] [1] [1] [1] [1] [1] [1] [1]	
and and and		4 CATCH BASINS	CATCH BASIN	- ware	4 EA	\$3,500.00 / EA	\$14,000		
TA-113	Rte 4 & Pacifico	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275	\$254,191	\$432,124
		400 LF 24" RCP	24ª RCP		400 LF	\$554.79 / LF	\$221,916		
		1 HEADWALLS W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000		

L	OCATION			C	OST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNIT	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000	THE THE PARTY OF T	THE ALL MARKET MALE
		100 LF 24" RCP	24° RCP		100 LF	\$554.79 ⁷ / LF	\$55,479		
TA-107	Jose P Cruz	1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000	\$90,089	\$153,151
A-10	Jose F Cite	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275	\$50,085	\$133,131
		100 LF BIOSWALES	BIOSWALE	EXCAVATION	48.48 CY	\$27.53 / CY	\$1,335		
		100 CF BICSWALES	BIOSWALE	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000		
TO VILLEY		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000		
	Ernest Santos Street and Pasadero	200 LF 24" RCP	24" RCP		200 LF	\$554.79 / LF	\$110,959		
TA-111		1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000	1	6247.455
(A-111	Francisco Diego	300 CF RIP RAP	RIP RAP	77	11.11 CY	\$744.79 / CY	\$8,275	\$145,568	\$247,466
		10015 015011115	2000000	EXCAVATION	48.48 CY	\$27.53 / CY	\$1,335	1	(i
		100 LF BIOSWALE	BIOSWALE	EROSION CONTROL (HYDROSEED)	1600 SF	\$5.00 / SF	\$8,000		
		1 CATCH BASIN	CATCH BASIN	MESTS BUSINESS BUSINESS BUSINESS	1 EA	\$3,500.00 / EA	\$3,500	OSIGNAS DE LA	
		300'x24" RCP	24" RCP		300 LF	\$554.79 / LF	\$166,438		4010.000
TA-103	Monte Drive	1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALL		1 EA	\$10,000.00 / EA	\$10,000	\$188,213	\$319,962
		300 CF RIP RAP	RIP RAP	A Company of the state of	11.11 CY	\$744.79 / CY	\$8,275		
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000	¢53.040	£05.703
TA-114	Route 4 A S O Route 17	12,000 LF DITCH	DITCH		1600 CY	\$27.53 / CY	\$44,048	\$51,048	\$86,782
TA-115	Route 4 A North Low Points	2 CATCH BASINS	CATCH BASIN	THE RESERVE OF THE PARTY OF THE	2]EA	\$3,500.00 / EA	\$7,000	\$7,000	\$11,900

	<u>.</u>		T/	AMUNING VILLA	GE					
LOCA	ATION			co	COST ESTIMATE					
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES	
分子站是被执行	AND THE PARTY OF T		\$16 (根据:1952年2018年) 18.155年(1	EXCAVATION	355.56 CY	\$27.53 / CY	\$9,789			
TV-101	Pizza Hut	200' CONCRETE TRAP CHANNEL	CONCRETE TRAP CHANNEL	CONCRETE (DITCH LINING)	143.8 CY	\$633.32 / CY	\$91,071			
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	Grand San Strait Constitution	0.25 AC	\$4,562.38 / AC	\$1,141	\$184,754	\$314,082	
		3000 CF RIP RAP	RIP RAP	SERVICE SERVICES	111.11 CY	\$744.79 / CY	\$82,754			
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000			
TV-102	Tun Jose Coves Way	100' 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479	\$185,128	\$314,718	
		200' x DOUBLE 3'x5' RCB	REINFORCED CONCRETE BOX CULVERT		111.11 CY	\$1,103.85 / CY	\$122,649	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	425 (// 22	
	Tamuning Outlet	300,000 CF RIP RAP	RIP RAP	WARREST THE STATE OF THE STATE OF	11111.11 CY	\$744.79 / CY	\$8,275,444	CPT (INVESTMENT)		
TV-103	Channel	5 AC DEBRIS REMOVAL	DEBRIS REMOVAL	SALES AND THE PROPERTY.	5 AC	\$4,562.28 / AC	\$22,811	\$8,298,255	\$14,107,034	
		400' 24" RCP	24" RCP		400 LF	\$554.79 / LF	\$221,918			
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000	New Aprillan Augusta and A	200-200-200-200-200-2	
TV-104	Estrellita Court	1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALLS		1 EA	\$10,000.00 / EA	\$10,000	S247.192	\$247,192	\$420,227
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275			
the wilder	CHECKER WEST	New York Carlot Carlot State of the Control of the	AND ASSESSMENT OF THE PARTY OF THE PARTY.	EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059	ARTHUR DESIGNATION		
	N. Sgt David Camacho	200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556		20000000	
TV-105 Street FILTER FABRIC 2500 SF 200' DITCH DITCH 29.63 CY	Fig. Section Communication and Computer Vision (Co. 1997).					\$1.50 / SF	\$3,900	\$12,330	\$20,961	
	\$27.53 / CY	\$816								
TV-106	Sand Castle	2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000	\$62,479	\$106,215	
		100' 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479			
	Market Sections	2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000			
		400' 36" RCP	36° RCP	CARDARIO SER SER DANGE	400 LF	\$815.12 / LF	\$326,048			
TV-108	McDonald's (Rte 27)	1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALLS	221446 (W. S.	1 EA	\$10,000.00 / EA	\$10,000	\$351,322	\$597,248	
		300 CF RIP RAP	RIP RAP	ESCHALL THE LINES	11.11 CY	\$744.79 / CY	\$8,275			
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000		***************************************	
		400' 24" RCP	24" RCP		400 LF	\$554.79 / LF	\$221,918			
	McDonald's (Rte 27 @	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275	4444		
TV-109	Anthurum Ln)			EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059	\$248,707	\$422,801	
		200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556			
				FILTER FABRIC	2600 SF	\$1.50 / SF	\$3,900			
THE MEMBER OF THE	第四周的	2 CATCH BASINS	CATCH BASIN	· 自己的可以的 · · · · · · · · · · · · · · · · · · ·	A 2 EA	\$3,500.00 / EA	\$7,000	政策制度 的复数形式		
		100' 24" RCP	24" RCP	SEALED WELL THE PRESE	100 LF	\$554.79 / LF	\$55,479			
		300 CF RIP RAP	RIP RAP	A DESTRUCTION OF THE PARTY OF T	11.11 CY	\$744.79 / CY	\$8,275	\$03.360	\$139,856	
TV-110	Rte 27	建一种工程的		EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059	\$82,268	\$139,836	
		200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556			
				FILTER FABRIC	2600 SF	\$1.50 / SF	\$3,900			
		2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000		1-4	
	Fu)ita Ponding Basin	100' 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479	\$80,754	\$127.202	
TV-107		1 HEADWALL W/WINGWALL	HEADWALL W/WINGWALLS		1 EA	\$10,000.00 / EA	\$10,000	\$80,754	\$137,282	
	Lot 2151-36	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275			

				UMATAC VILL	AGE				
LOC	ATION				COST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATION		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	a ser a	0.25 AC	\$4,562.38 / AC	\$1,141		
UM-108	Jose Q Leilei River	3000 CF RIP RAP	RIP RAP	Consultation with the second second	111.11 CY	\$744.79 / CY	\$82,754	\$83,894	\$142,620
UM-113	Route 2 Tributary of Sella River	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$1,141	\$1,939
	NAME OF STREET	30' x 5 - 48" RCP	48" RCP	a establishment with the s	150 LF	\$744.50 / LF	\$111,675	to a series	A Will Street A William
		HEADWALL W/WINGWALL	HEADWALL W/WINGWALL	THE PROPERTY AND	1 EA	\$10,000.00 / EA	\$10,000		
UM-112	Route 2 and Cetti River	8000 SF GABIONS	GABIONS		286.3 CY	\$629.66 / CY	\$180,272	\$389,263	\$661,747
		1 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562		
		3000 CF RIP RAP	RIP RAP	A DEPOSE OF PROPERTY OF PROPER	111.11 CY	\$744.79 / CY	\$82,754		
UM-114	Route 2 and Sella River	1000 SF DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$1,141	\$1,939
de company	Market Sharpel	1 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562		A TEMPLICARION WINDS
UM-101	Route 2 and Umatac River	60,000 CF RIP RAP	RIP RAP		2222.22 CY	\$744.79 / CY	\$1,655,087	\$1,661,690	\$2,824,872
	E TOMA DE LA COMP	2000 CF DREDGING (EARTHWORK)	DREDGING (EARTHWORK)	EXCAVATION	74.1 CY	\$27.53 / CY	\$2,040		
THE RESERVE OF THE PARTY OF THE	Finona St	30,000 CF RIP RAP	RIP RAP		1111.11 CY	\$744.79 / CY	\$827,544	SHIP TO CARD HIS CONTROL OF	Sa Calles Colonic Consequence Colonic
UM-102	NEAR	1 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		1 AC	\$4,562.38 / AC	\$4,562	\$833,126	\$1,416,314
• 202	Madog River	1000 CF DREDGING (EARTHWORK)	DREDGING (EARTHWORK)	EXCAVATION	37.04 CY	\$27.53 / CY	\$1,020		7-7-1-1
STATE OF STREET	EHOVE HOW ASSESSMENT	2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL	a Rodeldining Korawatski	2 EA	\$10,000.00 / EA	\$20,000	ille Constanting Constant	IN A POSTA CARRENDO ACARSANA
	Finona St	600 CF RIP RAP	RIP RAP		22.22 CY	\$744.79 / CY	\$16,549		
UM-103	NEAR	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$93,169	\$158,388
	Jose A Quintana St	100 LF - 24" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479		
HARMAN CONTRACTOR CONTRACTOR	Manage Street Construction of	100 G - 24 NG	24 110	EXCAVATION	74.07 CY	\$27.53 / CY	\$2,039	-	
UM-104	Finona St NEAR	1000' CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,572	\$32,885	\$55,905
JIII 201	Jose A Quintana St	300 CF RIP RAP	RIP RAP	CONTRACT (DIVORT SIMILAR)	11.11 CY	\$744.79 / CY	\$8,275	1 100,000	
STANKE A CHARLESTANIS	a production and a second state of the second	100' - 24" RCP	24" RCP	a service and the control of the left control	100 LF	\$554,79 / LF	\$55,479	and hat of the sound	9 5 5 6 U.V. C.V. E.V. S.
	Jose A Quintana St	2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL	THE POSSESSED AND REPORTS	2 EA	\$10,000.00 / EA	\$20,000		
UM-105	NEAR	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141	\$84,895	\$144,321
	Finona St	300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275		A fair and the second second
THE CONTRACT OF THE PARTY OF THE PARTY.	# # # Production of the state o	SOU CE THE TOTAL	A MANAGEMENT CONTRACTOR	EXCAVATION	177.78 CY	\$27.53 / CY	\$4,894		
		100' Concrete Trap Channel	CONCRETE TRAP CHANNEL	CONCRETE (DITCH LINING)	71.9 CY	\$633.32 CY	\$45,536		
		200'x36" RCP	36™ RCP	- Control of Control of Control	200 LF	\$715.00 / LF	\$143,000		
UM-106	Rt 2 Near Jagar Dr	2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL		2 EA	\$10,000.00 / EA	\$20,000	\$222,845	\$378,837
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275		
		1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	·	0.25 AC	\$4,562.38 / AC	\$1,141		
a substituti si Pauli Del Gille Louise	SCHOOLS STORY OF THE STORY OF T	4 CATCH BASIN	CATCH BASIN	ne seun-schieder Reinschaft bei sone	4 EA	\$3,500.00 / EA	\$14,000	Anton Bonnet Parkey	IN ANDRESCHOOL WITH A
			24" RCP	ID. RUSSIAN SUBSIAN WILES FUNDESS AL MINOSPAL CANTALINA DA VIDAS	100 LF	\$554.79 / LF	\$55,479		
		100' 24" RCP	THE REPORT OF THE PARTY OF THE	EXCAVATION	74.07 CY	\$27.53 / CY	\$2,039		
UM-107	Road A	1000' CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,572	\$169,569	\$288,268
	The state of the s	2 HEADMAN E WANNEWAY	HEADWALL WANINGWALL	CONCRETE (DITCH LINING)	33.04 CY	\$10,000.00 / EA	\$20,000		100
		2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL 24" RCP		100 LF	\$554.79 / LF	\$55,479		
	WANTED STREET	100 LF - 24" RCP 1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL	ar awenig Karlo ya Kinise di Propinsi	0.25 AC	\$4,562.38 / AC	\$1,141	AND THE STREET OF THE STREET	THE WASTER CHICAGON CONTRACTOR
UM-108	Jose Q Aguon St NEAR Laelae River				111.11 CY	\$4,562.38 / AC \$744.79 / CY	\$82,754	\$83,894	\$142,620
	HEAR FREIGE VIAGI	3000 CF RIP RAP	RIP RAP DEBRIS REMOVAL	REPORTED CONTRACTOR AND ACCORDANCE	0.5 AC	\$4,562.38 / AC	\$2,734		er Zi-filastrologiska trade
1114 100		0.5 Ac DEBRIS REMOVAL	RIP RAP	III TOPON TOPON TOPON AND TOPON TO THE CO	555.56 CY	\$744.79 / CY	\$413,776	\$436,057	\$741,296
UM-109	Rte 2	15000 CF RIP RAP 2 HEADWALLS W/WINGWALLS	HEADWALL W/WINGWALL		555.56 CY 2 EA	\$10,000.00 / EA	\$413,776	7-36 ₁ 031	7/41,250



LOCA	ATION				OST ESTIMATE				
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATION		QUANTITIES UNITS	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES
	Rte 2	2 AC SPILLWAYS	AC SPILLWAY		2 EA	\$1,000.00 / EA	\$2,000		
UM-110	NEAR	1200 CF RIP RAP	RIP RAP		44.44 CY	\$744.79 / CY	\$33,098	\$36,239	\$61,606
	La Sa Fua River	1/4 Ac DEBRIS REMOVAL	DEBRIS REMOVAL		0.25 AC	\$4,562.38 / AC	\$1,141		1
UM-111	Rte 2 NEAR	1 AC HYDROSEED W/BFM	HYDROSEED W/BFM	EROSION CONTROL (HYDROSEED)	43560.1 SF	\$5.00 / SF	\$217,801	\$374,181	
	Observation Rest Area	T WC HIDROSEED W/DPM	HIDROSEED W/BPM	EROSION CONTROL (BFM)	43560.1 SF	\$3.59 / SF	\$156,381	\$3/4,181	\$636,108

			Y	GO VILLAGE									
LOC	ATION			COST ESTIMATE									
MAP DESIGNATION	STREET/ROUTE		RECOMMENDATIONS	QUANTITIES UNIT	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES					
The second second	Chalan Tun Luis	\$6.55 MEAN (\$15.65) 对	Manager State of State of Manager State	EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059		SERVICE PROPERTY.				
YI-108	Duenas Street &	200' INFILTRATION TRENCH	INFILTRATION TRENCH	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556	\$11,514	\$19,574				
	Route 1	10000000000000000000000000000000000000		FILTER FABRIC	2600 SF	\$1.50 / SF	\$3,900						
				EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118						
YI-102	Azud Street	2 - 200' INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$23,029	\$39,149				
				FILTER FABRIC	5200 SF	\$1.50 / SF	\$7,800	1					
	UNIVERSE STREET		Character and Character Street and Character	EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118	And the Posts					
YI-103	Chalan Sta. Bernadita	2 - 200' INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$23,029	\$39,149				
				FILTER FABRIC	5200 SF	\$1.50 / SF	\$7,800						
		1000 LF CONCRETE DITCH	CONCRETE DITCH	EXCAVATION	74.07 CY	\$27.53 / CY	\$2,039						
		1000 EF CONCRETE DITCH	CONCRETE DITCH	CONCRETE (DITCH LINING)	35.64 CY	\$633.32 / CY	\$22,572						
Chalan Tun Li YI-105 Duenas Street	A STANCE STANCE OF STANCE	I 100'x74" RCP	24" RCP		100 LF	\$554.79 / LF	\$55,479	\$100,365	\$170,620				
11-203	105 Duenas Street at Route 29 (cont'd) 2 CATCH					2 CATCH BASINS	CATCH BASIN		2 EA	\$3,500.00 / EA	\$7,000	\$100,505	\$170,620
		1 HEADWALL	HEADWALL		1 EA	\$5,000.00 / EA	\$5,000						
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275	1					
AND LABOR.		2 CATCH BASINS	CATCH BASIN	PLANT MERCHANISCHER	2 EA	\$3,500.00 / EA	\$7,000	· 起表。如底流	100 300 600				
		200'x24" RCP	24" RCP		200 LF	\$554.79 / LF	\$110,959						
YI-106	Route 29 and Chn. Tun Jose Anaco	1 HEADWALL	HEADWALL		THE STATE OF THE S	\$5,000.00 / EA	\$5,000	\$132,374	\$225,036				
		300 CF RIP RAP	RIP RAP		11.11 CY	\$744.79 / CY	\$8,275						
		1/4 Ac CLEARING & GRUBBING	DEBRIS REMOVAL	The state of the s	0.25 AC	\$4,562.38 / AC	\$1,141	THE RESERVE					
	Chalan Tun Luis			EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118						
YI-104	Duenas NEAR	2- 200' INFILTRATION TRENCHES	INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$23,029	\$39,149				
	Kiko isabela Loop			FILTER FABRIC	5200 SF	\$1.50 / SF	\$7,800	1					
Line State of Parties	Gayinero Dr (Rt29)	100000000000000000000000000000000000000		EXCAVATION	222.22 CY	\$27.53 / CY	\$6,118	A THE STATE OF	A HOLL BATTLE BATTLE STATE				
YI-107			INFILTRATION TRENCH	0.75" ROCK	222.22 CY	\$41.00 / CY	\$9,111	\$23,029	\$39,149				
	Lagu (Rt 15)			FILTER FABRIC	5200 SF	\$1.50 / SF	\$7,800	"当我就没得到	MATERIAL PROPERTY.				
				EXCAVATION	111.11 CY	\$27.53 / CY	\$3,059		00.000000000000000000000000000000000000				
YI-109	Rt 1 & Chalan Chamorri	200' INFILTRATION TRENCH	FRENCH INFILTRATION TRENCH 0.	0.75" ROCK	111.11 CY	\$41.00 / CY	\$4,556	\$11,514	\$19,574				
	1			FILTER FABRIC	2600 SF	\$1.50 / SF	\$3,900	1					

			YC	NA VILLAGE								
LOCA	ATION			COST ESTIMATE								
MAP DESIGNATION	STREET/ROUTE	RECOMME	NDATIONS	QUANTITIES UNIT	COST / UNIT	COST	TOTAL COST	TOTAL COST W/ENGINEERING CONTINGENCIES				
YO-101	Route 4 (Route 10 to	1 Ac Hydromulch, 2000 LF	Hydromulch	1 AC	\$1,000.00 / AC	\$1,000	¢c can	C44 200				
10-101	Ylig)	Silt Fence	TEMPORARY SILT FENCE	2000 LF	\$2.82 / LF	\$5,640	\$6,640	\$11,300				
Y-108	Route 4 near Chalan	1000 SF Debris Removal,	DEBRIS REMOVAL	0.25 AC	\$4,S62.38 / AC	\$1,141	402 004					
1-108	Aguon	1000 SF R)p Rap	RIP RAP	111.11 CY	\$744.79 / CY	\$82,754	\$83,894	\$143,000				
			CATCH BASINS	2 EA	\$3,500.00 / EA	\$7,000	-50					
YO-102	Chalan Teleforo	2 catch basins, 100 LF 24" RCP, 1 Headwall/wingwall,	24" RCP	100 LF	\$554.79 / LF	\$55,479	ćen cza	£427.000				
		100 SF Rip Rap	HEADWALL/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000	\$80,672	\$137,000				
			RIP RAP	11 CY	\$744.79 / CY	\$8,193						
THE PERSONS			·马克罗·马克斯曼			2 catch basins, 400 LF 24"	CATCH BASINS	2 EA	\$3,500.00 / EA	\$7,000		
YO-103	Jesus Santos Road	RCP, 1 Headwall/wingwall,	24" RCP	400 LF	\$S54.79 / LF	\$221,918		A				
10-103	Jesus Santos Koad	100 SF R)p Rap, 250 LF Inf	HEADWALL/WINGWALL	1 EA	\$10,000.00 / EA	\$10,000	\$251,418	\$427,000				
		Trench	INFILTRATION TRENCH	138.89 CY	\$90.00 / CY	\$12,500						
		2 Ac Spillways, 200 SF Rip	AC SPILLWAY	2 EA	\$1,000.00 / EA	\$2,000						
YO-104	Balajadia Road	Rap, 1/4 Ac Debris	RIP RAP	22.22 CY	\$744.79 / CY	\$16,\$49	\$19,690	\$33,500				
		Removal	DEBRIS REMOVAL	0.25 AC	\$4,S62.38 / AC	\$1,141						
		1/4 Ac Debris Removal,	DEBRIS REMOVAL	0.25 AC	\$4,562.38 / AC	\$1,141		A \$15% E # \$100 E E E				
Y-10S	Route 4 @ Yilg River	1000 SF Rip Rap, 800 SF	RIP RAP	111 CY	\$744.79 / CY	\$82,672	\$126,604	\$215,000				
		Gabions	GABIONS	67.96043 CY	\$629.66 / CY	\$42,792						
		2 catch basins	CATCH BASINS	2 EA	\$3,500.00 / EA	\$7,000						
Y-107	Salas Road	100 LF 24" RCP	24" RCP	100 LF	\$554.79 / LF	\$55,479	\$78,865	\$134,000				
			RIP RAP	22 CY	\$744.79 / CY	\$16,385						

Appendix E Prioritization Spreadsheets



Guam Stormwater Drainage Master Plan Agana Heights VIIIage

180	\$14,000	\$70,100	218,000	8,340,000
Proposed improvements	Interneusing jointeement of 2005 (e.g. they gailing antichement of behat in their prochability to malphorising sood design with placement of approximately 2005 of the true shows they stigged basis at larce his where extended to examing. Also recommend research of other souther hands improvementally 24 442. The will obsert up existing baths and tealables embedment in prevent larther strategy.	To personst further Booding of properties, two 200 linear foot indirection healths are recommunically the countriculous along the crement sheet, at its low point.	District Control and maletinessez is beautiful at this lab, humanes pon earn of others innersold and white goes professor (remost to protect the charge and places ADD squares free of the rog for channel infallation for a district and a 25 that ingrates and 25 the determinent of the reflection and the Protection of the channel of the ingrates and selections and selection and the channel and the Protection of the channel	Recommend photomets of 5 new injection wells at this library with an increase of the addression basis size by 5,000 squares feet. This will becommend to the increase in expectity required to prevent it basishag.
Mittigation Effort	A. A.C. Debris Reseased, 1000 SF 141 Mg Rap.	T leithration Trenches	E In AC Debris Removal, 1000 SF Rip of Rop. 2 Handwish, Wilespeaks	6 new wells, increase hash size
Miligation Type	Ermiten Control	Storm Drain	Conveyance Improvemental/ Conveyance Maintenance	Storm Drahi
Sta Aussenment	There is significant problem shoug basis feating, On one side of the basis, an owner high a conventing good very close. In the lambs of the basis, and this is counting more ensures. Internal to studdless with the sag.	About this street, there is no detailedge system and there is thouling of houses at the inve- posits of its treet. Also upstream from the lose point at 439 famight Crut Are, the posits is backpard gan thouled.	Land Control and professional beater is all discussions that the first in our operations one task his fact on other profession in the result and expert in the company is transmitted with a section of the control and remainstances assistances are required by a remaind of the companion of the control and remainstances assistances on the opportune many of the RT. The observations and the section of the RT. The observations and the land of the RT. The observations and the land of the RT. The observation of the land of the control and the expectation is the result of the control and the expectation is the result of the control and the expectation is the control and t	This is a pooling bass with dry well. Pooling basin is understand and more dry wells are secretal. Surmanding leaves floods when healt countines. High Bows go to dry wells to high and bow floors perceive. Many of Agent Perceive. Many of Basin county florings to the basin.
Cost	ğ	No Low	J. Park	1
Weter ROW Impact Meeded Cort	2		4	
Control of the last	1		Seffee	1
Flooding Erosion Swearity Sewerity		MA	, and	W.
	MA	Lose	Low	ğ
1		, in		and the same
新春	to Medium Medium W/A	No Lose Medium Loss	Yes Low Machina Low	1
Proof A	1		HICKORY DE	2
A A Second			•	1
Star Type of Store Backway	Collector	Collector	Hipmay.	Collector
4 5	9	159 Collector	80	130
ğ		As Rolle Overt		Vorsitz Vorsitz Sobinen Francher AG-MI Ones Jones Ave 330 Collector
3 <	1111	AG-100 Cruc Are	AT CAME	Vicentite Solomon Bree
	THE RESERVE OF THE PERSON NAMED IN	THE OWNER OF THE OWNER OWNER OF THE OWNER	AG-1De	THE RESERVE AND ADDRESS.

Guam Stormwater Drainage Master Plan Anat Village Sire Evalsations

į	Out 9913	STACOO	STACOO	odorzets	905/1115	0007555\$	\$363,000	00072525	\$143,000	544,100	5394,000	5226,000
Presented International	To menkmiss Mooding of sulparary properties, a 2-th light harm [1 ft west) is moonmenshed along but describements of the describement and the supervises of the careful to describe on a servine simply 200 feet, the some one quantity and of detect (on supervises and describement and a described and compared to the party of the party of the party one party and describement and and and investigation above to the party of	A form their years a resided to talked and commy first treat four first 2 at backets under the 2. Proposition 2017 Money depart of places the 2 covering filter to the speak of the time as good care their wife merget the institutional and other their comply approached to the start 2 for 3 places are the 2, confirst great the absorbable formation equipped with 2. Only if the payment dissipant facults along the absorbable.	Incomment addition of a start for the repeats about head to the change of starting and starting as	incomment improvements to the statistic designage conveyance system featured makely in the west take the PE Electricates and 46 of F. Linder to the table. Moreovate substitution included: I the second state of the SE AL	becomment placement of n he' RCE and placement of if 25 feet upstream and 25 parter acre of delatis remo-	Recognition of properties the design proteins and goes belief and the belief protein the electronic design and a recognition of the protein the electronic design and a recognition of the protein the electronic design and the protein and t	Recommend them of the Improvements their Eichi Drive from Chewalthiere Charles Cit is the Color Strucker (1) processed or a concrete data have each label of trails for a discharge of 1500 fet. 2) presenced (2) presenced or a concrete data have each label of trails for a discharge of subsidiable in rotate from them to the color of the colo	Account in deprocated to the certain grant and property of the certain property of the certain	quarter acts of debts trence) is needed both spotteran and downstraam of the cub-est. Approximative SOD op best of the needed should be spotted should be spotted to prevent further undermining. Approximative SOD on the ct of greatest try say should be placed along the	Adaptacement and Peprovenential are sended for the desirange conveyence system at this lab. A label are not defeat in record it seeded (both upstress and deventurant) along with paleament at leaderally regional structures and a 100 Fr for no energy disciplate placed upstress and homestress of the colour.	Mobilianum and Improvement to the dishapp conversion system is weeked at the bits. A marries of other stream to the stream and	Recovered placement of use hash-all-left-good structures on the spiritous and deventions and of the 2 chains's bestelled at the 2 considerable flowers flower Recommend placege the EFF RME Lineal Broomy for warping of the suppresson networt. Also recommend reasoned of these services are at their structure and all their spiritous and decreations of their flowership of their spiritum for the structure of 12 the spiritum and discontinues of scholarship.
Mithention Pilont	2 8	20124" RCP; 1	The second second	1,000 if Cone. (Stark, 2 Catch Readed) Villege (EC): 1 Headed) Villeges	1/4 AC Debris Removel, 1000 SF Rip Rup, 2 Headwall/Wingwall		MID IF 34° ROP, 6 Headwalle, 3500 Jf Gove, Direk 2 catch besieve	1/4 AC Debris Nemocal; 1,000 SF No Rog 2 Crists Rasino; 100/24* NCP, 400' Ditch	1/4 AC Debris Removal; 1000 SF- To Rap	3/4 AC Debris Removat; 200 SF Rip Rap; 2 Handwall/Wingwell	1/4 AC Debris Removat; 1000 SF Pay Say; 30 LF Conc. Paye Examement; 2 Headmold/ Wingsuilb.	1/4 AC Dalaris Removal; 4 headershydringsalls; 1 Headersh; 2000 SF Rp Rap
Afternation Terms		CONTRACTOR OF THE PARTY OF	Storm Drah Improvemental Storm Drah Maketernamory Treatment BMP Improvements	THE RESERVE OF THE PERSON NAMED IN	Eracion Cantrol/ Convergence Maintenance/ Convergence	THE RESERVE OF THE PARTY OF THE	Stern Drain Improvemental Commence Improvement	The second second	Erotton Control/ Comeryance Maintenance	Conveyance Maintenance/ Conveyance Improvents	Conveyance Maintenanced Conveyance Improvements	Essalon Control/ Commercia Malebranace/ Commercia Improvementh
Che Austrone	ons coherts rore under R.Z. Upstream departs to Bay Dollar Mark and it properties including the store gots and to stop the Rocoling, Both spreament states removed. Downstream charmed Withhelix ments to be recovered.	ponds in this tale along RZ	The second second	(6 P.) P.D. cross cohert trattes runoff collected spatrates aboug fixin Dr. Upstroan, a source; in lead channel deshapes to ICE. Domestroan, the ICE collect to a channel. The ICE collect to a channel. The ICE collect to the Channel of the ICE collect to ICE collect to the ICE collect to ICE collect to ICE collect to ICE collect to the ICE collect to ICE collect to ICE collect to ICE collect to the ICE collect to ICE collect t	Double Over RCB routes Chase River suder RCL. There is understricting along the road subjects to the suspendia. road to acid or tooken stabilization (vigorg) to prevent submittee of PCL. This instruction and decreases nationally models received by the Life in the submittee and decreases nationally need related to the decrease of tental sections. Along our emissions are abilities for the submittee of the submitt		havelf from Estila Dr. and from teacher? Howaveg abong Communicator Clariforms C. Assembly from the state of the state o	lineal floods, and poods the intersection of father folded Stand Bruse Stanth corner. Agents carb bein and is to an inferiguest basis at the south corner of Father Stant Stanth corner of Father.	119.1.5 PED rockes Chalgan Creak across RIZ. There is evoiden around wheyoulks - need to add evolutes stabilisation (fightspl. Downstream, the existing concrete channel stab is being understanced.	North of Chalm Lade, a 42" RIO trous calvest nore under RI2 and descharges to identity backs. Next to each be absolved and wingswells both sportness and downstream and envises stabilization (spring). Also zeed to chear regarding felicies quantum.	A double cold NCI moter the Topich Short under NCI. Upstraum and downstrame noded the service corregions registerie. Upstraum than it is inclusive about de let Chromopoul, sent the and embedderies tabilitation to prove it rejects yethermine; Downstraum to the contract of the contract of the contract of the contract of the NCI. Spot about his contract account in present or spirits.	The Topics Blost consect the 18 Cook S. at the locations where the 19 Cook of
1500	No. of Concession, Name of Street, or other Designation, or other		Pag.	Low	Low	Medium	1	Median	Pag.	Low	, B	Medium
Now Mandad	Commence of the last	2	2	9		9	2		2	4	2	2
Env Weder		Obestel	Coastal	Coastal	Games	Coestal	Constal	Coestal	Desta	Coastal	Countain	Coasta
Erosion Committee		3		1	2	K/A	1	N/N	- Application of the state of t	Po Po	3	Methon
Flooding Greatity		\$	Median	Too	100	ğ	3	3	B	M/A	NA AM	3
		Ē	NA THE PERSON NAMED IN COLUMN 1	1	1	Medium	ğ	1	Median	-	1	Medica
The Party of the P		Media	Medium		1	Media		Melhon	ag.	low.	agg agg	Medican
Within Read		,	ř.		, te	Y	Ĭ	,	Į	ž.	Ya	ş
Mb. of Affected Presenties					NA		9		NA	BVA	MA	NA
Type of		- Agranay	Collector		1	į	1	Collecto	Highway	Highweg	I	Olector
# 3	N I I	2	4 - BOOK	9		-	18	345		S	81	1
<u>s</u> =	Month of IIT	Makes N	Alle	Enia Dr	Gaso Biret	ather Folland St.	WAYE.	Bruce St	100 M	north of Chalen Lade	the River	
<u> </u>		The State of the S	20	M72	To be seen	firs fac	Eralin Cr	Salar Folland Se				Courts
<i>a</i> =				AV.121		AV.120	AV-118 6			AV-107	AV-128	AV-120 F
Sile	THE RESERVE AND ADDRESS OF THE PERSON NAMED IN	100				and the same	MARKET .		1			

8		SURLAGO	524,800	000/6513	Steadon	Stochoo	OULVES	\$117,000	2222,000	\$117,000	935,000	\$349,000	22.490,000	556,700	Opposite State of the State of
Proposed improvements	becommon inspection to the existing storm drafe system as this interaction to stop Booding in street. Becomessed adding 4-100-0 databas resides the to 2 and 2 and 2 existing catch basins.	connect the new catch basins with the soluting ratch basins via 100-ts of 24" NCP.	There is a brotter wave that on the size that meets to be frend to they the underroming of the sushings to more reveal membels and the placement of a 34° ICF for 2D from her will be would be they the understaining.	harmonised a quarter sore of depirt remarch, IDDs agains for of the rap chossel stabilisation planes a feature of D the demonstrates of the school and 600 calls yorks of familying for a allowing of 50 the demonstration of the school:	Measurement a quarter acts of debth resource and processors of 1,000 repairs less of this top Advance stability and a black the embandament of Togstu. Bove adjacets to Backsta Ma Approximately 100 ft is length.	Adhings are required permit in the control back principles that we find the types to take it may be used in me manned of thinking commysters on pates at the interrection of backer 12 and backer 12, becames and placement of two could having placed at this situation for point on 22 and backer 12, but the manned and the country have to the systems at the 2 and the 22. Also it quarter care of clothship.	Personnent placement of hybraneat and bunder there make over 1 arm of Malab when mal brapast to present further exists.	The operators and decomments of the chanded property of Lactors are that we make it is be required and self-ancient countril is emptod. Recommend of Lactors and the chanded of the property of the chanded self-ancient countril is emptod. Recommend of Lactors and Comments of Lactors and colors to Lactors and the Lactors and the chanded included and the control of the chanded are substituted by emptod in sections at best detailed of chanded the page with a quarter core of debries and substitute of the chanded and the chanded of chanded their good and a quarter core of debries may be appeared by emptod and control of the chanded of chanded their good and the core of debries and the chanded of the ch	reconstruction of a first ground section of the control of the con	hecomment addition of a draking minorphorm system along Tim Loon head to map disording of strong. The depage system conditions the second process to be second to the Description at 10 km and supply control given to the confine a closer correspond system constitute of 200° at 20 km analysis constitute of 200° at 20 km and an experimental 200° at 200 km and 200° at	Representation to the outling starts date system along Concer Meas Street to stop blooding to service The designed streets and configuration and configuration to the cond of the service of the configuration of the configuration and configuration and the service of the configuration of the cond of the design at 100 changed storing when the service outliness as the temporal conduction of the 2 blood of the convert made. The specification was the configuration of the configuration of the 2 blood of an entire for the configuration of the configuration o	Recommend platement of 2000 space feet of the ray channel stabilization along Finds Drack channel selections are a comparable of the spatial and an extra channel selection and the stability of the 3 to subdist the channel embedament, also recommend placement of ever bandwall, wingous interres as the for social of Finds Creak Cultural under the 2 and for a placematy P. M.D. when the resistance as the for social of Finds Creak Cultural under the 2 and for adjusted SP M.D.	A time draw system is worthed by collect and commay place; result from Em. 2 at Chalen boson statements of a "Lader-Eme Var "Depose intensities or appointments", p. 2 of Chalen boson waves take of Em. 2, conserving from the river. Propose is because for a global statement of Em. 2 and Chalen and 1000 February propose intensities of the proposed in because the proposed in statement expendent which the proposed in the proposed in the proposed ACL Bushell, in commented in 2 for decisions of the proposed ACL Bushell, incommented 1.4 for decisions with Chale beam dispersions and 100 for fem. In comment of the proposed ACL Bushell, incomment 2 for the control proposed and propos		Could preparation in sected of this file beg of party presentant to the shape convenience. The country of the
Milipation Effort	400 U Obsok, 2 beless; 100 of 34"	à	I new server resemblele, 20 LF 24" p	LVA AC Dubris Recentrals 1000 SF is the Ray; 400 CY Direcking	5000	I Catch Ranses; 200 U. 24" IECP; U.R. AC Debris Removal	1 Ac Puplicated with booked Name	1/4 AC Debris Remosal, 2 headenshit virginalis; 2000.59 Ng Ray	Mech, 2 Catch Basins, 200 CP, 1 Headwall Wingwest, To Ray	1/4 AC Dalois Removal; 200 (5 24° RCP; 200 (F Biomodis; 2 Headwall/Wingstalic; 100 SF Rp.	eith J. Com., Dibrit, 2 catch bennet, 100 f. 20° MCP, 1 pandowni, 100 S° Np. Np.	4 headwalls/wingstilt; 2000 SF fig. lay	2000-59 RG, 2 headwald/Weigned, 174 AC Debts (Benedick) 2 2 174 AC Debts (Benedick) 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1,4 AC Dalois Removed; 2000; 15 Seeding, 200 SF Mp May	14 AC Debris Removel; GS Ac Preferenciels w(1974; 1,000 U Core, Disc)
Witgaston Type	-		Storm Orale Meisternance	Expelien Control! Cheeve partor Maletzmateror	Name and Address of the Owner, where	Stern Drain Improvements/ Stern Drain Maintenance	Erusian Control	Ereston Control Communication (Maintenance) Communication (Maintenance)	Stores Drain Improvemental Conveyance Improvements	Conveyance Maintenance/ Conveyance Improvements/ Treatment BMP Improvements/	Som Dain	Erosion Conducty Conveyence	Stern Duch Proprocessents/ Disseptants Ingrovements/ Conveyance		Constal Protection/ Conveyence
	At the Interchange of San Vicenta Ave and San Roque St, four grated intest emist-one at leash corner. There are signs of read fillhooking the intersection - possible substitute is to	have double grate indets featured of slegie grate.	There is a unablobe along Pagacho Or just went of Miller Criz St. The simblobe focation is in Two wills a server live, Realons sewer lives needs to be found to stop prodermining of disnet.	_	delers and	At the south side of Perion St there is no drainage conceptume system to routh street mouth that of the time consecuence system will defeating to the proposed dechange conceptume system is it the interaction of BLIZ and RZ.	84018			Assign Tax Loon Mit, one property gitt Brocked - there is not inciseque consequence systems and again to the Consequence systems and again study. In contrast the suits for the Conse Rever As executed well be receded to motion the contrast to the Consequence of the receded to motion the changes system to the contrast for the Consequence of the receded to motion the changes system to the changes system to the contrast for the contrast for the contrast of the change of the cha	4 4 6	And it is Concept the Const state Its A seek to system statemen and description benefits and experient between the Construction and the Construction and the Construction and the Construction and construction an	to propriet year the visit was the factors that the region Mangage in the interactional by gardening the sense of the propriet in Chairs have been for its cleaned it is comed to a chair and in the promise in Chairs have a subject on the come in the propriet in the chair and chair have been first the chair in the propriet in the chair in the propriet is the propriet in the region in the propriet in the propriet in the region in the propriet in the propriet in the region in t	At the mostly and of Periods Six 8 24" PET comp cubert imm under the shorest before owners and describes a channels for covered only brack-before, registrates, they was the declarate of the small a long brack and reach their to the cost scheet to present fluctions of the Sixture.	
700		low	Ige	ğ	Low	1	4	1	Medica	To the second	Method		1	2 4	Low
Now Needed	900	2	9	2	2	2	2		a		4	9		9	1
T A LA		Chattal	Coastal	Coeste	Countral	Countal	Coastal	Comment	Coartel	Country	Coestal	O O		Surface	8
Erosibos Seventry		NA	MA	1	Medica	N/A			MA		×				
Flooding Sewerity	4	ton	MA	W	MA	Meta	W	¥N	1	-	1		1	low	
Character		hose	Low		, I	1	8	1	Low	1	1			Median	Methon
Public Soloty Threat		M		MA	tow	a de la companya de l		3	Pag.		1			N/N	Low
Whithen Flood Zhoe A		Yes	Yes	Yes	Yes	100	,	Į.	Yes	THE RESERVE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN TW				1	Yes
Mb. of Affected Properties		2	N/A	M/A	NA	WA	***	ş	МА	00.					*
Type of Rosdersy		Collector	Objector	į	Collector	8				Collector	1			Collector	, in the same of t
A J		di	118	1	335	Sea married	a.	ALC: UNKNOWN	MORROWA	and the same	m.			ā	aı
ğ		A Boune St	Ne Charte	American				auth of Also	Ш				4		To append
3 <	See	Abre	On Day	M. I. M.	V F Babauta Lage	Sc Neilso X	j		E	Turn Lason	11		The state of the s	No. of the last of	m2
A o		AV-116	AV-105	OLI /W	AV-123	AV-130 P	adi-MA	ZEWA STATE	AV-12?		SIL+W				AV-100
Site		22			in the	9	434	SECTION.	a	15 AT #	DATE OF				180

=

Best	218,000	274,000	DOOTLORS	5141,000
Proposed improvements	Research in proposements to the shortly care for any instea short Quick is now placing. The start Ne debugs protein shortly lead to the specimenship 200 Us of data because delicence to the read, ording the in 25 protein shortly lead to the second control to the s	The downstream chacter is this sits needs stabilization for the embastement and resourced of binsis justiment. Recommend a guaren acr of duch renewed and the placement of LODD inquires let of the published stabilization for a distance of SO-It downstream of the colonic coulting binsis flow under this L.	United control and instances of the part o	Recommend placement of 1,000 square first of ny no channel stabilization along channel emissioners for a detaces of 200 squares in cloude 20° ones advert because it in Research Chells for a stables the channel systems of others.
Mitigation Effort	1/4 AC Dahris Remoust; 2 Cash headward: 1007.15 Rep. 1 headward: 100 SF Rip lay; 200 L Study	1/4 AC Daists Removal; 1,000 SF	100 UF 12" Cone. Excussment; 1/4 AC Debris Nemocal: 1,000 SF Rip Ray	
Mitigation Type	Storm Crain fraprovemental Storm Orakn Maleterance	Eroscoa Caestrol/ Conveyance Mishtonance	Erosion Control/ Conveyance Mointenance	Erosion Control 1000 SF lip Rap
Site Acussment	4545	A 4"x4" KTB cross calvert trootes Seleus Bow under R2. Upstrows a trapscridds coverne lead channel discharge to the RCB. No lease, with the trapscridul thermal. Covertizeen needs above 50 of emberdament schillistion and debril/wellment incovers.	head bank stabilistion and channey at late, JD a.E. III. as later. Beak treetiment as south stable. Executed present willing the (pression prevent).	Double 35" RICP Cross culturit under Toe Ramon Clark Mit revies runnit to Takerfac rheer lightrates to Committee of the Commi
ROW COST	Tes Love	A 4 the file of th	li de	Low
THE RESERVED			9	
Env Water y Impact	Surface	a Serbor	Coetal	n Surface
Eroslon y Savarity	4	1	Lone	Medium
Flooding Severity	-	MA	WA	MA
Hooding Eroslon Maintenance Severity Severity	Medica	Medius	Medium	N/A Low
Public Salety Threet	Methon	N/A	W/W	N/A
Within Flood Zone A	Yes	Yes	ti ,	Yes
Mo. of Affected Properties	10	N/A	N/A	MA
Type of Roederay		1 Parameter	Collector	Highway
Stee Score	% Colemna Collector	28	a	100
loc B	Fielle Dr	AT 2 Salinas Meet 92 Haghany		AV 102 KT 2 Chele Bd III Highway
<u>ş</u> «	Olong Greke	And in case of the last	AV-312 Reile Dr	KT2
8 9	AV-113	AV.117	AV-112	AV 102
Site				

Guam Stormwater Drainage Master Plan Asan Village Sita Eveliations

Cost	2148,000	800	900 DE	copressis	decinor is	\$10,700	2170,000	\$158,000	approsite	app/815	2007541745
Proposal impromental	to present futine exolox, 1 acre of obids primoud beloand by for pop observa exablación; 300 esse separante and 500 determinante of Fores Pear Belgin Bings in repérent floraling approximents.	function and placement of potentials in a located flow ment over approximately 1 der of the Plates ben'ted the chartes in on effect to cortrol man winker the cortrologic mentionals in the control of the chartes of the cortrol of the chartes of the Chartes of the chartes of the the found of \$4 sets of defect around just advantate moreal to the sating obsert, the excession along the defect of the cortrol of the description in the sating obsert, the excession and the benefit and suggested attractors to sophieses when of charte to advant to charte the standard and suggested attractors to sophieses when of charte to advant to advant the control of the control of the cont	The errors culvent at this later results to be replaced with 10.0 fears fear of Th.2 Th.2 equipped with the entire the sevent of an 2014 in the prostabilities observations of the science. Approximative even parties rest of other bodded the emmond latery the observation.	removement to the desirage companies system at the alto are neglect. Then are three justice institute to control the parties in the parties and advantage to the parties of the parties and advantage of the parties of the parties and advantage of the parties of the parties from the parties of the parties of the parties of the parties of the parties from the parties of the pa	To present further shorefine enotion, placement of 30,000 spaces best of the top constal analysis in jeasurements to the whollow and the broadest from the Forder Rest coults to the Asset Merc coults (payment many 2000 best) is recommended.	Recommend instituting the estiting of CDP Witters bish obstructing flow institution of the satisfied the state of CDP Witter which (supposed with sintenses when convenient to this helps which in color to moreous the worder from out of the flow path and present conserve additional and short instruction spireward the bridge.	The cross calcients at this size needs to be implement with OD here feet of STV IRTE exceptoral suffi- scrating instruction and decementaries and SDO of the first problement conservation after to calculate speciments in our quarter, and of their should be recovered along the threat Amountment instruction of hydromidation by a boround liber marks over approximately 1 store of the adjacent shades.	The cross cubers at this title needs to be replaced with 100 lives here of And ThD equipped with greatern and describeran headwald structures sing with 100 kg it to pe resiliation; ploted greatern and describeran of the cabers, Approximately one exactes one of lighth straids be reviewed along the structure.	mains conting, discharaters and fundamental the farm does require to remode at this size, seature are of other recover and plazment of one are of hydroxide but booked flow mains in commonded along the Mikids to definite hydroxide suddiversables and designing of the seasurement with A fage the Rood Control Document, pre correctly storm draw reads to be plazed at a 200-20° EX.	the subsert at this state needs to be replaced with a TAT RCS for 200 flear feet equipped with spieme and downstream hashwall structures cudding flow to a 100 square foothly no struct business.	representable to the form of the other or reached. The artifling strategy explains reache to be setted to a SQT consequence system that "All for JADO least feet and two carbs bashes are reposal to deferring a stating the set founding bases.
Mitigation Effort	T. NA. MORO SF Rip Amp Stabilization; 1 No. AC Delays Branches	1/4 AC Dibble Memoral; 1 Ac th Hydrorade/1954; 1 Newbest; 2	Strate,	trus and trus and a con-	ACCOCATE REP Rep	SCOVET DIP Water, Air Release	LEGISTRETH TOTAL DATE FOOD, 2 News Presidents, 100 SF Rip Ray, 1/4 ACA Chiefs Remond; 1 Ac	TOD 15 6'se' RCB (per FCD), 1/4 HC Defrit Berrowd; 2 Houdwalk; 200 u	1/4 AC Debre Removed; 1 Ac hydramach/1994; 100 UF 24* RCP tare FCLIs	DOORSTAT NCB, 2 Headwolle; 100 and 160	Lucio LF 30° ACP (per FCD); 2
Milipoden Type	Ereston Control/ Conveyance Maintenance	Erosico Corazol/ Coraspera	Consepance Improvements/ Consepance Maintenance	Conspans		Consystem	Ettikin Cantrul Conveyance Improvemental Conveyance Maintenance	Conveyence emprovemental Conveyence Meterance	Eracion Control/ Storm Drain New country Storm State Improvement	Consyence	Storm Drain Improvements
St. Assessment	riven inter brings along Bit with supplications resident on the unstream ribes of the subsection of the supplication of the s	AZ P to the Vertice and exchange all post control and a section to the first control and a section to the first control and co	The state of the s	At the electrication is all as elegan to a delay loss, a local contents of the agents into the consent is not clear where there belon callet no, but ther explain small from IUI and then higher loss A Laco Guerres Dr. Two of these graded feebs are covered with self-mine had develor, but the IVID Economic, a loss collect located here must be upposed.	There is eignificant costal erosion from Asen Reenhounts to Fonte Rieur (north). There said some found-sions left sing the coeding.	Bings it in good condition, there is no errotion not debell or overgrown vegetation. On the upstream side of the bridge a water main errotes the fiver, this water live is too bow and now example debra to accountain on this side of the bridge. Water live should be mainty.	to weiding 1st Chast chakert crossing Sarca Ano S is explaining nextel from NaMoo. The apit issue cohert fraz o handwal that it automorph is water and deaths. Historie is promise inspectation, and from are a great of crucker is Ribble result to be subdissed for mission and the cross cohert should be supplied.	Celabrily 4/12 RCB strate consultation St mean to be upoland. Upotream channel in Treasity regressing. Counnel needs to be channel of regression and debrit to prevent Totaling of terms.	dis grand dis grand dis De re	There is 20' IE's closed contribute to the Asset News, just settlift of the Asset News tridges were News tridges. When News is not all soon to extrate it. This calent and beautish in the good shape, and have are to signer of extraine accord coulder, newed to be replaced with a 2's, Till. The materials 20' PO's is understand.	Ebiting of samps commerces system along West San Cartos C. reach to be upsited, then are signs of street booking.
teos teos	low and		loe	ğ	ž,	tow	Š	ğ	3	ISW	ş
No.	2	2	g	4	g,	No	g	9	2	9	Company of
Market Market	Consta	1	Owens	1	0		Surface	Surfece	Surface	Parties.	Coestal
Lordon	6	j		***	and the last	MA	Medium	NA NA	Š	**	Read S
Ploodle	ğ	3	Medium	**	Ę	MA	Company	3	1	3	Ē
Rhoding Eroten Mainteance Jeverthy Severth	Medicon	4	Medium	1	100	1	(A)	Medium	Method	lbe	ğ
# 5 H			10 16 g	3	1	*	3	ě	*	N/N	N/A
The A	1	J.	le le	Yes	2	1	p	Ä	1		2
Marcal Affected Properties			V/M	V/R	91	MA	N/A	NA	W/W	NA	MA
Type of Readersy	-	ļ	Diffector	1	N. Company	Į	Collector	Defector			Collector
a mog	GI.	551	1	1	A PERSONAL PROPERTY.	133		ä	D	100000	12.00
ğ =	1	Owest of Owest	Magne Jose A Leon Guerrero St	Mayer Jose A Laon Calement R	Corme Co. Asian Sheet	Acar Gree and po	Santa Ana Lare	Magar Iose A Lecen Guerrent St	See Acres S	Actan Days	West Sen Leon Certain Courses &
ig «	mi	111	Sen, Man A	T.D.	Commence of the last	T I	NA CONTRACTOR	A STATE OF THE PERSON NAMED IN COLUMN 1	ij		
ž 9	ZIEV	ASIII	A\$-109	ASTIDA	AS 300	16.00	A4-108	AS-100	AS-108		
Series Series				Vii +						ŧ.	

SWDWP

Guam Stormwater Drainage Master Plan Barrigada Village Sice Erabatons

8	CESTOO	000 7512	\$17,000	544,700	2142,000	319,600	845,200	000,7512	900,7118	\$137,000	STATION	\$192,000	920,700	\$122,000	230,600	\$137,000	\$22,000	519,600
Proposed improvements	Vienes at the and income Stooded due to an existing inflamtion beam that overtops. Retonmental inflaments of two 2000 ft beam shallows from the constraint beam by 100 ft if it is not one probability the stop of the total of the critical beam beam by 100 ft it is constructed in companion of the critical beam where areason is construct.	becoming placeness of a store that sprines along IR 10 to present flow from existing has been all treat in courts having should be placed along the 10 (spriness and determines of the streaming with S. an Autono Storett, connecting to a 2 of M. Fe's trick to have been and determines of the streaming with Storetter, confidence of the Storetter of Storetter beet of rap energy dissipation and to 2 of 20 the sufference remains remain leaves to the 20.0 capers beet of rap energy dissipation also 2.500 the sufference remains remain leaves to the 20.0.	Boom 8 at this side Boods. Two over stack books need to be pleased along the 8 japprochantely 1000 best west of the 146 at the roads how point to intercept and roads road through a new 34° 100 feet west of the 100 feet will correctly the point to intercept and roads road through a new 34° the 100 feet will correctly correctly down to be beached wingowil structure and a 100 spacer book not not rep as even gradielester custoffing ground the adjour.	The infiltration lastin along floorin 10 and modit of floorin 6 no langue drainst the nestly Sud has turned into a permanent idea/habbled the enchappend specter. Whe teru meets a qualifier sons of the following and approximately 5,000 table; yorks of dending (out, in order for the mishimates to occur, an agreement between DPV and DPV will most idealy be required.	The set in rectabilisms and set if Bit of the bases of ages (consistent for the bases of the bas	To prevent further ponding at this site, a 200 linear foot sufficielties treach should be placed along the edge of payments of the interruction of its 16 and 5 Sahana.	Recommend implemented to the whiting covering durings structure based along flows 16 adjusted for depth May white the entitle below covering to 3.5 for approximately 100 beaut that is longed covering to the sinking limit of them in date in a passive spractice.	To prevent renderny flooring, two citch busins need to be placed shop the east side of Rey 30, words of last it, render Gene to the chicky inference both boths focuted could of the 76 gas station. The contribution will consecut to a 27 MeV for 2100 beam feet, recently the member law is independently placetimes and a 100 papers from the payers projection to contribute to the inference business beam placetimes and a 100 papers from the payers projective to contribute the inference business beam.	Assessment information to the state of the content	Proceedings of the process of the pr	To prevent further encion and damage to the existing helitosion back, the ray stabilistics of age smallest 1000 SF is reconsected along the unknowness where encions is existing.	incommental improvements to the others of the spiral behalf should the set jobs of his 15 at Thesis (Street including spiralness of 15 Colors in his 3 FeV Colors on spiral south summers and decembers subgraph backed intentions planted and such taggle and all summers of the spiral should be the spiral subgraph of the spiral spiral should be the second of suppressions of the spiral subgraph 300 U of this should be the spiral of parentied.	To prevent further powdeng at this site, one AC spillinery, a 100 linear foot duch that outlitts lines shrough a 100 square foot site ony marring stituigable is needed.	Reconstituting the a storm drain system in victory of mannow (assume 100 L) of 28. II.C. to replace satisfy storm drain in anal.)	is note to premote proper draining and conveyance of Bow through schools, measurement planement of a new leaderal/leingwall structure equipped with trash rack to left of cross-colovert artibiation.	A dishape conveyance system to instead short larger list to prevent hance Booking of the street and assumedage prease properly. Recovered the hands presented of greater can be assumed by 10 for of 24 PCL, with small conveyed should, as a deblored in 10 for 10 Feb. required that hands hands the partners are called 20 PCF for partners to manufacture page hands are the supplied for this better upon control manufacture page hands are the required for this better upon control or manufacture of compressed hands.	The colour linital at the low point of Conada Tato Loop Not needs to be upstand to a 36° NCP for 100 Noor feet.	Incomment phermions of a 200 lease feet infiltration transfundations to the colating subhanton transfundation with traintenance of the analysis juditation transfunds analysis pullitration.
Miligation Effort	2-200' Long heftitation Tranches of			Managed LODO CY ALL Agreement DAW	Cdebrie ACP, 1 20 SF rip rep	200' Long infiltration trench	ģ.	2 catch basine, 100 LF 34" RCP, 1 A bestined/wingstell, 110 SF 16 rsp 180	2 catch busines, 100 LF 24" RCP, 1 benebunif butterpane, 100 SF typ rap			100 if 3F NO, 4 bendenblyfergensk, 200 if Obth	1 AC spillway, 100' Onth, 100 SF	Upsides paper for 100 LF to 36" RCP	Add leadwalls/wingwall and trash rack to cross-cohert	7 celch besine, 100 (F 24" ICO, 1	Upuins coloert to 300 LF of 36°90?	Add 200° inditization trench
Milgation Type	Storm Drain	THE REAL PROPERTY.	-	Conveyance Improvemental Conveyance Maintenance	Erosion Coatrol/ Conveyence Improvemental Conveyence Middletenence	Stores Drain	Storm Drain Improvements	Storm Drain Ingroventents	Scorn Drain Imperovements	Commysters	Erosion Control	Storm Brain Improvements	Storm Drain Improvements	Morre Drain	Storm Drain Maintenance	Storm Drain Improvements	Conserpence Reprosements	Storm Drain Beginderments
Ste Assessment	a exacting infiltration havin overtraps sind floods homer. Also concentrated flow sharing the lastest to everlashe everlashes the set to a home. Gration convols needs to be resided to embastioned test to private property, and fortan needs to be resised to also are of all last rands without flooding proper lies.	of floods homes.	along this stretch of the weed to the at part.	*		tecthesis cornet of interchange shows signs of possibing. There may be enough right of sity to piece on inditiation transft to take care of tweet.	The STATE Appeals of STATE APPEARS OF ST	At the routheast conver of ELID and fill betweenthen there are below of possibing TK Gas. Staining and the possibing transferous second along ELID and the best class; here it as and a derinage summers system endered should be the ELID and routh it to the existing hillipscipes busin beaused deem to ELID.	Ones Object under RLIS should carry flow from west to eats, but snots of the flow closes not error the sure start and controllers. Though such should put, being LLIS, being an equiphose, side of charts to mode flow to the sun more efficient.	shong the west take of RELD on label to a cross cubwest has been placegord, and avestion- short to a cross cubwest at no relations property to not sufficient to route all the roundle to the east rate of RELD than Biocheg these properties, should be unplug entaining cross subserts rate	all the end of Lecon Guerretor St. an infiltration basin cuitts. A side of the basin has been second ond the basin force has callapses; - nearly to stabilize estudion with the say.	Along the sent take of ELEs is series of graded doctors and 3° MP colorents collect and series well generated back ELES, The Series when they of blooding about pas road shouldby, althous and calculates exect to be sequent.	At the interchange of fits and REES come of the runoff flews towards the routheast come: where this area functions as an infiltration healt. Need in add spillnoys along the ridge of passessed to prevent ponding of riginals area to prevent pending.	A stormadrain Manhole cover in the notable of RIS pages and open when it takes.	There is a natural basis on side of RIIQ, on the opposite side there is a cross culters that makes to be makeshed to present makes in Rivelle.	one content and the content an	A cross calvert lescated at the love point of Canada Tota Long fild is understood for the sensure of rawoff that is restling. Cross colvert needs to be upsized.	Runoff Bood s one property, existing infiltration trench can't handle volume of runoff.
TSCO	3	š		ğ		3	low	1	Low	Long	Low	3	low	Low	Loss	Ē	LOse	Low
NOW Membersh	4	2	2	2	2	2	2	2	3	2	98	9	9	og .	9	Yes	92	3
Env Water Impact	1	Assetter	Aspatics	Assista	Assiles	Appelle	Apalle	Aquiter	Aquite	Aspille	Aspeller	1	Aspider	Aquille	Aquiter	No.	Aquelar	Aquiller
Erosion Severity		MA	N/A	N/M		SHIE	N/A	N/A	*	N/A	N ₂	W.	MA	N/A	MA	1	N/A	N/A
Flooding Severity	1	1	Median	Median	1	Median	803	ğ	3	P P P	N/A	3	Loss	M/A	Median	1	Liber	Median
aintenence	1	1	word.	1	1	Medium	low	low	3	Low	tow	3	tow	Lowe	Low	low	Low	Medhin
Public Selecty Three	1	1	Metho	3	la la	los .	ğ	1	3	Low	Low	3	Jag.	Low	N/A	1	Low	N/A
Within Flood Zone A			Committee		2	£	2	4	2	9	- N	9	2	2	2	2	Mo	2
Macaed Affected Properties		\$	MA	N/A	S.	MA			N/N	N/A	WA	*	NA	M/A	MA		M/A	1
Type of Rendersy		1	landing.	1	ļ	Mediumpy	Į.	I	Į	16 Champ	Collector		Highway	Highway	Highway		Collector	Collector
Stre Score	188		and the same of			IS		150	31		246	346		143	139	118		138
2 =		9.	1000' West of RT 16	818	Sir Warne	South Sabana	Capacida Way	MT S	200		No.	Person of the Pe	изз	Latter Day		Marifolism to	Mar Sc	The second
§ «	Unettern St	3 8	NIE P	Name of		NT 16 Se		MT 30	MT 18	Victoria, Victoriae Majoria Ma	Laron Guartiero	MT 16	87.8	NT &	ot 710	2	Canada Toto Loop Rd	Maritman
# 9	10 SW-116	-	BV-131	W-130	84·130	EV-134	BV-102	W-137	sv-tos				W/139	84-138	ELL-MI			101-A8
Site Han.	-	100	1		1000			-17		-	-		1				5	*

	Cont	CENTRO	\$19,600	887	CONTRACT	218.600	\$46,200	000/2E1\$	009'815	009'615	\$34,000	Sers,000	28,100	\$78,700	000/2115	000/6/15	\$112,000	08128	\$342,000	\$4,570,000
	Proposed improvements	To prevent further flooding, two 2007 long infiltrations trenches lone on each sale of the crowned Saretty are recommended at this often adomy San Reque Ories.		incomment of processments to the storm of their conceptions python delay like, it is the achiging com- sivent between less of the EV operations in their proposess of extract 20 PATE. The operation of the particular storm of 20 PATE and their delay of decembers income and the 20 PATE of their operation of the 20 PATE of their operation of their particular storm of their particular	On great the time probabilities, we man of placement of an addition of good cock has been added to the control of the cock of the cock of the cock of the cock of the months of the heavy to the cock of the cock has been and the cock of br>each hashed and the cock of the cock of the cock of the three rounds to cock hashed Cocket proposed with event has to the placement after a spiritum with the rounds of the cock of the cocket of the cocket of the cocket of the cocket of the present of the cocket of the present of the cocket of	nother of the sensis bossion's objected to 415 layings M.A. To prevent the fittings are 200' long inflitation treatful (one on each side of the crowned which are accessed.)	The state of places and alone in the paper in 1 highly Street to send in Rood presention hing. the statest condeng to an adhermon intend, ICD bang allocate to the people in the street, there is no send of the state of the street. The statest independent of the state of the street of the street, there is no send of the street of the street of the street of the street. The street of the str	Necessaries de la contra del contra d	To prevent further flooding, two new 2CD' lang latification insuches (one on each side of the coursest streng are recommended.	To prevent further Booding, box sees 200' boy finishing for trenches Jone on each side of the crowsed street, are recommended to replace selling influention trench booked of baseds finish.	To prevent further entries and possible themaps to the cetting hardwalls and channel anabulaness. If it are a choice is ensured belowed by to up channel stabilisation enount belowed to and it to go concrete channel (estimated at oppractimately 1000 SF of to rep) is recommended.	Recommend pacement of a 2007-200° infiltration halfs at this into along with a dissipary reperen- sing Westbroad Street. Two middle budges should be pload at the street's long points to between a and covery them as 2 of 100° for 100° lines the streeting to behaviority designed executions and a 100 spaces to not no every dissipary ploads at the infiltration lands.	The new beadwalf-singwalf arm then should be abled to the existing trees calent on this JSD, analosing flow through a JSD square fact by the minter discharge. This will recent the first to the north.	To prevent Surther Theology of the medicine, the existing rectine plant concrete hand channel at this this neuto to be table. Recognizing experiences of existing channel estimated at 10 wideb and 5 height for a siliation of 200 literat heat.	Amount of properties of a reactive state of the 15th properties for two entering literal decision. Two citch faints should be ploud along the 15 feptimens and inventorina of the mission on 16 february, connecting to 2 of 12° feet 70 februar has equipped with a breaded in great fraction, contribute to 2 of 12° feet 70 februar has equipped with a breaded in great fraction, contribute the burst thought a 100 square base by comparison of the contribute in Park.	Resonance of platement of a 200 XXV relitration have a this time short with a destroying system wing Barrier Coop, Two cards the barrier has been deep the state that the barrier pain of convey, he as pit Two De XXV De have the another than the barrier pain of the property of concerns and a 100 require time to an angular distance from a few memory to the property of the property of the time of the property destroyer before a few memory between the property of property of the property of the convent readingly to convey the time and a platement of 100 Let the property of the convent readingly to convey the time and the property of the property	Recomment on the long critical for a real time parameter in the clean bank had require ECOU through possible in the collection of the collection with the clean of the collection and an appearing the week possible and benefit of the fraction where the collection is the collection of	Recommend multipg temporary bifficultion banks hate partmenent infiltration bean to be owned and and administer by DFW (requires RDM exceptibles and fearing for 800 fears had around pertenent of the sening bifficulties bean.)	lusament of a 2007-1007 inditivation hash along Puntales Street to minimize enterment to Tamesing Dyalongments.	TOTAL
	Miligation Effort	2 - 200° Long Infetration Treaches	Add 2007 Infliteration trench	1/4 AC Debris Removed, 3 trach med, 100 LF 56" RCP, 200°200° ellimation beats, 1 construction of trace 200 SF for ma-	1,00,1	2007 belitzation Trends 2 2007 belitzation Trendses			2. 200' infiltration trenches			2 Catch Basins, 200 (F.s. 24° RCP, 3 Headmail/Wingwait, 100 SF Rp Ray, 200' st 200' Infilization Basin	2 Hundwalls,Wingweller 100 SF Rip Rap	200% S'ALV' Rect conc. chaesed	7 calch beam, 100 U-34" RCP, 1 bandeal/velopmel, 100 SF-tp-rep	2 catch beams, 100 if 24° ECP, 100 if diesh, 2007/200° inflimation heavi, 1 headwalf derrigned, 100 5 rigons	1/4 AC Dalorh Removal; 10,000 SF Pythrosand vr/RTM	act' long have around Martine basis.	200's 200' infiltration bests	
	Militation Type	Storm Drain	1	Company Company Drain Processed	THE RESERVE OF THE PERSON NAMED IN	Storm Orac	Storm Drain Improvements	Storm Drale	Store Drain	Storm Drain	Erosion Control/ Comergance Maintenance	Compyance	Company	Operayeecs Improvements	Storm Drake	ij	Erescon Control/ Conveyance Michigenenics	THE RESERVE AND ADDRESS.	Stores Doals Improcesseetts	
	server) and the same	An existing uniforzion trench is not worthing property and also may not be enough to take care of the street ranoff. A property gets flooded, Should criteral length of infligation trench and also naulation trench.	sent of REIS ger Repaird. On the south risks of REIs south and REIs and REIs are a sent to defen at this area, under the between there is a least to defen at this area. There is also a cross culterfunder and to the first and a demangs accompanies system to prevent of nationary.	per certified the certified of read, add the per section of the per section of the per section of the per section	which gets Bounded and as a hamporary substition a horn was built to provent Bouling. A house gets Bounded and as a hamporary substition a horn was built to provent Bouling. Acress to street a west-and is bounded to provent Bouching of the house, an infiltration then though to halft available to the horto.	Peedade bestien for an ielitratum bade or sreach, sits at a less point.	Estima channed needs to be deciged and channed of comprom regardition to prevent foreigning of every, about married yours extend agreement when this channel seets to be channed of any decision the buckship and seepants statement when the channel seets to be	Along the saiddle of Captain Raysa Way on both sides of the street, flooding exists. On the sost side of the road there are existing infiltration treatment best are not working properly, Need to ball size following treatment along both address of the street.	An infiltration gallory is incained where a basebull field tuned to be, but it not worthing properly and it examing foolings, here infiltration gallory reach to be built, and nevert to be activated in order to fenction properly.	d sistem and vegetation manaval. There is all conhadrenest, they need eroxion	7 hoosis get flooded nead to add a Millerston besis to take care of the randi.	A cross calvest under RLS carries flow from the sext to the west where a property is being developed. Updatesm, a headered and undergoads should be solded to establing cross coders. Domestream, the new development will build a structure to trate flow to the newth.	Distribut concrete Stand channel needs to be re-bulk to haup area from Bootharg; the reserving chartend was domagned and, show sections have collapsed, is not functioning greatering.	Primate property of reads IL Property gas Bended by spatteres mode, a new descriptions a spatial back becamed feature fleshinging to primate property, these for old it design commences years.	Manaria Long at off Progediess Wey and adjacent to the signer. This is never advantageness and stored is not powerful with their govern entron. These houses get the control of the control advantages have no entrol of the control of	At the Internation of Lagues have May not performed to the new Years would have the upper of the second performance of the second performance of the performance of the contribution has a routed to be use and before the property, each to work or chiefly being character have noted to be used to the use and a believe the performance of the performance or the performance of and debute removal.	All the end of Lizzue St there is a CLA der Ste whom a immorrany batte was provided to be as one of the Booking generated by the new development. Stock this beam is at the business of the beamin is at the business of the beamin is at the business of the beaming and the man and the personness the Batterian beath, wend to suggest the district of single to beam and from an account read to batter.	Airing Proceeding St advance PEE minude to add particulation basins to relativistic the amount of formely that flows shows to PEE mark PEEP Mat.	
CONTRACTOR OF THE PARTY OF THE	TSOO	ş	tow		š		P P	Low	Low	3	Low	1	Line	į	ton	1	Low	3	-	
MO8	T Neeth	9	SHIPPIN	<u>, 1</u>		2 3			2		A	Y	1		1	J.		2		
Env Water		Aspatler		Control of the last	Statement of the	1 1		Service Service	1	SHIP OF	ł	Aspiller		ALC:	1			1	10000	
fing Brasion	rity Sever	2	1	- Barrier 1999					Series.			\$	N/A		NA NA	All residences		Medium	200	
Flooding	200	n Medium	No. of Section		10/21/20 10:00		BENEVAL I	1	<u></u>	SECTION SECTIO		1	Llow				The state of the s	100000	13.67	
	Melnten	Medium	Distance:					Eov	1	STATE OF THE PARTY.	To the second	The same	, post		3		Meteo	1	10000	
Safety V	-	M/A	The real Party lies	1	70		HERE EVE			10000	COUNTY	1	Medium		Love	3		20110	20114	
Within Flood	-	2	9	2	2	9 9		•	2	2	9	2	2	2	2	2	2	2	2	
No. of Affected	Propertie		1	•	¥.		YA.	WA	V/M	N/A	4	,	-	V/N				\$	WA	
Type of	Ecochecy	Collector	Collector	ļ	1	Private Private	Collector	Collector	Collector	Collector	Collector	Collector	Highway	Collector	Paperay	200	Collector		Collector	
*	Score	139	139	2	CENTER STATE OF	1 11		10	an		110	113	82	138		Chicago III Care	Electronic .	ig	*	
8				S.III		Tanana I				Desab St			Market Gas Striken		Morth Salesa	ļ	1 2		0.1	
Loc	A	1	Author		Committee of the	e di di	Ungelow St	Automa 8	Capado	Courts The	Lupan Mery	Whathead	er 16	1	NT 16		11	1000	Annalis St	
a	Q	W.1R		WA-100	PP-104	W-120			W-725			30-115	SQT-NE	BV-124	901-48	IN-107	SEC	90,100	BN-140	

1	
200	
lan	
ī	
-	
Master	
S	
18	
5	
l 은	
æ	
rainad	
E.	
7	١,
=	i
18	=
tormwa	>
ㅂ	9
12	8
S	۵
Ε	5
G	t
3	24.0
-	٠,

ğ	007888	2140,000	00071155	\$142,000	5765,000	\$766,000	\$134,000	0007395	000,5812	Saskon	\$142,000
Proposed improvem	O Familia Reco	Account department of a transfer of an injury of the University of the 100 has a 100 has been than the ACM on each shaped for zones towards from a grant of each leaves being being on being ladge of clearer at the private has point. The two catch haster all concent to a 24° RO for 100 hear best second-page for the far and country from a second to the proper of the 100 hear best grants best do no prompt designed.	Processing carrier glob hydrocenter at lower the the calculations of 200 of depth desired along the profit of Banker Drive wall pictores of the calculations of 200 of depth than a processing and one cancellage to when the pictorial design is taken foliate at ladie 54th a form plaggic, concentral by 200 of 2 ft. 27. Along place 1 benefored with the subsequent and 200 of the right of the energing the control of 200 of 2 ft. 27. Along place 1 benefored for the calculation and 200 of the right of the energing theories of the equations of the equipment.	The jearned of the Med will be those 4 pt 100 center of the charge company memory Agenter start of debt seads to be amongs 2 centerlates sheall be four the cheeft for points to expany for that if it need though 2.0° (EV for 100 hour feet, building to one another lates and the charge of the charge of the charge of the charge of the charge of one another lates are considered to the charge of the charge		2-4-0-2 H M :	THE RESIDENCE OF THE PARTY OF T			Accomment placement each side) of the street catch basins will conne structure at the outlet i outletting through a 10 also rended.	Internation of properties of the Consequence of the
Attigation Effort	SOULE N. 2.24° ACP; 2 Headwolls/Wingwall; 200 SF Rp Pay 1/4 AC Dabris Removal; 400 U Pay 1/4 AC Dabris Removal; 400	2 Cetch bases; 100' 24" IICP; 1 Penahani/Wingsell; 400' Ditch' 1,00 Sf llip Rap	2 Catch Bessey SOV 24" RCP, 1 Headwalf/Wingmalf, 400' Distri- 100' SF Re Rep	1/4 AC Debris Nemovek 2 Catch Basing, 10074.24" RCP; 1 Henderall/Whegwald;100 SF Rip Ray, 4007 Ollich	2 Handwall/Wegwell; 400' DED; 100 SF life Rep; 2 Celch Beston; SSD's 6F RCP; 200's 24" RCP	Catch Basins; SOOTAS' ROP; 100 14.424' ROP; 100 Meadwall, Whyperall; 400' Dicth; 100 SF Ba Ray	7 Catch Basine; 100% SF BCP, 100 SF Re Ray; 100 Conc. Channel; 100 Obth	100 Care, Chantel; 100 Olibi' 2 Cash Shanes; 500 Olibi' 2 Tall Baris; 3 September Wingsan	2 Cotch Barber, 1507:24" NCP, 300 SF Rp Rap, 1 Headwalf-Wingors; 400 Dook; 3/4 AC Debris Removal	2 Catch Bealing 100's 24" RCP, 101 SF Rip Say; 1 Headwoold/Whoppeak 1/4 AC Debris Removal; 400' DRcb; 300' Conc. Channel	J. Catch Bookey, 1007/24" ICO-100 SF Top Rap; 1 Headwall/Wingwall; 1/4 AC Dahen, Removal; 400° (Stat)
Mitigation Type	Eroston Control/ Storm Drain Improvements/ Treatment (BMP Improvements	Storm Drain Improvements	Storm Drain	Storm Drain	Storm Drain	Storm Drain Improvements	Conveyance improvemental Storm Drain improvemental	Conveyance Departments/ Score brain Supprovements	Storm Drain Improvements	Storm Drain Improvereents/ Storm Drain Maintenance	Storm Drahn Improvements
Site Assessment	Bridge leading to Dur entderson meets geardrak. Debts from channel abong mad causes from the debts the channel for the feature to Death them channel abong mad causes refer to be defining summersons referen should not be noted it not persed, nead right- per way to be defining summersons referen should not	his the end of Vestustean Resid, there homes probably get finished, Need to add seale to parry the Rese sizing the read to the end of the nead.	Analoser from the school was darbourget to a private property, the property has been beautiful and the colonial chapter, data is plantice recursor as the east of the colonial private and the love the chapter of the colonial property of the colonial and the colonial property of the colonial property of the colonial halps School as the when we making your colonial to become	The Section of the Section Sec	This street is located in the Booking zone, and houses get Bookied. There is no desirage theory-some systems, bleed to build including conveyance systems to recote flow to Chaol Freez.	at lone point of Chalan Took Street, the private owner built a bern to beep thou on the bear formed from the took the too the street. What monitories we note their property and he property behind alone Rabia St. Brind to add a chalage conveyance system to make it need to the property and the street of the street of the street of the street of makes the street of the street and need to the street of the street of the described for the conveyance of foreign systems.	at the low goint of this street a grown property Goods, flow from Bit also flows to this server. The property has a Bit Commander at the most value of the property. This cross the server for the command of the property. This cross Aplanetic cross flow for an extraction of the server flow and the grown of the server flow for the server flow of the server	Aquencin Garden development is blocking the natural flow from the bulks of desirage the second secon	Along Ubb road Dern a no deploage convejence system, the natural flow is from west to seast and the road gain flooded. Debrit haves, his lowers in the primming of the road.	Aung bis nod thern is no delange conveyore system, at the intermetion with Jane M. Bennish G. L. Commodern's medical to present blooding of a system of Anny Chalen of Machine Test for broaded to present blooding of a system of Anny Chalen Classical Annoved Required to a thintery to Pape Anny Chalen Classical Annoved Required	hanel from took cassodes like prosts properties. Need to add cuts road and aid cuts haves. Sections of the road passesses is labell, principal from road framewing.
1500	1	Low		35	Median		Ē		Low	Low	Low
Now Member	1	9	3	2	j	Yes	2			2	2
Env Weter Impact	1	Aspendan	1	1	1	1	1		Asperie	Aquille	Aspider
Erosion Severity	š	N/A	\$	MA	MA	NA.	\$	ş	×	MA	Medium
Flooding Seventry	3	Poor Poor	3	1	Medica	Median	1		1	3	Mediam
Maintenance	1	yori	3	abot		100	3		3	1	Medium
Sedery Threat	1	, ag	4	3	3	3	3	3	3	3	Medium
Within Read Zone A	2	- 4	9	2	2	2			2	2	9
No. of Affected Properties		E	1	MA	я	7	-	1	N/A		•
Type of Roadersy	S. Carrier	Collector	Collector	Helman	Colector	Collector			Collector	1	Collector
85 S8	9	151			an an	110	2	All Indiana de la Contra de la	- 5	166	1111
<u>s</u>	les Pales	Derp Road	halps Saldan St	RF4		m4	+.23	No. of the last of		Sanda One Dr	Sents Cruz Or
<u>ş</u> «	Coults Family	McContabo			o de para	Chaldan Totot	Ne signal	Coden	g a		Manbus
2 0	O-100	G-102	CP-103	101-63	0-108	CP-108	0-107			OF-110	Manhusa CP.111 n Lane

jig	oun'tests	3602,000	\$255,000	TOTAL \$5,500,000
Proposed improvements	These properties facilities for the description for the description of the description of the description of the description described for the description of the des	Described or proposed of any other sections of the proposed of	e of ending cohery with 2007 2.30° IED quipped with upstream appeal structures, conducting to a new construct channel, 1000-less bleed less of 2 proporties from y mayine consensed, to the natural or property. A 100 St for my contra designent stands to placed at	TOTAL
Mittgadon Effort	2 Catch Basine; 1004.24° RDF; 100 54 fig. Rap; 1 Headwell Wingsmile; A A Chichel Sempork; 600° Ottos	Accompanies of public processing and constitution of discussions and discussions of discussions and discussions of discussions of discussions of discussions of discussions of discussions of the Accompanies of the Accompani	100' conc. Channel; 100'e2-34" ICP; 100 of Np Ray; 2 Haadwoll/Wingwool	
Miligation Type	Seen Dish	Ersalen Control Coovepance Improvemental Convergence Maleinance	Conveyance	
COST Sto Assessment	Manual from RCID facults there properties along Chalon Chifd. Head to add consequence plantame skips (200 present read from extering Chalon Chifa. Head to add consequence presents along \$1.00.	Daning Drug culent water road, welcome the Need Colcions on both sides of cross todaries to subdisk seekalborant, owed to resound lader in registration, and also upper Mediting cross colores.	A per serve of Charles seaks, earling 2. The Years on section but were outdiring it is not serve any alligned in a property but sees developed and the ground stands, were seen selector speedy files. The specify but sees developed and the ground stands, were seen selector speedy files. The stands could be seen seemed to the section seems of the seemed to the seemed	
ROW Resided	4	2	ž,	
Erv Water Impact	1	1	Aspather	
Erosion V Severity in	4		NA	
Flooding Severity S	1	3		
Patrianence	3	1	ion	
Pottle These y	1	1	and and	
Plood Zone A		4	2	
No. of Affected Properties		MA		
Type of Roadseay	I		Collector	
4 3	s	7	130	
<u>s</u> •	9 6	Lee Pales		
3 ≪	18	11	Chilli Fambo	
å Q	3	Mi-6	O SILO	
Site				

Guam Stormwater Drainage Master Plan <u>Dedecto Village</u> Ste Evaluators

				10.7			8	9	8	8	9	R	8
3	000.8552	000'6118	21,500	BEOTETS	53,670	000'921'8	2137,000	oor'sHS	000739955	\$112,000	oon'sets	00077775	2142,000
Processed Processed	To grown thrite finding along those 26 at the two point, two on the basis are proposed along the 1 and 2 defined cent along these may required it the two point the 26. The cents haven along that should be required to the system of the 1, connecting to the system with approximately 200 at 40 47 for March teachers. The think are to designed along the 26 to that the prevenent then to the catch basis at the two paint ignormances, 900 ft and 1.	To prevent further porcibing and possible flooding of our communical property at the fow point of this sink, have catch behave connecting to a 24° ILP bat 100 linear fact theming to one bendess have good interctive contenting from to a 100 square foot to rap energy designative is needed at this side to improve the starm of only system.	The second of the following interpretation by the Agrangian of the Agrangi	Perconnected the delibror of a stems draw draw review about Labor Street Incheding 2 cach hashes commercing to a 24% TOD for 200 hears they colorating to be hashed-straightfull structures and a 100 separar boot for on every disablestar located at the entiring inflirented hashs at Execal Barkers.	Maintenane to the storm drain system at this dise in needed to prevent further findeling of private privates in the area. JADD system for of debter tremond is needed to entitle the existing griend link; a 100 system foot opens and 1-th Mg/ trash rack should be placed second the links to prevent forther chapping.	To prevent the continuation of earlyse fiboding arrand the partierster of this basis, recommend scales yet and the discourse of the partierster of the basis, recommend the fibration of the improvements beds pricemated by the partierster of	There is a breaked to black? When the transfer Addrained are noted of a private transfer. The present is the reason of the private transfer and the properties that the circuit attent and the private are reason. The count of make the transfer that the points on the transfer transfer that the transfer	To prevent lettine profiting and property blooking, a new inditivation bearsh is sended at the levention of the scholarship of the scholarship blooking in the control of the scholarship place, the self-place and performance of the scholarship place, the self-place and performance of the scholarship blooking and the personnel at the beaution as an anoted the a scholar scholarship blooking the control of the scholarship blooking and the scholarship blooking and the scholarship blooking and the scholarship blooking the	Personnel and processes of a 1-10 of Milhatting bein with is bigging week file on desiring the personnel and personnel or 1-10 of Milhatting being of the confidence of the personnel pader (right of sex, become and placement of been also adjuent to the road to per treat road prior to endiring an special many Milhatting being (DD) must be the Dissemble and being to propose distingtion and the personnel of the personnel of the personnel of the personnel of the personnel approach and described paints of Control (page-treatment). The integrit personnel approach approach and described and of control to the personnel of the integrit personnel approach and described the personnel of the personnel of the personnel approach and personnel of the personnel of the personnel approach and personnel of the personnel of the personnel approach and personnel of the personnel approach and personnel approach and personnel are personnel approach and personnel approach and personnel approach and personnel approach and personnel approach and personnel approach and br>and and and and and and and	for points are Restrict on Robin factor of the road should, Base 3. Mecommond pheroment of a man- ability speam should be an extra black and consect to surviving them drain spicious about the 20 the 12 form action speam will exhibit how control house conventing to 100 factor in 47 kP. TO concept fifther to a new smoothing to the 20 of about proper has about conflicted to the 20 one-per fifther to a new and control from the 20 of about proper has about the 20 of the 20 one-per fifther and about control for the 20 of about proper has about the 20 of 20 one-per fifther and 20 one-per fitter and 20 one-pe	To avoid further powding a catch birds at the souther connecting to the existing	111	下框 格 陈 称 称
Mitigation Effort	4 Carch Basiny, 200 LF 24" NCP; 400 Datch; 2 Manfades	2 Catch Basins, 100 UF z 24° BCP, 1 Headmail/Wingwell, 100 SF Rp Rap	100' Conc. Claimet, 1/4 AC Debrin Removat, 2 Carth Basins	2 Catch Basing 200 LF x 24" RCP; 1 Headwell/Affingsools, 100 SF Rip Ray	1,500 SF Deleris flemoval; 100 SF Agency, 1 Trisis fact.	3 Check Basher, 100 Jr 34" HCP; 1 Headwalf-Whitepask, 100 SF Ro, Barg 1 AC Check Benoved, 4,000 Checking (stud)	2 Catch Basine; 200 If a 24" RCP; 1 Headwalf/Wingsmil; 300 SF Ep Ray	2007-2007 bellitration Besley 2 Cottol Bashow, 2007-24"HCP-3100 54 flip Rap	3 Injection Wells, 100/LDD Mills then Besing 200 U Bennaday 3 Handwells, 100 SF Rp Rep	2 Catch Basing 1 Manhole, 200 J Deed; 100 U 24" IICP	I Couch Beshy 100 U x 24° MCP-1 Markets	4 Catch Basins, 100 LF s 24" NCP; 1 Headwall/Wingwall; 100 SF Rip Rap	T. Cutch Basins; 400° Ditch; 100 U viv. 24° all?; 1/4 AC Dabris Terresceit; 100 SF Rip Rap; 1 Handensil Viffigment
Militariten Type	Storm Drash Improvements	Storm Drain Improvements	Storne Drain traptroverniestal Storne Drain Maintenance	Store Dran Improvements	Stores Orain Maintenance	Stern Drain hyprovemental Stern Drain Stern Drain Stern Drain	Szern Drain Improvements	Stern Brits Improvements	Storm Drain Improvemently Treatment BMP Improvements	Storm Drain Improvements	Storns Drain Improvements	Storm Drain	Storm Drain Improvemental Storm Drain Maintenance
Ste Ausenment	through from Notes I ocuses fibording shoup Notes 78. There is a low point along Broots 76 and cross W. Ligans street when two lates are largered. The Brooking strends to wisher the formal through special strends to wish	This is a low point along Boute 25, where poroding is created and youstbly Booding one convenients in property. There are no existing dralwage systems at this location. Possible mistin will be to add a dralwage system that can route the flow to an existing additions bathe most by.	the certainty executive liked distribution to a pige with a train raid. This pige reconstruction is a dramage written about Salakany St. The channel is covered with treat and death, the conference of the treat and death, the conference of the pige and death, the conference of the pige and death is a construction of the conference of the pige and death is a construction of the pige of death of the construction of the conference on pige Booket.	At the interaction of these has attent, these inditition breaches exist. This transless consistent as indifferent to the care of all amond to appendix a the individual does individuely con- transless to the care of the extractional Are existing affectivities basis exist allowing the factor was about 100 Me searcy tense indirection. A consider subsidies to and a debugge region and design go to the existing of infiltration basis.	An existing grawed bake, gets clogged with abdets, and this causes thooling of absent there to have private properties in the area. A possible southons is to add a definit/trank reck that will take care of debtsit/trank and than when the flowalling tissue.	to existing jufferson bath stat each from Books 2 and man of Books 27 White we not sill treat, among, the bath states to be the shaped and a seguither careers. This listinger carees and before greated the presence of this back, which is this was a sainly commercial properties.	0 0 0 0	Board from Race 2 revolvery flows othic to the adjusters properties on the sast table. Where a preside the kennel and possing occurs than Standard given properties. One sold flower properties have a Annalysis and possing occurs that Standard given properties. One sold flower properties have a Annalysis and be to the double A relation will be to have an infiltration below to the topic occurs in fragment.	Fire, a tor post is bothed slong this storet when possible is emetted. Booking the principles were Widels this bear are, the breast point is bothed as the contex of other of the presenters where the context by the beginning the backlin to this care of the Booking. There is an emissing that the executed variable that state is one of the Booking.	her points along RJ on both sides of the mod. Need to add catch basins and connect to bill estimage dealongs system. Dete is an enabling each basin at RJ where RJ connects: In RJ.	There are also at peocleag at the acoust corner of RLI and RLIVA interessistion, there is a health Gas statem at that location. At the west conner of the interrection there is an ourth that health, and women were west along RLIVA. Solution for the pometring is to add a catch takes and pages and record natives to the catch basis in the property.	hieraction of Busis 27A and Busis 23 Books on all four content. There is only one case beats in the west corner. Need to regrate corners and add cash busis to other flow corners and content to existing what Or paper corners and content to existing what to the existing with busis.	There is an existing hillbridge flash at the earth West humanches of Rocks 25 and Blocks 2, 1 sead of Blocks 2, 2 and Blocks 2
8	1	Low	P. P.		E.		Low	Median		3	3	Medicin	Low
NO N		98	2	2	2	4	2	Yes			4		2
Env Bates			Aspalla	1			1					3.00	
ing Erosion fty Severity			N/A	\$	N/A	*		\$	\$				m Low
Flooding Seventry	1	Medin	. Low	1	<u> </u>	ALIENSE S	**	Part of				EUG.	Med
Menter	1		1	3	1	2	3	1			3		1
Public Safety		Medium	Medium	3	Į.		N.	3				PERSONAL PROPERTY.	tow.
Mithin Flood A Zone A		g.	9	2	2		2	2	2	2	2	2	2
Macaed Affacted Properties		1	2			\$				ş		NA	W.
Type of Roadway	j	Highwey	Collector	-	Collector		į	1		į		I	Collector
# 50	21		160	2	5	1100	ti ti	180	8	981	91	9	
2 a	100	Magnet Bd		E. Ste Berbers Ave	W. Sto Berbara Ave	11.11				11.1		KT28	V-Skerg Scorg
3 <	STATE OF THE PARTY.		M	(Loreta St	Redondo		A COLUMN TWO IS NOT THE OWNER.					-	
a e	06-101	06-102	DE-103	06-104	\$01-30	06-106	DEJOT	DF-108	95.50	DE-110	DE-143	06:112	Betti
a te													

	8	8	8	8	8	8	8
3	STRACOO	cooreats	one'hus	00072225	SIPADO	ocarians	900,7942
Proposed Improvements	perwell forther Booking of the sing, shalls first week to the respond from the shallong courses and classes and effective beautiful courses were considerable and effective beautiful courses were considerable with the second of the course of the SC and the SC connecting the SC AF The approximately 100 feets when the This speece which could not be the SC connecting the SC AF The approximately 100 feets when the II in speece which could not be the United SC and the SC and	Processing of charges conveying to primary the best the benefitted the Res. 25, consecting to a primary many placement of 2 cards believe to calculate the best point shade games 25, consecting to a 10° RC for 200 hours from contribution from a 100 report best operance and processing of the an operance and contribution of 200 report best operance and processing for influence excipated with temperature to the reset.	has maken the Ballooney parameters with the parameter of transfer. Il memor a maken acre of stocks and sudients from colorist and spatters and demonstrates channels; if held me has been being and presents on the upperson and demonstrates the stocks of the Tall of the page of purposes and demonstrates of the other backenful foreigned framewar, and that is not as the left and outside tops of the calculate backenful framewar, and	incomment of processed at a section that is price as well as a contribute of the contribute of the section of the contribute of the example at the 1 (confit which adjusted to the Card enterior where another the predict entitle. The the contribute is equilibrium to a 2 of some device populationally 150 for handle income, are a 2008 belonging (or otherwise weed) because long the 1. The 2° chan device income are a 2008 belonging (or otherwise weed) because long the 1. The 2° chan device income has because bounded consisted of a basished winequal structure and a 1003 by any contribute singuisment.	Reconstruction of the property of the contract	To grown I arther poording at this this, recomment placement of a catch bash on Royal Pales Down 1st the insuraction with lite 31, conventing to 1807 at 8 180 across pain unding fine under Rib 3 1st a 200 I blanched jet difficulties in mankly. The color of the factor is deeper along the manufaction and a bashability singularist tentime with a decembrate mergy disappear to 1805 it is in any party.	A desirogen compares reported by the control of the control of the control of the fibre of the control of the c
Mittgation Effort	2 Chick Same, 1/4 AC Chebit Semented, 100 LF 24* RCF 1 Semented viringent, 100 SF Rp Stay	200 LF Blowesky, 2 Catch Basing, 100 LF v. 34° 90°P, 100 SF Bip Bage, 1 Headensil/Wingsoil	SF IEP BAF	3 Carch Busing 150 If a 24" MCP. Thouse 740 Bays 1 Headwall Wingsord, 200 If Bloomshay	100 If Bonsale, 2 Cutch Basher, 100 If n. 24" RCP, 1. Headmail/Whysell, 100 Sf Rip Rap	200 U Bounds; I Catch Bailty 100 Dr 24" BCP; 1 Headwall Wringwall; 110 SF Rip Rap	2 Osth Basins; 200 Jf Core District 200 Jfs.2° HCP; 3 Meetiche; 200 Lf Research
Mitigation Type	Stern Date; Improvemental Stern Drain Stern Drain Mikhinsonere	Stores Brain Improvements/ Treatment BMP	Storm Drain Improvements Some Drain Maintenance	Store Dries Paptiverental Tractment BMP Represented	Storm Dram Improvemental Treatment BMP Improvements	Stores Drain Improvemental Treatment BMP Improvements	Storm Dasin Improvementaly Treatment BARP Improvemental
Shu Assumment	Sectionary processing the control and great me the sectionary of the institutions of control like declarated from \$1.25 from the cond and state of the sectionary of the cond to the cond to the cond to the cond to the condi- positive conditions are also that the condition of the condition of the processing support conditions are also that the condition of the condition of the processing supports condition to the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the distribution of the condition of the characteristic of the condition of the condition of the condition of the condition of the characteristic of the condition of the condition of the condition of the condition of the characteristic condition of the condition of the condition of the condition of the characteristic condition of the condition of the condition of the condition of the characteristic condition of the condition of the condition of the condition of the characteristic condition of the condition of the condition of the condition of the condition of the characteristic condition of the condition of the condition of the condition of the condition of the characteristic condition of the characteristic condition of the condition of the condition of the characteristic condition of the condition of the condition of the con	At the macraction of floater 9 and floater 3s, there is a low point along Eals. There is no consing declarge consequence systems, hered to add a consequence to present floatering of	At the outbress businestion south of Chabe Foreta and RD Beers are ages of Bendag. A JDPS RZ new order Evert, and is chapted about 50% and these not seen to have any believed shope. The sees to be characted of delate and entrease and earl oron acts to be good to present in tagging of RQ.		Produje, at the markeast corner of its and little Need to regrade corner and add storms their system along its valence for rand fina he rocked.	At the internation of R.3 and Repai Pulls, personne at solution is to build a cross- gates at Repai Polis Orien to constitue a result down R.3. Acedian relation is to add a cost behavior on Repai Polis Research and Research and Research and assistance of the add a soil where there may be repeat to be add, on refittation treats.	based two this tenering theys Pales, then its adds desirage correspond sperm to assigns from from R.J. Adds a cross gather to force the Boor from R.J. to existent above R.J.
COST	3	a di	low		Low	1	Eber
2 1	2	4	ol de	3		2	4
Western Inspect		1	Charles of the last of the las	1	, and an	1	1
Erosion Severity	MA	**	Medium	\$	Section Section	N/N	The state of the s
Hoooding Street, 17	1	low low	1		Lone	3	3
	Medium	Median	Medica	3	Medica		NA PARTIES
Public Selection in the	3	Low	M/A		low.	1	4
Wether Recod Zone A		4	2		4	A	
Mo. of Affected Properties	***	MA	N/A		MA	N/A	
Type of Type of Bonderry	j	į	Collector	1	Ì	I	j
A	81	les	10.	SI	And in column 2 is not	87	ACAD STREET, S
2 m	tsz mpsyku – as tyl	ET.30	C II		200	1	Commission Trans
3 <			To the same of		113	III.3	
2 0	DE.UA	06415	DETIG	DE117	DELLIB	98.00	E
Site Fans							

Guam Stormwater Drainage Master Plan Hagatina VIIIage Sire Eralbastons

ä	\$143.000	22.360,000	200 000	\$1,100,000	8142,000	100,100	0001523	\$141,000	000'8118	231.100	\$14.100	82-6,000	000 152\$	\$46,900	\$60,300	85,100,000	\$205,000	\$178,000
Proposed Ingrovernants	To prevent further hillings or being above Rocks 7A across from the detention facility, 3/4 area of the control and to rap Chernel stabilization SO heat upstream and SO fast detentations of marker or have a markets.	The present influencion gallary above flouin 7A does not have smooth's capacity to handle all the nountil it unches. Need to expand influence bean by 5,000 seases fleet (50°1100) and add 6 section while widths the busin.	lucronnessed factors drive integrovernessed at the Intersections of Books 7A and Eth St considering of 3. HET Formy Reserveders placed adjacent to the readsony, reacting surface flow to 2 new catch haans located at the intersection. Note that that 2 betweeness are being proposed since the area is	Incomment a species according to a feet section of a prosper prime a point of the feet and a point of the section of the secti	A quarter acre of older's removal is enouther at this see along with placement of 1,000 square lever of the real channel stabilization placed sining the downstream embalshannts for a distance of 20 feet.	To prevent further ereation of the shorefine and chagging of the outfit, a new headwall vinguest therefore, with 100 equan feet of the top outfit paid is recommended at downstream tide of national.	informanced start and the hypoteness at the heavester of hears of south districts Stears and informative et al. 100 per continuous of a LOT long bosonius pieces appears to the readent, or noting carbon the to 3 mining upon heaves of the south heaves of the south heaves the south that the exact acting carbo heave will ensemble the south heaves the south that the continuous of the south of the	o prevent further doors line enables, no ray channel stabilitation for a distance of 50 last commanded, or stability culture (1000 SF et me local is recommended.	Incommend placement of a disbugg conveyance system shoug OS Soate Paps. Near Pable Date to apparent the mostly paint to it gainst group, the private proportional and mostly begans lives including \$100.550** Value handless all placed a system of the proportional and resolves surfaces and downstraves of belies.	To provent further seration of the shortfirm and chagging of the outlet, a most headwalf-hingwold pincates with 100 square heet of the rap noting paid is recommended at downstream side of colours.	ecomment placement of a 10°x10° rip rap energy dissipator at the outlet of the cohert at legates there for evolution control.	To present further sit buildap and pording at this this, recommend replacement of solicing cross- solvent under the 4 with a 2004 of PLOS equipped with systems headwall and 300 SF ty rap for charact stabilistics.	The RCI at this size needs to becreased in othe to a CNC RCI for 200 beaut feet jas par the Road Longuis Documenty resting flow from Res 1 to the Madrox. A new headwall located at the Madrox his seguence	Commerce placement of bytemakis and booked fiber maker for red basheld place provisionally ALOD SE of calcabatured behind the Said States to covered emission and the said sky of the 1. Flacement, died (200 Up at the of black bashed relating and to rouse there to catch with convergent to texts of every fiber over 1000D councils agrees wound catch basis green.	To prevent further underplaining at the approach states, four new wingwall structures at the abusement are needed and a 400 square foot his nay semingy illustrates in recoded.	the decimage system that correctly ruse along floco? In needs to be system, becomessed bloomers of 4,000 lease feet of a 48" RIP outbring to a new headwall-bringead structure and a 100 system for energy floringster.	intercential erration stabilization (righ rap) and one half acre of debrit removal along with sederent imment from the chosen's bottom. These 2,000 spaces feet of righ rap channel stabilization for a flatinise of JUD spaces.	Recommend placement of 20,000 squares fact of reck blacket placed behind Chen's Furthern Stone are stated as the 2 fact entities control about the blacks. Fact more, deep DODLIJ as two of black is now the substitution and the state were behanded placepal structure at cohest entitle 100 Sp. when the substitution as the ED codes.
Mittigration Effort	1/4 AC Debris Removed, 1000 SF etch con	00 SF to Infiltration Basin,	apodt 6 inted;	_	1/4 AC Dabris Nemoval, 1000 SF A	Np Rep. 1 Al/wingwall	4.100 Scosseles [Intspod; 2 n Catch Besley, 200724* RC		mont; 1	1 2 3		, 1 headwall, 100	ICR, I leadest		4 New Wingscalls @ Abutment.	Headwall/Wingwall 100 SF No p Ray.	1.1.7 AC Debris Removal, 2000 SF niferage	10,000 SF flock blanker, 100 SF of Rp Rep. 1 headwall/wingwall, https://www.not.com.com.com.com.com.com.com.com.com.com
Mitigation Type	Frontes Control		Storm Drah Improvementy Treatment BMP	Erosco Control/ Convergence Improvements	Enstern Control/ Conveyance Improvements	Ension Control/ Conveyance Improvements	Stern Brain Inprovemental Trestment BMP	Erosion Control	Conveyance Improvements/ Conveyance Majorenance	3 0	Erusion Control	O Table	Conveyance Improvements	Erosion Control/ Conveyance Improvensental Conveyance Malebrance	Erosion Control	Storm Drain	Erosion Control/ Conveyance Malebrasence	Eneura Contral/ Conneyance Institutements
Stee Assessment	Hilbde above R2A and sorons from deseation herlity is being erocked by trensfil from an permission health above hilbside, abo this remoff is couring to Bood R22 and carrier stakely to the stress.	As infiltration galaxy above RL7A does not have enough capacity to handle all the runoff that is being counted to the galaxy and the eneurs wantl those downstream to RL7A and is enough Mistale and floods RL7A. Need to upuise the infiltration galaxy.	At the intersection of RETA and IGS Street four catch busins are located that probably dentange to RET declarge systems or to Hagatas inner. Dry wrett are located on the interferact conner and are used. Analysing property for leaving high pile and heavy storms. In the Retail and the Retail	A three of REC costs older under REC PE costs (feet Rec, this cost submit to the cost of the cost older under the REC Costs (feet Rec, this cost submit to evolute the south credentiates contribute to souther accountable segment of the south evolute the south credentiates cost to a private property, lead to update costs submit to what the propelle entering tablishment page terms and demonstrate (plants) and week to that delays and everygone wagetides.	Double 24" RCP cross coherch ander R11 discharge just north of Sweage Treatment Fisies debenery, lived underholment stabilization(rightzpe) for about 25' on the downstream send, also debin immoral and dividing of channel. Also need to stabilize coastline with rightzpe at this laurities.	Ores calvert under Rich outlets to West Hagains Beach. Datlet souther is covered with sand, need to modify outlet structure the a sediment hash structure to prevent and from dagging outlet. Also need shortlers erosion controll springl.	Could call be besses of the interaction of Disk of Acid belocks by every the left of which that are constanted and periodes is constant. In the president to the president of the county of the period of the county of the county of the period of the county	Mond shoreline erotion stabilization(rorap), and need to provide drainage outlets where seneralizated nanoff from Dake Nomber de Maria Dr discharge to court.	Bridge over Hugsba here slong Cintan Smito Papa Man Palda Dos. The bridge emblessement ments maintenance and vegeration ricerce, Roof from the street goes through private properties, not also ded dealungs conveyance spains to caparar mouff below accounts the solventy accounts.	Does tubert Under RII dischaiging sorth of East Hagates Beach. Meed eroolen control along coastion, and seed to modely outlet headwalk to a verificent beain structure to the eroot task from clearing coastic cutter.	A KCI cutleting his the Hagstra ness just roath from the least of Guens building events eventues control at the channel events destructivens)	A grades channel on the north side of RJN, west of house 4 a channel is crosered in side and has been as perceiven poord. The order RLD but mass under RHs is halpped with switnesses, and the property adjacent in channel girl bedoefd. This cross RLD meets to be resisted to be occordinately must rend? and to prevent sedement accommodate rend?	Two Se' RCD cross colores to distribute to the Notive decling area, these colorests prohibity early flow from RCL Headwald for the cross colorest need to be replaced, and a treat such class and edited. For the Rood Control Document, this RCl is to be increased in some to the to a few RCL.	hand have the diffusione the Shell states and from the states promotely then the states in a state of the state of the part of the law of property and a part of the hand other in the record and destroyers to the ordinary spiritures within certain to the state of th	Minorado Inchigo elevey RZA is being underruined at the approach stabs.	The exhibit deliving system along R2A and scross from the detention hellity needs to be appoint in order to handle the stress and infinite meet?	A 55-6° NCB cross colvent under Ret dischairges to the north of Police Polamo Memorial Pert, The coulds character embaltaness insects enrollos stabilization (virus) and elektric removal for about 2007. Also the bostom of the character needs to be classed of perference.	contacts of Ending Reflections and Principles Reflection and Pro- ference and from Control principles and provincial profession and above of this last of the media for the control principles and provincial profession to prevent and the control principles and the media to control anxiety and provincial with those last profession and the control principles and the principles and the control principles are controlled and the control principles and the control principles are controlled and the control principles and the control principles and the control principles are controlled and the control principles and the control principles are controlled and the control principles and the control principles are controlled and the control principles and the control principles are controlled and the control principles are controlled and the control principles and the control principles are controlled and the controlled and the control principles are controlled and the con
1500	Line			2	le e	tow	Median	1	j	Table 1			Meriton	Love	Low	2		
Non-Mandad		3	4	2	2	9	A S	Me		9	2	- 2	2	, a	9	No.	2	J
Env Water Impect	Courte	Aspaller		Coestal	Coartal	Chastal	Coestal	Coestal	Chertal	Coattal	Coastal	Coastal	Cought	Oeenbl	Surface	Coastal	Country	į
Erosion Sevenity		Medium	1	Median	Medium	Low	Media	Medica	1	1	Median	low)	i	1	Mechan	NVA	1	
Flooding Severity		1			N/N	MA	Median	N/A		N/A	M/A	Low		lon.	Loss	Medico	YM	
Melitlanence	Merican	4	1	lecton .	Pos	Median		Median		Medica	tow	Medica	Medium	1	Low	Medium	Median	
Sadery Threet	100	Median		Medium	3	1	I Day	lon.		V/N	MA	N/M	WA	Low	J.	Low	V/N	
Flood Zone A	ş	<u>ji</u>	ļ	ž.	Ž,	Te Te	, a	Y AB	Į.	Ş	Yes	1	N.	1	Ĭ,	Yes	Ĕ	
Mb. of Affected Properties		N/A		1	WA	NA	NA	N/A	MA	MUA	NA	1	V.M	NA	MA	NA	MA	
Type of Roaderay	Top of the last	1		1	life and a	Highway	I	Collector	· ·	- Indiana	1	Į	Į	ight special s	Ngway	Į	1	
8 5	21	G		a Commence of	ā	179	NO. OF REAL PROPERTY.		M	an	a	136		a	201	a		Section 1
ğ	Deteration	III III	2 10	Fonte Elect	Srange Treatment	District Court House	ofter to St	Monthre de	Agent Bee	East Hagatina	HT.1	2 2	Gregorio Perez Marina	Shell Gas Studen	1 4	O'Bries Dree	themorful Part	(m)
g «	0 W.18				17			Hagatha M		3		ž.	The second second	87.1		0		
# Q	MA-106	100		- Linear Section	A COLUMN						HA-101	B1-4H					100000000000000000000000000000000000000	
Site																	-	

Dest	\$172,000	\$178,000	TOTAL \$12,200,000
Proposed improvements	Recommend placement of 10,000 space for of our blacks placed basked Chibana on sort other first the second Chibana on sort other first at line receives mention should be second a first the receive and the second should be second as the control of the second should be second to the second should be second should should be second should should be second should should be second should s	Recommend placement of \$1,000 mapson fact of real blockets placed builded belief Cas Station as axes after of the 3 for excellent control along the abelief. Place conc. data (200 U) at the of blocks to reads from a corn excherts, here are an abelief or placement of exchert control was \$10.95?	TOTAL
Mitigation Effort	0,000 SF floot Bondert, 100 SF vir Sp Ray, 1 benderalfvelving wald, in side Lf Copier. Datch	A MODES Start Branch, 100 St. Record of Consequence (No. 100 St. Record of Consequence). The Deep A Learner Start Branch of Const. District Start Branch of Co	
Ministration Type	Erusion Control/ Conveyance Exprovemental Conveyance	Exosion Control/ Conveyation Improvements	
She Assessment	One other LED societ RI declarative to less hearth this RID corties mostly that the less than the le	Once calver I CB under RI declarages in Virtuators Beach. The RID corrier model from RID and from the model of gradient promoting and from above files Rend in modely world be available and solven an	
ROW COST	3	ğ	
NOW Managed		9	
Cov Wester Inspect	Company	Country	
Erosion Severity	1	Liber Merdium Chantal	
Hooding Severity	\$		
	9	4	
Public Selety Threat	15	, jo	
Metalsh Flood Zone A	1		
Miscand Affected Properties	NA	NA	
Type of Roscheny	Highway	1000	
a soon	14 11-2 R	119	
ğ a	1	Kabili Gas K13 Salising 139 Inghany	
<u>ş</u> «	1	M. S. L.	
2 12	HALIS	HA III	
CVOID			١

⊏ :		
-		
~		
_		
_		
an i		
=		
7		
Waster Flan		
T		
=		
>		
_		
41		
_		
co.		
=		
10		
_		
=		
an I		
_		
_		
_		
41		
ж.		
=		
100		
>	Cal	
~	=	
	\simeq 1	
_	അ	-10
_		
Ξ.	=	ш
U	>1	и.
_		
$^{\circ}$	-	
S	E	
2	au	
2	nar	
E	naine	
iam Stormwater Urainage i	ranian	

3		\$139,000	945,300	oor oer is	845,300	\$138,000	\$189,000	\$46,300	\$46,300	\$22,600	\$142,000	9203 000	20072068	\$177,000	\$111,000	\$46,300
Proposed improvements	o prevent hower than hereg flooded, represented to the stern drain system are needed, economical placing one path basin along the 4, concenting to 100 linear fact of 24 PLP membranes of the part of 24 PLP and 24 PLP	catch begins along \$10.6.	infiltration treachers at this size were not constructed property and resed to be re-built. Recovered spisowers with 2 standard infiltration trenches $DBB \ B$ such.	The minimal malatimates and improvements in the drivings conveyoner system throughout this are, first a convery magnetic channel [Fast, 6, 20, 4, 2, 4, 9, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	To prevent future flooding at this cite, phononent of two 200 ft inditration trenches are reconnected along fine 4 (both cities of road) at this size.	To avoid further thousing set a property on the side, it is reconstructed that is desiring convergence repairs he hadded to the history register and the set of the set of the set of the set of the properties of 2 cach build a ledge file of converting to 100 hear the of 2 ft. IP2 shows that cach then remittedly should file of cachelogy to the converting to 100 hear the of 2 ft. IP2 shows that cache from terminally should file of cachelogy to the cache benefit such at Abayana May Cachelog at the cache hands control of one basedward register to the cache benefit such at Abayana May Cachelog at the cache the former and 200 Left including the cache benefit such as 200 square fit property published.	For personal that the excitors of the makes between the broad place between 14 the bits, approximate and antibiosomers will excell to be made to the deshings conveyence system. According to the personal repeting making active with 100 MF for the personal personal personal personal to the personal to t	To prevent Motore Dooding at this site, placement of two 200 it inititation trenches are recommend along the 4 thoth sides of road) at this site.	To grower turnior peocing at the sine, recommend placement of 2-300 hear foot lading alon procedes and growing the plants along a feating or place 2 additional cytch habins correcting to ensiting each believe at the.	To prevent further flooding, recommend photoment of a 200 linear foot infiltration trench along road.	Grotion control and makescensors in meetind is 1th little. Remove one quarter extra of dasher, lifter 1,1000 square for of the pile fractionations conditions of places as the condition approach in the 1-or distract of 15 set uptress and 25 set of demonstrates of being the	Explosis control is wortful of this pile and measures result in the taken in prevent these possibility and appropriate the proceeding the control of the con	(rights) control is readed for the substancing it bills, becomened department of deventment substancing/singuist with new hardward-principal of restaure with versional control of a sooid further substancing creation. Also recommend photometric of 2,000 spans fast of the top should deventment substancing for a dataset of 100 feet, Also recomment one half across of defails memoric spectrum of the colors.	officially control improves and production of the third begin equilibrium of possibilities. A question term of desire/positions/environment broadent being with the photometer of LDD papers feet of the pay chowand includations for a delatence of EV upstance and destinations of the street, LDD personnel planmant of telegrada adjacent to broadenable on the upstances and feet and the street.	To prevent further evoken of the Milkids upstream of Aultiger River, recommend placement of hydronesis and bondeyd figer nathrit is areas devoid of vegetation (estimated at one serve).	To prevent future Rooting at this situ, phoeneast of two 200 R infiltration trenches are recommendation. The 4 fauth aides of reading 1 this site.
Mitigation Effort	0 U' 24" MCP; 1	100	2 - 200' Militation Trench	LKOTs cover trap channed (p. Sens., e. S. explort, for son worlds, JOSE (s. Sens., et ar. Par.), for son worlds, JOSE (s. Sens., senseshalls integrate., ISOS 57 pp. ms., JOSE CCC, et al. Chebres of Sensessial conference on the senses of the	2.200' ieditration trenches	7 Carch Bashes; 100 U 24" RCP; 1 Headman Weignerd, 200 S Rp; 18 Ray, 200 U Deth.	TOTAL STATE TO STATE		7 7 3 - 200' tellbratlon Treach		25 00	100 YeA'S INCR, 2 Land Management, 1/4 AC. Land Management, 200 SF tip ring, 1-1 200 SF tip r	2000 SF rip rap, 1/2 AC debris remove, 1 handens@velgees#	Name of Street	1 Ac hydraneed with bonded files	nfabration trench
Mitigation Type	Som Drah		Storre Drain Impribationent	THE RESERVE OF THE PARTY OF THE	Storm Drain Improverment	Storm Orain Improvement		Storns Drain	المهاملات	Stoon Drain	Erusion Control, Corresponse Maintenance	Stern Drain beprovenent Correspond Engrovenent Correspond	Erosion Control/ Conveyence Insprovementh	Ension Control Conveyance Maletanaece	Erraios Cestral	Storm Drain Improvement
Shr Assessment	iding ENS and on the processity of Tun Marieo D. Lean Guerreo Rd three houses got Coded. Need to add a departed convenient system to roots resulf to the sorth where	R can be distriction to the Tompas Open. Season by April 1985 of the State of the	of they are not working properly. Infiltration trenches were not built per standards - med to be rebuilt.	Properties along Line Examinate & Region Diago D. got Bookeld, creek north of the alevent should be better the control of the sevent should be beautiful to the control of	At low point add on infiltration trench on both sides of road.	ingenty south of Abeyea way on BA vecatide floods, bleed to add a deshage simplying gelden to roots seeing to the tested sented of Abeyea way.	If this location, 2.2 or RED couns colorent non under Ret. These colorents are partially believed by the defense of the colorent	At this location, inflization treathes can be built on both addes of NM to take care of named and prevent floating and providing.	the interaction of 184 and Beach, And Place comment has gradelity depociation of 184 and 184 a	Speake side of Nayor's office - need to build as soffice ion trench to prevent nucelf ion fooding private property.	the business single the bugge consort of depths of the source of the business of the bugge consort of the formation of the fo	singly \$1.8 (To come lacket this filtering and an experiment the single	This is a first one of BLC band of the factor and the Adapter Rev. (Appress observed seed of the advergation remode to prevent delaying a RLC florentzeau weighted seed to be extended to layoute the conveyence of flow and to control the embestures review. Bedeeper is being undermined, need to add injury on the observations makes and account of the conveyence of flow and to control the sembastic makes and the control of the conveyence of flow and to control the sembastic makes and the control of the conveyence of the conveyence of makes and the control of the conveyence of makes and makes br>makes ma	the blocking on comparation that the properties of the properties	Along the last nerth of the Aukeger Beer Millade are exoding and probably the softwarst. Been these hillade runs down to the river, itself to take care of the arrolon adjacent to this.	Aid infiltration trenches aims It4 to capture renesfi.
TSOO		Low R	Low	1		Town	4 11 0 4 16	SEED OF	j		Low	Medium		103	3	100
ROW		2	å	alia di dia		9	1		4		2	2	2	£	1	
Env n Water ty impact		Constal	Coasta	Coested		Coasta	Tourse of the Court of the Cour	_	m Country			e Coestal	m Country	Chestal	Country.	
ing Erosion ity Severity	7000	UM NA	N/A	6		m you			A	W/A			1	P. Co.	4	M/A
Flooding ance Severity	Will be	Madhm	n tow			Medlem	3		M, M,			m Low	M/A	e los	MA	
Maintena		Low	4	Meditors		Sow			1	Made	Media	Medium	Media	-	ğ	Medium
S Safety A Threat	W. E.	Medium	Medium	*		Medium	Median		3		ğ	Medium		ğ	3	
d Fleed		20	**	*	Yes	ž.	Ď	, te	ļ	Yes	Į.	A STATE OF THE STA	j	Ď	1	
Mo. of Affacted Properties		-	-	9			N/N		7			VM	*		MA	
Type of Roadway		- Indiana	Michael	Collector		1	ļ				Charles and the	Jesnaffill (Ì		Hajimery	
86 sp.	8 -	191 PM	191	5		136	81	-	5	1		365	g		8	1
ğ =	Tun Marieno D. Leon		Ales In	e e e		Aberyen		Dan Dan Store		Padro Kivera Dr.	ž.	South of Bibesies		Torgan Creek	Morth Adapter Ever	
a loc		IS RT4	E	Tun Enemerici & Regina 24 Gago Dy		00 81.4	82 RT 6		23			19 RT 4	100		D) RT4	
Site Sie		1 IVAIG	N/102	N-124	# IV-104	N-120		N tot	m,	· NATES	THE PERSON NAMED IN	. W.119	15 P/108	1	TOTAL NATION	1

Appendix E - Page 14

ğ	\$22,600	STRAGOO	000'9005	ornorthis	000 Taiss	000/029/28	\$427,000
Proposed Insprovements	is avoid paneling at the lose paint at this sile, recommend buttifistion of a 200 leaser but helitestion remails ediposes to lite 4.	Couloir control and mubiconsoco is remaind as the site, Termore own bull zers of debrit. Pless 2,000 grams that of the pipe of channel stabilisation for a dissact of 30 best spirituan and 50 best demonstrates of bulge.	Desire counts and makessance a mental at the Uts. Reserve one had any of debris. Most 2000 required for the play for shades abolishing the Lastings of the Lastings and 20 that countries of May for the Lastings and 20 that	(9 present further entation and Booking, incommental JA was of depth incompatibilities of the present further entation and Booking, incommental JA was of depth incompatibilities of the present and 15 final determinant of the present of the present should be the deservation to accompanies on the present of the present of the present of the present should be the present of the pre	recomment injusting 2, with protection channel of this little little is 4 when channel (2007 to 1854. Also recomments conting uniting quality comes flow to the relations.)	to present further aborting version as a result of high iddes along Chapton Lage hor, maintenance solding 3 cars of defer removed beforeach by installation of 20,000 square last at high approxima- table and present and present a beginning to the present and a second a secon	becomes well replacement of cross-calvert routing fines from Audiono Rev sudder fine 4 to a 2000 For KTD with supposement of downstrawn bandwally language distributes. Recovered of 2000 queen fact of they be recommended to a belance of 25 test spacement and downstrawn of the routing. A queens some and delets transcoal is also requested.
Attigation Effort	2007 befiltration trench	1/7 AC Debris Nemocal, 2000 SF The ray	1/2 AC Debris Remonel, 1000 SF Chel Lising, 2000 SF rip mp.	1/4 AC Debris Removal, 1200 SF rip mp	Consequences 2000's feet coor, channed	1 AC Debris Removal, 20,000 SF Pip Ray	LOUNGING RCS, 3 headwally of mysells, 1000 SF Rip Roy, 1/4 AC Debris Removal
Militigation Type	Stern Drake	Erwisen Control, Conveyence Maintenance	Ernaion Control, Conveyance Malatonape	Erosion Control/ Comerçuece Maintenance	Company	Coastal Protection	Conveyance Improvement/ Conveyance Maintenance
Anessment	Adeng Rt 8 between Thago Elser and Agrana Dr, a low point is located where ponding is created. Reed to build as infiltration transh to present possible.	HI crosses two benches due havings likes, of the least having they man, bench the spacemen and downstream of the river, frees are presented tree. These was grow in the uniter and cases which to accominate, a pound is reached to treaser flees their Three it express much this appreciation of the river, jeaned embestiment and the properties of the properties of the river, and embestiment and the properties of the properties of the river, and embestiment and the properties of the properties of the river, and embestiment and the properties of the properties of the properties of the river, and embestiment and the properties of the p	is this bottom, but got is their more or if in high part and their betterms and the strength of the strength o	A. S. If P. De can expect this parties and deventions belowing in designing by the control great of the parties	the soliding 2 has a 15° TO white country and page the early of the country. The desiration is a 15° TO white country in the Topic of the country in the country of the country of the country of the country of the country of the shading water from country the colours, these water limit should be required into the properties of the country the challength of the country of the country of the properties of the country of the country of the country of the country of the properties of the country of the country of the country of the country of the and the country of the and the country of the coun	Along Chapma Lapp Are the roodkay is being undermined by the bazajan Bay, lead aloneling potenties jalond 2000 of spenja and delyts reasonal shay countless.	ficiently corn; cohest ender RM does not header all the modif that involves. This cross coloriest reader to be upplied by all cross cancer. It and alignment is within a private, property RW, the road reader to be readinged to be taken out of pricate property. Been reader and administration of the price of the property of the property.
ROW COST	tow	Medium	1	loe	No Meditor	1	Yes, Martines
Difficulting	og	9	4	2		Yes	DE SE
Env Negaect y Impact	Cherch	Coestal	Country	Medium	Constit	Country	Constant
Flooting Eroston Severity Severity	MA	Lose Merican Coastal	1		Ē	9	a los
Roading Swertty	Low	No. of Concession, Name of Street, or other Designation of Concession, Name of Street, or other Designation of Concession, Name of Street, Original Origina	M/A	lore	WA		
	Medium	•	Meteo		100	low	Yes Low Medium Medium Low Countail
441	Low	Low	tow	V/M	LOW	100	Town
Plood Zone A	Yes	Yes	9	Yes	Ä	Yes	
Ma. of Affected Properties	MA	N/W	V/N		V/N	NA	N/A
Type of Roselang	Highway	-	lighter)	0	1	Collector	-
Some No.	118	139	136	110	×i	103	2005
¥ =	South Person	11-1	KT4 Days Beer.		Special College		Andone
₫ <	MT 4	Nr.	The second second	W-123 Agman Or	MT4	W-172 Laps Ave	N-303 RT4
ã e	N-233	N-LIA W-LIA	N. 109	W-123	W-III	N-112	N-300

Guam Stormwater Drainage Master Plan Manglao Village Sie Evibadens

8	\$151.000	1.180,000	00/905	\$138,000	\$139,000	8138,000	000709+\$	3485,000	967,500	\$19,900	\$1.590,000	\$448,000	000'902\$	\$1,381,000
Proceed brancoursests	in present forms beauting at this like recommend interception of the 15 flower spations and believe that and placement of the relievement of the respective for the property of the property	Resonment placement of a 2007-200 feltization lean with IRO house here of lenting 8 highston with this filteryon the current changes problemed in the 20th Resonanced gradies along the edge of presences whose "lenting to delate in feltiparities between the change of the edge	incomment placement of a 2000 of dath, shoughts edge of trackery for Mandefee, lene, moting solven most in the inflations have have shown the area (2000, 100).	It need that the folicing of the securities the same activates converse assets as parts of set Lamon- har events to be constructed. Recommend placement of the catch habits converting to 2000 leaves set of 24 for that with exchanging to be proposed for the catch habits converting to 1000 leaves the code is settled by supplied with the catch of the catch o	To sood frame Booding of area properties a deshape conveyants system meads to be added shain into 15 to prove the horn expension by Policy State Commontal Asserted at 2 Castal hashin four not be to the off Fellow, John Wall, Commontal by 25to Bears and 25 V "Exp states faith, and the properties of the Common and the properties of the State Common and conference of productive Common and the Common and the Common the Common and the Common and the Common and the conference and partners of madebal districts on covery from to call to being the Common and the Common and C	To good factor backing recommend placing two catch forms along the parts along the place in 2000 minute from a 12 Print 2 atoms day, but along the backers of properties to a natural side kocases individual to properties from a labely requiring an assumed. The another though the exposped unit no management from a season of the properties from a label properties and assumed to be another though the exposped unit no management and assumed to be a support the properties from the properties of the pr	imman in the set all that to se information into it all wend of Daupaini Street leichin an enting Color animation in the fact man boding of allowing reported in the Sale Recommend information basis (DDD/SDD) and DDD and TDD have been 25 °CD; stem that making flows in information basis (DDD/SDD) and DDD of all bean Also recommend a quarter acre of debets thereby.	hearmonied placement of a STA-GOT billiteration locan with SOT of hearing at the end of the street local with profile the toget of personal select all Capital Storet to driet lowerd the bisin Also mountanes 3.4.c of delate removal throughout area.	To prevent flooding, recommend along sulps of shoulders as all 4 corners and placement of 100-ft bloomaing routing floor from it as 15 to fits 35 on all floor corners.	To evoid focus promising, recommend placement of a IZD loses foot cancerts cross guitar shong his ID as the focusmendon with Lab Streat is notice to mandach drainings along fits ID.	To person that we experiment forward as it is required that the control between the control person of the cont	Recovered placement of a 2001-2004 felducation basis jents 800 if of incurage at the ead of Disagradal Street, More recommend observement of a storm of only system in Chargodal consisting of may catch below conventing to 1000 fearer feet of 24° RPC storm shin and a quantim store of challs removed. The pipeline doublet may be named to the proposed biffiliation toda.	To present further producy/flooding, recommend improvements to the waiting atoms drain system beloates for the Tall All Subsessation, but all a talls the basis for an and 2 on methods and presenting to 200 blazon freed 3.4 Tbl.	To acceld best processed, every note to the form to a feet to the, some notes that to present in the commenced free 2 central beams after the west Ade of the 15 a fold fits A & conventing to 100 have fitted of 2 for the count about broadle free acceldance in consist returns along the west side of the 13.5 has receive to both broadle is beams along along and receives with a little quarter than the every fit factors to become for the second along the present of the processed for the pre- sent fit factors to be present the present of the present of the present of the present of the pre- tained by beam, also receives our present of the factor than the present of the pre-
Militatios Effert	1 Corth Bachr, 100 Lf 24" RCP, 1 Neudonal Wingson, 100 SF Ro Line, 200" Love Indignation Treats	PROVZOV Prištrvično Besin; 200° Ferror; 8 lejector wede	LOCOL IF Come, Obseth	2 Certan Basines; 100 JF 24" RCP; 1 Presidentil Wingsmill, 100 SF 80p Rep., 200 UF Distri	2 Cerch Besing, 100 LF 24" RCP, 1 Necologist 100 LF 24" RCP, 1 Neg, 200 LF Ditch	2 Catch Bayes; 100 LF 34" NCP; 1 Meschenif/Mingresif, 100 SF Rp Rep, 200 LF Bitch	2 Ceach Basins; 100 UF 24" RCP: 1/4 AC Debris Temporal; 2007:2007 Influences Basin; 8007 Fence	SON-BOT Infloresion Basin W/NGOT-envice 1 AC Debris Bestransi	ACO IF Seale	100° Core. Cross Gutter	LJBD JF Core. Trap Charmet LJBD SF Resulving Walt, JJA AC Chebra Removed: LJBD SF Hydrogradh w/RFBA	2 Catch Basing: 100 LF 24" RCP, 1/4 AC Diabris Removal; 2007;200" Infiltration Basing ROU" Fence) Cetch Bases; 2007,24° BC	2 Certh Realing 100 U-24" RCP; 1 Nearly All Williagness, 100-56 Rip Ray, 200 U-Distrib
Militagration Type	Storm Drain	Storm Oralin Improvement	Conveyors	Storm Drain Improvement	Storm Drain Improvement	Storm Drain Improvement	Storm Drain Improvement/ Conveyence Adainterment	Storm Drain Improvement/ Conveyence Maintenance	Storm Drain	Storm Drain Improvement	Storm Drain Improvement/ Conveyance Improvement/ Conveyance	Storm Drain Improvement	Storm Drain	Soom Drain
Site Assessment	reproduct raced from Races 31 Mew to the proses and creates flowing of possibly from homes. There is no eathing delaying consequent system stock of the street. A mission is to add eathings conveyants a pytem along flower all the prevent most filter misses it from entangle and bear, and adding judication tenches at the fowers point for parties to cancer was started most.	While is the poor gaing "progress in some wite opports continued may expect the para- philities opening and find foreign approximately by a properties at the hostics, housing proportes shall become to lower foreign and the properties of the hostics, which gaing properties shall become to the properties of the hostics. In the hostic and white gains believe the properties of the properties of the properties of the hostic in a mappy in, the hostic will be made of hostic from what at the not of the street in a mappy in, his behavior that was about hostic from whatever law, and it is possible that the	to the kearch to be to be post on Anderbre Lee with the part of the Teagers, to the kearch to the part of the Teagers to the part of the Teagers and Anderbre are Appropriately between the Control of the Anderbre at the Society per Robotic, Medicary for Anderbre and Anderbre and Anderbre and Anderbre and Anderbre and Anderbre and Anderbre Anderbre Anderbre and Anderbre A	There is a been point at the interchange. There is no stating denings conveyence symptoms, posing concerns and this following of flow properties. A possible substanties we be the side of desingles conveyence system which can exist its the proposed fellowing halo, at Funging the Labe.	his is a lose point along festus risnes, where small from Bode 3.5 censers possible and along a boding of properties used starts for the reventsh speakers. The boding the mission is to said as and to Boaze 3.5 and add othering conveyance systems that can be the relating system along about 3.7 and and othering conveyance systems that can be me trickly express along the said of the said to the said to the revent prevented from Bode 3.5.	At the beatter, a bru point is because it to te and of the stress where pooling it toward, froming the properties. Within this became, the busin point is because from memorial, and the properties. Within this became, it is busined to be asset from the could be consequent to make it of each of the properties where a scarrier depressed are point. In examence, will make the persent of behalf the priser.	At this location a low point along the street exists, this creates poording than flooding has proporties. A possible salation is to add a delange conveyance system that can make those deversagement to be end of Chargudak street where a historation beain can be also required any categories.	At the because, a two peops and saying the prome care of accretion. They exesses pooling, thus flooding about the goognetics. Also, this is become to be a location for recentable beneding then the suggest exercise. Apachies position is to add a stakebook for recentable beneding the throughout exercise were A possible position is to add a stakebook consequence approximation that can have for the street where as inflicted to be an early former and the street where as inflicted to be an early be at the former because the state.	At this interchange there are styre of pooding on all four corners, and possibly flooding of one property on the north west corner, A possible polution is to registle corners to onesee to consist and and seales.	All this interchange possibly occurs due to a high point along the the entrance to Laid Street from Nouso 10. A solution is to regrade area and add a cross gutter to maintain the named along route 10.	As this and of this street a valuaral band despension exists which private proposity where all world from struck derive in. These part bedong of proposition between joined to not developed and water felicitiests valuate canning promisents powder of brooking all allowers proporated. These is applicate creation which the promisents powders of brooking all which hoppow under proposition between the proposition to map entering it to build a which hoppow under protecting band channel.	This is the and of the street and is also the bowest point along the street. At this bondon, then is positive, and flooding of flooding of one property, letter, as infultration bash can be built within an existing ofly esterement a. It mould from this street and from Loquus Street can be routed to this influention bush.	aging of poregly discheding elasts on the notice record of the interritions, of alternatives, or discheding conservations or prices of their services or the conservations or prices of their services or their services or their services or the north services and possible designed grantified that have more elast or their services and possible designed grantified that have more than their services or the possible or the possible or their services their globes in 1.1 The possible on their manners of the possible or the possib	At this locations providing it cruated along were rate of Rosen 3.5, and there is significant and the standard deving were rate of Rosen 2.6, and there is significant advantage conceptuated and Rosen 2.6, and there is supported to the standard providing it to create a statement as prime to code knowld to this south should were taken of Rosen 2.6 and were provided were provided for the standard and the standard for the standard for code Rosen 2.6 is probably Press Ward Schools.
7000	3	1		J.	3	ğ	1	Martin		tow	1	Media		5
No.	2	3	2	2	9	2	g	3	2	ON.	9	2	4	2
Env Water Impact	all a	1	1	Aqualter	Aquiller	1	1	Agoliter	1	Aquiller	1	Aquithr		1
Erosion Severity	ş		-	MA	MA	Mark Street			4		1	N/A	HINDS CO.	4 2
Flooding Severity	9	Medium	Median	Medium	Wedkm	Medium		, and a	-	Medium	1	Market Market		š
Maintena	-	2	1	low	- Pag			1		š		Medium	3	
Public Safery Threat		\$	- A		Medium	Medium	Medium	Medium		I I	1	Ę		3
Within Read Zone A		2	2	2	2	2	2	3	9	- A	2	2	9	2
Mb. of Affected Properties			w							MA	ş			
Type of Ecedency	8	Coffessor	Collector	Dellector	Collector	3	S. Contraction of the contractio			Collector	and the state of t	3		
Store	141	81			3				COLUMN TO	102	Andrew Street			
ğe	MT.10	87 TR	Chero Lane	Chero Lane	et 13	Marries Lane	į		W.10	67.10	May opposite			200
3 <	Manha	Targerine	Mandarine	Lemon	Farther			Chargoulde	M. M.	1 2	Charl G.		9	
ă e	TH-OM	MO-106	WO-UN	MO-108	MO-102	807 CM	MO-JIII	MO:DM		MG-112	MO-110	MO-106		1001
576									•		E STATE	#		

Cost	000'8118	\$779,000	TINTAL CY TON DAN
Proposed Improvements	Domb Basing, 200 (F.34" ACD;). Spensive and a server device years along Basin & 10 present Base from sensiving the control basing, 200 (F.34" ACD;). Spensive team, Pleas & card bearin sing Raz. & connecting to 300 fears from of 8 Fe Fact from the following pages. As connecting to 300 fears from of 8 Fe Fact from the following pages. As the following pages are along the page of 8 Fe Fact from the following pages. The following pages are along the following pages and pages pages and 30 processes of 200 for models of the following pages are along the pages and 200 pages are along the following pages are along the following pages are along the following pages and 200 pages are along the following pages and 200 pages are along the following pages are along the following pages and 200 pages are along the following pages are along the following pages are along the following pages and 200 pages are along the following pages are along the following pages are along the following pages and 200 pages are along the following pages and 200 pages are along the following pages and 200 pages are along the following pages and 200 pages are along the following pages are along the following	To general thought of this series, considered to a soon debs bytain including to the Act of the Act	TOTAL
Mitigation Offers	Z Catch Bachne 500 U-34" ACP; 1 headware, Wingston, 100 SF 80p. Jun. 300 U-08tch	2 Cetch Seelng; 100 Us 34" RCP; in 1/4 AC Debris Bermand; 2007-2007 infiltration Shape; 800" Fence	
Attigation Type	Storm Brake Improvement	Storm Drain Improvedoctif Coompanie Mathienance	
Site Ausestreent	At the eard of the street the law pine it has been bounded to who as I fitted the law and of the street. There are no existing derivings reptame. One analysis is noted for them the street of the str	At this bestratupes on the east shad of them L. I. I way shad the first Randf from Bazza. Is sed from Scottern Cross Laws energies produce and floridate of mean. This man is this servent with a resolution of mean of the first floridate. A floridate of the situation has been admissioned and in floridate, and mean from the pure overlatter demanges consequence systems as the landsmith, resulted meanless well are to be all an infiltrations bester at the law point to take the statement of the state	
ROW COST	tow		
ROW Insented	Yes	Yes	
Env Water Impact	1	į	
Erosion Severity	4	NA	
Poodleg Severity	1	1	
Malobasa	100		
Se fe fe fe	4	No Long Anadoms Long	1
Mithin Road Zone A	2	9	-
No. of Affected Properties	2		1000
Type of Residency	Collector	Highway	
Store Store	110	8	
ğ-	RTIS	Southern. RT15 Cress Laws 113	
ğ «	1	M 15	
ā e	-		

3	847.00	\$141,000	COCURATS	\$147,000	5196,000	Stetamo	57,630,000	\$14,000	5143,000	\$2,100	\$243,000	5543,000	SPAS, DOD	\$145,000	\$343,000	\$143,000
Proposed Improvements	prevent further deging of colorists and further andominishing of the need near the cross colorism. Authorized including 1/4 area of other reasons fallowed by placement of a 10/20 for par- merg designer; (both supervisor and demonstrate) along with lessabilities of a headers!) whereast areasy as the culture and is reconstructed.	Administrators and channel stabilistion for the are adjocent to and opcorate of the house to required features one quarter ears of delate. More 3,000 squares fact of the pray for channel stabilistics for a distance of 50 feet supresses and 50 feet demonstrates of subsect.	The cross calvert at this side neach to he replaced with 100 house feet of SLF RES., a headwide/reliqued structure with 100 mg it on to passibilization systems and downstream of the scheek; a consultant of approximately 20 code; yords and malmentones including a quarter our of health transpart.	for powerst facilier undermissing of all four approach take at the bridge along home at one long filter, analonement containing at a quarter acrost deaths in mound along with 300 take specified moundained and installation of 1000 means and political political political for a distance of 507 politication and 507 decembers and the pringing in reconstruction.	inheliations (ability) in a restort along the approach table and to stop entains develorate, the increment of the past inspired. A quarter are of short remod it required for antistances, along signal with region approach and the spire and a short remod it required for antistances. Spired spired in an add dominated and the spired of the concerns impossibility classed spired spired in 30,000 super but of classed living.	To prevent further erobios, seablewares histoling 154 e.cr. of deten renocal and erobin control while it 1,000 sustaine best of the rap channel stabilization for a distance of 50 last qualities and 50 feet demansions of the bridge is required.	To prevent the concentration of sealoust falling and investigate channel and in stables the blanch flow, makingware in the form of a quarter arm of destrict insenses, removed, the CADO cable specific of the purposes of the form of a quarter arm of destrict insenses, removed at CADO cable specific of the purposes of the purposes from the proper part of the purposes of the second cables of the section content and the purposes of the purposes of the provision of the existing content extractigate channel papers instably 2000 feet approximated by 2000 feet of cables again feet incommendate.	To prevent further erotion, multimenses including 3,5 are of debre messed and erotion control localing 1,500 seens have for the control to the control of the form of 100 less seathers and the extremelisment of the cuber; it requires.	Insists counted and maintenance is seaded at this late. Remove one quarter acts of dishels. Reco J.XXX repairs hart of tip mp for channel stubilization for a distance of 50 fact synctone and 50 fact deventables of calvert.	is prevent further ensules, makbananze including 1/8 acr of debrit and endinest removal and sension routed landuring 1,000 square first of the rap channel stabilizations for a distance of 50 feet demaitrase of the culent's required. And agrees and train rack to entiring catals besits in the side.	is general. Butter undermining of the approach labs, maintenance consisting of a quarter size of thinks enmood along with leatablishes of 1,000 square feet up rap chancel stabilization is nucessessible.	the cross colorest as this soft needs to be wishered, and embodoment cooldestion is mented systems and deductions. In consecution, the consecution in the consecution of colorest consecution of the consecution of colorest consecution of the colorest color	Contino control and readistrements in needed at this site. Remove one half acre of shelts. Place 3,2000 appears frest of type trap for channel stabilization for a distance of 300 feet upstream and 300 feet immittaes of adderst.	Dissists control and maintenance is esseded at this dhe. Remove one half acre of debrin and place TSG squeer her top may be channed stabilishins for a distance of 35 hert spatness and 35 hers downstream of 4 caherin (1,200 square feet trails).	Fourier control and maintenance is needed at this aits. Becene one quarter acre of electric and pieces. JADO meaner feet of the pair of homes isolatistics for a district of 50 feet spatteres of maintaining colours; and account 30 FaZ palment outlier becamed homesticing, synthems of cross colours.	Fresher control and reachersonce is needed at this site, Remove one quarter size of stebris and place 1,000 reques feet of rip rop for channel stabilization for a distance of 50 feet downstream of entiting stabers.
Mitigation Effort	1/4 AC Debris homoval, 100 SF or fly flag. I haudwalf vergenal		2 headwalfvelogoud, 200 SF Rp. Reg. 1/4 AC Debris Renewel, 20 CY Cat. 10076543 RCB		1/4 AC Debris Removal; 200 SF III	C Debris	4,000 CY Back Removal; 1/4 AC. 1 Bullels Removal; 5,000 SF Riggs 20 CY Car; 10,000 SF Retening 5	LADOS SE RIP Bage 1/4 AC Debris Remoral	1/4 AC Debrie Bernoval, 1000 SF 1	1000 SF Rip Rap, 1/4 AC Debris Removal, 1 Agram	. 1/4 AC Debris	100 CY Cur; 100 SF Re Rup; 800 15 SF Gablerey, 100*55.12" RCB Addison Barrely	L/2 AC Debris hemonol, 2000 SF In Righ	1/2 AC Debrus Removed, 2000 SF.	1/4 AC Debris Nemonal; 1000 SF Rip Rap	1/4 AC Debris Removed; 1000 SF Rip Rap.
Miligation Type	Erosion Control/ Conseyance Maintenance	marking.	Conveyance Maketenasacz Conveyance Ingrovenment	ndrol/ nes	Corresponde Meintersandel Corresponde Improvenient		Ensien Control/ Conveyance Maintenance/ Conveyance	Erosion Control/ Conveyance Malatentance	3		Erosion Control/ Conveyance Maintenance	Consequence Maintenance Consequence Improvement Engine	Erosion Control/ Conveyance Maintenance	Eroslen Coentrol/ Conseryance Malattenence	Erosion Control/ Conveyance Maintenance	Evesion Control/ Conveyance Maintenance
Sto Assessment	The BE TO cross coderts with besidental user life steem August Ocet to Auguston by Upfortune coderts with besidental user life steem August by the section of the test of the section of the test of the section of the	A 2-36" REP cross subsert under RM south of Benny Epinoza Are. At the upstream of their cuberts is locus has been bull on tap of the husbank. It ments debrinfuedement enemy, and embandment stabilization(repray) both upstream and donesstrams debresstrams followers.	A label 36" RCD cross cohest twen under RM north of Rie rhee. This cross cohest should be replaced with a PAT RCD with velocable, and the apptean and devestment channel lead distribution removal and embalanced stabilization frames.	and place in the control of the cont	Midge should be over furgions river. The upsternam river is marked should always imagented associates fined channed; that channed reads with the length, Portions of the suprimise macrate enclosishment are britain and need to be found. Bectime of the concrete channel week to entired control ratify and demonstrates in supple the contributions of the british- ment. Bect in the control ratify and demonstrates in supple the contributions of the british- and also ment in and length elementaries better of feet in temps reaction.	Bridge over Seavy rhve. Head erosion isbillisation abneg appreseds table and also quartenam and downstream along the river embandment. Also recels upstrams and downstrams defertly preferency lyegista than removed.	a, it carries an chance to continue chance the second the charred of	A folder by VII for our context rocks System the besselved by each school 2007 electronic and the second second second second second second second second receiver stabilization along the two hashesh, about 50 on both sides of headralk to may be undermissing of the Livest designed of hear better both upstream and absummary and second second second second second second second second second absummary.	South from Sonary rines 4 FaVE ICLS cross coldents rans under R04 and descharges to Soming Bay, should mealer actions catalogicalism spectrums and advantageans for about SIT, and also along SIT sent to the leadwralls. Alon meets debris and vegetation removal qualitation and downstratum.	Month of Metrico Catholic constraint, there is a SE NCP cross scheer; twas under IDA. The upstream end of the cross cuther) has a cath basin that events an apone and trach cach, the descrizivas and coulded the botted IB is possible powerful with sentenced.	Bridge along R14 over Alapan river. Approach stabs are been underniesed, need to stabilize residency ambustonest with rigrup.	A PALE ICS under Est routes Pages Reve. The cross calvert ICS seeds to be velocion to delettry tegetions revened and enhancement calculations/pring or gabbourd is seented on both agains on and decemberate and revenue.	There cross calverts under R4 treats Assales Creat to Aleyen Bey, 2:30° R2' and 1:37° can calvert with resignal handless. Both oppinsons and downstream med clebrist Amprilless removal, dranging of chancel between and enhancement stabilization with rights for Alexa 100' upgresses and downstream.	Un-nessed tributary at this faction. Standing water observed on the apartness side, Downstream like enable bank stabilization along the rubers and roudensy. Along Bouts of there are 4 cross calvers with un-named tributaries that need leave stabilization on the uportness and downstream sides.	A Syst MCS cross cubert water Rit, just secth of Jane Makeura St. The MCS is in good comblems, character to revision acrossed the upstraces including. Wend to extend headwall (or and on print) quickness to include a SW MCP data to distributing to the side of the headward, and also need to said riting for entaken control.	Duzdee Fold Kill strate clebert. Upstream there grand whits discharge to RCE, these wides are adjacent to brown. There is also a bismal cross caleurst discharging to RCE flows the month. Downsteam absolutely absorbed resect debut/Ursal/legstration resected and prehishabilitation (Paper).
7500	Š	- Committee	To a	ì	low	low	2	Low	low	Š	Low	Medical	1	and a	, j	Love
None Member		3	2	2	2	2	Į		2	£		2	1	2	2	2
Env Wester Impact	OWNERS OF THE PERSON	Common	Coesta	Cheestal	Consti	Countral	Oseth		Coastal	Company	Coestal	Correlati	Change	Coastal	Countrel	Country
Eroslon Seventry	1		3	2	\$	Medium	\$	1	lector.	× ×	ton	j	1	1	-	1
Flooding Seventy	Medica	The state of the s	1	MA	KA	N/A	*	N/W	Medium	j	M/A	4	*	NA	MA	N/A
Lakritenen	Medico	Media	1	1	1	Medium	1	low.	Meduan	ğ	tow	Medium	1	Medium	Median	Median
Public Sedeny Threat	1	1	9	ğ	tow	tow	1	tore	WA	3	Liber	203	3	MA	MA	N/A
Placed Zone A		į	ģ	E,	, s	Yes	,	Yes	Yes	Ĭ	ħ	2	Ą	Į.	Tes.	'n
Mb. of Affected Properties	N/A	-	MA	WA	N/A	NA	9	NA .	NA	W.A.	N/A	NA	NA	WA	MA	NA
Type of Berthal	Ì	Highway	į	I	1	Highway	1	I	1 Spinory	į	į	1	j	Highway	Neghrany	į
2 5					146	342	10			136	1	3115	m		110	m
ğ =	Agpato Creek	SO Benny Equinus Ave	NO little river	Upog Nes	pan fer	many Sheet	Manual Demand	Supply Ther	SO Sumay (beg	NO Merito Cathale Constru	Jayan river	1	Annale Orest	SO Surpain New	SO Juan	charles and
ğ ∢	HT4 As	1	Section 1		MT 4	NT 4 S	*			SALES OF THE PARTY		, Lie	911		KTA	NT &
2 9	MEJOS	WEID	MEUR	ME-103	METE	ME-106	ME116	MEIIG	MF-105	MF-125	ME130	ME128	ME-101	MEJOR	MESSS	METTS
Sile Gu	NAME OF	100					THE POST OF		45							

Appendix E - Page 18

Cost	3007113	SIKIDO	OUTS	\$143,000	\$243,000	CLAND	000'LL9\$	2144,000	contrars	\$707,000	000'\$825
Proposed Improvements	Experiment studies from and makessance are needed at this star. Research or quarter zore of makes and place 20 square from the grap for a distance of agreementary 200 both systems and dissessions of each calvert [basing 2000 or it holds for 3 selected.	Finishm control and mentions are meeted at this She, Remove one quarter acre of dishift. Phoen Little queen her of the rap for channel stabilization for a distance of 25 heet upstream and 35 heri democrates of calvert.	To prevent further evoluts, makemanes including 13% acre of delate remont and evotion control makeing 1,000 operare best of the spice demont studious has to detained of 50 fear spiceness and first calent to impation.	Person curved and institutioners is useded at 1th site, famoure one gotter zers of debris and piece 1,000 space hard of the nap for channel stabilization for a distance of 50 fact spatteres of making charge.	fromm control and pulmervator is secried at this file. There are quarter are of debts and interest to the control and the file of the tip for the man makellastics for a distance of 50 feet dementerate of making facilities.	balancance is needed at this site. Resoons one quarter ects of debts and sediment from channel.	is may the understanding of Beath 4, the placement of approximately 100 bears fact of 1756 RIC. With two blooding images interest (now spicious and one documents, and LODD approxi- ted of demand publishments are sequented.	To mishabar Stooding of the adjacent forms, a 1.2-R high benn (5 R wide) is recommended along selfs emishabared of the river on the upstream side of the calvest for a distance of signosimality. 200 feet, Remove one quarter acre of eldoris. Then 1,000 square feet of the mp along lenes tide of here and 3,000 paids feet of Ri.	g prevent further storeflag errollen at a result of high totas, makenamans heldselfig 1/2 zers of neith i removal habened by totalistation of 5,000 square her of sig mp crossial stabilization approximately 15-7 in width slong the storeflest from Samay West to 500 but south of the rher recommended.	to prevent further abordules errollon as a result of high other, maintenance including 1/2 zers of which between blobwed by installations of 5,000 repairs her to fin pre-coastal stabilitations of 5,000 repairs her to fin pre-coastal stabilitation are represented by the midth along the observable from Samey New to 500 fast control the river arrangementals.	Emilion control and authorisonous is received at this oths. Become one half acre of debries, Nuce 2,2000 symmetry for at preparation characteristics for a distance of 50 heat supstream and 50 heat investments of abbors.
Mitigation Effort	Ja AC Debries Removed, 1000 SF of the Ray	JAAC Dehris Removel, 1000 SF 18	1/4 AC Delets Removed, 3000 SF in	Life AC Debris Remorbal, 1000 SF p Np Ray	1/4 AC Debris Removal, 1000 SF p	1/4 AC Debris Removal	the state of the s	1/4 AC Deferis Ressocate 1000 SF 78 Ray Story CF FR	L/7 AC Debris Removal; 5000 SF	1/7 AC Diches Summand 5000 Sf	betrik Bannoval; 2,000 SF
office the		Control Control	Ermines Constroly Conveyance Malettenance	Erraien Control/ Conveyance Massimusco		2000	Erotion Control 2 Conveyance by	Consequence Maintenance Consequence Ingressment	STATE OF THE PARTY.		Erosion Control/ Conveyance 1 Maintenance 9
She Assessment	Merth of Massel Charred John & Hole & Rid three children \$1.5 Till Erass others need resperaments in the seatons and demotrates character, based stability responsed and contaminent stabilities for about 20° systems and demotrates.	FLT RES cruis cubert under Ris carries Actuag new Row to Actuag Ray, Upstroon and downstrade used sectiones and delarly erropes.	A 10°S RCS cross colvert under RAC The RCS needs sections/cloter/angestein research and embackment stabilization/clotery) both supresen and devenues and Along the deventerant have also rights mad to be placed to stop the undermining of the RCS register.	TOO'S ICO cross calvert under ERI, just worth of Calvala Joseph A. Cost. This ICO trans- results from a channel along the south cide of Calvala Ample A. Cost. The ICO is in good conferen, operation channel needs debrit/conferent removal and embandment stabilisation.	A double 24" RCP coss colors tweet RE Est to only of Gesus rever. Updrawn channel in m good considera coungs for vegatation capital decirally, described memoritemen channel ments to the consideration of the consideration of the consideration.	A contracte lined channel parallel to RM needs sudinged removal. It discharges to the 3-36" RCP crass palwetts.	A minut of cross colorest cross field south of Markey Cathook Chemstray. The uppervenant control of the color	Home SSS neary from Bit Boods. The Sergje riest Boods properts, need to add a bern to rate the Sergje riest enthalsalmost and prement flowing of groupsty.	South from Sumay river the madeway has ereded rest to the shoraline, it needs attention as protection. It needs	acion stabilization to prevent	A 4 cell IZ7si TCO under Ris carries Gena river Boss. Heach debrit/besinnerst/regntation research and ambackenest stabilization both systems and chemistress.
TSOO	, and	3	ğ	Low	low	low		Š	Media	1	Madison
ROW	2	-	g	2	No	No	4	Y S	1	1	No.
Weezer Impact	Chestal	Compa	County	Coestal	Charte	Cheetal	Coestel	Coastal	To and	1	Coastal
Emstern	-	1	-		,	Low		MA MA	1	1	ton
Phondage Sensethy	NA	WA	Vin	N/A	N/A	N/A	83	1	1	1	W/N
Ashtenance	Medical	1	Harden	Medica	1	- Charles	Median	1	1	1	Medium
1 1 1	WA	N.	tow	HÍA	MA	WA	, ja	1			N/A
Road A	Ta Maria	E	2		Ţ	Yes	2	1	-	Management of the last	ļ
Affected	W/W	N/A	NA	N/A	N/A	MA			MA	*	N/N
Type of tonies	Į	1	1	Lamage	- American	Migham	I	1	1		Į.
6 M	m	Carrier Control	Committee NA. P.	325	821	128	81	COLUMN TO SERVICE AND ADDRESS OF THE PARTY O	NAME AND ADDRESS OF	-	
	Mark of Charmed	Action Sec	CONTRACTOR OF	A O'R	AID Gents theor	Spensor And	11		9	NO Sumary flow	Gets free
3 4	atte	CONTRACTOR		17.4	ire	MA	IITA	11	ř.		
å e	100 115	M. 116	ME UT	METZ	MEIST	ME 120	ME134	METH	ME 104	MF-107	WE-118

Guam Stormwater Drainage Master Plan Mongmong Villane

Ste Evaluations

te S	debt 10 10 10 10 10 10 10 10 10 10 10 10 10 1
Proposed Ingrovements	To prevent the containment of the first terminal containment of the first terminal to the containment of the first terminal containment of the containment of
Mitigation Effort	Cetch Basker, 200 IF 34" INCP. 1 Incidentally Williams Inc. 10 July - Underground Infilization Incidentally Infilization Incidental Infilization Incidental Infilization Incidental Infilization Infilization Incidental Infilization Infilization Incidental Infilization Infilization Infilization Incidental Infilization Infilizati
Mitigation Type	
Sto Assessment	Concentrated from these is on and off money deduces to BED 2.1 fection where the appropriate complex is 155 fection where the approximate complex is 155 fection is because it is the contract because it is the contract because it is the contract because it is to contract because it is personal contraction to the contract of personal contraction in the contraction of personal personal contraction of the contraction of personal contraction of the contraction of personal personal personal contraction of the contraction of personal contraction of the contraction of personal persona
COST	\$
NOW	2
Env Master Impact	1
Erosion Severity	*
Pleoding Sevenity	Melen
Asintenenci	1
Public Salety Threat	
Flood Zone A	2
Misched Affected respecties	
Type of P	kead
Store Re	g g
ž =	
ğ «	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
# Q	Ne 101 (8)
ž į	

SWDMP

December 2010

ppendix E - Page 20

Guam Stormwater Drainage Master Plan Phi Village See Evaluations

Cost	out sets		240.000	\$158,000	5394,000	OUCTRES	5141,000	\$146,000	OUTHNIS	21,430,000	\$141,000	SHARM	006/115	STATION	STALLOGO	
DESCRIPTION 4 Photols in Report.	is order to practice unificaci convigence caperity, the catching colorer should be explaced with \$100 bits and ord \$10 VEX registered with the second-register stress to the supercease and measurement when of the colorer, to prevent before contain, an advantages including all forms of shall be recovered and revision control including a \$20 or \$1 tensory discipation because in the measurement with a first colorer it reconstructed.	in order to provide militativa tomorpous country, the making NY claimest should be registered using the layest fine of claims NY Constant and instantively register and country may be any constant and constant to present before a results, resultant an advances to the approximate of white transcript and events constant in formers before a total and advances between the claim of the constant and constant constant including a DD on it covergo disquires located at the	To priversi further evolum, makelenance lackading 1/4 acre of debit removal and erosen control relating 1,000 quarter fort of the rap channel stabilization for a distance of 50 feet operation of this bridge is remained.	in result to provide sufficient conveyance causeity, the eahing calcut cleaned in registrate with the provided sufficient conveyance causeity, the eahing calcut cleaned to the registrate and interesting related to the content of present to the care cannot be content to present to the results, and administrate including 1/2 series of such interesting and entire content to the least, the care cannot be calculated to the calculated of the care cannot be calculated to the care cannot be calcula	to create to provide inflicional conceptions to CARCA the relating calculated should be replaced either 200 flower belot of 2 NNT 102 on spicycol tittle hacke allylelegand interations to the operations and characters with or the cachest. To prove the trades, with interaction in the cachest in the cachest of the cachest of provide the trades or mother, an interaction includes 12 of some of additional and or provides and includes the cachest cachest cachest cachest and an interaction of the cachest cachest and the cachest cachest cachest cachest and the cachest caches	To prevent further excites, maintenance including 1/4 ears of abbit in second and eroless control residing 1,200 agrees here of the photoest aballication for a distress of 25 feet qualitiess and 25 set desentations of the facilies to section.	To present list the stroke, maintenance leakading 1/4 acre of debble removed and enotion control makeding 1,000 agence best of the public party distriction for a distance of 15 best operation and 35 best development of the bridge is required.	Mattering and Perspectives and the base has also been been provided and correspond replace to the size of the base	To prevent further enturing, maintenance including 1/4 arm of defect removal and moutes control including 1,000 square facet for the channel stabilization for a distance of 35 fact squares and 35 feet describes to the briggs in requirent.	To growned further shootshare strates, maintepases behading 2 zers of debets memoral and glossomer of LOSOD squares best of the top coastal stabilization (specimenshar). The flue width show the shootest force afterno lives to 1000 for text) of the fleet furth is recommended.	To present further excise, malabrames including 1/4 are of darks removal and motion control minding 1,000 upons her of the parallelazion for a distance of 25 feet upstraum and 25 feet dissentations of the Adent I reconsumeda.	To prevent further entellon, assistenseure lexibiling LIA sinne of debils removed and enoises contror. Including 1,000 requires feet of forp stabilization for a distance of 25 feet upstream and 25 feet demonstrates of the calent is recommended.	is order to mittych sector quality concerns about the road, 2-300 linear foot brownakel are proposed for consequence of recoff about the west side of the road to a gained bett with a 300 repaire from perceived of the few point of the road. The absorates will be boated on both sides of the later.	To prevent further review, maketraners bedaning 1/4 acre of definit removal and erosion control manufactures for other populment stabilization for a distance of 25 fort spaces and 25 feet demanders of the feeting in septement.	To prevent Arthur employ, makersance including 1/4 dates of debts sensoral and employ natively 1,000 expanse bert of the stabilization for a distance of 35 feet systems and 25 feet demands the announcements.	To prevent further erusion, redestinance bedoubling 114 acre of debra reasonal and erusion control resisting 1,000 against fort of the rap stabilization for a distance of 25 feet spetram and 25 feet
Miligation Effort	100% St. St. RCD; 2 Interferable (Wingspeak), 200 St. Rp. lay; 174 AC Departs Recognish		SAME DESIGNATION OF THE PERSON NAMED IN COLUMN 1	PCP; 2 lk/Mingwalle; 3/4 AC 50 SF Debru Removal	PER PROPERTY.	COCO SF Rip Rage 1/4 AC Debres	LOCUSE Rip Ray; 1/4 AC Debris Immoral	ION-2-36" RCP; 2 New York Market 214 AC Petrit Removal; 200 SF Rip Rup	2	1 AC Detects Removed; 10,000 SF The Fags: Newdorns/Virtuguesh	1/4 AC Debris Removal, 1000 SF Rip Rop	I/A AC Debris Removal, 1000 SF Rip Rep	NOT Biocousts, 100 SF Agron, 1 catch Basin	U4 AC Debris Removal, 1000 SF Rp Rap	1/4 AC Debrit Removal, 1000 SF Re Rue	Life AC Debris Nemoral, 1000 SF
Mitigation Type	Consequence Historicana Consequence	1111	5	7.7	Grasion Control Conveyance Maintenancol Conveyance Ingenvenment	Eroson Control Conveyance	Erosion Control/ Conveyence Maintenance	Conveyance Maintenanced Onveyance	Erneinn Control/ Cowwyahte Moletenance	Coastal Protection		Erosion Control/ Convergence Maintenance	2 ×	Conveyence Malmanance	mesons.	4200
	contractivity distinct and sing plants principle of the plants of the plants on society 1.3. If "builds man under \$12 and detailings in the "spagne limits." The exists are under \$12 and statement as the "plants of the plants are and elementaries, and frequent is the plants of the	As we flow as the 2-2 V cross other is Rill. A NY BY Construction school control from the size is the 2-3 V V cross others. Hereas shows constructed to the stage of the 1-2 V V V V V V V V V V V V V V V V V V V	lettigr along REI over Assetten river. Appraich siche ver siehling übere is eresten all seprinsch fabla, and parts of wingsraß selecting. Uptitation of channel fabrar is significate eresten before genabelizieren. Need to add erosion controllygrapj along spatronen seekseletieren and pergeselle.	The Abstraction of the East of Assemption (Note Man in 1, 1) Cross colory that read- propried to this seader Assemption (Nov. May corns colors after corns to the control of the control o	A depute by Force anders row over the road 2 and existing one month about Performance country that I have enderst are used intend and there is algebrain sedement blockled the decement med, they carry proved from the south table of block 2 force latery fleet, The double over supervised them the south table of block 2 force latery fleet, forces seen and the supervised them the south table of block 2 for the property decements and duth and performed to bould be removed allow.	Indigo shapes of the over lateral man, a significant events on squarement where the ment is not dispose to adulties even. There is a surface provide fifth that wears the river on the north souts take of the twi-Three is a surface provide fifth that wears the resultmining the supposite based to take to the debrit and then the entering resultmining the supposite based to take the debrit and then these services from the understanding of twentiers.	Bridge along Bit town Sean Hent. There is unstambling of approach sides and under a vector line that runs parallel to the bridge on the downstream side. Hend to incorporate wingstalls to bridge on the downstream side to stop the undermisting of road and musico.	A datable 35 Cross minest runs under PLI and dictabuge to the Troungan Beach Park, but souch two made Troungan Beach Parking 164. The map pages are conversed with many and as about 27 Constant and the safe are the 2000. The send tensis to be treasoned and the areas gained so they can consisten to the leavant.	Manon treat bridge along Anamoption other. The river evertups and it has been understanding the approach shiels - need to chee all the overgrown regardion upstrasm and development betrights to server flooding of lawings. The street prevented at the approach shall receive the approach shall receive the law.	There is significant coasiline erosion, if not taken case of will undernise houte 1, Need to add signing all along the coasiline.	There is a cross cultwrit under this streat that couldn't be located, both sides of the result are heavily registated with some enough evident.	Grows caleson RCB under REI, this is promisely the Tagoug free. RCB in good shapes, downstrained channel needs to remove a pales tree that is growing on the olds of the contractivities embosishames and registive emboratement.	fishing citich hain mot to RELL, a diachage directly to the brach. There is a contern of oil spills from trucks estering and haining the conserval per. Add o greated made to both any spills.	Where Maso rhee crosss Ris there are signs of Residen of Ris. Elect was not vidable.	This area flows to the 2-36" cross calverts at REL. There is a deader 36" REL cross calvers that crosses under A Carrega Se, systemen there is an earther channel and manufactured and committees an concrete lead channel, both need delete and vegotation removal with steps stabilization at services channel.	Crest culter? Under Assumption Drive dischenges to a tribustry to Mosso Diser. Meet to their overgrown vegetation at the downstream end and provide outlet energy
TECO	tow	Ē	3	3	1	1	low	tow	Low	809	low	Low	ğ	Low	3	
Months of the Park	9				STREET	4			DESCRIPTION OF THE PERSON OF T	3000	N.	2	NUK SE	ARIS		200
Water Impact	Coestal	Coestal	Coertal]		Control	-	Chantel	Coestal	Coastal			Carlotte Section	_
Erosion Seventry	-	1	, and				1	1		1000	- Sil	Los		MA	History	
Flooding Security	Meteo	No.	-			1	Carlo Carlo	tow	ALC: NO.	×.	N/M	MA	Selection of	- 4	Š	100
Maketena	Meteo		Median	1			-	1	COLUMN TO SERVICE STATE OF THE PERSON NAMED IN	Item	Medica	Mechan	And in case of		GUINCALL SECTION AND ADDRESS OF THE PARTY OF	
Three of the			1				Decision of	\$	STATE OF		NW	M/A	W	SALE IN		100
Plone A	Į.	1 0 × 10 × 10 × 10 × 10 × 10 × 10 × 10 ×	Yes	ž.	Į.	2		Į	18,	18,	Yes	Yes	ž.	1	Ĭ	N. Control
Affected Properties	\$ 11	\$					N/A	M/A		NA	NA	MA	*	N/A	W/W	100
Type of Reschary	I	Collector	į	j	İ	I	İ	, in	-	la partie	Collector	Highway	į	Repay	Collector	
S S	174	191	158	Section Section 5.	Name and Post	Sil	Lambert Advantage	100	The second		129	138			See See	116
og -	473	14 Towas	Attached	148	Sames Memorial Pack		Séts fåer	Tepangan Beach Park	Maso ther	Mildeo Mese to 1000* North		Tagang Bone	12	Macro Beef	A Quenço Ambrepation St. Date	E S
ğ <	11	P. P.	128	III.6	M.	1.00	111	MT.1	or Delta	E L	A Quango	ME	M.Z.	NT 6	A Quança	
8 9	#1,107	P1-103	PERMIT	Philip	94102	9112	P1-108	PASSE			#113	Pists	PELLS	017.44	PAIDA	18

Cost	\$12,100,000	00072085	TOTAL \$36,514,900
DESCRIPTION & Photos in Regient	The MLI CAN STAR, LIGHT, AND AND AND AND AND AND AND AND AND AND	the first is problem inflation corresponse appeals, the mainly \$4.5 chainer bandle in regi- tal base five; of \$4.5 fbC carbon rathe bandwall/angued structures as the spiritume and state of the structures of the carbon is presented for the control, and administrate bandled \$4.4 administrates and the carbon is presented to the point in the flow point) about which the downwisters of the carbon is reconsensated.	TOTAL
Mitigation Effort	Parents of the State of the Sta	100*15* PCP; 1,000 SF Rip Rap; 1,000 SF Debris Beneval; 2 Headwalk/Mrignals	
Mittgation Type	Entiton Control Sterm Drain Sterm Drain Ingerovemental Convergator Perprovemental Treatment	Erusion Control/ Conveyance Maintenance/ Conveyance Ingrovenees	
She Assessment	has RI over Gass, Legons, Agends and Mantison filter filterly plates by I'be Zime K ness and by I'be Zime A sense. Thou grounds plate in the greaterest with plately was a sense. The greater of pre-consent with plately was a sense. The greater of pre-consent with and deventurement of each consent, Filter model, When the sense alone of a Vegler to each the sense. And colors of the sense of Zi catch basin, ESON of 34" stemm. Very Vegle Agents in model filters.	A graded study near along AC. Station and darkneys he a 24" netal cross cohere that manufact, MI transport as the distributions as a part of 18. A netal cross coherent by an analysis of and distributes as partially 28. A netal cross coherent are about 21 of ordinates and abolts. Cross the graded coherent and abolts. Cross that chooled he received to 3.5° PC and benches all added, and the house pattern than little for a graded study.	
1500	a de la companya de l	3	
Now Needed COST		9	
Env Wester Impact	Connector	Low Surface	
Eroslon Sevently	3		
Flooding Severity	1	WA Medium Low	
Maintena	2	-	
Safary Three A	•	M/A	
Flood A		1	
No. of Affected Properties	*		
Type of Roschway	1	Collector	
A S	8	8	
ğ •	RT3 Polacis Polacis	S.M. Tumcap St	
ğ <		L J. Santas	
8.0	ST4		
# 5	1516		

Guam Stormwater Drainage Master Plan Sania Ria Village Sta Evalsators

	2146.000	3191,000	007.004	80 80	88	000 5903	224.000	000'8528	\$1,010,000	67,690	000/25998	\$174,000	\$168,000	000)088
	To prevent further undermining of approach takes and prodrigg platement of 2 eversible drives in transverseded along with one quarter atte of debris remond spatteress and downstream of the brings and 1,000 purpose from the pap channel scalingschop placed a discusse of 50 feet suppress and demonstream of the bridge.	Intermeted ministrance as the size including over quarter soon of sights is stoomed, pleasured of a manufactured an intermeter and a 100 mile for one swarpy disclaims because at a five action g.2 or 20 colder, confluences of the existing covers of content with a sense, decrease at a 100 mile size disclaims at the demonstration and of the sends connecting as new dealers 9.13, 100 mile connections of 100 the signal purpose of the sends connecting as a new dealers 9.13, 100 connections of 100 the signal purpose of the sends connecting as a new dealers 9.13, 100 connections of 100 the signal purpose of the sends connecting as a new dealers 9.13, 100 connections of 100 the signal purpose of 100 the sends of 100 the signal purpose of 1	Removement of bottoment of 100 fears felt of 100 ft. Dr. adjacent to eliting cores culture in writer to service conveyence calcular contents and the backers. The new corrections the character is new yord with me introducial languages conclusing sportation and observants of the softent. Name the state of the contents of the contents of the contents of the contents of the softent. It is consisting to 100 fears there of 20 ft. To 7 but also contents to the correct-charact in the contents of the backer contents. These intelligations of appropriately 500 in It of for mp in recommended upstress and dissembles of the potent contents.	The cross cachest as this star sensith to be replaced with 200 bears has not 56° PCZ, a resolved liveraged is caches with 200 rg it for ong authorization (superchannely 55 bear is langth) spinsars and development of the cachest and maldomorate including a quarter arts of debrits warrows.	Recomment of blazement of 27 Mpt pakken with an each table of the calent outbut for a figurers of 50 sec downstream along with 1,000 cubic, lest of for one placed as the channel become for the same distances for enrich colored as the lab. One quarter gave of definit removal is also needed at which the control colored as the lab. One quarter gave of definit removal is also needed at	husanninnin placement of an AC Scallary lakes the 12 at this location and 2,000 square feet of the age stabilization for érozion control. Adultament in the form of one quarter acre debits removed is also needed.	The cross colores at this size needs to be replaced with 100 hears fast of \$12 RCS and a seed-well-level great structure with 100 at it is no stabilization instrumes and downstrawn of the meet.	Was a storm draw system slong felst Dydoco Dr. considing of JUV of concress data, 100 linear of a 5-ft RD just Tool Control Document) with a header-life independ drivature upstrawn and benefities of the pubert.	Dis Site reacts to be replaced with 300 fears? In this 2000 on the form calculations where the site of the chemical sides for a distance of 200 fear Trar lates of debrit recover it sides received at 10 to spit of hydrorenichs with bornded Riber mach yout.	A quarter zon of debits removed and the rejectment of one calch lash is resonanted at the west of the consents respected data at the size, "The system is essuanted to consent to an existing state data six this size." The system is essuanted to consent to an existing state of one six estimate in the read.	The double of FCP cross calviors at this date assets to be reployed with 100 Bases here of B-SF RCD and is headworks harponed sections with ASS to at it for participation superties and downstraws of the object. One quarter acts of debrit entonest is also sected at this bas.	incomments of parties 4,200 the man to do cat he degree 2.0 is coment in certain of the L. The categories of the categories of Categories of Categories of the Categories of the categories of the categories of the read in the detail descriptions of the road in the detail descriptions of the road fine askert in convey flow spectrosis of the read in the detail descriptions of the road in the detail descriptions of the road in the detail description of the road fine askert in the detail descriptions and descriptions of the cale of the cale of the cale of the categories of the cale of the categories of the cale of the categories of the cale of the categories of the cale of the categories of the cale of the categories of the categories of the cale of the categories of the cale of the categories of the categories of the cale of the categories of the ca	increase, and adole justability of the extraction of the extractio	we extracted a SOF cross-device make (bit 1) Update in departs the first has been to be the soft of the soft street which the Village of soft librarity or explored with RCP but crossly will require the addition of beamsally optimes, and downstrated of the software and so extracted soft of control from the software of the software of the software and so extracted software for our extracting parapose, all cross-defects are native on the SP-best him.
Militarium Cllori	de rap.	1007ndouble 5/3.57 RCB (per REC); (per REC); (per REC); (per REC); (2 Next Next Next Next Next Next Next Next	SETTLE RCF. 2 Feedback Weegewalk 1/4 AC Feedback Weegewalk 1/4 AC Feedback Court Backet FOUNDATION TO LOUIS Backet FOUNDATION TO FEED Backet	- Charles	1000 St Ray	F Rip Rage:	CONTRACTOR N	Ca (per PCD); 100"	4,000 CF Ray: 1/4 AC 000 SF		LOCHENS RCD, 2 Americally Wingeralts; 1000 SF Rtp Ropt 1/4 AC Outers Recognise; p	1000 LF Disch, 2 headwells, 200 SF fly rap, 100 LF 36" BCP	2 Headmodis/Whogwalks 200 SF High Rups 400 LF Descrit 2 Catch Basing 100 LF 24" RCP	Manager 1
Milgation Type	Improvement Eroslos Operad/ Conveyence Malepanence	Conveyance Maleramental Conveyance Improvement	Eroton Control Comeyance Moletesance	Englan Control/ Conveyora Makkamarca Conveyora	Eroden Control/ Consequence Makittenance	Storm Drain Improvement/ Storm Drain	-	Storm Drain Improvement Conveyance Improvement	Eroston Control Control Consequence (Consequence Consequence Consequence Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Con	Storm Drain Improvement/ Consequence	Conveyance Conveyance Maintenance/ Conveyance Improvement	2321	Erosion Carerrolf- Storm Drain Improvement	Conseptince
Sto Accessent	ermicing of approach tabs and secretar drains at all four corners of fraction both upstman and stan removal.	An enable design system within the action declarage in a dry well that is not handled by the mean of an extract work from the broad fault. The character hand is a second to a fail of the found that may refer a delevery, then outside to a reporter and a fail of the character from a refer a delevery, then outside to a response handled alternative to replace as because of chemic to a para seed and outside to the refer and amounting to the place as because of chemic to para seed and outside it to a new relation amounting to the place and the part profession which we have	ACT Corn colonies and we liven for life of centris from terms and evidencemes being designed by the control of the central ce	And the party of the processing of the party	where the TAG Globy of Court, a sew drivings mentions and a lived concerns study is a white interaction to the most need for the likelihoo. So so except \$25 most other main folks, or flows. We as \$1.9.75 miles outher on the morth what of their Other manner of the secretary is made of the morth what is \$1.9.75 miles outher on the morth what of their Other morth of the morth of the morth of their other of their or the morth of their one of the secretary of the se		Salang RF RC cross calvert under Chalan Fele Dasses, street gats floodeef and chemistreen enfolderment has been errolleg road, leved to add another 36° RC cross chemistreen and stadkes demonstrates reclarations.	Fell Dyckson Dr. does not have any drainage conveyance system to suckst navel property and it posts the struck. Bared from the struct flows to left I, Pengelsken Dr. then I to add a cross gatter across struct to present positing, and to allow navel flow shearmen.	3.3. For our culent router hall benoot contribute from them Didge Oleva. These claims should be replaced with a PSF RQ, and specimens and demonstrates reset invariant resets makes alreased and advantage of publics for a popular for a depth frequencies.	A trapezotical coccusts channel at the entrance of the newy base needs sherts reserved, couldn't became outlets.	"me 4" #2" cross cubevits to a seefer knot 5, Ermann Dr. There i we cubevits are on not all each color before it significant deshabitmess revenue held inspirates and evergenies in Explacations constitutional deshabitmess revenue and color; with headwall and evergenies in Explacation and description. Need also to clear other and vegatization equipmes and descriptions.	Browff from REJ Buser covereds First. 1 Opdated Dr. Head to add workes slong REJ to be provide Uses entirely effect. To Debuso Dr., and outlet the sweller towership felds 1. "Swellickes Dr. Head for franching too her mosted.	Result from the Ray Is leving rotated vis creat traverts order RLL levind to add from the result of	inchem juli perioring Cold cross colorers water RET iment is to september to the SCO grans colorert.
1500	Low	89	Medican		3	Manha	THE REAL PROPERTY.		2	3	Medium	, Mon	Low	Modern
NO N	2	2	2			3.10	80	Mary and		2	2	2	2	g.
Env Water		1	Surface	1	The second second	9	Serbas	ş	Serlace	Surface	STEEN STORY	(All the Late)	Surface	Surface
Erosion Sewatity		NA	1				Medium	\$	PR 9410 1107		1	Shares a	P. C.	¥ ×
Maintena Rooding sea Sowerity	tow		Methon	1		TAKE	1	2	Service Control of th	A STATE OF	B. BOLES		3	log-
	(All September 1992)					-	100	9	March Hotel	- Per	Teckon .	3	1	ğ
111	9	š	1			STREET, STREET	1200	1	4	N/N			M/A	
Read Read	The Part of the Pa	8	2	2		2	3	2	2	2	2	*	2	9
Mo. of Affected Properties	м/a			v)	\$	M/A	× X	N/A	MA	NA	NA	V/M	NA	NA
Type of Roadhery	Highway	į	Collector	1	1		1	4	Callector	Sphere	Collector	-	Hyberty	Parameter
11		81	4	4	a a	30	100		2	g	g	R	2	F ME
E	plette the	9	Obbapo Damo(#7.12)		1.	Namo Falls	St. Gents	RT 3.7		Mary Base Extransa	Pedro Actions Dr Det2)	Felt T Dydasm Dr	j	
\$ E	artz A	Part of the last o	Nume felt	THE PERSON NAMED IN COLUMN		Obliga Olano RT 323	Chales Fale	Febr. T. Opissus Dr	1 2	m.n	d de la company		III 12	NT 17
8 8	801-95	101-107	Strios		broad his beautiful account for	91 9	80.48	ALC: UNKNOWN		90.6	AUTOM	Savité	STIPES	54-310
Site														

Appendix E - Page 23

SWDMP

_
0
Ñ
-
8
Δ
2
-
0
o
•

	Cent	0007218	\$165,000	25.0,000	\$142,000	2718.000
	3	218	\$18	528	318	
	Proposed Improvements	houter profest Lifeton extraor coverage, for some located quantizations of lastes 2, Scheeg yet out that of Version B. Likeran David Joseph Brasiliand with 200 pg for of prog for statuses of aperturbated 2.5 face and to choose licented decentament of the restrictor should be statused by a discusse of 12 few with 500 pg for for pro, A questre serior of depth removal, and challenges of two belonges of 12 few with 500 pg for for pro, A questre serior of depth removal, and challenges of two belonges by with surgicals (one quitasen of Ba 32 and one chamitrees not let 2,2 are also processmentaled.	The deal 12" KD cross colors at the tide recels to be repleted with 100 Bees feet of 6.4" KD sespices has been been of 6.4" KD sespices has been been of 6.4" KD and the recels to the destruction at the upstrant and description in the upstrant and	This AV CARP cross colored at this side meets to be replaced with 300 Bears feet of 750 K.B. This AV CARP cross colored at this side meets to be replaced with 300 Bears feet of 750 K.B. This side meets of 200 K by by a general and deventation with color quarter grown of death freeword is the second at this side.	The property wall requise approximately 200 bears fast of concrete transmisted classed to convey they from what appears to be constitued from a spirity focused at the back of the property to the hates of the specimization (as appear of they at eary, Approximately 2000 St of the possibilization and to requise at this time for expect country.	The 26° NO CORE CARNET OF the stress recent to be replaced with 100 hower lets of Dev EXD (class in accordance with the Parch Corest of Coloranti opposite with a Technologic helphoral surface at the accordance of Constitutes each. Represented in 18° rector galactic control dark (colorance at 50 helphoral helphoral Research the calcular relativity and structures that will concept the flow to accounted also of the SSF NO.
	Mitigation Effort	1/4 AC Debris Removal; 1,000 SF tap Eury, 2 Headwald; MYregorafi		TOO'S'S' RCB; 2 http://districtioned/ 1,14 AC Debris Sterroved, 1,000 SF Np hap	200' Conc. Trap Channet, 1000 SF Pap Rep	100'46'4' 8C3 (per FCD); 500'
	Mitigation Type	Eroskes Control/ Consepance Maintenance	Storm Drah Improvement/ Conveyence	frotion Control Conveyance Maintenance Conveyance Ingrovement	Erosion Control/ Conveyance Improvement	Consequence
	She Assessment	Along the morth idde of Victorie D. Litzma Dr. sariety of 24° IND cross calvertic and pression results and the Control is placeful structure at Int.2. The application structure is the control and extraction of the Control is the control of the Control in the Control in Control is control to the control in color and the control in color and entablishment adults and entablishment adults and entablishment adults and entablishment and entablishment and control in color and entablishment and enta	As setting globes 12, You worker Incase Broader Worker Reads and Weld Version 2, Belle Dr. and admissioning as a READ of the Annual Versions, as concerns disch seas enclosed and sown is burstoonly as as REA. The double 12' cross calenty could be implaced by a Annual 2. At ELL and cutting swelst siving the stress read to the annual property of the could be setting to the CEA.	A.1.8. Cute work ELX Transfer for forms as upon terms of benefits of benefits for the and discharges to parables channed deventramn. This, 3F Cute troot channes and reminent with a 3-24 KC2 along with the upstrumn handwalf. Both upstrumn and downstrainer channels resed debra and vegestation termonel and embastramint standardium.	Private processor at 25 GOAD Class in Section Class in Se	A 12 EX Cores conclusion to use offer the "programment and its be- a 35 water assessment where the instance" to provide an Excellent School Sc
	1500	3	Love	Medlun	Low	
MON	Meaded COST	Og.	Mo	9	Yes	2
_	brapact	Serface	Surface	Surfee	Surface	3
Eroston	Severity Severity	1	MA	Marken	Medium Medium	
Flooding Eroston	Sovertry	VÀ.	Low Medium	MA		tow Medium Low
	800	Merken		Median	woj	The second second
100000	Threst	· A	MA	××	Median	
Hood h	Zone A	2	9	2	2	9
POSE PROPERTY.	Properties	MA.	NA	NA	•	
	Roadway	A SPECIAL PROPERTY OF THE PROP	Collector	Į	Preside	a second
â	Soor	K	u	2 2	2	
3		Pedro Redemin Or (AT 12)	MT 37	Pedro obserts Dr (RL12) er 1.7 g. er 5	Pale Medina S2	
ğ	V	Vicentia O. SP-3138 Literate Or	Vicanca S Borja Or		745 Obligo Olero (RT 13)	Reda T Pangadhan Dr
ā	-	9116	36.111	SHIPS	101-95	ti e
	Han.				*	

Guam Stormwater Drainage Master Plan

	Coet	872.300	252.400	\$125,000
The state of the s	Proposed Progressments	To prevent further enulon, a querter acre of debris removal followed by placement along the road embankment of agreemmently 500 against fact of up no stabilization is neoded.	To present further exists of influences both each additional and to the edjacent property at the place, a querier acre of other removal followed by placement of 400 5 of gabbon shoughts believe below instrument and placement of approximately JED square feet of the rap at the landers of the gabbon is recommended.	TOTAL
	Mingetton Effort	Sylv AC Debris Removal, 500 S Ry Ray	MCD SF Cabbone; 1/4 AC Debris Removalt, 100 SF Hip Ray	
	Mitigation Type	Erpaton Control	Eroslon Control Treatment Slave	
	Re Assessment	Direct confidences on the cast aids needs stildfillistion, the days is suy storp and penhashment has been cruding and may ingin undermining conficent.	infittation bath where small entering the boso how the street has been ending adjunction property. Head to stabilitie beats embankament eact to the press a property with applicans.	
	cost	1	P.	
	ROW COST	No.	2	
	for Wester	A	Apple	
	Several Severa	1	MA HA	
	Floods Sensit	ALAN .	MIN	
		High Monthon N/A	Medical	
1	Public Solicity Threat	1		
	Witth Flood Zone A	al de	No	
	He, of Within Public Affected Flood Salisty Properties Zone A Threat	12.2	1	
	Type of Readbary	Special P	1	
	Soom Second	1so	163 Collector	
	ž =		Book	
	3 <	MT 244	Chalse	
1		1004	250	

8	\$168,000	\$120,000	800.000	\$143,000	007909	\$15,000	\$2,610,000	8173,800	\$134,000	811,900	000'0858	\$247,000	00070025	cocroses	0007086\$	000 0048
Proposed Improvements	Forevers further Booding of ama properties it is interessery to which the conveyeres years. This SF ICD carbot should be replaced with 200 feets for set of 45 TED equipped with selected regiment instruction this suprement offices securities to the Conference and Conference	District influences bases is under capacity. Propose a rew, desper influences bases as the same site with a depth of 6 fear, width of 50 fear, and length of 200 fear with 500 fears fear of encing. Also add on Ar, spilling to roads prives in road leas we influences bases this site.	To prevent further fiboding of properties at this sits, constitute a stem drain system constitute of a cash basted lows a such corner of Publics things (consecuted by approximately 400 leave feet of the Public flow to startly to such the opposite exployed in the binding whereast partners couldning an 100 consecution or no necessity disclosure store or no necessity disclosure store or no necessity disclosure store or no necessity disclosure store or no necessity disclosure store or no necessity disclosure store or necessity and necessity of the	To prevent further existen on the intige entherbrane at this star, remore appreciately 1,000 season force of earth sat higher entherbranes and any approximately 1,000 as it of the rap (500 as less seems of each season of the entherbranes substitution.	To prevent feature ponding at the fize 4A low point, construct a desimpge conveyance system along bloth sides of the road constituting of approximately 3000 E-of clash on both sides of the low point. Outsine flow with two carch basins and convey flow to the south using approximately 50° of 24° flow.	To prevent Matter Booding, construct a forms drain system along leas P. Chu Street. Place two carbi bearin at the provest bein point conventing to 100 leaw leas of 24% for fronting Beam- westering expensed with a haudmelyleingrand structure and as 100 square boot to pro energy changing at its coules, And a 100 learn foot bioseneds to the and of the energy displaces.	To prevent further showing errotion as a result of Neth tides, install 20,000 square feet of rip rap creases, subdistrates (approximately 10.14 wide along the showinghe) for a distance of approximately 2000 feet, priving Taldefo Beach at Rig 4.	4 20 0	To prevent Booking, constructs is storm drainings system along & Lahriny ST laingon Street constitting of SECT of themsel learning on both sides of low poles. At low poles, and 3 each hash repulposed with agents convesting to edisting 5° RET cross-suberts outletting flow into a 100 square foot on pra- many glasquare to a bloomab.	hers are currently 2 catch basies at this site that meed to be replaced with 2 new grated catch sakes with aparent to improve interreption capacity.	centulat a temperare system to use used with templace discussions and also plasticated centulated a consequence system to control and the management of the control discuss of the second control and the control and the control and the control and the control and the control and the stress representation of the control and the cont	hand flood need home as fact, that is, it desired procession systematic bits based origing. There is based sorted excepting sound from the high point in the westerds in Signatura. The floor mile becomes dish the case the facility floors in the high point in the westerds in Signatura. The floor mile becomes dish the case the facility floors where the case of the procession is the read. The case the basis will convent in approximately 200 learn free of \$4 *** the well, is better deviced subjects to the case of the case of the case free of \$4 *** the case is the case of the subject of the case of the	A storm dates system is secured to collect and convey stores rawelf about gissuin in Datasque Screet. Pressues one careb basis betand as for stores have been, and convey four to the proposal of efficiency as leads in the SSD leaves free and all "R.D." represent context and a basis and advised and in the store and all "R.D." represent outside soil and an abandwheligned instance which as DSD squares four (i.e. growing engineering countries are not all the pumpy singulations from the present parts of the property singulations from the store of the	A conveyence persons in sewed to take that of convey terms taught dept. Securizable A legals Men. (West of through P, Childagual). The system wall exceeds of approximately 2000 leavest for discrete allight with seaths colvent because as developed promising of approximately 2000 leaves found of 17 mills and 12 leaveshed belongered innormely. The stath wall made then to the 26° EQD trons collect at Dissist General Street.	Accompagning signing in readed to such and communication that the control of tentrol or the control of the control of tentrol or the control of tentrol or the control of tentrol or maken the control of the control of opportunistically LEDD have the control of this who is because maken the control of th	implace existing catch basis and connect 300 linear feet of 24" RCP to excising RCP. Equip outlet the a headway becomes constructed and a 100 linears feet the seasons decisions.
Witgetien Effort	1007-MST RCP; 2 september 2007 Per Bloomeder, 2007 Per Bloomeder, 200 Set Mp Rap. Pag.	B New SO'LZOO' Int Bashs (6' Deep): sa SOO LF Fence; AC Spillmeny A	B. G.	DOD SF Debris	2 carch basene, 12,000 LF Distra. In		20,000 SF rio rap	1,000' Conc. Distry, 100 IF 12" at RD; 6 Hesthers Wingsmills.	40	2	2,000° Core, Dethi, 200 G v 12" of RCP, 12 Housevalls/Wingwalls, pr	2 Corch Besir, 200 Lin 24" NEP; IT Headwall/Wingwall, 100 SF Rg; 34 Rays 100 Li Biomeals	1 Carch Beaing 300's 24" ROF. 1 P. Headwall/Mingwall, 100 SF Elp. P. Headwall/Mingwall, 100 SF Elp.	2,000° Conc. Distry, 200 IF 12° III BCP; 22 Nesdewills/Wingwalls	STATE OF THE PERSON NAMED IN	
Mitigation Type	Convenience Improvement/ Convenience Addrigmance/ Trestment BMP	Streen Drain Improvement/ Treatment BMP Maintenance	W. C.	Eroston Control/ Comesyance Misietamence	Companie	Strom Brain Improvement/ Frestment BMP	fresion Control	Conveyance	Seram Dratin Improvement (LAP Insurance	Norm Drain	Oneyers reproven	Scrow Drein Improvement/ Treatment Bide Improvement/	Storm Drain	Conveyance	Consystica	Maintanance/Storm
Sibe Assessment	1. See Part cross cakent runs under David Centers II, where a lose poor is bestatelenable of the first of the last a contract for its the lower person for it hand to be the lose poor it has been contracted in reduced to the lose poor. The cross softent to design of which their load leading to the cross softent to design of the contract to the cross softent to design of the contract to the contra	infiltration own more sapacity.		N over Togicks (Nex. There is eroulon on bridge embantoment both downstream, need to add embantoment stabilization (forse), and need and overgrown vegetation.	sed to acid a drainage convergence system to	set of N. Sen Miguel St a street few point is located and one to add a descript company promeyants system/jenshit and most of the west along loss by Druz Stlawesis the file standow).		del sociales and cross guitters along porth side of Ferredico A Reyes Are, List of Bysaco - Calcagues well be receded to the defigration basis at lipsacio P. Calcague. West of graces P. Calcagues rewelf will be moded to the 36° RCP cross colvers at based Gorton C.		At a low point along RM mest to the gold course, two grated catch basins need to be improved to be more effective. Depress grate and old a concrete aprox.	Manage To	June I from Dense P Sonto S Books fine homes along Pasideran Franckon Diego. Add claring convenue or sprint Child hashe of S Cacher Books of Example S (2000 S). The sprint of S (2000 S) and the sprint Child S (2000 S) and the sprint Child S (2000 S). The sprint Child S (2000 S) and the sprint Child S (2000 S). The sprint Child S (2000 S) and the	skik a desimaga corresponse system to collect street nercelf, and route to the bellizzables S south.	Add e debrings conveyance system along Fractico A Bares Any and rouse to will be a visible to the 36" EFF costs culvers at Devil Centra St.	wents) along Leonardo C Id another drainaga conveyance if can outlet towards the	
TSOO	Low	Low		and a	3	Ola Control	5	Low	8		Madem	Medium	Marijum	Medium	Medium	
No.	9	Ne	9	2	9	2	Ĭ,	No.	2	Mo	2	g.	92	og og	9	1
Water	Surface	Apple	County		g	Surface	Country	Surface	Surface	Surface	Surface	Saftea	Surface	Surface	, and a	1
Erration Severity	Medium	MA		2	\$	A COLUMN			3	MA	Low	The state of the s	N/A		N/A	
Reading Severity	•	Pos		MA	Medium	Medium	NA	Medium	Low	Low	Medium	Median	Medium	Medium	Methon	
Maintenance	Medium	Medium		Medium	ğ	ğ	Medlum	Pol	ě	Lose	1	tow	low.	and a	ğ	1
Salesty Threat	1	low	3	3	1	3	ş		ě	MA	Low	Mothem	P.	Love	85	
Flood Zone A	No	No	2	Į.	2	2	2	9	3	No	£	9	9	No	9	1
Affects of Parties		N/A	-	N/A	N/A		N/A	MA	NA	N/A	NA	2	\$	NA NA	MA	
Type of Brandway P	Collector	Collector		Highere		Collector	1	Defector	Collector	Hachway	Collector	Colector	Collector	Collector	Common	1
Store	191	Miles	No.		la constitu		18				ĸ	2	F	The same		0
ğ e	Cor to	Jose P Cha St	Padro Ble	Togethe	11.11	R. San Magnel St	Beach Park	g and a	3 3	Golf	David Gorban St	Emest P Some S	Rail	Leonardo C Tenarlo St	Course P	
ğ <	Dawid Gorton St		Marry Street, Square, Square, Square, Square, Square, Square, Square, Square, Square, Square, Square, Square,	1000		2		Francisco A Reyes Ave			2 S	Passderus Franction Diago	grado P Detrepas		Lienardo C Teranto	Errest P
e Site	Parity of	1		14.147		_	Tauris	Take a	a division		STATE OF THE PERSON NAMED IN COLUMN 1	1		144118		

Guam Stormwater Drainage Master Plan Tamunana Village See Evabations

3	000 EDAS	oortoes	\$14,100,000	007/855	\$106,000	edite:	221,000	acovies	\$137,000	STELLOOD
	The lick of a device age conveyence system should also 2 in this area coasts constant Benades, A agent when the large coasts constant Benades, A agent when the large system is become about the 12 Copy conveyed are the large system in the concentration to 120 captures are also the large system in the coast benades conveying the large system of the coasts, to habilitate of a 200 least feel algorithm through a symptomic of a page of a system of the coasts, to habilitate of a 200 least feel algorithm through a prepared on the page of the coasts, to habilitate of a 200 least feel algorithm through a prepared on the page of the coasts of the co	In each further pooling of resultaneous interporties at the inseruction, a team draining prime it is needed to interrupt and convey from the line late. It is system will consist of a prime door, because because at the low point along 22 feet built jobs of the streetly, connecting into the setting fits, it divinuals politims to 200 beaute less of 25 feet.	Downstern in miditarization and followership is the probability of the Thombody Divisions with Charmel Arm Ris 1 to the cost inpermental investigation following the contract including symmetric field from the cost inpermental investigation following the contract conduction following missions are also that 2000 it implications of \$10,000 in the first proposed and missions from the cost of the cos	is storm done system along this section of fig. 77 is required to allestate fincing at this size. In special to asked to a section the size of the size, the special number of the size of	is one development it has being constructed behind the Sand Cantile property has created a low tools in the beach of the property causing before, it is necessarised and see to nevel at this beach the process be interested and conveying to the lowest disk or property and constructed to the saling specimen defeat persons for San Verleas of the specimens of control can be considered to the maniput to 100 bear of 20 Fe Dr of the specimens when most fine to the study.	this behalf we same not have held not the District Development to the concentration of the properties	of delings conveyence bytem is needed along N. Sqt Darigt Christic Street to prevent Marey proceding of the street and surrounding syrikish properties. Reconsentabless should placement of specurionally 200 lesser fact of darb edisored to the street reading flow to a 200 lesser it influstion property.	To grower than e thould go in the area, construction of a 200 least has converse transmission and the second control of the second second second second second second second second second second second second second sec	High Richard no delingue options in this stee. A defining incompanies system is consisted about the said in experience and incomply interest to the consistence of the properties of the probability of 2 grand that is been priced at the two point of the convenient conducing Richard Annie Aden Aden of the result, concentrately not 200 for the contract of 200 for the contract of the conducing and a properties and a 200 for the contract of the conducing Richard and a 200 for the contract of the conducing Richard and a 200 for the conducing originates industrial the cold as	To prevent team belong in this are constructed or game to their possible to this end of the required Contrictation and or both belon swep To Moster (room Way, convected to JUP of JP MCP which means then an actual to JSF ACD in recommended, Approximated 200 Rever field or the RCD with increase the convey file security from the top proceed contracts top charmed all allages May, An encomment will be required for this ACD.
Mittgedon Effort	Catch Basins; 400's 24" BCP; c	Couch Bosing 200's 24" BCP	COLUDO SF Np Nap; 5 Ac chaming/ blefs recoved	Oach Resing 400's 36" BCP, 1 meta-skiwings-at, 100 SF Rb ap	Count house, 100-30" RCP	00/02 tot; 2 clets bales; 1 becked Wingseld; 100 St Bp.	200' selforation Trends, 200' Drugh	200" Conc. Trap Channet, 1/4 AC. Orders. Removale, 1,000 SF Rip Rap.	Cutch Basines; 100 LF z 34" BCP, Headwad/Wingwale; 100 SF Rb lap	2 Catch Basins; 100° s 24° RCP; 2007sDoubles 31-5° RCB.
Alltigation Type	Storm Orain 2 Insprovement II	Strom Drain Improvement 3	Conveyance Mantanance Conveyance Inspresented	Starm Orain 14	Storm Drain	Storm Drah Improvement	THE REAL PROPERTY.	Conveyance improvements/ Conveyance Maintenance	Storm Drain 1	Storm Brain
Sha Assestment	At the intersection of RE2 and Auditurals in the desirings conveyance system cubics and this transcribings constraintly floods, liked to batiful a thristings conveyance system. In the colution will be to build inflication trenders along RE2 and along Authorium In.	There is a local deportation at the instructings of RET2 and REL. Mend to add a defining temperature of the temperature raced it is the long point(carch bead) and convect this system: the soliciting systems about REL. The long point is creating portaling of trainformmentals properties.	Trausching Christiage Way Charand is laggly embed and neach stabilization for excito large) to coast shong with debth transcoal.	There is no districtupe convergence system shoug the roots. Hend to huids a districtupe convergence system.	In back of Sand Cattle property gast Recoded sloce a new development is under construction to the backs and has measted about point where wents points, Ormers of the Cattle have included a partie to purply the water cut to Pale San (Start (Ed. Li) is a partie by the purple of the cattle of the cattle is a manager of the Day force (Ed. Li) is a partie by with purple of the Cattle (Ed. Li) is a partie of the Cattle (Ed. Li) is a partie of the Cattle (Ed. Li) is a partie of the Cattle (Ed. Li) in the Ca	i form de de declarges to a private property, Need to rocks atom delsh to a demingo	There is no clothage conveyance system along this streat, blead to add a drahage conveyance system (and possibly reflication breaches to cucke face) in order to prevent locating of strees and private proporties.	handf from the attract foods the area broand the Pico McLadery R.1 and belons way, send to explane need? a serport to process this foodby. Also ches clothis and add channel to rock few to Tenushing Desiragemy, Ault ecolors commit downstream of built.	This road door not have a dishings tonewayence system and rureff flexes to Janess flay and door tourners, lead to dishings to response system and rureff flexes to Janess flay and the desired to the system and trast rureff labelers being dishinkaged to bery.	Aurual from the stryont flowsh this area along from Josen come Very, Meed to capcare areas? A layer to prevent the Roboding, Next also had desirable system to prevent allowing in next.
7500	1	Medium	Veryiligh	Medium	3		3	Medium	Low	
2 1	2	No	M	2	9	3	No.	Yes	MO	1
Meter Impact	Apple	Apathe	Chantal	Aquite			Aquiller	Coastal	Chantal	1
Eresion Severity	WA	N/A	9	N/A	\$	The state of the s	N/A	MA	*	
	1	Medium	9	ğ	1		ğ	Medium	Medium	
Chickenson	Medium	low	*	ş	1	1	Medun	Medium	25	J
111	Į.	Meditors		ğ			1	Medium	-	
Pace A		98	a A	9	1	9	9	Yes	9	1
Affacts of Properties								10	\$	W. T. E.
Type of Beeckeep	- Appropri	Highway	1	Highway			10	Hapman		
A S	182	288	851	112	3		951	171	20	9
3-	Applyments (n.	RTA	B 1940	McDinalds	Pale Son Visconia Rei			Mapie	TOI 25.1215	
3-	III ZI V	NT 27	Tamuning Ducket Channel	mv.	13			E	2000	
	14.109	TV-13D	74-308	TV-308	14:106	17-106	TV-105	TV-101	TV-10	Shirt.

SWOMP

g	Oxero	\$143,000	\$661,000	ORTHA	SYNOW	334000	\$4,100	00078825	31340	ONETS	535,800	achits.	000 9100
channel ingrovements	For personal care four and a first season has an affecting a learning disposary segmentation for an experimental and the control of the cont	To prevent further extraochroness of the Leakee Bayer fron Jose C. Aguson Screek, maintenance conventing at a quanter store of debries removed above with hestallaction of LODO square fees for application and control fees from the proportion of the control of the second property of the proportion of the control of the c	To present effective underwise plant in tensioners and an administration control and an administration of the control and administration of th	On acro of delet innoved to receive to clear out accomplished delet's and the electrons improfession. The improvementation of the deleted agreement and descriptions about upder Bit 2 is needed for a description of 200 feets het demonstrate frogeting proprieting 2003 of all first procedurable and procedurable indexing symptomic 2003 of all first procedurable and accomplished and symptomic 2003 of all first published and accomplished and accomplished and accomplished accomplished and accomplished and accomplished and accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished and accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished accomplished and accomplished accomplished accomplished accomplished accomplished and accomplished	incommonal modelination of the 2 declaring animalists in forms of booking of houses beautiful absolution from the control of the control of the forms of the form	To person it with the control of colorant machineries and deliberation of the entitled delever, control or the colorant	Incomment placement of four Art spillers, slong flours 2 with approximately 100 SF of for my stabilization placed downstream of the spillerspie for every? distribution. The additional spillerspie and stabilization landscapes and thought of the road is the outlet to the Li SF frue Sowi-	These stems desiry parts of the card for set of book collections of a classic product by the collection of the collecti	To prevent future stugging of the cross calvest at this site it is recommended that a quarter acre of stational sediment be removed to permiss proper the advance.	To prevent fitzes dogging of the cross cakent as this list is recommended that a quarter acts of sales/y sediment be reasoned to paramete proper desirange.	T 10 . 10 . 10 . 10 . 10	A quarter son of definit monocal & mended to their accommission debits and any overgrown requires to require many of a constraint of their accommission of the mission of their accommission that an additional 200 hears also of 2° EXD by placing additionate to the actiful debit of 2° EXD by placing additionate to the actiful debit of 2° EXD by placing debits and a constraint of 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing and 2° EXD by placing 2° EXD by placi	Paramenens ploanment of lystrowed w/ a banded fiber matric over approximately 1 acre of the Millian where a manufacture does not relating an effort to control not create major the fallable.
Mittigation effort	A AC Debots Removal; 20,000 SF Eq. Ray; 2,000 CY Dredging Santheroxid	1/4 AC Debris Removel: 2,000 SF No Rap	DOORS 44" NOT; Headway (Albrignest, LOOK) St. Gabbers, 1.4C Debris, Removal; LOOK) St. Rap Rap	1 AC Debris Remoust; 5,000 SF Rip Rup; 2 Neodership/Wrigesalls	LOT Care. Trep Charvet; 2007/98 RCP-2 President Worgsmale; IDS File Manual Alf Cabric Responsi	AGPADY RCF-2 Pendenal Whygealt, 1/4 AC Dathi's Remonal-100 SF Blo Rap	A AC Seitheage, 400 SF Rip Rap	4 Catch Sasins; 100 UF 34" KCP; 1,000 UF Corn. Diletty 2 Medically Wingwale; 100 UF 12" MCP.	1/4 Ac Debris Removal	Life Ac Debris Removal	1,000 Coersets Dach, 100 SF Kip Rap	2 Headmaft/Wegwalt; 200 SF Headmaft/Wegwalt; 200 SF 100 U 24" EOF; Judy Coversia Dittay, 100 SF Rie Reg	Protice Control
Militation Type	Eroston Control/ Commygance Materiance	Conversance Improvement/ Conversance Maintenance	Eroston Control/ Conveyance Maintenance/ Conveyance Improvedunt	Ereston Controly Conveyance Improvement/ Conveyance Maintenance	Conveyorce Disprovement Conveyorce	Conveyance Maintenance/ Conveyance exprovement	Storm Drain Improvement/ Ensien Control	Storm Drain Improvement	Conveyance	Conveyance	Storm Drain Improvement	Conveyance Maintenance/ Conveyence Insprovement	Freeigns Control
Ste Assessment	there had and here need to be designed, here embedments taskingtion upstresses at the property of the control o	More the end of lose O Agoon St, the Latice Rover is encroaching host the road and eventually it will undermose the road. Embalment stabilization (road) is except to present the free from undermining the street. The free Boods the street but it has not. Woodel breez.	blooks 2 over the Circl /rec is heig undermised, buil of the road/vest side) is undermised that it can crosspan as not your. At this because now bridge is resent the built part of built of the control of the control of the control of the properties he revision correct (glassing sharp expensive.).	2 2 5 7 2	Let be identifising of listin 2 and lags Drive a two definings systems read to be becaused in present of the definition of the definition of the control of the definition of the definition and desirations which the list were set that has been dead but the thin the list of the definition of the desiration which the list observe that has been assisted settlement and destructions which the list observe that has been assisted by the desiration of the desiration of the desiration of the desiration of the desiration of the desiration of the desiration of the desiration of the desiration of the list observe to a desiration of the desiration of the list observe and extend the desiration of the list observe the desiration of the list observed of the desiration of the list observed of the desiration of the list of the desiration of the list of the desiration of the list observed of the desiration of the list of the desiration of the list of the desiration of the list of the	A. A.* ID. Cross calvert row under loss A. Quelano St. The spritterm and at the calvest to who villeds, and the convertises and it is one to that half and indicessoral sub- selement. The calvert made enhancement caleful	Along books 2 the road has been are with any profiles, at the about to the notifiery win has one overlook draft and the systems and led of it is from ther the roadway mentural transit reads stabilization. Mean overlook drafts need to be added to readway in south to alondarge all the roadway to the transitive at travel than one location and prevent ear fluoding of this readway.	At the end of the Code-Code-Core has be a code code code code code code code code	A cross calvert under Boats 2 routes nundif from a tributary to the Sells liver. This cross calvert is in good condition, and no ertodion issues are vidible; it only exects vegetation removed to promet aim disciple.	A 45° KP cross cahest routs Selfs Reer flow under flows 2 towards Selb law. The stora cahest and headwall wingwell are in good condition. Vigotation removal in jumple its protection of the production of the pro	There is an existing critis-grater recling secural vegation into Reso S and crosses than A Chairbara S, and debugges to the west of from St waller counts into the behavior their the prospector has non-independ on degeration. It must be replace with a primar gather that has defined alignment and cross section that will be expelted of working from as iteratives.	The second second second second	About Blooks 2 by the observation rest area, on the west able of the road the hillshish has mass erosion. This erosion needs to be stabilized with stone form of hydroaced misture and bonded feet matrix is onder to stop the erosion and preventing sediment to run asserve the most
1500	Í	3	Medium	Median		3	3	Medium	29	3	3		
No.	2	2	98	2		9	2	2	2	2	2	2	1
Env Water Impact	7	Surface	Surface	Serlace	Surface	surface	Surface	Surface	Series	Surface	Sortece	3	
Ernston Severity	ğ	1	Neth	2		\$	NA	Love	V/R	N.	3	1	
Flooding	2	5		NA NA		Com	Medical	Medium	Š	1		3	0.1
Maintena	1	Medium	Medium	Meden		Wedom	3	ğ	Medium	Median	1		
111	9	9	2	3		Medica	3	Liber	MA	ş	ğ	1	
Within Flood Zone A	,	3	2	ì		2	, p	2	ž	Ä	2		
Mb. of Affected Properties		N/A	WA	MA		M/A	KA		MA	N/A	ş	*	
The state of		100	The same of the sa	I		Collector	I	Collector	-	1			
# 5	176	8	325	1		ai	8					9	
¥ =	Imake Rhes	otion Kiver	Certi River	F.E	4	Finans S.	la Sallan Rher		Tributary to	To the	Jose A California St	A Mark A	Observation
ğ <	M2 2	-		T T	E	John A Quibtizana Se	E	Aped A	2	DOM:			
A 2	101-901			UM-109	901900		OM-310	UM-197	100	Chartia			
a ite	THE WALL		7 7		THE STATE OF						-		

Na.	ocarioca F 12 A 200 (200 ocarios)
Proposal Improments	To prevent further dissibility of two properties frames, reconstructed one sizes of death common have seek to conclude the death of the control of the death of the control of the have seek to the control of the death of the death of the control of the death of the have seek to the control of the death of the control of the control of the death of of 1000 to seek that of the control of the death of the the control of the death of the foundation of the size and 100 feet specimen of the line.
Mitigation (Ther	MAJOD SF Np rap; 1 AC Debris Services; 1,000 CY Devolping Tearthway's
Mitigation Type	Erosion Control/ Convergence Improverment/ Convergence Maintenance
T Sto Accomment	The chain has been socially the fact that end of freeze. So that and receive when being the chain has been socially to be the chain of the chain. He is a temporary to the chain of the chain of the chain of the chain of the chain of the chain of the chain of the chain of the chain of the chain of the chain of continued from the chain of the c
TSOO	2
No.	Ď
Water Impact	Serface
Erosion	The state of the s
Flooding Security	•
R see so	Medico
111	9
Part of Part of August	2
No. of Affected Properties	•
Type of	Collector
Score See	G
ğ	Made No.
3 4	Peona St
- A 8	084.102

SWDMP

lan	
~ .	
ш	
4	
=	
ste	
-	
22	
0	
ainag	
a	
Ξ.	
C	
ä	
_	
-	
=	
ate	
8	
Ξ	
orn	
2	
S	
Ξ	
2	
75	
U	

Site Evaluations

Class	532,100	\$100 June	nor as	\$19,100	\$19,600	200,942	511,000	STATOO	519,600
Proposed trapsoments	To present Lantur Buckley of Ingigibativity properties in this images approximately LXDD square heet of dashin process along the dementation raide of the colonic file radium have propertied in second along with darking proportionaries at the colonic high carding the addition of a haudwall and ston regulate that a LXD square foot in page over glidiquess.	to prevent further Recology of properties, two 202 livest book infiltration trenches are nucernmised for constitutions along the properties (a) bit loss points.	To prevent Auther Booding of properties, two 200 invar food indication centries are instrumented for construction sing the crowned clinies in the loss points.	to prevent Nurbon Northing of properties, two 200 fewar book inflimation transfers are recommended for construction form along each street at its low points.	To prevent further booting, one 200 livest foot information brinch is inconsisted for one struction along the street at its low coint.	Oprevert further fooding of properties, two 200 live ar foot infaination beave are recommended for construction slong the crowned street at its foor point.	To present turbus thought of properties at this bits, construct a taken death option consisting of 2 attacks being before at the broader of the consented concernated supports being 300 theory and 2.7 CD could give story the safety the safety at priviles property (regulate, an examental to could the as a less becaused before the presents. The couldes the backed is repeased and experimentally 14 and a cliently experimentally the property of the property could be an examinated by 14 and a cliently experiment of the property of the pro	To prevent further Recolding of properties as this bids, oversuces a shorm draft system consisting of 2 acts it has if pleased at the burst code of the conventional potentiarity approximately 1000 Result and 12 KPD rections (the but of actings of this approximately 1000 Result of the properties of	o present harber Randra, one 200 linear loss infliration basis is recommended for construction along the street at its loss early.
Minjerton Effort	1000 SF Debris Ammoral, Add Trainferes & 2 vergenals, 100 SF No Rep	2-300 Infaration Trenches	2. 200° inditination Trenches	1 - 200" Infiltration. Transfers	1-200' Infiltration Trench	2-200' instruction Trenches	2 Chitch Basing, 2007;24" RCP; 1 Headwall; 1/4 AC Clearing and Grabing	1,000 U Cone. Cloth, 1,001,34* MCP, 2 Colch Resins, 1 Headwall; 1100 SF Ris Res	DEC Indiration Trench
Miligation Type	Consergence Inconsersent Consergence Maintenance	Scorm Crain Improvement	Storm Drain Improsement	Storm Dram Impromensent	Storm Drain Improvement	Storm Drain Improvement	Storm Drain Improvements/ Conseports Maintenance	Szom Drain Improvement/ Conveypons	Stare Gran
Sto Assessment	3) City cross colvert under El, The updatenn earthen returned to this cross schein enemy are and board enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy enemy (chaings return flowes) term cheen. This season for the facility of that the requiring (chaings return flowes) term is the airtrea lake it for an existational property and the system (chained from the property enemy enemy enemy enemy enemy enemy enemy enginety individual law systems construction with the airtrea lake. It is a registery individual law systems construction in the property enemy enemy enemy enemy enemy enemy enemy enemy enginety individual law systems construction.	this is alow point along the street where porteing creates the Booding of 5-9 presenties. There are no earliefly desirage systems at the Bootins. The scholous hall be to add allowine trackies along the street at the bowest leading, an aboth addes of the street.	his is a low point story the street where pording creates the shooting of 5-9 properties. here are re-mixing francings systems at this location. The solution will be to add situation transfers along the street at the longer sousing, an abolt sides of the street.	At this infamention of Now corners Rocks, and presiding one property, we calefying trainings conveyours aptems. Add infiltration (sendras along both streets.	Gare point plong Rocks I. There is no seiting drainings conveyance spitem along Rd. Chainn Chamort is higher than Rt I. No obsious solution to prending	his is a bus point along the street, this creating porting and flooding of one property. These are outsing of nietes systems at this location. A possible standon will be its add efficients in tenches along the street at the losest location, on both sides of the street.	This is a top post short this street this creating proving and fooding 3-4 properties. There are no extending definings instructures if this fusion is in gooding set studies will be to be of the supervise transfers and the top the properties of the properties of the properties of the properties of the substitution of the properties of the substitution of the properties of the substitution of the properties of the substitution of the properties of the substitution of the properties of the substitution of the properties of the substitution of	This is low goods about this street than trackly proride; and fooding 2 of properties. The set no charge designing patients at the blackings, possible and be be because in charge and because the charge patient to be noticing leditively behalf as the flow was conveying the days patient to an activity leditively on the behalf as the charge facility in constructing the charge facility in the conveying the properties are also as a conveying to the conveying to the charge of th	have it a line point along I'm lais Dorman Rid where a Notice gets Booded, heed to add distriction transful to service carefula. Will need to accuse vive
TSOC	a di	a di	3	LOW	Low	a and	Medium		
ROSe Section 1	Mo	2	Ne	Mo	No	940	Yes		Yes
Ere Water Impact	Agailer	Apuller	Agades	Applier	Ander	Acpallac	Apple		Acader
Erosion Severity	*	N/A	N.	N/A	N/A	N. N.	MA		
Flooding Severity	Medium	Medium	Mediam	Medium	Medium	Medium	Wedien	Median	-
Residue Eresion Maktineance Severity Severity	Comment	Medium	Medium Medium	Medium	Medium	Medium	Medium	1	Maritan
Public Salety Threat	Medium	Medium	Medern	Low	LOSE	MOI	Medium		
Within Floors A	3	ď	2	OM.	No	No	98		
No. of Affected Properties		,	,	1	NGA				THE REAL PROPERTY.
Site Type of Score Rossbary	1	Coffector	Collector	Highway	Highway	Collector	ļ		1
Score	n.	173	m	952	152	N.			1000
- <u>F</u>		Towns of		Paditon	Cherron	Kho habels fore	Oralin ten Jese Anico		
ž «	P 18	Atual St.	Oratan Santa Bernandita	Digital 28)	RT2	Dants Ter Lisk Deents	FT 78	Challen Tun Lide	5 1
# 0	101-14	Y1-102	Oradan Sanza YF103 Bernandita	Y1-107	Y1-109	YFIDA	Vi-108	ALIDA D	
S. Ref.	T. Te	7. d	1	Ü	100			TEN.	

Guam Stormwater Drainage Master Plan <u>Yona Village</u> Site Evaluations

ğ	347,000	\$134,000	00075125	\$11,300	\$141,000	200,500	\$117,000
Proposed improvements	assembled particular in a serior or Victoria and execution in the serior of the serior	Recomment of Etablication story teaching edge (where undermising to countrie) and planeauming of a story date of the story and planeauming of a story date of the story of the	Software may stabilization is nowford in the vicinity of the briting approach take. Recommend the discernent of approximately 400 at it is plaint along the north and poofs refinement and 300 and for the part at the bottom of each enclassioners. A quarter zero of other removal is required for maintenance.	incremental improvements to the a-biding donormative publishing prevention statisty for this making construction to be in the form of a care of hydranishes and 2000 U. of sitt lence to prevent inclinate from more rail government.	. Well to see the process of the pro	The second distance of a term delta spiran shop the sold. Place 2 considerable (short p.C.) spiranged still a policial as stack soldering to a 180 5° (sy rep congradation) and stacked of second spiral stacked second.	Patronnement placement of a sterm slowle system along the road. Here 2 catch hasee at two points, promental by 100 ls of 24" EXP centricity to natural strongs path through a headmostly integral abstratus wayagesed with a 100 SF up may moving disclaring.
Miligation Effort	7 Couch States; 400 LF 34" RCP, 1 Headen LAWIngersk, 100 SF Rp. Rep. 250 LF Inf Trench	2 Couch Basing 100 LF 24" NCP; 200 SF Np lkp	1/4 AC Disloris Removed, 1000 SF Rije Rags, 800 SF Cashions	1 AC Hydroewddy, 1,000 US SB Pence	1,000 SF Debris Removal; 1,000 SF No hay	2 A.C.Spilleraye; 600 Cf. Rip Rap. 1/4 A.C. Delen Responsi	2 Catch Basem; 100 LF 24" RCP; 1 Headwalf/Mingsmal; 100 SF Rip Rep
Attigation Tape	Some Drah	00331	7 . 8	Erguna Control P	Storm Drain Imperovement/ Compensation (Administration) 1 Erosion Control (Streeters) 1	Stores Drain Improvement Conveyance Maintenance (Experience	Sorm Drain I
Ste Assessment	The fow arts of this storest's fills and five properties gas Boodad, And a dashage proventionars beginn middle you had not been the residues gastless of the sect of the seven-	Constant undermining of randowy from premisely to Vig river, Head permisers and this litteria, possibly dense shade condeny.	Fig. 94(g), undermissing of approach claim on both morts and south endoachecast. Blend to add more palatons to approach claim endoachements, rainfa section to its score granditions.	have development short, RM. Histor grading of dispert, no visible ages of temporary enterine control measures. Sectioners will go to the last deventures if no control measures in implementaries.	has east of Tig, ther creating at a madeway care a lose public is created leader the cares and position by creating and control resolute, which is build an exemble drain with figure, to receive the late Tig serve determinates and receive details.	Read embassionals are very takes. To prevent createst from meditum, a spirite diass because it actuals on pools sider of read at they point of read and correle drawn with Pringe Johan.	At long point of street is knowns got flooded, homes are lower than the road. Need to add a drainage conveyence: system along road and rostrie it in the natural flow path, session a private property where assertent will recal to be equalizated.
COST		ion	Median	3	ğ	4	ag)
2 1	3	4	9	9	1	2	ŗ
	1	Chantipl	Coastal	Countral	lufter and	, and a	Surface
Eresion	\$	ş		3	*		W
Flooding Severity	1	M/A	*	MA	1	N/N	
1		ac)	Mundo	ag ₁	3	1	4
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	Median		100			
Flood A	3		,d	2	ē	2	1
Affactad Properties	•	V/M	MA	N/A	d _M		
Type of Bondsony	1	Collector	1	Physical		Coffeeton	1
a §		166	136	133			R
ğ =	77-7-17						
Loc A	ij	11	V.11	B17.4	11	And in case of the last of the	Chelto
Į e	TO-DE	VO-307	VO.306	M-ON	#01-0H	10.104	Chellan YO-102 Tok-folo
Site							