

MEMORANDUM

Prepared for: Marianne Bishop, San Ignacio Homeowner's Association

Prepared by: Kara D. Festa, P.E., WestLand Resources, Inc.

cc: Mark Ostermann., WestLand Resources, Inc.
Steve Olivero, WestLand Resources, Inc.

Date: August 21, 2012

RE: **EROSION AND SEDIMENT CONTROL
WESTLAND PROJECT NO. 1766.01**



INTRODUCTION

WestLand Resources, Inc. (WestLand) has been contracted by San Ignacio Vistas Homeowner's Association (HOA) to prepare this memorandum for the San Ignacio Vistas subdivision to identify and address areas of slope erosion and sediment control. This 228 lot subdivision (the Project) is located in Green Valley, north of the Interstate 19 (I-19) and Canoa Road interchange, at the northeast corner of Calle Tres and Camino Del Sol (see location map, *Figure 1*). The subdivision is bordered on the north by the Demetrie Wash and on the east side by I-19.

Similar to many of the existing subdivisions in Green Valley located west of I-19, the Project was constructed by leveling off and filling of the existing hills that were significantly higher in elevation than the existing I-19/Demetrie Wash corridors. As a result, this created significant sloping around the entire perimeter of the Project.

Initial construction utilized rock riprap, revegetation, benching, and drainage swales to stabilize the slopes and direct drainage flow.

The majority of the interior north-south running streets utilize a varying-width common area between the back of lots and the street to catch grade. This area also varies in slope and is treated with varying degrees of rock riprap, revegetation, drainage swales and drainage structures (area drains and piping).

SITE VISIT

WestLand personnel visited the Project site and met with HOA personnel on July 16, 2012. The Project site in general appears to be well maintained and in good condition. It was noted that the street surfaces have recently been resealed. The perimeter of the Project, as well as the interior streets, were visually surveyed and photographs were taken (*Appendix A*). The majority of the exterior and interior slopes appear to be in acceptable, functioning condition.

The following section of this memorandum addresses the problem areas that were identified during the site visit and offers suggestions and/or alternatives (if available) for the treatment and/or maintenance of these areas. In addition, this report includes an opinion of probable cost associated with the suggested treatments (*Appendix B*).

PERIMETER SLOPES

AREA 1

Area 1 is located on the east side of Camino Del Sol between Vista Ridge Drive and Calle Tres (*Figure 1*). It is our understanding that in 2004 a contractor was utilized for the placement of rock riprap on filter fabric to stabilize the slopes in this area.

As depicted in (Photos No.1 through 4), it is noted that drainage rivulets are occurring between the existing riprap areas that have no vegetative cover. Compounding this problem is drainage that runs downhill to the west from an existing bench/swale that occurs roughly halfway up the slope (Photos No 5 and 6). This drainage appears to be intended to travel southerly along the bench/swale to reach the existing retention basin/drainage structures located at the northern corner of Calle Tres and Camino Del Sol (Photo No. 7).

Suggested Treatment

The rivulets in this area are a common occurrence throughout Southern Arizona due to the soil characteristics, especially in areas with steep unvegetated slopes. There are some locations where extending the filter fabric and riprap will aid in the protection and stabilization of the slope, and other areas where we suggest filling/scarifying the slopes and applying an approved native seed mix.

In addition, we suggest that minor grading occur along the bench/swale locations to ensure positive drainage towards the south and into the existing retention basin area.

Suggested Maintenance

Maintenance of all drainage channels, swales, piping, structures and riprap should occur no less than annually and these areas should also be inspected for possible additional repair or maintenance following significant rainfall events.

AREA 2

Area 2 is located along the back of the lots north of Calle Tres and east of View Ridge Drive (*Figure 1*). This area is currently utilizing a bench/swale with straw waddles (Photo No. 8) located approximately halfway up the slope from Calle Tres toward the back of the lots. This treatment appears to be functioning and no rivulets of any significance were noted downhill from Area 2.

There are some minor rivulets occurring north of this bench/swale (Photo No. 9) and some erosion occurring near the rear of Lot 138.

Suggested Treatment

These locations appear to be treatable by placing riprap in the area behind Lot 138, exercising caution not to disturb or remove any of the existing trees or vegetation, and by performing some minor regrading in the areas of the rivulets and applying an approved native seed mix.

Suggested Maintenance

Inspection of these areas should occur no less than annually and also following significant rainfall events to ensure that the bench/swale and straw waddles are still functioning properly and that no additional erosion is occurring behind Lot 138.

INTERIOR SLOPES

AREA 3

Area 3 is located at the southwest corner of Gloria Vista Drive and Vista Ridge Drive (*Figure 1*). This location has an existing functioning riprap swale that runs from the corner of Lot 206 to the handicap access ramp at the southeast corner of Gloria Vista Drive and Vista Ridge Drive (Photos No. 10 and 11).

Nuisance drainage from the earthen/landscaped common area between the back of lots and the street is not making its way to the existing swale and is overtopping the existing concrete curb depositing sediment along the roadway (Photo No. 12).

Suggested Treatment

It is recommended that an approximate 2-foot wide riprap swale be constructed in the common area to direct and carry this flow into the existing riprap lined channel. In addition, in areas where sediment is overtopping the back of curbs, we suggest removing a 2-foot wide swath of dirt, approximately 8-inches deep and placing riprap in this area, directly behind and even with the top of the existing back of the curbs. This will allow sediment to be captured within the rock and allow drainage to follow the intended pattern.

Suggested Maintenance

Inspection of these areas should occur no less than annually and also following significant rainfall events. Riprap that is not grouted will retain sediment and eventually be rendered ineffective. These areas will need to be maintained and cleared of sediment on a regular basis.

AREA 4

Area 4 is the common area located southwest of the bend of Vista Ridge Drive, west of the intersection with Hidden Crest Court (*Figure 1*). Part of this area's drainage scheme begins at an area drain inlet located at the southwest corner of Vista Ridge Drive and Harvest Moon Drive (Photo No. 13). At the time of the site visit this drain was partially clogged with sediment and debris from nearby vegetation. This drainage flows through piping to another area drain located west of the guest parking (Photo No. 14). From this point the drainage is carried east under View Ridge Drive to its release point in the common area between Lots 88 and 89. In addition some of the post barricades are loose due to erosion around the base and should be reset.

The drainage structures and piping appear to be functioning as intended. However, sediment from the swale west of View Ridge Drive is being deposited at the northwest corner of the paved guest parking area (Photo No. 15)

Suggested Treatment

Some grading needs to occur in this area to provide positive drainage towards the area drain away from the edge of the guest parking area. As an addition or alternate, a concrete curb could be added at this location from the existing curb termination to just past the second post barricade.

The earthen/landscaped common areas feeding into this area drain also needs to have some minor grading to install for a 2 to 3-foot wide riprap swale behind the parking area to direct the drainage flow into the existing riprap collection area. The area of rip rap surrounding this area drain is full of sediment and should be cleaned out.

Suggested Maintenance

Maintenance of all drainage channels, swales, piping, structures and riprap should occur no less than annually and these areas should also be inspected for possible additional repair or maintenance following significant rainfall events.

AREA 5

Area 5 is the common area located west of View Ridge Drive from Sonoran View Drive to the pedestal mailbox (*Figure 1*). Photos No. 16 through 18 were taken along the west side of View Ridge Drive from the pedestal mailbox towards Sonoran View Drive. The photos demonstrate that the flows run down the hill and past the existing curb and deposits sediment on the roadway. Photo No. 17 shows an area where over time the curb and roadway have sunk creating a low spot that holds water (birdbath).

Suggested Treatment

In areas where sediment is running over the back of curbs, we suggest removing a 2-foot wide swath of dirt, approximately 8-inches deep and placing riprap in this area, directly behind and even with the top of the existing back of the curbs. This will allow sediment to be captured within the rock.

In the area of the birdbath, we suggest removing and replacing the asphalt and curb as this condition will only worsen with time due to the effect of standing water on pavement and underlying soil.

Suggested Maintenance

Maintenance of all drainage channels, swales, piping, structures and riprap should occur no less than annually and these areas should also be inspected for possible additional repair or maintenance following significant rainfall events.

Riprap that is not grouted will retain sediment and eventually be rendered ineffective. These areas need to be maintained and cleared of sediment on a regular basis.

AREA 6

Area 6 is located behind the rear lot wall of Lots 3 – 5. Additional photos were made available for WestLand to view via Picasa Website by the HOA. These photos were not available for download, therefore are not included within this report.

The rip-rap located behind Lot 3 appears to be stable, with some minor sedimentation within the rock. This does not appear to be hindering the drainage in this area.

An exposed stem wall/retaining wall is depicted in the photos behind the corner where Lot 3 and 4 meet. This area appears to be stable and there is some scattered existing vegetation on this slope.

The rip-rap behind Lot 5 also appears to be stable and performing as intended.

There is some minor sedimentation and rock displacement behind Lot 4. The slope leading down towards Calle Tres appears to have some piles of landscape debris and areas of scarce vegetation.

Suggested Treatment

The area behind Lot 4 should have some additional rip-rap with filter fabric placed in the void areas near the wall. WestLand also suggests re-seeding of some of the barren areas on the slope towards Calle Tres.

Suggested Maintenance

The piles of landscaping debris should be removed and properly disposed of by the HOA landscaping company that is under contract.

There is an area depicted on the last few photos where the drainage from this area collects near Calle Tres. This area appears to be within the Calle Tres right-of-way and should not be the responsibility of the HOA.

SUMMARY

This report demonstrates and confirms that there are some areas of minor exterior slope erosion and sediment deposit within areas of the interior streets. The recommendations of this report offer feasible solutions for these problem areas provided that sound engineering and construction standards are implemented. In closing, WestLand would like to reiterate the importance of periodic maintenance of all drainage channels, swales, piping, structures and riprap areas to remove sediment build up and to ensure proper drainage flow.

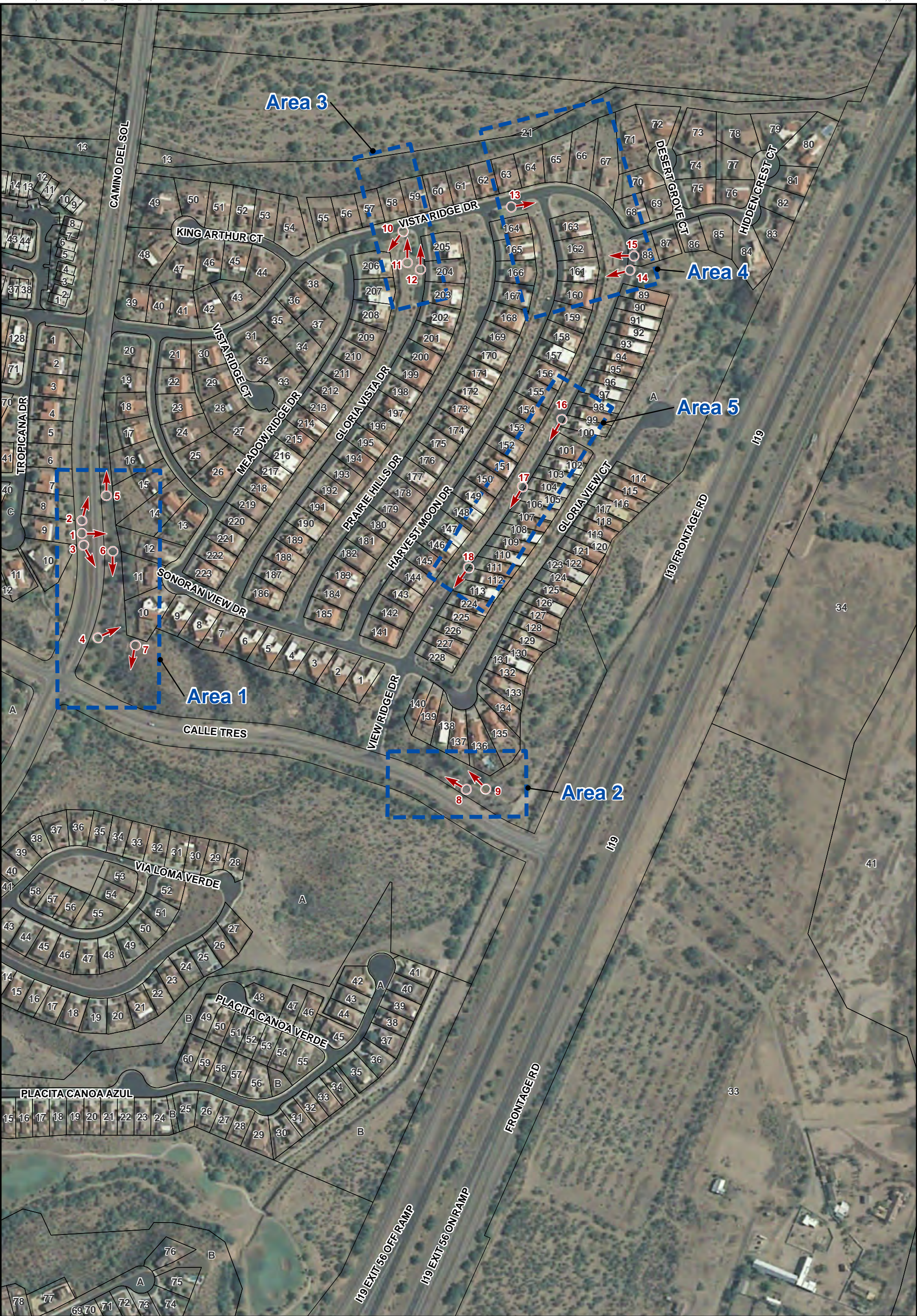
Figure 1. Location and Photopoint Map

Attachment A. Selected Photopages

Attachment B. Opinions of Probable Cost



FIGURE



Portion of the San Ignacio de la Canoa Land Grant,
Pima County, Arizona,
Esperanza Mill USGS 7.5' Quadrangle
Photo Source: 2010 National Agriculture Imagery Program



ATTACHMENT A

PHOTOPAGES



Photo 1. Area 1 – Bottom slope adjacent to Camino Del Sol looking east.



Photo 2. Area 1 – Bottom slope adjacent to Camino Del Sol looking north.



Photo 3. Area 1 – Bottom slope adjacent to Camino Del Sol looking south.



Photo 4. Area 1 – Bottom slope adjacent to Camino Del Sol looking east towards the back corner of Lot 10.



Photo 5. Area 1- Mid-slope bench/swale looking north.



Photo 6. Area 1 – Mid-slope bench/swale looking south.



Photo 7. Area 1 – Mid-slope bench/swale looking south towards retention basin/drainage structures.



Photo 8. Area 2 – Mid-slope bench/swale with straw waddles looking west.



Photo 9. Area 2 – From mid-slope bench/swale looking north.



Photo 10. Area 3 – Looking west towards corner of Lot 206.



Photo11. Area 3 – From common area east of Lot 206 looking north.



Photo 12. Area 3 – West edge of Gloria Vista Drive looking north towards Vista Ridge Drive.



Photo 13. Area 4 – Drainage inlet at southwest corner of Vista Ridge and Harvest Moon Drive looking east.



Photo 14. Area 4 – Riprap collection area and area drain – View Ridge Drive at Hidden Crest Court looking west.



Photo 15. Area 4 – Common area, riprap collection area and guest parking. View Ridge Drive at Hidden Crest Court looking west.



Photo 16. Area 5 – View Ridge Drive looking south.



Photo 17. Area 5 – View Ridge Drive looking south (birdbath).



Photo 18. Area 5 – View Ridge Drive looking south.

ATTACHMENT B

OPINION OF PROBABLE COST

OPINION OF PROBABLE CONSTRUCTION COST

Project Name: San Ignacio Vistas Subdivision

Project No. 1766.01

Location: Green Valley

Description: Erosion and Sediment Control

Prepared by: Mark Ostermann

8/21/12

Checked by: Kara D. Festa, P.E.

Date: 8/22/12

Client: San Ignacio Vistas Homeowner's Association

Item No.	Item Description	Unit	Quantity	Unit Price	Amount	Remarks
1	Area 1*	LS	1	\$23,900	\$23,900	Expand riprap filter fabric (appx. 300 sy), re-seeding (appx.150 sy) and re-grading mid-slope swale (appx. 400 LF).
2	Area 2*	LS	1	\$4,000	\$4,000	Expand riprap filter fabric (appx. 50 sy) and re-seeding (appx. 30 sy).
3	Area 3*	LS	1	\$9,200	\$9,200	Re-grade cut-in 2 feet, riprap swale (appx. 45 sy) with filter fabric (appx. 70 sy).
4	Area 4*	LS	1	\$4,200	\$4,200	Re-grade cut-in 2 feet, riprap swale with filter fabric (appx. 25 sy), re-anchor post barricades (4), cleanout riprap collection area (appx. 70 sy), add concrete vertical curb (appx. 15 lf).
5	Area 5*	LS	1	\$23,600	\$23,600	Remove 2 feet of material behind curb and replace with riprap (appx. 270 sy). Remove and replace concrete curb and pavement (appx. 25 sy).
6	Area 6*	LS	1	\$1,675	\$1,675	Expand riprap and filter fabric (appx.15 sy), and reseed (appx. 50 sy).
	Total				\$66,575	

*Refer to Figure 1 for area delineation