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# **TECHNICAL REPORT ON THE MINERAL RESOURCE UPDATE FOR THE JUANICPIO JOINT VENTURE, ZACATECAS STATE, MEXICO**

**NI 43-101 Report**

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**June 12, 2014  
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# TABLE OF CONTENTS

	PAGE
1 SUMMARY .....	1-1
Executive Summary .....	1-1
Technical Summary .....	1-5
2 INTRODUCTION .....	2-1
3 RELIANCE ON OTHER EXPERTS .....	3-1
4 PROPERTY DESCRIPTION AND LOCATION .....	4-1
5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY .....	5-1
6 HISTORY .....	6-1
Prior Ownership .....	6-1
Exploration History .....	6-2
Previous Mineral Resource Estimates .....	6-2
Scoping Study - 2009 .....	6-4
7 GEOLOGICAL SETTING AND MINERALIZATION .....	7-1
Regional Geology .....	7-1
Property Geology .....	7-5
Mineralization .....	7-9
8 DEPOSIT TYPES .....	8-1
9 EXPLORATION .....	9-1
10 DRILLING .....	10-1
11 SAMPLE PREPARATION, ANALYSES AND SECURITY .....	11-1
Sampling Method and Approach .....	11-1
Sample Preparation and Analysis .....	11-2
Quality Assurance and Quality Control .....	11-3
Core Storage and Security .....	11-7
12 DATA VERIFICATION .....	12-1
Site Visit and Core Review .....	12-1
Independent Check Samples .....	12-1
Assay Table Review .....	12-2
13 MINERAL PROCESSING AND METALLURGICAL TESTING .....	13-1
Metallurgical Testing .....	13-1
Implications for Process Design .....	13-5
Recoveries and Concentrate Grades .....	13-6
Metallurgical Study Update .....	13-6
14 MINERAL RESOURCE ESTIMATE .....	14-1
Resource Database .....	14-1

Geological Interpretation and 3D Solids .....	14-2
Statistical Analysis .....	14-6
Cutting High-Grade Values .....	14-7
Compositing.....	14-11
Interpolation Parameters.....	14-13
Density .....	14-19
Block Model .....	14-20
NSR Cut-off Value .....	14-20
Classification .....	14-21
Mineral Resource Reporting .....	14-22
Mineral Resource Validation .....	14-24
Comparison to Previous Estimate .....	14-25
15 MINERAL RESERVE ESTIMATE .....	15-1
16 MINING METHODS.....	16-1
Geotechnical Considerations .....	16-1
Mining Method .....	16-3
Production Rate .....	16-4
Backfilling Method.....	16-4
Haulage .....	16-4
Access Development .....	16-5
Ventilation.....	16-5
Stoping .....	16-6
Tonnage and Grade of Material to be Mined and Milled.....	16-9
Underground Mobile Equipment .....	16-10
Update Since the 2012 PEA .....	16-14
17 RECOVERY METHODS.....	17-1
Processing Plant and Operations.....	17-1
18 PROJECT INFRASTRUCTURE .....	18-1
Site Layout.....	18-1
Access Road .....	18-1
Power Supply .....	18-1
Water Supply .....	18-3
Stockpiles .....	18-4
Paste Fill Plant.....	18-4
Tailings Storage.....	18-4
Other Surface Facilities.....	18-7
19 MARKET STUDIES AND CONTRACTS.....	19-1
Metal Prices.....	19-1
Marketing.....	19-1
20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT .....	20-1
21 CAPITAL AND OPERATING COSTS .....	21-1
Capital Costs .....	21-1

Operating Costs.....	21-6
22 ECONOMIC ANALYSIS.....	22-1
Overview and Modelling Assumptions .....	22-1
Taxes.....	22-2
Revenue Assumptions .....	22-3
Analysis of Project Economics .....	22-3
Life-of-Mine Cash Flow .....	22-5
Revenue .....	22-7
Off-site Costs.....	22-9
Sensitivity to Metal Prices and Costs .....	22-9
23 ADJACENT PROPERTIES.....	23-1
24 OTHER RELEVANT DATA AND INFORMATION.....	24-1
Project Development Schedule .....	24-1
Mine Development Schedule .....	24-1
Mill Feed Schedule .....	24-2
Waste Rock Production .....	24-4
Run-of-Mine Stockpile.....	24-5
Vertical Development.....	24-5
Trucking Schedule .....	24-5
Concentrate Production Schedule.....	24-5
25 INTERPRETATION AND CONCLUSIONS .....	25-1
2014 Mineral Resource Estimate Interpretation and Conclusions .....	25-1
2012 PEA Interpretation and Conclusions.....	25-2
26 RECOMMENDATIONS.....	26-1
27 REFERENCES .....	27-1
28 DATE AND SIGNATURE PAGE .....	28-1
29 CERTIFICATE OF QUALIFIED PERSON.....	29-1
30 APPENDIX 1 .....	30-1
List of Drill Holes.....	30-1

## LIST OF TABLES

	PAGE
Table 1-1 Mineral Resources By Metal Zone (100% Basis) .....	1-3
Table 1-2 Juanicipio Joint Venture Mineral Resources (100% Basis) .....	1-4
Table 1-3 Proposed Budget (100% Basis) .....	1-5
Table 1-4 Mill Recoveries and Concentrate Grades.....	1-10
Table 1-5 Tonnage of Material Mined and Processed as a Basis for the Preliminary Economic Assessment .....	1-12
Table 1-6 Summary of Financial Results .....	1-14
Table 4-1 Tenure Data.....	4-1

Table 7-1	Stratigraphy of the Fresnillo District .....	7-4
Table 7-2	Select Drill Hole Intersections .....	7-11
Table 12-1	Check Sample Results.....	12-2
Table 13-1	Metallurgical Balance from General Composite Sample .....	13-3
Table 13-2	Summary of Flotation Tests on General and Section Composites.....	13-4
Table 13-3	Flotation Reagent Suites.....	13-5
Table 13-4	Head Grades Used for Test Work and for Process Design .....	13-5
Table 13-6	Mill Recoveries and Concentrate Grades.....	13-6
Table 14-1	Descriptive Statistics of Resource Assay Values .....	14-6
Table 14-2	Descriptive Statistics of Cut Resource Assay Values .....	14-10
Table 14-3	Descriptive Statistics of Composite Values .....	14-12
Table 14-4	Block Estimate Search Strategy.....	14-13
Table 14-5	Comparison Statistics of Density Measurements and Block Estimates .....	14-19
Table 14-6	Juanicipio Joint Venture Mineral Resources (100% Basis) – December 31, 2013 .....	14-23
Table 14-7	Mineral Resources By Metal Zone – December 31, 2013 .....	14-24
Table 14-8	Tonnage and Grade by Cut-off – December 31, 2013.....	14-24
Table 14-9	Volume Comparison .....	14-25
Table 14-10	Comparison to RPA 2011 Resource Estimate.....	14-26
Table 14-11	Comparison of RPA and Strathcona Results.....	14-27
Table 16-1	Tonnage of Material Mined and Processed as a Basis for the Preliminary Economic Assessment .....	16-9
Table 16-2	Design Assumptions .....	16-10
Table 16-3	Underground Mobile Equipment Fleet.....	16-11
Table 18-1	Estimated Site Power Demand .....	18-3
Table 18-2	Estimate of Site Water Usage .....	18-3
Table 19-1	Lead Concentrate Treatment Terms .....	19-2
Table 19-2	Zinc Concentrate Treatment Terms .....	19-2
Table 19-3	Concentrate Transport Costs .....	19-3
Table 21-1	Summary Capital Costs .....	21-1
Table 21-2	Mine Capital Costs (Direct Costs) .....	21-2
Table 21-3	Mill Capital Costs (Direct Costs).....	21-3
Table 21-4	Infrastructure Capital Costs (Direct Costs).....	21-4
Table 21-5	Indirect Capital Cost Summary .....	21-5
Table 21-6	Owners and EPCM Costs .....	21-5
Table 21-7	Details of Capitalized Operating Costs.....	21-6
Table 21-8	Capital Contingency.....	21-6
Table 21-9	Summary of Life-of-Mine Site Operating Costs .....	21-7
Table 21-10	Operating Costs per Tonne Milled.....	21-8
Table 21-11	Average Total Employment Costs per Person per Year .....	21-8
Table 21-12	Life-of-Mine Underground Mine Operating Costs .....	21-9
Table 21-13	Life-of-Mine Mill Operating Costs .....	21-9
Table 21-14	Life-of-Mine General and Administration Operating Costs .....	21-10
Table 21-15	Estimated Annual Power Costs (Year 10) .....	21-11
Table 21-16	Estimated Employee Numbers.....	21-11
Table 22-1	Summary of Project Physical Parameters .....	22-4
Table 22-2	Summary of Project Costs .....	22-4
Table 22-3	Summary of Financial Results .....	22-5
Table 22-4	Revenue by Concentrate Type and by Metal .....	22-7
Table 22-5	Off-site Concentrate Treatment Costs.....	22-9
Table 22-6	Comparison of Economic Parameters to Changes in Metal Prices.....	22-11
Table 22-7	Sensitivity of NPV to Changes in Prices and Discount Rates .....	22-12

Table 22-8	Sensitivity to the Silver Refining Charge .....	22-12
Table 24-1	Key Scheduling Parameters.....	24-1
Table 24-2	Total Mine Development Quantities .....	24-2
Table 24-3	Project Development Milestones.....	24-2
Table 24-4	Mill Feed Schedule .....	24-3
Table 24-5	Development Waste Production.....	24-4
Table 26-1	Proposed Budget (100% Basis) .....	26-1

## LIST OF FIGURES

	PAGE
Figure 4-1 Location Map.....	4-3
Figure 4-2 Claim Map .....	4-4
Figure 7-1 Regional Geology .....	7-2
Figure 7-2 Regional Stratigraphy .....	7-3
Figure 7-3 Property Geology.....	7-8
Figure 10-1 Drill Hole Plan Map.....	10-2
Figure 11-1 Blank Results for Silver.....	11-4
Figure 11-2 Control Chart for CRM AL222542 .....	11-5
Figure 11-3 Control Chart for CRM BL.....	11-5
Figure 11-4 Control Chart IPL Versus ALS Duplicates .....	11-6
Figure 11-5 Control Chart ACME Versus ALS Duplicates .....	11-6
Figure 14-1 3D View of Wireframe Models .....	14-4
Figure 14-2 3D View of Block Model Silver Grades.....	14-5
Figure 14-3 Histogram of Silver Resource Assays (n=1120).....	14-8
Figure 14-4 Histogram of Gold Resource Assays (n=1120) .....	14-8
Figure 14-5 Histogram of Lead Resource Assays (n=1120).....	14-9
Figure 14-6 Histogram of Zinc Resource Assays (n=1120).....	14-9
Figure 14-7 Histogram of Sample Lengths (n=1120) .....	14-11
Figure 14-8 Vertical Section 2200SE .....	14-14
Figure 14-9 Vertical Section 2400SE .....	14-15
Figure 14-10 Level Plan 1740Z.....	14-16
Figure 14-11 Level Plan 1590Z.....	14-17
Figure 14-12 Inclined Longitudinal Section .....	14-18
Figure 16-1 Plan of the Mine Development Layout .....	16-7
Figure 16-2 Sectional View of the Mine Development.....	16-8
Figure 16-3 Schematic of the Proposed Valdecañas/Desprendido Pumping System....	16-13
Figure 17-1 Process Flow Sheet.....	17-2
Figure 17-2 Plant General Arrangement .....	17-3
Figure 17-3 Plant Sections.....	17-4
Figure 18-1 Site Layout Concept .....	18-2
Figure 18-2 Concept Design of Tailings Storage Facility.....	18-6
Figure 21-1 Schedule of Site Operating Costs .....	21-7
Figure 21-2 Schedule of Estimated Employee Numbers.....	21-12
Figure 22-1 Life-of-Mine Costs and Net Cash Flow after Tax (Undiscounted).....	22-6
Figure 22-2 Costs and Cumulative Net Cash Flow after Tax (Undiscounted).....	22-6
Figure 22-3 Revenue by Concentrate Type .....	22-7
Figure 22-4 Total Revenue by Metal.....	22-8
Figure 22-5 Life-of-Mine Revenue by Metal .....	22-8

Figure 22-6	Sensitivity of after Tax NPV to Changes in Metal Prices and Costs .....	22-10
Figure 22-7	Sensitivity of NPV after Tax to Changes in Silver and Gold Prices.....	22-10
Figure 23-1	Adjacent Properties .....	23-2
Figure 24-1	Production Schedule by Period.....	24-3
Figure 24-2	Mill Feed Grade by Year .....	24-4
Figure 24-3	Lead and Zinc Concentrate Production – Tonnage Schedule .....	24-6

## LIST OF APPENDIX FIGURES & TABLES

	PAGE
Table 30-1	Summary of Drilling .....
	30-2



# 1 SUMMARY

## EXECUTIVE SUMMARY

Roscoe Postle Associates Inc. (RPA) was retained by MAG Silver Corp. (MAG) to update the Mineral Resource estimate and prepare an independent Technical Report on the Juanicipio Joint Venture in Zacatecas State, Mexico. This Technical Report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). MAG requires this report to support the updated Mineral Resource estimate for the property prepared by RPA and disclosed in a press release. RPA has visited the property several times, most recently on May 27, 2014. This Technical Report was amended as of June 30, 2014, to include enhanced cautionary language.

The Juanicipio property is owned by Minera Juanicipio S.A. de C.V. (Minera Juanicipio), a joint venture between Fresnillo plc (Fresnillo, 56%) and MAG (44%), with Fresnillo acting as the operator. The major asset associated with the Juanicipio Joint Venture is a silver-gold-lead-zinc epithermal vein deposit.

An updated Preliminary Economic Assessment (PEA) was carried out by AMC Mining Consultants (Canada) Ltd. (AMC) in 2012 (2012 PEA). The study defined Juanicipio as an economically robust, high-grade underground silver project exhibiting minimal financial or development risks that will produce an average of 15.1 million payable ounces of silver over the first full six years of commercial production and 10.3 million payable ounces per year over a 14.8 year total mine life. The 2012 PEA did not take into account any potential mining, processing, or infrastructure synergies from any association with the adjoining property owned by Fresnillo. The 2012 PEA was based on the resource estimate and model developed by Strathcona Mineral Services (Strathcona) dated November 2011.

The economic analysis in the PEA is preliminary in nature and is based, in part, on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the PEA will be realized.

On October 28, 2013, MAG announced that the Joint Venture had commenced underground development. The ramp advancement work is being conducted by a contractor using a conventional drill and blast method and a continuous miner where possible.

## **CONCLUSIONS**

MAG and joint venture partner Fresnillo have made a major discovery of low-sulphidation epithermal vein mineralization, located in the southwest part of the world-class Fresnillo silver mining district. The discovery is located in the northeast corner of the property and consists of two silver-gold-lead-zinc epithermal structures known as the Valdecañas and Juanicipio vein systems. Most exploration on the property has focused on these two vein systems. There is good exploration potential remaining at the Juanicipio Vein and elsewhere on the property, which remains largely underexplored. A significant exploration budget is warranted.

The updated Mineral Resource estimate reflects the drill results available as of December 31, 2013 including 40 new infill diamond drill holes completed since the previous resource estimate. The new estimate demonstrates a conversion of previously classified Inferred Resources into the Indicated category and reports a deep lower grade resource separately. The Mineral Resources on the Juanicipio Property are contained within the Valdecañas Vein system and the Juanicipio Vein. The updated resource estimate uses a cut-off of US\$70/tonne Net Smelter Return (NSR), which includes values for silver, gold and base metals.

The Valdecañas and Juanicipio Veins display the vertical grade transition from upper silver rich zones to deep gold and base metal dominant areas that is typical of Fresnillo District veins, and epithermal silver veins in general. Previous resource estimates were largely based on the upper silver rich zones with limited influence from the deep base metal dominant zone. The recent infill drilling has greatly improved discrimination of the vertical compositional zonations, allowing the updated Mineral Resource estimate reported here to be manually divided into the upper Bonanza Grade Silver Zone (BGS Zone) and the Deep Zone (Tables 1-1 and 1-2). This division highlights both the improved confidence in the BGS Zone, through conversion of previously categorized Inferred Resources into Indicated Resources, and the initial definition of the Deep Zone.

The increased drill density provides a better understanding of the vein geometry and indicates that the Valdecañas Vein comprises two overlapping “en-echelon” veins rather than a single vein offset by a fault. This reveals an area of overlap, with incrementally increased tonnage, especially in the BGS Zone. A number of new holes, targeted below the limits of the previous resource estimate, intersected significant widths (10.5 m to 25.8 m true thickness) of lower grade mineralization, which combined with previous deep intercepts led to the definition of the new Deep Zone resource.

**TABLE 1-1 MINERAL RESOURCES BY METAL ZONE (100% BASIS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Zone/Classification	Tonnage	Grade				Contained Metal			
		Ag	Au	Pb	Zn	Ag	Au	Pb	Zn
	(Mt)	(g/t)	(g/t)	(%)	(%)	(M oz)	(k oz)	(M lb)	(M lb)
Bonanza Grade Silver Zone									
Indicated	8.3	601	1.7	2.0	3.7	160	448	365	676
Inferred	2.4	626	1.9	1.4	2.2	48	146	74	114
Deep Zone									
Indicated	1.8	93	1.7	1.4	2.6	5	97	54	102
Inferred	2.7	146	2.0	2.1	3.4	13	173	128	203

Notes:

1. CIM definitions were followed for the classification of Mineral Resources.
2. Mineral Resources are estimated at an incremental NSR cut-off value of US\$70/tonne
3. NSR values are calculated in US\$ using factors of \$0.57 per g/t Ag, \$30.11 per g/t Au, \$9.07 per % Pb, and \$12.21 per % Zn. These factors are based on metal prices of US\$21.50/oz Ag, US\$1,250/oz Au, \$0.91/lb Pb, and \$0.99/lb Zn and estimated recoveries and smelter terms.
4. The Mineral Resource estimate uses drill hole data available as of December 31, 2013.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Totals may not add correctly due to rounding.

Combining the BSG Zone and the Deep Zone into a total resource by category, results in an overall increase in tonnage and a lower overall silver grade (Table 1-2).

**TABLE 1-2 JUANICIPIO JOINT VENTURE MINERAL RESOURCES (100% BASIS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Classification	Tonnage (Mt)	Grade				Contained Metal			
		Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Ag (M oz)	Au (k oz)	Pb (M lb)	Zn (M lb)
Indicated	10.1	511	1.7	1.9	3.5	166	544	419	778
Inferred	5.1	372	2.0	1.8	2.8	61	319	202	317

Notes:

1. CIM definitions were followed for the classification of Mineral Resources.
2. Mineral Resources are estimated at an incremental NSR cut-off value of US\$70 per tonne.
3. NSR values are calculated in US\$ using factors of \$0.57 per g/t Ag, \$30.11 per g/t Au, \$9.07 per % Pb, and \$12.21 per % Zn. These factors are based on metal prices of \$21.50/oz Ag, \$1,250/oz Au, \$0.91/lb Pb, and \$0.99/lb Zn and estimated recoveries and smelter terms.
4. The Mineral Resource estimate uses drill hole data available as of December 31, 2013.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Totals may not add correctly due to rounding.

In RPA's opinion the Juanicipio project has the potential to be developed into an economically robust, high-grade underground silver project. Further drilling and investigation work aimed at upgrading Inferred Mineral Resources and increasing the geotechnical and hydrogeological understanding of the deposit is required to form a firm base for the next stage of project design and evaluation.

RPA notes several changes since the 2012 PEA that would have an insignificant impact on the overall economic results:

- Updated Mineral Resource as described in this report
- Metal Prices
- Payment Terms for concentrate
- Cost Escalation
- New Gold and Silver Tax (0.5% Gross Revenue)
- New Mining Tax (7.5% on EBITDA)
- Increased Corporate Tax rate (30% from 28%)
- Increase in cut-off grade used to report Mineral Resources

RPA would expect an updated PEA to have similar economic results as the 2012 PEA, and believes that the 2012 PEA remains a reasonable representation of the property's economic potential.

## RECOMMENDATIONS

The Juanicipio property hosts a significant silver-gold-lead-zinc deposit and merits considerable additional exploration and development work. RPA recommends a budget of

US\$22.6 million (Table 1-3) for 2014 to advance the access ramp to the Valdecañas vein system and to explore elsewhere on the property. Work should include:

- Continuing to advance the underground access ramp. The budget in the 2012 PEA estimates this work to be \$11.4 million with MAG's 44% share being \$5 million.
- 10,000 m of drilling at the Valdecañas vein system to obtain a drill hole spacing no greater than 100 m in both the along-strike and up- and down-dip directions.
- 10,000 m of drilling for a property-wide exploration program including mapping, and drilling of new targets. Key criteria should be known mineralization, lineaments, and alteration.

In addition to the ramp advancement and continued drilling, RPA recommends the continuation of the environmental, engineering, and metallurgical studies as recommended in the 2012 PEA.

**TABLE 1-3 PROPOSED BUDGET (100% BASIS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Item	US\$ M
Ramp advancement	11.4
Drilling (~20,000 m)	3.6
Interpretation, resource update, etc.	0.1
Geotechnical and Engineering Studies	1.2
Metallurgical and Mill Design Studies	1.1
Permitting and Environmental Work	0.9
Operating Costs / Office	1.2
Infrastructure Studies	1.0
<b>Sub-total</b>	<b>20.5</b>
Contingency (10%)	2.1
<b>Total</b>	<b>22.6</b>

## TECHNICAL SUMMARY

### PROPERTY DESCRIPTION AND LOCATION

The Juanicipio Joint Venture consists of a single concession covering 7,679.21 ha in central Zacatecas State, Mexico. It is centred at approximately 102° 58' east longitude and 23° 05' north latitude.

## **LAND TENURE**

The Juanicipio 1 exploitation concession has a 50 year life from the date it was issued and will expire on December 12, 2055. The Juanicipio Joint Venture holds the surface ownership over the area of interest in the northeast portion of the property which encompasses the Valdecañas Vein system, Juanicipio Vein, and the proposed tailings storage site north of the Juanicipio 1 mining concession.

## **SITE INFRASTRUCTURE**

Site infrastructure consists of the following items:

- a series of roads used to access drill sites, the decline and the mill site,
- an underground access portal, and the start of an underground access ramp,
- a surface explosive magazine, and
- interim power lines.

## **HISTORY**

Silver mineralization in the Fresnillo area was discovered in 1554. Although no records exist prior to the 1970s, the Juanicipio property was likely prospected sporadically over the years because of its proximity to the Fresnillo mining area.

Industrias Peñoles S.A. de C.V. (Peñoles) drilled several holes to the northeast of the property in the 1970s and 1980s. Detailed exploration of the areas adjoining the Juanicipio property was initiated by Fresnillo in 2006 based on results from the Valdecañas Vein discovery.

From 1998 to 2001, Minera Sunshine S.A. de C.V. (Minera Sunshine) completed an exploration program consisting of property-wide geological mapping, preliminary rock chip sampling, and Landsat image and air photo analysis. This was followed by more detailed geological mapping in areas of interest, additional Landsat image analysis, detailed geochemical sampling, and a limited Natural Source Audio Magnetotelluric (NSAMT) geophysical survey. Drilling targets were identified, prioritized and fully permitted but never drilled due to Minera Sunshine's bankruptcy.

In July 2002, Minera Lagartos S.A. de C.V. (Minera Lagartos) optioned the Juanicipio 1 concession. On August 8, 2002, MAG entered into an agreement whereby it could acquire

98% of the issued and outstanding shares of Minera Lagartos. This agreement was later amended such that MAG could acquire a 99% interest in Minera Lagartos and a beneficial ownership of the remaining 1% interest.

From May 2003 to June 2004, MAG completed 10 drill holes for a total of 7,595 m and during this exploration program, discovered the Juanicipio Vein and cut what would later be discovered to be the upper and deep parts of the Valdecañas Vein outside of the thick and high grade Bonanza Zone.

On April 4, 2005, MAG announced that it had entered into a joint venture agreement with Peñoles whereby Peñoles could earn a 56% interest in the property. Fresnillo, then Peñoles' wholly-owned operating division, and MAG formed a new company, Minera Juanicipio, to operate the joint venture.

On July 25, 2008, MAG filed a Technical Report on the Juanicipio Project which included an initial Mineral Resource estimate. That report covered work on the property to December 31, 2007. The Mineral Resource estimate was then updated by RPA (then Scott Wilson RPA) in early 2009 based on drill hole results available to January 29, 2009. On September 14, 2009, MAG announced the results of the independent preliminary assessment by Tetra Tech WEI Inc. for development of the Valdecañas Vein as a potential stand-alone silver mine. On December 1, 2010, MAG announced a Juanicipio resource estimation and update prepared by RPA (then Scott Wilson RPA). A NI 43-101 Technical Report to support the resource update was filed on SEDAR on January 14, 2011. On November 10, 2011, MAG announced an updated Juanicipio resource estimate prepared by Strathcona on behalf of Minera Juanicipio. On December 19, 2011, MAG announced an updated resource estimate by RPA. On June 14, 2012, MAG announced an updated PEA study prepared by AMC on behalf of Minera Juanicipio. The 2012 PEA was based on the resource model prepared by Strathcona.

## **GEOLOGY**

The Juanicipio property lies on the western flank of the Central Altiplano, just east of the Sierra Madre Occidental range. Basement rocks underlying the western Altiplano are a late Palaeozoic to Mesozoic assemblage of marine sedimentary and submarine volcanic rocks belonging to the Guerrero Terrane that were obducted onto older Palaeozoic and Precambrian continental rocks during the early Jurassic. These were then overlapped by a

Jurassic-Cretaceous epi-continental marine and volcanic arc sequence that in the Fresnillo area is represented by the Proaño and Chilitos formations. The late Cretaceous to early Tertiary Laramide Orogeny folded and thrust faulted the basement rocks in the entire area and preceded the emplacement of mid-Tertiary plutons and related dykes and stocks.

On the Juanicipio property, the dominant structural features are: (i) 340° to 020°, or north-south structures; (ii) 290° to 310° trending, steeply dipping faults; and (iii) lesser 040° to 050° structures. From field observations, the north-south structures appear to be steeply dipping normal faults that cut and down-drop blocks of silicified tuff, especially in the vicinity of Linares Canyon. More important to the silicification appears to be the 290° to 310° trending, steeply to moderately dipping faults. These faults occur where silicification and advanced argillic alteration are most intense and may have served as major hydrothermal fluid pathways.

The two significant silver-gold epithermal structures discovered to date on the Juanicipio property are known as the Valdecañas and Juanicipio vein systems. Both veins strike east-southeast and dip 35° to 55° southwest. The Valdecañas structure hosts the majority of the Mineral Resources currently estimated on the property.

Mineralization consists of precious metal rich, banded, or brecciated quartz-pyrargyrite-acanthite-polybasite-galena-sphalerite veins. The veins have undergone multiple mineralizing events as suggested by various stages of brecciation and quartz sealing, local rhythmic microcrystalline quartz-pyrargyrite banding, and open-space cocks-comb textures and vuggy silica. The vein exhibits the characteristic metal zoning of the principal veins in the Fresnillo district, observed as a change from silver and gold rich zones at the top to increased base metals in the deeper intersections.

## **MINERAL RESOURCES**

A set of cross sections and plan views were interpreted to construct three-dimensional wireframe models of the mineralized veins using the descriptive logs, a minimum NSR value of approximately US\$70 per tonne, and a minimum thickness of two metres. Prior to compositing to two metre lengths, high grades were cut to 6,000 g/t Ag, 16 g/t Au, and 15% for both lead and zinc. Classification into the Indicated and Inferred categories was guided by the drill hole density and the apparent continuity of the mineralized zones.



The updated Mineral Resource estimate dated December 31, 2013 is listed in Table 1-1.

**The following summary sections are summarized from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012. In RPA's opinion, these sections remain reasonable for this stage of study.**

## **GEOTECHNICAL CONSIDERATIONS**

Cretaceous sedimentary rocks, which host the veins, are overlain by Tertiary volcanic rocks across the majority of the project site, except for two surface outcrops located southwest of the Valdecañas Vein. Rock quality in moderate to slightly weathered Cretaceous sedimentary rocks typically consist of poor to fair quality rocks with localized zones of high fracture frequency. Rock quality within the Tertiary volcanic rocks varies greatly from extremely poor to good. Veins are characterized by typically good rock quality, but geotechnical data relating to the veins is extremely limited.

Hydrogeological information on the project area has not yet been collected. The study assumes that the rock mass in the project area will be generally dry except in fault zones, which have been assumed to produce medium inflows.

## **MINING METHODS**

AMC considered use of the following stoping methods at the project:

- Down-hole benching with uncemented rockfill (modified Avoca).
- Long-hole open stoping (LHOS) with cemented backfill.
- Cut-and-fill with uncemented backfill.

In AMC's opinion, LHOS with cemented backfill is the most suitable method for the veins, mainly because of the higher recovery achievable using this method. LHOS with cemented backfill can be used in both steeply dipping and shallow dipping parts of the deposit. It is envisaged that some steeper dipping lower grade parts of the veins will be mined using the lower cost Avoca method.

Truck haulage, shaft hoisting, and conveying were considered for transferring ore and waste from the mine workings to surface. The trucking option was selected on the basis of its lower up-front capital cost and lower overall net present cost. However, there are relatively small

cost differences between the options and the trucking option is sensitive to future increases in fuel and labour costs. In AMC's opinion ongoing consideration is warranted on the option of constructing a hoisting shaft to a depth of about 450 m.

It is envisaged that access to the mine will be via a decline driven at a nominal gradient of 1:7. The access decline will connect to a number of internal declines providing access to stoping levels positioned at either 15 m or 20 m vertical intervals, depending on the dip of the vein. It is envisaged that mining will be carried out using modern trackless mining equipment. The proposed mine ventilation circuit will include a number of ventilation shafts, raise bored from surface.

## MINERAL PROCESSING

Two sets of metallurgical test work were carried out in 2008 and 2009, on metallurgical samples composited from drill holes samples taken from the Valdecañas Vein. No metallurgical test work has yet been carried out relating to the Juanicipio Vein.

The proposed process plant consists of a comminution circuit followed by the sequential flotation of a silver-rich lead concentrate, a zinc concentrate, and a gold-rich pyrite concentrate.

It is envisaged that the process plant will commence operation at a throughput rate of 850,000 tpa, which will be increased to 950,000 tpa when production from the Juanicipio Vein commences.

Estimated mill recoveries and concentrate grades are summarized in Table 1-4.

**TABLE 1-4 MILL RECOVERIES AND CONCENTRATE GRADES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	<b>Gold</b>	<b>Silver</b>	<b>Lead</b>	<b>Zinc</b>
Recoveries to lead concentrate	69%	81%	93%	8%
Lead concentrate grades	30.3 g/t	10,265 g/t	43.0%	6.7%
Recoveries to zinc concentrate	3%	7%	1%	87%
Zinc concentrate grades	0.95 g/t	637 g/t	0.33%	52.0%
Recovery to pyrite concentrate	19%	6%	–	–

## **PROJECT INFRASTRUCTURE**

A 9.8 km access road, mostly over hilly terrain, will be required to access the site. A two-lane unsealed road suitable for use by heavy vehicles hauling concentrates is proposed.

Power would be supplied to a main substation at the site via a 115 kV overhead power line from an existing power line and substation located to the north of the property. The line would have a length of approximately 5.2 km. The average power demand for the site is estimated at 11.9 MW.

Three water catchment dams are envisaged for the site. The dams would be used to store water from the mine dewatering system and from rainfall. A hydrogeological study will be carried out during further studies.

The Joint Venture has purchased 125 ha of relatively flat-lying land suitable and adequate for the proposed five million cubic metres tailings storage facility (TSF). This land lies to the northeast of the proposed mill site along the proposed access road from the JV area to the regional highway. The necessary detailed environmental and geotechnical studies for this TSF site have been outlined but not yet initiated.

## **PROJECT DEVELOPMENT AND PRODUCTION SCHEDULE**

Following satisfactory completion of further studies, and subject to the application for and grant of the necessary permits and licences, it is estimated that it will take approximately three and a half years to develop the project from the start of the box cut and portal to mill start-up.

The estimated tonnage and grade of material mined and processed that forms the basis for the economic assessment is set out in Table 1-5. Mill feed from vein development comprises approximately 19% of total mill feed, with the remainder from stoping operations.

**TABLE 1-5 TONNAGE OF MATERIAL MINED AND PROCESSED AS A BASIS FOR THE PRELIMINARY ECONOMIC ASSESSMENT**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	Million Tonnes	Grade				Contained Metal			
		Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)	Au (koz)	Ag (Moz)	Pb (Mlb)	Zn (Mlb)
Material derived from Indicated Resources	5.3	1.88	667	2.1	4.1	318	113	242	472
Material derived from Inferred Resources	4.9	1.46	408	1.6	2.9	230	65	169	311
External dilution	0.2	1.80	209	1.8	3.0	9	1	6	11
Waste	3.0	0	0	0	0	0	0	0	0

Note: The tonnage and grades of the material mined and processed were derived from the 2011 Strathcona Mineral Resources. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability

The tonnages and grades shown in Table 1-5 do not reflect the 2014 updated Mineral Resource estimate that includes 40 new infill diamond drill holes completed since the previous resource estimate, but rather have been derived from the Mineral Resource estimate and vein model prepared in 2011 by Strathcona by applying a \$65 NSR cut-off grade to the resource model and then allowing for dilution, and design and mining losses. Metal prices used in the NSR calculation were \$1,210 per ounce gold, \$22.10 per ounce silver, \$0.94 per pound lead, and \$0.90 per pound zinc and an exchange rate of 12.50 Mexican pesos to one US dollar. In developing the tonnage and grade estimates, stope blocks that were in contact with the property boundaries were excluded and zero grades have been assumed for the dilution material.

## CAPITAL AND OPERATING COSTS

Project capital is estimated at \$302 million, inclusive of capitalized operating costs (costs usually related to the operation of the mine, but incurred prior to first concentrate production). Sustaining capital of \$267 million results mainly from the need for ongoing mine development after concentrate production commences, including development of the Juanicipio Vein, and the need for mobile equipment replacements over the mine life.

Total site operating costs have been estimated at approximately \$67/t milled. The unit costs are broken down as follows:

- Mining: \$43.92/t milled.

- Milling: \$19.18/t milled.
- General and Administration: \$3.46/t milled.

## PROJECT REVENUE

Project economics have been analyzed using the following metal prices (Base Case Prices), which are based on the three year trailing average prices to the year ending December 2011:

- Silver price = \$23.39/oz
- Gold price = \$1,257/oz
- Lead price = \$0.95/lb
- Zinc price = \$0.91/lb

It is envisaged that silver rich zinc concentrate will be sold primarily to smelters in the Asian region. Lead concentrate could potentially be sold to a smelter in Mexico or exported to offshore smelters. The gold-rich pyrite concentrate will be sold to a customer able to recover the gold and silver values.

## ECONOMIC ANALYSIS

The economic analysis in the PEA is preliminary in nature and is based, in part, on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the PEA will be realized.

Table 1-6 summarizes the results of the economic analysis. Employee profit sharing (PTU) is not included in the financial estimates and the net present value (NPV) and internal rate of return (IRR) of the project may fluctuate depending on how the project is structured once it is in operation.

**TABLE 1-6 SUMMARY OF FINANCIAL RESULTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Item</b>	<b>Units</b>	<b>Value</b>
Revenue	\$M	4,992
Cash flow before tax	\$M	3,013
Tax	\$M	851
Cash flow after tax	\$M	2,162
Discount rate	%	5%
NPV before tax (5% discount rate)	\$M	1,762
IRR before tax	%	54%
NPV after tax (5% discount rate)	\$M	1,233
IRR after tax	%	43%
Peak debt	\$M	(302)
Payback from Year 1 (approximate)	yrs	5.6
Payback from mill start-up (approximate)	yrs	2.1
Project life from Year 1	yrs	19

Note: PTU is not included in the financial estimates.

## **SENSITIVITY**

The NPV of the project is most sensitive to changes in the silver price and will have similar sensitivity to silver head grade. The NPV is less sensitive to costs. The project maintains a positive NPV over the range of sensitivities tested.

## 2 INTRODUCTION

Roscoe Postle Associates Inc. (RPA) was retained by MAG Silver Corp. (MAG) to update the Mineral Resource estimate and to prepare an independent Technical Report on the Juanicipio Joint Venture in Zacatecas State, Mexico. This Technical Report conforms to National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101). MAG requires this report to support the updated Mineral Resource estimate for the property. This Technical Report was amended as of June 30, 2014, to include enhanced cautionary language.

MAG is listed on the Toronto Stock Exchange and on the NYSE Amex Equities. MAG's major assets are the Juanicipio Joint Venture Project, the subject of this report, and the Cinco de Mayo Project located in Chihuahua State, Mexico. The Juanicipio property is owned by Minera Juanicipio S.A. de C.V. (Minera Juanicipio), a joint venture between Fresnillo plc (Fresnillo, 56%) and MAG (44%), with Fresnillo acting as the operator. The major asset associated with the Juanicipio Joint Venture is a silver-gold-lead-zinc epithermal vein deposit.

An updated Preliminary Economic Assessment (PEA) was carried out by AMC in 2012. The study planned production at an average of 15.1 million payable ounces of silver over the first full six years of commercial production and 10.3 million payable ounces per year over a 14.8 year total mine life. The 2012 PEA did not take into account any potential mining, processing, or infrastructure synergies from an association with the adjoining property owned by Fresnillo. The PEA is based on the resource estimate and model developed by Strathcona dated November 2011.

The economic analysis in the PEA is preliminary in nature and is based, in part, on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the PEA will be realized.

### SOURCES OF INFORMATION

The most recent site visit to the property was carried out by David Ross, M.Sc., P.Geo., Principal Geologist with RPA, on May 27, 2014. Other site visits were carried out in 2010

and 2011. Mr. Ross examined core from numerous drill holes (M40, KE, M22, KG3, 18-R, NA, NF2, PD, and JC), visited active drill sites and underground development, and reviewed logging and sampling methods. Discussions have been held with:

- Mr. George Paspalas, President and CEO, MAG
- Dr. Peter Megaw, C.P.G., President of IMDEX, Director of MAG
- Lyle Hansen, Geotechnical Director, MAG
- Mr. Dan MacInnis, former President and CEO, MAG
- Mike Petrina, P.Eng., former Vice President Business Development, MAG
- Gabriel Arredondo, Geologist, Minera Cascabel
- Carlos Altamirano Morales, Fresnillo
- Jonathan Franco, Project Geologist, Fresnillo
- Polo Gonzalez, Geologist, Fresnillo

RPA has visited the property several times since the discovery of Juanicipio and Valdecañas vein systems. In December 2010, drill core from boreholes NA, NF2, PD, and JC was reviewed and compared with assay results and descriptive log records were made by Fresnillo geologists. RPA visited the core shack again in May 2011, and reviewed core from KG3 and again from NA. RPA visited the property and core shack most recently on May 27, 2014 and reviewed core from holes M40, KE, M22, and 18-R. In addition to reviewing core, RPA examined outcrops, drill rigs, sampling procedures, and other general exploration protocols in use by the Joint Venture.

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27, References.



## LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the metric system. All currency in this report is US dollars (US\$) unless otherwise noted.

a	annum	kWh	kilowatt-hour
A	ampere	L	litre
bbl	barrels	lb	pound
btu	British thermal units	L/s	litres per second
°C	degree Celsius	m	metre
C\$	Canadian dollars	M	mega (million); molar
cal	calorie	m <sup>2</sup>	square metre
cfm	cubic feet per minute	m <sup>3</sup>	cubic metre
cm	centimetre	μ	micron
cm <sup>2</sup>	square centimetre	MASL	metres above sea level
d	day	μg	microgram
dia	diameter	m <sup>3</sup> /h	cubic metres per hour
dmt	dry metric tonne	mi	mile
dwt	dead-weight ton	min	minute
°F	degree Fahrenheit	μm	micrometre
ft	foot	mm	millimetre
ft <sup>2</sup>	square foot	mph	miles per hour
ft <sup>3</sup>	cubic foot	MVA	megavolt-amperes
ft/s	foot per second	MW	megawatt
g	gram	MWh	megawatt-hour
G	giga (billion)	oz	Troy ounce (31.1035g)
Gal	Imperial gallon	oz/st, opt	ounce per short ton
g/L	gram per litre	ppb	part per billion
Gpm	Imperial gallons per minute	ppm	part per million
g/t	gram per tonne	psia	pound per square inch absolute
gr/ft <sup>3</sup>	grain per cubic foot	psig	pound per square inch gauge
gr/m <sup>3</sup>	grain per cubic metre	RL	relative elevation
ha	hectare	s	second
hp	horsepower	st	short ton
hr	hour	stpa	short ton per year
Hz	hertz	stpd	short ton per day
in.	inch	t	metric tonne
in <sup>2</sup>	square inch	tpa	metric tonne per year
J	joule	tpd	metric tonne per day
k	kilo (thousand)	US\$	United States dollar
kcal	kilocalorie	USg	United States gallon
kg	kilogram	USgpm	US gallon per minute
km	kilometre	V	volt
km <sup>2</sup>	square kilometre	W	watt
km/h	kilometre per hour	wmt	wet metric tonne
kPa	kilopascal	wt%	weight percent
kVA	kilovolt-amperes	yd <sup>3</sup>	cubic yard
kW	kilowatt	yr	year

### 3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA for MAG. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report;
- Assumptions, conditions, and qualifications as set forth in this report; and
- Data, reports, and other information supplied by MAG and other third party sources.

For the purpose of this report, RPA has relied on ownership information provided by MAG, including an independent opinion by Creel, García-Cuéllar, Aiza y Enríquez, of México, Mexico, dated September 5, 2012. RPA has not researched property title or mineral rights for the Juanicipio Joint Venture and expresses no opinion as to the ownership status of the property.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

## 4 PROPERTY DESCRIPTION AND LOCATION

The Juanicipio Joint Venture property is located in central Zacatecas State, approximately 70 km by road northwest of the state capital of Zacatecas City (Figure 4-1). Zacatecas City has a population of approximately 255,000 and is located about 550 km northwest of Mexico City. Zacatecas City is serviced by daily flights from Mexico City. The property is accessible by Federal Highway 49 northwest from Zacatecas City to Fresnillo, then six kilometres to the southwest along paved and dirt roads. The centre of the property is located at approximately 102° 58' east longitude and 23° 05' north latitude.

### LAND TENURE

The property consists of a single mining concession measuring 7,679.21 ha (Figure 4-2). Table 4-1 lists the tenure information for the Juanicipio concession. All concessions in Mexico are classified as exploitation concessions and have a 50 year life from the date of issue, renewable for another 50 years if desired.

**TABLE 4-1 TENURE DATA**  
**MAG Silver Corp. – Juanicipio Joint Venture**

Concession	Date Issued	Expiry Date	Area (ha)	Title No.	Owner
Juanicipio 1	13-Dec-2005	12-Dec-2055	7,679.21	Tx 226339	Minera Juanicipio S.A.

The property is owned by Minera Juanicipio, a joint venture company 56% held by Fresnillo and 44% held by MAG, with Fresnillo acting as the operator. Industrias Peñoles S.A. de C.V. (Peñoles) holds a 77% interest in Fresnillo and therefore a beneficial 43% interest in the property.

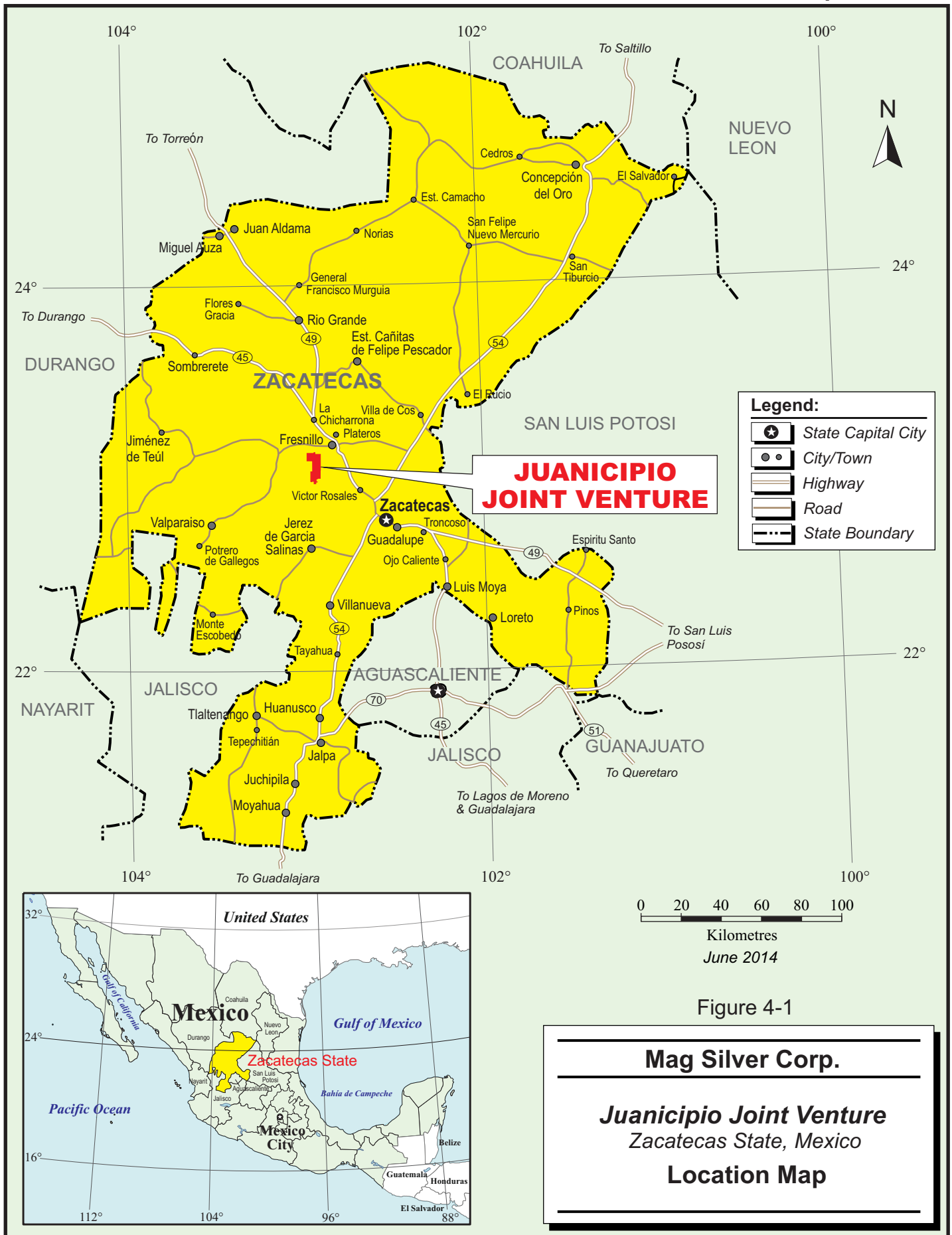
Surface ownership over the area of interest in the northeast portion of the property was held by the Valdecañas Ejido and Ejido Saucito de Poleo. The joint venture has purchased the surface rights of that area for US\$1.40 million (Figure 4-2).

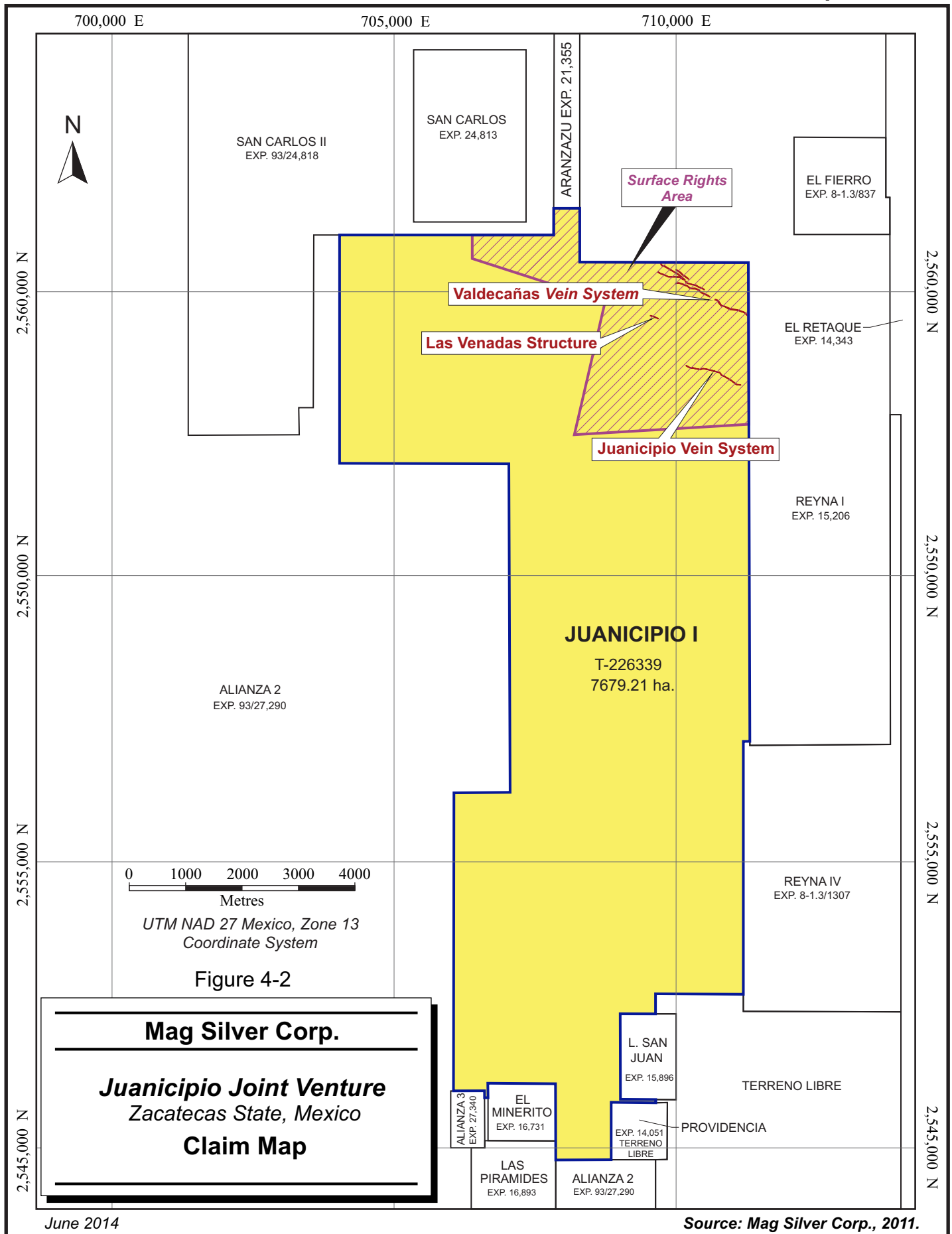
MAG provided an independent opinion by Creel, García-Cuellar, Aiza y Enríquez, of México, dated September 5, 2012, which is in agreement with the above land tenure information.

Since that time the Joint Venture has purchased 125 hectares of surface rights north of the mining concession for a tailings storage facility and access roads.

With the exception of liabilities related to the reclamation of exploration drill roads and sites, RPA is not aware of any outstanding environmental liabilities. MAG reports that all applicable permits required to conduct mineral exploration, drive the decline, prepare the millsite and improve or construct access roads and powerlines have been granted.

RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.





## **5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

### **ACCESSIBILITY**

The Juanicipio Joint Venture is located 70 km by road northwest of Zacatecas City in central Zacatecas State. The property is accessible by taking Federal Highway 49 northwest from Zacatecas City to Fresnillo and then six kilometres to the southwest along paved and dirt roads.

### **CLIMATE**

The climate is warm and arid. Temperatures vary from 0°C to 41°C and average 21°C. The average annual precipitation is 290 mm, with the period from June to September being the rainiest. Exploration and development can be carried out twelve months a year.

### **LOCAL RESOURCES**

The closest full service town is Fresnillo, located eight kilometres from the property. Fresnillo has a population of approximately 255,000 and has all the services required to support a mining operation including a trained workforce, hospital, and accommodations.

The closest airport with daily air service to Mexico City is located at Zacatecas City. Both Zacatecas City and Fresnillo are serviced by rail.

There is an electric power substation in Fresnillo.

### **INFRASTRUCTURE**

Site infrastructure consists of the following items:

- a series of roads used to access drill sites, the decline and the mill site,
- an underground access portal, and the start of an underground access ramp,
- a surface explosive magazine, and
- interim power lines.

Section 23 describes infrastructure located immediately outside the property boundary.

## **PHYSIOGRAPHY**

The Juanicipio property lies within the Mexican Mesa Central or Altiplano. This region is flanked to the west by the Sierra Madre Occidental and to the east by the Sierra Madre Oriental mountain ranges. The Altiplano in this region is dominated by broad alluvium filled valleys between mountain ranges with an average elevation of approximately 1,700 MASL. Local mountain ranges reach 3,000 MASL. Elevations on the Juanicipio property itself range from 2,050 MASL to 2,450 MASL and the terrain is moderate to rugged.

Vegetation is sparse and consists mainly of grasses, low thorny shrubs, and cacti with scattered oak forests at higher elevations. Surface water is rare, but groundwater is available.

At this stage of the project, there are sufficient surface rights and available power, water, and personnel to carry out the exploration.



## 6 HISTORY

### PRIOR OWNERSHIP

The Juanicipio 1 concession was originally staked in 1996, with title eventually granted in 1998. It was held under the name of Juan Antonio Rosales and covered an area of approximately 28,000 ha. The concession was later acquired by Martin Sutti, who optioned it to Minera Sunshine de Mexico S.A. de C.V. (Minera Sunshine) until 2001.

In July 2002, Minera Lagartos S.A. de C.V. (Minera Lagartos) optioned the Juanicipio 1 concession from Mr. Sutti. On August 8, 2002, MAG entered into an agreement whereby it could acquire 98% of the issued and outstanding shares of Minera Lagartos. This agreement was later amended such that MAG could acquire a 99% interest in Minera Lagartos and a beneficial ownership of the remaining 1% interest.

On April 4, 2005, MAG announced that it had entered into a joint venture agreement with Peñoles whereby Peñoles could earn a 56% interest in the property by spending US\$5 million on or before the end of year four of the agreement. Peñoles committed to a minimum expenditure of US\$750,000 including at least 3,000 m of drilling in the first year of the agreement. Peñoles subscribed for US\$500,000 in MAG shares at the market price on signing and an additional US\$500,000 in MAG shares if the contract continued into the second year. All earn-in requirements have been met.

In 2007, Peñoles' precious metals assets were assigned to a wholly owned subsidiary, Fresnillo plc.

On December 21, 2007, Fresnillo and MAG announced the formation of a new company incorporated in Mexico, Minera Juanicipio, to operate the joint venture. Minera Juanicipio is 56% held by Fresnillo and 44% held by MAG, with Fresnillo acting as the operator.

## EXPLORATION HISTORY

Silver mineralization in the Fresnillo area was discovered in 1554. Although no records exist prior to the 1970s, the Juanicipio property was likely prospected periodically over the years because of its proximity to the Fresnillo mining area.

Peñoles drilled several holes to the northeast of the property in the 1970s and 1980s, prior to the discovery of the nearby San Carlos Vein. Concerted exploration of the areas adjoining the Juanicipio property was begun by Fresnillo in 2006 based on results from the Valdecañas and San Carlos veins.

From 2000 to 2001, Minera Sunshine contracted IMDEX Inc./Cascabel S.A. de C.V. (IMDEX/Cascabel) to complete property-wide (1:50,000 scale) geological mapping, preliminary rock chip sampling, and Landsat image and air photo analysis. This was followed by more detailed (1:5,000 scale) geological mapping in areas of interest, additional Landsat image analysis, detailed geochemical sampling, and a limited amount of Natural Source Audio Magnetotelluric (NSAMT) geophysical surveying. The NSAMT survey was used to define structures, mainly in the northeastern part of the property. Minera Sunshine obtained drill permits to test this area but was not able to undertake drilling before they went bankrupt in 2001 (Megaw and Ramirez, 2001).

## PREVIOUS MINERAL RESOURCE ESTIMATES

In April 2008, Fresnillo reported an initial Mineral Resource estimate for the Valdecañas deposit. In June 2008, MAG retained SRK Consulting (Canada) Inc. (SRK) to prepare a NI 43-101 Technical Report documenting the initial Mineral Resource estimate prepared by Fresnillo and audited by SRK (Chartier et al., 2008).

In 2009, RPA, then Scott Wilson RPA, prepared a Mineral Resource estimate based on drill hole results available to January 29, 2009. This work was done independently of the modelling and estimation work by Fresnillo (Ross and Roscoe, 2009).

RPA updated the resource in late 2010 based on data available to September 10, 2010 (Ross, 2011). Fresnillo prepared a parallel estimate using similar drill hole data. The Fresnillo estimate was audited by SRK (Brown et al., 2011). The two estimates differed in

the silver grade, which led to studies by additional consultants (Srivastava, 2011; Leuangthong et al., 2011).

On November 10, 2011, MAG announced an updated Mineral Resource estimate made by Strathcona on behalf of the Minera Juanicipio Joint Venture. The estimate was based on drill results available as of June 1, 2011, and used a cut-off grade of 100 g/t Ag. Indicated Mineral Resources were estimated to total 5.7 million tonnes at 702 g/t Ag, 1.9 g/t Au, 2.2% Pb, and 4.2% Zn. Total contained metals in the Indicated Resource were 128 million ounces of silver, 346,000 ounces of gold, 268 million pounds of lead, and 521 million pounds of zinc. Inferred Mineral Resources were estimated to total 4.3 million tonnes at 513 g/t Ag, 1.4 g/t Au, 1.6% Pb, and 3.0% Zn. The Inferred Resources contained an additional 71 million ounces of silver, 192,000 ounces of gold, 152 million pounds of lead, and 280 million pounds of zinc.

On December 19, 2011, MAG announced an updated resource estimate by RPA (Ross, 2011). Using drill hole data available as of August 5, 2011 and a net smelter return (NSR) cut-off value of US\$55/t, Indicated Mineral Resources were estimated to total 6.2 million tonnes of 728 g/t Ag, 1.9 g/t Au, 1.9% Pb, and 3.9% Zn. Inferred Mineral Resources were estimated to total 7.1 million tonnes of 373 g/t Ag, 1.6 g/t Au, 1.5% Pb, and 2.6% Zn. The contained metals in the Indicated Resource were estimated to total 146 million ounces of silver, 384,000 ounces of gold, 267 million pounds of lead, and 539 million pounds of zinc. The Inferred Resources were estimated to total 85 million ounces of silver, 370,000 ounces of gold, 236 million pounds of lead, and 400 million pounds of zinc.

On June 14, 2012, MAG announced an updated PEA Study prepared by AMC on behalf of Minera Juanicipio (Thomas et al., 2012). The updated PEA was based on the resource model prepared by Strathcona dated November 2011.

All Mineral Resource estimates reported in this section are superseded by the current Mineral Resource estimate contained in Section 14 of this report.

## **SCOPING STUDY - 2009**

In May 2009, Tetra Tech WEI Inc., formerly Wardrop Engineering (Wardrop), was retained by Minera Juanicipio to carry out an initial scoping level study on the Valdecañas deposit. The study (Ghaffari et al., 2009) was filed on SEDAR on November 6, 2009.

The study was completed on the basis that the joint mine/mill project would be conducted on a "stand alone" basis, independent of any other regional mining operations or related infrastructure. It was based on Mineral Resource estimates made by Strathcona. It was also assumed that the most economical and efficient access to the mine would be via a ramp. The estimates were to an accuracy of + 35%. All costs were in US\$ and the Wardrop Base Case utilized the Energy and Metals Consensus Forecasts (EMCF) quarterly reports in calculating Wardrop/EMCF prices.

## 7 GEOLOGICAL SETTING AND MINERALIZATION

The following is modified from Megaw and Ramirez (2001). Figure 7-1 shows the regional geology and Figure 7-2 depicts the regional stratigraphy.

### REGIONAL GEOLOGY

The Juanicipio property lies on the western flank of the Central Altiplano, just east of the Sierra Madre Occidental range. Basement rocks underlying the western Altiplano are a late Palaeozoic to Mesozoic assemblage of marine sedimentary and submarine volcanic rocks belonging to the Guerrero Terrane (Simmons, 1991) that were obducted onto older Palaeozoic and Precambrian continental rocks during the early Jurassic. These were then overlapped by a Jurassic-Cretaceous epi-continental marine and volcanic arc sequence that in the Fresnillo area is represented by the Proaño and Chilitos formations (Simmons, 1991; Wendt, 2002). The late Cretaceous to early Tertiary Laramide Orogeny folded and thrust faulted the basement rocks in the entire area and preceded the emplacement of mid-Tertiary plutons and related dykes and stocks (Ruvalcaba-Ruiz and Thompson, 1988). Mesozoic marine rocks are host to the San Nicolas volcanogenic massive sulphide (VMS) deposit and Francisco Madero sedimentary exhalative (Sedex) deposit (Wendt, 2002).

Unconformably overlying the Mesozoic basement rocks in the western Altiplano are units from the late Cretaceous to Tertiary, Sierra Madre Occidental magmatic arc. These rocks consist of a lower assemblage of late Cretaceous to Tertiary volcanic, volcanoclastic, conglomerate and locally limestone rocks, the “lower volcanic complex”, and a Tertiary (~25 to 45 Ma) “upper volcanic supergroup” of caldera related, rhyolite ash flow tuffs and flows. Eocene to Oligocene intrusions occur throughout the Altiplano and are related to the later felsic volcanic event. Locally, these two units are separated by an unconformity (Ruvalcaba-Ruiz and Thompson, 1988; Wendt, 2002).

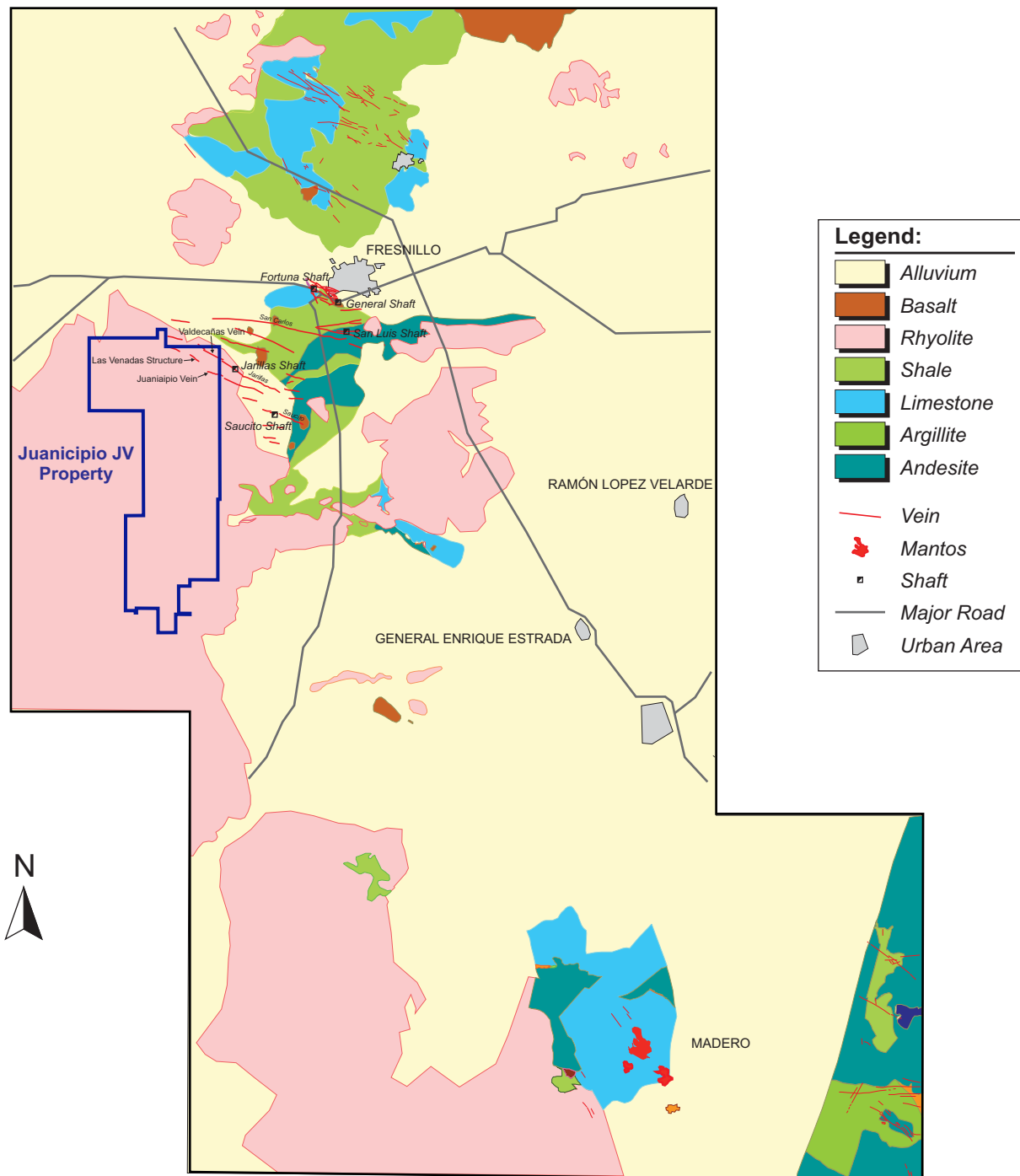
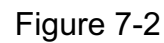


Figure 7-1

**Mag Silver Corp.**

**Juanicipio Joint Venture**  
Zacatecas State, Mexico  
**Regional Geology**



**Juanicipio Joint Venture**  
Zacatecas State, Mexico  
**Regional Stratigraphy**

A late northeast-southwest extensional tectonic event accompanied by major strike-slip fault movement affected the Altiplano starting ca. 35 Ma. This extension was most intense during the Miocene and developed much of the current basin and range topography. Calcrete cemented alluvial material covered the basins within the Fresnillo area.

The Fresnillo district's lowest stratigraphic unit is the early Cretaceous greywacke and shale units of the Proaño Group (Table 7-1). The Proaño Group is broken into two formations: the "lower greywacke" Valdecañas Formation, comprising thinly bedded greywacke and shale, and the "upper greywacke" Plateros Formation, comprising carbonaceous and calcareous shale at the base grading to immature sandstone units (Ruvalcaba-Ruiz and Thompson, 1988).

**TABLE 7-1 STRATIGRAPHY OF THE FRESNILLO DISTRICT**  
**MAG Silver Corp. – Juanicipio Joint Venture**

Per.	Age	Group Name	Fm.	Local Name	Thickness	Rock Type	Assoc. min/alt
Cenozoic	Quaternary				1-250 m	Alluvium	None
	Miocene-Pliocene			Basalt	100 m	Olivine basalt	None
	Eocene-Miocene			Altamira Volcanics	400 m	Conglomerate, welded rhyolite ash-flow tuff,	None
	Eocene			Quartz monzonite	-	Quartz-monzonite	Ag-Pb-Zn skarn
	Paleocene-Eocene		Fresnillo	Linares Volcanics	400 m	Conglomerate, welded rhyolite ash-flow tuff, flow domes, volarenite	Veins, advanced argillic alt., silicification
Cretaceous	Late		Cuesta del Cura	Cerro Gordo	300 m	Limestone	Replacement and veins
				Fortuna	300 m	Limestone	Replacement and veins
	Early	Proaño	Plateros	Upper Greywacke	250 m	Calcareous greywacke and shale	Veins
				Calcareous shale	50	Calcareous shale	Veins and replacement
			Valdecañas	Lower Greywacke	700	Greywacke	Veins

(Modified after Ruvalcaba-Ruiz et al., 1988 and Wendt, 2002)

Laramide thrust faulting complicates the stratigraphy of the overlying limestone units, called the Cerro Gordo and Fortuna units in the Fresnillo district, and the Chilitos Formation



volcanic and volcanoclastic rocks. Regionally, the Cerro Gordo and Fortuna limestone units appear to be the stratigraphic equivalents of the Cuesta del Cura Formation and are probably early Cretaceous in age and overlie the Proaño Group clastic sedimentary rocks (Megaw and Ramirez, 2001). In this case, volcanic and volcanoclastic rocks of the Chilitos Formation are likely late Cretaceous in age and represent the earliest phase of volcanism identified in the area, and possibly correlate to the base of the “lower volcanic complex” of the Sierra Madre volcanic arc.

Overlying the Chilitos Formation are Tertiary volcanic rocks of the Fresnillo Formation (> 29 Ma), which consists of conglomerate, welded rhyolitic ash-flow tuff and flow domes, later (< 29 Ma) conglomerate, rhyolitic ash-flow tuff, and finally upper Tertiary olivine basalt flows.

Within this stratigraphy is a quartz-monzonite stock/dyke that intruded the Fresnillo mine area in mid-Tertiary (~32.4 Ma) and is associated with the introduction of silver-lead-zinc mineralized skarn and argillic alteration within surrounding greywacke and calcareous units.

## PROPERTY GEOLOGY

Geological mapping on the Juanicipio property was conducted by IMDEX/Cascabel on behalf of Minera Sunshine from 1999 to 2001. The results of this mapping are detailed in a company report by Megaw and Ramirez (2001) and are summarized in the following subsections. Figure 7-3 shows the property geology.

### MESOZOIC ROCKS

The oldest rocks observed in the Juanicipio area are fragments of greywacke found in dumps on the Cerro Colorado area south of the property and presumably belong to the Proaño Group. The oldest rocks observed in outcrop are calcareous shale and andesitic volcanoclastic rocks of the Chilitos Formation at the base of Linares Canyon. They are highly deformed and sheared and are locally boudinaged and dip shallowly to moderately northeast.

The upper contact of the Chilitos Formation forms an irregular unconformity to the overlying Tertiary volcanic and volcanoclastic rocks. Drilling in 2002 and 2003 intersected significant

sections of the Chilitos and Proaño formations, including polymictic intermediate volcanic breccias with exhalite layers.

## **TERTIARY IGNEOUS ROCKS**

Tertiary igneous rocks are divided into the Linares and Altamira volcanic assemblages that are separated by an unconformity.

The lower assemblage, informally named the Linares volcanic package (Megaw and Ramirez, 2001) consists of volcanoclastic sedimentary units, welded and non-welded crystal lithic tuff, flow breccia, and rhyolite flow domes. The basal unit is composed of 5 m to 20 m of epiclastic volarenites and arkoses overlain by 20 m to 100 m of variably welded, rhyolite to dacite, composite ash-flow tuff that resembles, and may correlate with, Fresnillo Formation volcanic rocks (Megaw and Ramirez, 2001). This unit generally hosts the pervasive silicification “sinter”, advanced argillic alteration (kaolinite-alunite) and iron-oxide alteration found on the Juanicipio property. Textural variation and Landsat interpretation within this unit suggests several eruptive centres (calderas) for these volcanic rocks in the Sierra Valdecañas range.

Overlying the ash-flows is a well bedded volarenite layer and then 100 m to 150 m of welded ash-flow tuff, which are less silicified than the lower unit. Locally, several rhyolite domes occur between Linares Canyon and the Cesantoni Kaolinite Mine.

The Linares volcanic rocks are block-faulted along north-northwest trending faults with shallow to moderate southwest dips. Silicification appears to post-date the faulting as the faults only locally cut or displace silicified units (Megaw and Ramirez, 2001).

Megaw and Ramirez (2001) also describe and informally name the Altamira volcanic package after the tallest peak in the area, Cerro Altamira, where the thickest section of these volcanic rocks outcrop. These volcanic rocks overlie the Linares volcanic package across an angular unconformity overlain by a 20 m to 50 m thick layer of well bedded conglomerate and coarse volarenite. Rounded fragments of silicified Linares volcanic rocks occur within the conglomerate. Overlying these clastic rocks is a 20 m to 350 m thick section of welded rhyolite to rhyodacite ash-flow tuff. Several caldera complexes have been identified within this package. This unit is post-alteration and presumably post-mineralization and does not appear to contain any alteration.

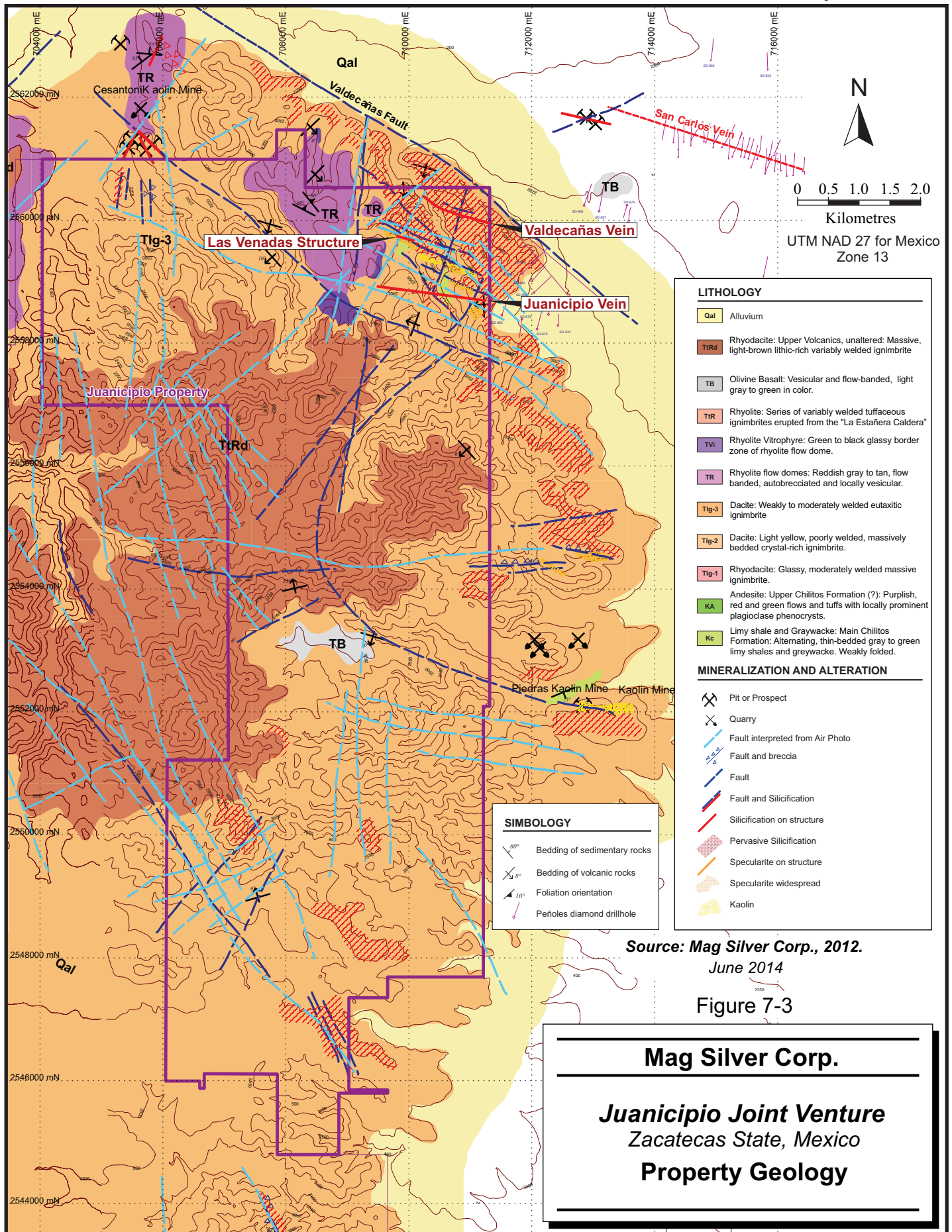
## UPPER TERTIARY ROCKS

These rocks are composed of olivine basalt flows that locally overlie the felsic mid-Tertiary volcanic and volcanoclastic rocks on the property.

## STRUCTURAL GEOLOGY

Regional satellite image interpretation suggests that the Sierra Valdecañas range is a topographically high, but structurally down-dropped block that is bounded by several major orthogonal northeast and northwest structures. The most notable of these is the more than 200 km long Fresnillo strike-slip fault and its parallel structure, the San Acacio-Zacatecas fault to the east of the Juanicipio property. Also, it appears that the San Acacio-Zacatecas structure traverses the northeast corner of the Juanicipio property and coincides with the Valdecañas and Juanicipio veins.

On the Juanicipio property, the dominant structural features are: (i) 340° to 020°, or north-south structures; (ii) 290° to 310° trending, steeply dipping faults; and (iii) lesser 040° to 050° structures. From field observations, the north-south structures appear to be steeply dipping normal faults that cut and down-drop blocks of silicified tuff, especially in the vicinity of Linares Canyon. More important to the silicification appears to be the 290° to 310° trending, steeply to moderately dipping faults. These faults occur where silicification and advanced argillic alteration are most intense and may have served as major hydrothermal fluid pathways. NSAMT surveys on the Juanicipio property appear to confirm the presence of these northwest trending structures and they were the primary drill targets for the 2003 and 2004 drilling program.



## MINERALIZATION

The two significant silver-gold epithermal structures discovered to date on the Juanicipio property are known as the Valdecañas and Juanicipio veins. Both veins strike east-southeast and dip 35° to 70° with an average of about 58° southwest. Both display the metal zonation typical of the Fresnillo District and epithermal veins in general, of an upper precious metal “Bonanza” zone grading downwards into a deeper base metal zone. Representative assay intervals for both vein structures are listed in Table 7-2. The Valdecañas structure hosts the majority of the Mineral Resources currently estimated on the property.

### VALDECAÑAS VEIN

As of December 31 2013, 142 drill holes had tested the lateral and depth extensions of the Valdecañas structure, with 132 holes being used for vein modelling. The vein extends beyond the Juanicipio property boundaries in both the northwest and southeast directions. It varies in true thickness from less than one metre up to 25.8 m, averaging approximately five metres. Generally, the precious metals rich zone is 400 m to 450 m in vertical extent with an additional 50 m vertical extent of base metal dominant zone. The vein structure is made up of one main vein and three parallel to subparallel smaller veins. Descriptions of the geometry, location, and grades are presented in Section 14. The various vein panels making up the overall Valdecañas vein structure are now referred to as: V1E, V1W, V2W, and HW1.

The naming convention of the individual veins within the Valdecañas vein structure has evolved over the last few years. The older names used in the 2012 PEA are maintained in this Technical Report for sections derived directly from that study. A summary of changes to the naming convention is listed below:

- V1E is approximately equivalent to the eastern part of the Valdecañas Vein and parts of the eastern Desprendido Vein as defined in the 2012 PEA. V1E was formerly known as the eastern part of the Main Valdecañas Vein in previous RPA reports.
- V1W is approximately equivalent to the western part of the Valdecañas Vein as defined in the 2012 PEA. V1W was formerly known as the western part of the Main Valdecañas Vein in previous RPA reports.
- V2W is approximately equivalent to the western part of the Desprendido Vein as defined by the 2012 PEA. V2W was formerly known as the combined Footwall Vein 1 and Footwall Vein 2 in previous RPA reports.

- HW1 was not included as part of the 2012 PEA. HW1 was formerly known as Hanging Wall Vein 1 in previous RPA reports.

Mineralization consists of precious metal rich, banded, or brecciated quartz-pyrargyrite-acanthite-polybasite-galena-sphalerite veins. The Valdecañas veins have undergone multiple mineralizing events as suggested by various stages of brecciation and quartz sealing, local rhythmic microcrystalline quartz-pyrargyrite banding, and open-space cocks-comb textures and vuggy silica. The veins exhibit the characteristic metal zoning of the principal veins in the Fresnillo district, observed as a change from silver and gold rich zones at the top to increased base metals in the deeper intersections. Notably, the gold rich mineralization cuts across the silver rich zones, which in turn cut earlier base-metal dominant stages indicating complex multi-stage mineralization as is seen separately in other parts of the district.

Within 10 m to 20 m of the vein, the wall rocks are progressively and pervasively silicified and cut by quartz veinlets carrying pyrite-sphalerite-galena sulphide minerals. Alteration in the volcanoclastic/sedimentary host rock farther away from the vein is characterized by weak pyritization, moderate clay alteration, and calcite veining.

## **JUANICIPIO VEIN**

The Juanicipio Vein was discovered in 2003 by MAG prior to the discovery of the Valdecañas system, which is located 1,100 m to the north. Discovery hole JI03-01 intersected two metres averaging 630 g/t Ag and 11.4 g/t Au at a vertical depth of approximately 515 m. Thirty-five drill holes contributed to the definition of this vein and the current Mineral Resource estimate includes the Juanicipio Vein. In general, the zone averages greater than 530 g/t Ag, 4.00 g/t Au with low Pb and Zn values. The Juanicipio Vein is referred to as JV1 most statistical and modelling examinations.



**TABLE 7-2 SELECT DRILL HOLE INTERSECTIONS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Vein	Borehole	From (m)	To (m)	Length (m)	True Thickness (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
V1E	IE	816.35	821.65	5.30	4.11	1,843	3.70	3.54	5.96
V1E	NG	732.25	735.25	3.00	2.17	1,703	5.78	3.47	5.50
V1E	16P	680.90	687.25	6.35	4.67	1,798	2.91	3.43	5.51
V1E	PD	619.00	624.20	5.20	4.17	1,021	3.32	4.79	7.20
V1E	NA	728.09	730.18	2.09	1.96	1,157	1.11	0.77	0.87
V1E	MC	625.20	636.25	11.05	7.86	1,046	0.44	1.00	2.05
V1E	M28	731.35	741.05	9.70	6.91	768	1.90	2.59	6.60
V1E	M41	736.90	751.90	15.00	7.11	706	2.88	2.66	4.86
V1E	M45	709.00	711.06	2.06	1.82	942	0.82	0.01	0.01
V1E	NF2	757.60	762.80	5.20	3.91	523	2.94	2.23	5.67
V1E	PE2	652.10	660.95	8.85	7.08	448	3.20	1.68	4.21
V1E	M7	686.45	696.70	10.25	9.12	580	0.98	0.71	1.33
V1E	M34	712.20	722.50	10.30	7.54	261	0.68	3.53	9.15
V1E	M19	870.25	873.45	3.20	2.46	290	1.31	1.02	2.72
V1E	JU5	802.47	805.37	2.90	2.73	136	0.24	4.37	6.03
V1E	M43	687.85	694.10	6.25	5.04	178	1.45	0.69	2.55
V1E	JD	690.85	693.00	2.15	1.87	225	0.16	0.24	0.53
V1E	QG	637.60	639.90	2.30	1.78	86	0.15	2.72	3.81
V1W	J04B	656.45	659.90	3.45	3.23	1,905	8.50	0.21	0.21
V1W	GD	802.80	823.90	21.10	17.57	1,032	2.97	6.21	5.77
V1W	JC	748.80	759.80	11.00	9.52	535	4.54	0.91	2.59
V1W	GA	669.50	676.85	7.35	5.55	562	0.55	0.80	1.92
V1W	J05	733.10	736.45	3.35	3.15	516	1.73	0.05	0.11
V1W	M13	649.05	655.50	6.45	5.01	420	1.89	1.24	0.81
V1W	M5	948.30	960.65	12.35	10.45	294	2.06	2.94	4.81
V1W	J02	827.60	839.75	12.15	10.52	138	4.80	1.25	3.32
V1W	KG3	782.55	801.70	19.15	15.59	302	1.02	1.72	1.91
V1W	M17	700.70	706.95	6.25	4.68	196	2.30	1.35	2.54
V1W	M24	955.20	958.25	3.05	2.22	165	0.86	2.55	4.50
V1W	HE	774.85	778.20	3.35	2.99	145	1.64	0.92	3.68
V1W	M21	806.85	815.80	8.95	8.09	110	1.88	0.49	1.19
V1W	KC	647.89	650.16	2.27	2.15	184	0.10	0.01	0.06
V2W	GE	838.05	847.20	9.15	7.95	771	1.51	2.21	1.85
V2W	M13	690.65	693.25	2.60	2.01	730	0.46	0.49	0.83
V2W	JA	741.80	751.25	9.45	8.34	1,182	0.25	1.02	2.30
V2W	ID2	864.89	866.93	2.04	1.88	773	0.56	3.39	3.38
V2W	NA	751.75	753.50	1.75	1.62	518	0.15	0.03	0.09
V2W	MC	684.80	692.25	7.45	5.29	487	0.30	0.11	0.18
V2W	J06	712.06	714.00	1.94	1.82	169	0.23	0.80	0.09
HW1	FE	652.74	655.56	2.82	2.46	1,166	0.15	1.47	0.64

Vein	Borehole	From (m)	To (m)	Length (m)	True Thickness (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
HW1	GE	685.20	688.15	2.95	2.48	728	0.25	1.41	4.60
HW1	HG	751.25	754.65	3.40	2.92	210	0.08	0.30	1.08
JV1	17.5R	888.60	890.35	1.75	1.63	1,597	6.92	0.82	2.06
JV1	19R	920.00	923.20	3.20	2.27	149	0.42	2.02	1.56
JV1	JU1	596.45	598.45	2.00	1.76	630	11.44	0.07	0.21
JV1	19P	656.55	660.60	4.05	2.42	133	2.66	0.03	0.10

Notes:

1. Prior to compositing, Ag was cut to 6,000 g/t, Au cut to 16 g/t, and both Pb and Zn were cut to 15%.
2. True thickness was calculated using an average strike of 120° and an average dip of -55°.



## 8 DEPOSIT TYPES

The following is taken from Chartier et al. (2008).

The Fresnillo district is a world-class silver mining district located in the centre of the 800 km long Mexican Silver Belt including mining districts Sombrerete (San Martín, Sabinas Mines), Zacatecas, Real de Angeles, Pachuca, and Taxco. Fresnillo owns and operates the Proaño silver mine which has been in production since 1554. From 1554 to 2010, the district had produced more than 850 million ounces of silver at an average grade of approximately 400 g/t Ag, with substantial gold, lead, and zinc credits (Megaw, 2010). According to the Silver Institute (<http://www.silverinstitute.org>), the Proaño mine produced 26.38 million ounces of silver in 2012, ranking second in the world. Also according to the Silver Institute, the Saucito mine produced 7.5 million ounces of silver.

The deposits in the district consist of low-sulphidation epithermal quartz-carbonate veins forming an extensive array of stacked steeply dipping, west to west-northwest-trending veins, crosscutting Cretaceous and Jurassic age rocks, mostly of sedimentary origin.

The veins are laterally very extensive and, although the structures are quite persistent with depth, the silver-gold rich section of each structure is typically limited to a 300 m to 400 m range of elevation corresponding to the boiling zone of the fossil hydrothermal system. Metal distributions show a subhorizontal zoning, with base metal abundance increasing with depth. The main veins in the district have been mined continuously over lateral distances ranging from one kilometre to eight kilometres.

The epithermal mineralization is characterized by quartz-adularia-carbonate veins, stockworks, and breccias exhibiting classical epithermal textures such as colloform banding, druzy, and vuggy cockade infilling, suggesting repeated episodes of hydrothermal deposition in open structures. Mineralization includes sphalerite, galena, pyrite, pyrrhotite, silver sulphosalts, and gold. The hydrothermal veins are associated with minor clay alteration.

Epithermal deposits comprise a wide range of hydrothermal deposits associated with volcanic and magmatic edifices and formed at shallow crustal levels by the circulation of

magmatic-related hydrothermal fluids into fractured rocks. These deposits are typically related with arrays of regional structures developed in extensional tectonic settings.

Low sulphidation epithermal deposits are related with the circulation of reduced, near neutral, dilute fluids developed by mixing of hot magmatic fluids with deep circulating groundwater. Metal deposition typically occurs during fluid ascent along open deep-seated structures through a combination of processes including fluid mixing, cooling, degassing, and transient boiling. The hydrothermal deposits exhibit strong vertical zoning about the transient boiling zone, with precious metals generally enriched above the boiling zone and base metals abundances increasing with depth.

These hydrothermal deposits are important supply of silver, gold, and base metals such as lead, zinc, and occasionally copper.

## 9 EXPLORATION

Exploration on the Juanicipio property prior to MAG's involvement is documented in Section 6 of this report. Drilling on the Juanicipio property is documented in Section 10 of this report.

In 2007, MAG completed a helicopter-borne geophysical survey using Aeroquest's AeroTEM II time domain electromagnetic system employed in conjunction with a high-sensitivity caesium vapour magnetometer. Ancillary equipment included a real-time differential GPS navigation system, radar altimeter, video recorder, and a base station magnetometer. Full-waveform streaming electromagnetic data were recorded at 36,000 samples per second. The total survey coverage presented was 351 line kilometres. The survey was flown at 100 m line spacing in a north-south flight direction.

The survey was successful in mapping the magnetic and conductive properties of the geology throughout the survey area. Additional reprocessing, interpretation, and follow-up work are recommended.

## 10 DRILLING

Drilling on the property has been contracted to various companies since 2004. All the drilling has been diamond core. Fresnillo currently contracts drilling to Perfoservice S.A. de C.V. (Perfoservice), an agent of Boart Longyear, headquartered in Aguascalientes, Mexico. Perfoservice currently operates two drill rigs on the property. Diamond drill holes are commonly collared using HQ (64 mm core diameter) equipment and reduced to NQ (48 mm core diameter) or BQ (37 mm) as drilling conditions dictate.

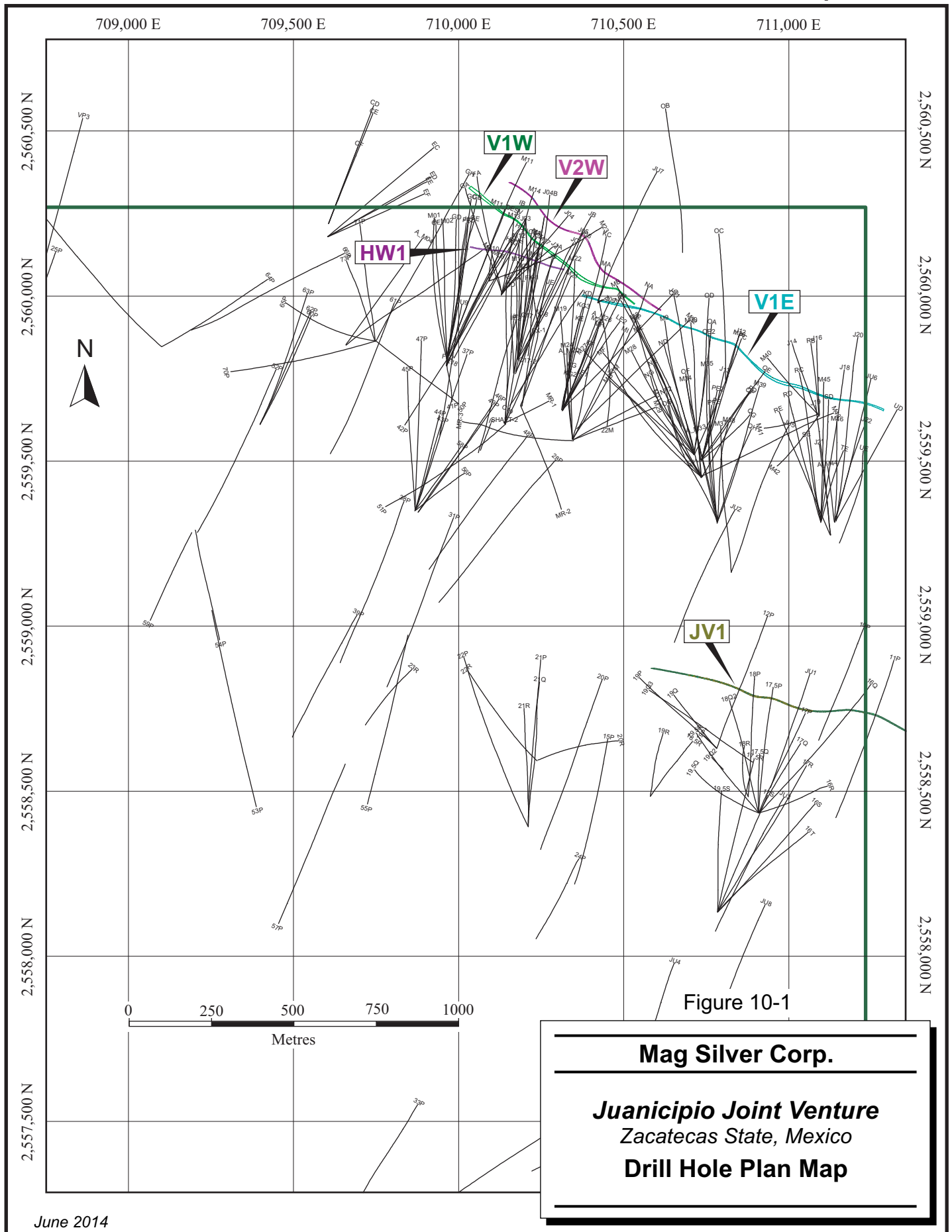
Fresnillo uses a Datamine database and 3D model to plan borehole locations and orientations. Spacing varies from 70 m to 100 m along strike and 50 m to 100 m down dip in the plane of mineralization. All drill hole collars are surveyed using differential GPS or a transit system. Downhole deviation is monitored using a Reflex Flexit instrument with readings at intervals ranging from 50 m to 150 m. Drilling by MAG recorded surveys every 15 m. Once a drill hole is completed, casing is pulled and collars are identified with cement monuments with the drill hole number engraved. The site is then revegetated according to local law.

As of December 31, 2013, 262 holes have been completed on the Juanicipio property for a total of 211,040.5 m. Figure 10-1 shows drill hole locations and Appendix Table 30-1 lists the drill holes on the property. From May 2003 to June 2004, MAG completed nine core holes for a total of 7,346 m. From August 2005 to December 31, 2013, Fresnillo completed 253 core holes for a total of 203,694.5 m.

Drill hole UE includes unusual downhole survey records that show the hole turns westerly and steepened abruptly, intersecting the Valdecañas Vein on the Juanicipio property rather than on the Fresnillo property to the east of the property boundary. RPA checked the raw Flexit data and these correspond to the resource database records.

Drill hole 13P was lost due to poor ground conditions and was also removed from resource modelling work.

There are no known drilling, sampling, or recovery factors that could materially affect the accuracy and reliability of the results.



# 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

## SAMPLING METHOD AND APPROACH

### SAMPLING BY MAG

Drill core was delivered to a core logging facility in Fresnillo where it was labelled, photographed, logged, and sampled under the supervision of MAG geologists. Core recovery was generally greater than 90% except in extremely fractured near-surface rock, argillite, or wider fault structures.

Samples were collected from half core and split lengthwise with a manual wheel splitter. Sample intervals ranged from 0.1 m to more than 3.0 m in length, and mostly honour geological, alteration, and mineralization contacts. Several metres were also sampled above and below mineralized zones. Sampling intervals were marked by a geologist and core was typically sampled continuously between sampling marks.

Samples were shipped to BSI Inspectorate laboratories in Durango, Mexico, an independent laboratory for sample preparation, and pulps were then sent to Reno, Nevada, for analysis. Some duplicate sample pulps were sent to ALS Chemex in Vancouver, Canada, an independent laboratory (Wetherup, 2006).

In RPA's opinion, the MAG sampling method and approach is appropriate for the style of mineralization and for estimation of Mineral Resources.

### SAMPLING BY FRESNILLO

Drill core was transported by Fresnillo personnel once daily to a core handling facility located near the Saucito minesite. Geotechnicians checked the depth markers and box numbers, reconstructed the core, and calculated recoveries. Fresnillo geologists logged, marked out sample intervals, and assigned sample numbers. Descriptive information was collected including recovery, lithology, alteration, structure, mineralization, and rock quality designation (RQD). Sample intervals ranged from three centimetres to twelve metres. One blank and one of two different standards were submitted into each batch of 20 or 30 samples.

Core was split using either a diamond saw or mechanical splitter. The splitter was cleaned regularly to avoid potential cross-sample contamination. Samples were placed in pre-numbered plastic sample bags, boxed, and stored in a secure facility prior to shipping. Sample batches commonly contained 20 or 30 samples. Samples were shipped to the ALS Chemex preparatory laboratory in Zacatecas, Mexico, for preparation and pulps were then forwarded to ALS Chemex Assay Laboratory in Vancouver, Canada, an independent laboratory for analysis. Coarse and pulp reject materials were returned to the core handling facility.

Density was measured using a water displacement method. Volume was estimated to the nearest 10 mL using a beaker with graduations of 100 mL. Mass was measured using a triple beam balance to the nearest half gram. The core was sealed in cellophane when required. At the time of the 2014 site visit, Fresnillo was in the process of duplicating previous density measurements using the Archimedes' principle whereby core is weighed in air and again in water. Statistical comparisons were not yet available, however, Fresnillo geologist report good correlation.

The procedures outlined by Fresnillo staff during all site visits were found to meet generally accepted industry practices.

## **SAMPLE PREPARATION AND ANALYSIS**

### **MAG SAMPLES**

Technicians at MAG's core facility in Fresnillo split, sealed, and labelled samples into plastic sample bags. Batches of samples were packed in rice bags for shipment. Samples were then transported to BSI Inspectorate preparatory laboratory in Durango, Mexico, by courier. The preparatory laboratory crushed, split, and pulverized the subsamples. Pulps were then flown to Reno, Nevada, in the United States for analysis (Wetherup, 2006). No sample preparation was conducted by MAG personnel, and the laboratories are independent of MAG.

Samples were analyzed for silver, arsenic, antimony, copper, mercury, lead, and zinc by aqua regia digestion and flame atomic absorption analysis. A standard fire assay was used for gold. The procedures used by BSI Inspectorate and the detection limits of each method can be found in the appendix of Wetherup (2006).

## **FRESNILLO SAMPLES**

Samples were shipped to the ALS Chemex preparatory laboratory in Guadalajara, Mexico, for preparation and pulps were then forwarded to ALS Chemex Assay Laboratory in Vancouver, Canada, for analysis. No sample preparation was conducted by Fresnillo personnel.

The ALS Chemex Vancouver laboratory is accredited to ISO 9001 by QMI-SAI Global and ISO 17025 by the Standards Council of Canada for a number of specific test procedures, including fire assay for gold with an atomic absorption and gravimetric finish, multi-element inductively coupled plasma optical emission spectroscopy (ICP-AES), and atomic absorption assays for silver, copper, lead, and zinc.

At ALS Chemex in Guadalajara, core samples were prepared using industry standard preparation procedures. After receipt, samples were organized into batches and weighed (method code LOG-22). Samples were then crushed to 70% passing below two millimetre mesh screen (CRU-31). A subsample of up to 1,500 g was prepared using a riffle splitter (SPL-21) and pulverized to 85% passing below 75 µm (PUL-31).

Each sample was analyzed for a suite of elements including silver, lead, and zinc by ICP-AES analysis (method ME-ICP41m) and standard fire assay for gold (Au-AA23). In the case where the silver ICP-AES upper limit of 100 ppm was reached, the sample was tested using a gravimetric analysis method (Ag-GRA21).

In RPA's opinion, the sample preparation and analysis procedures at the Juanicipio project are adequate for use in the estimation of Mineral Resources. ALS Chemex is independent of MAG.

## **QUALITY ASSURANCE AND QUALITY CONTROL**

Quality assurance/quality control (QA/QC) programs provide confidence in the resource database and help ensure that the database is reliable for resource estimation purposes. Programs include measures and procedures to monitor the precision and accuracy at each stage of the sampling and analysis process. Fresnillo's QA/QC program calls for a blank, one of two standards and a pulp duplicate in each batch of 20 or 30 samples. Fresnillo also compiles results from the laboratory's own internal blanks, standards, and duplicates. RPA received and reviewed a database of Fresnillo's QA/QC results dated December 2013.

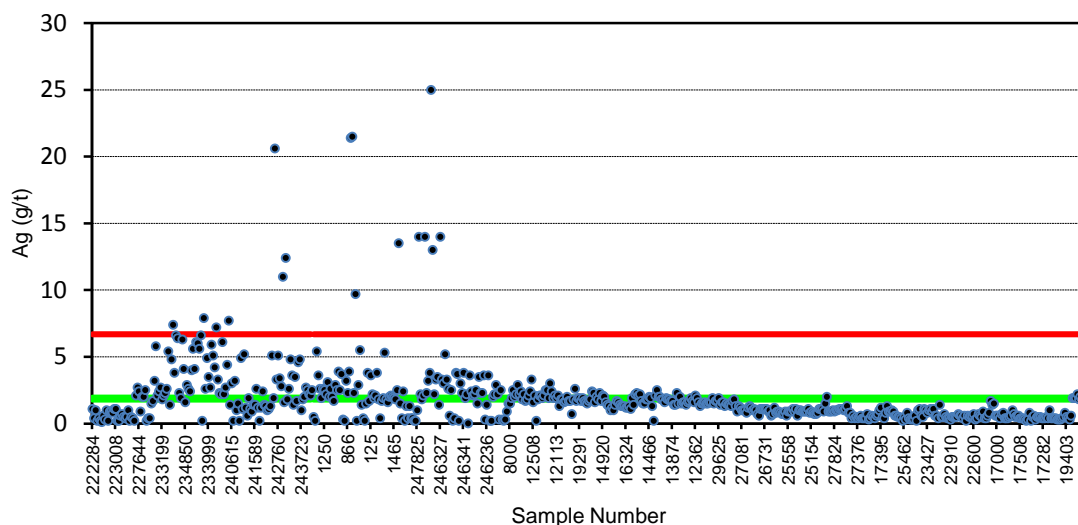


The regular submission of blank material is used to assess contamination during sample preparation and to identify sample numbering errors. Fresnillo submits blank samples at a rate of one in every 20 samples. Blanks were initially sourced from barren drill core and later from construction materials.

Figure 11-1 plots the results for silver values. The noticeable increase in results at sample 227644 and another at sample 242760 may mark changes in the source material. Several blanks return unacceptable grades, leading to batch reanalyses. Recent results of blank material for produced acceptable results.

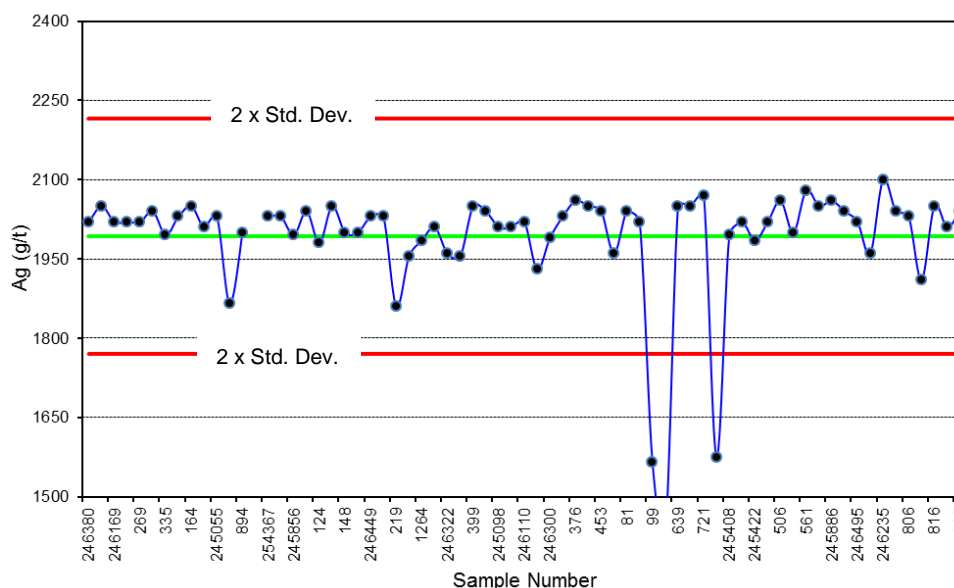
Similar data and graphs are available for gold, lead, and zinc. Earlier blanks returned unexpected high values for both zinc and lead suggesting that the material submitted as blanks is inappropriate for these metals. Recent results for zinc and lead were acceptable. Most results for gold were acceptable.

**FIGURE 11-1 BLANK RESULTS FOR SILVER**

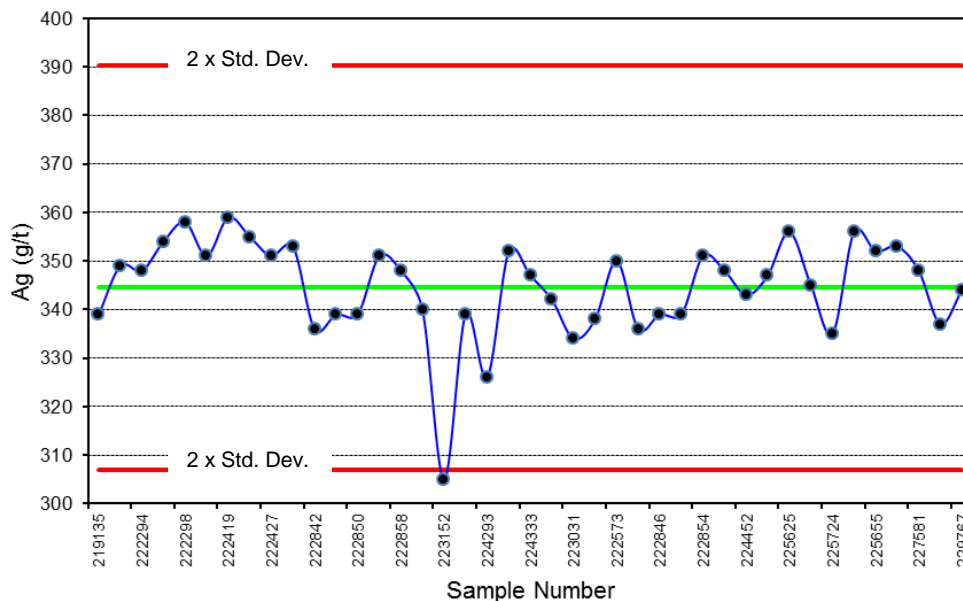


Results from the regular submission of standards are used to identify problems with specific sample batches and long-term biases associated with the regular assay laboratory. RPA reviewed results from five different standards, for a total of 154 analyses (Figures 11-2 and 11-3). Results are acceptable.

**FIGURE 11-2 CONTROL CHART FOR CRM AL222542**

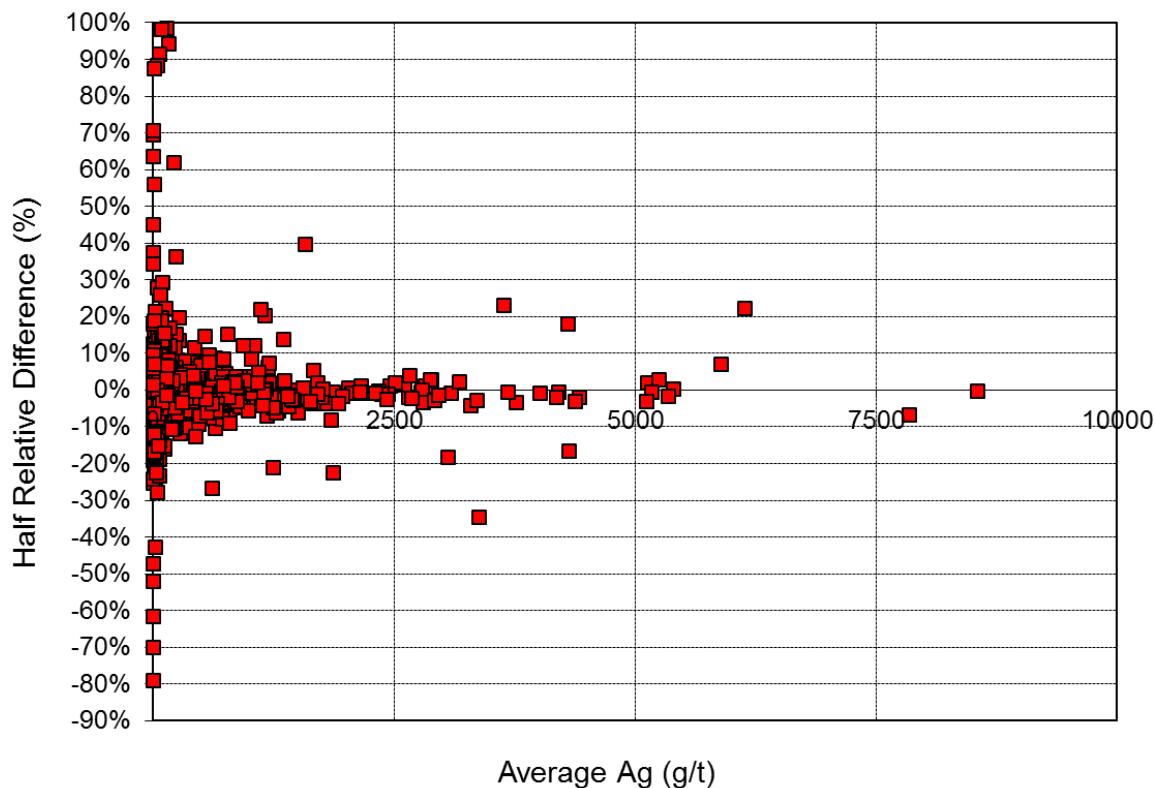


**FIGURE 11-3 CONTROL CHART FOR CRM BL**

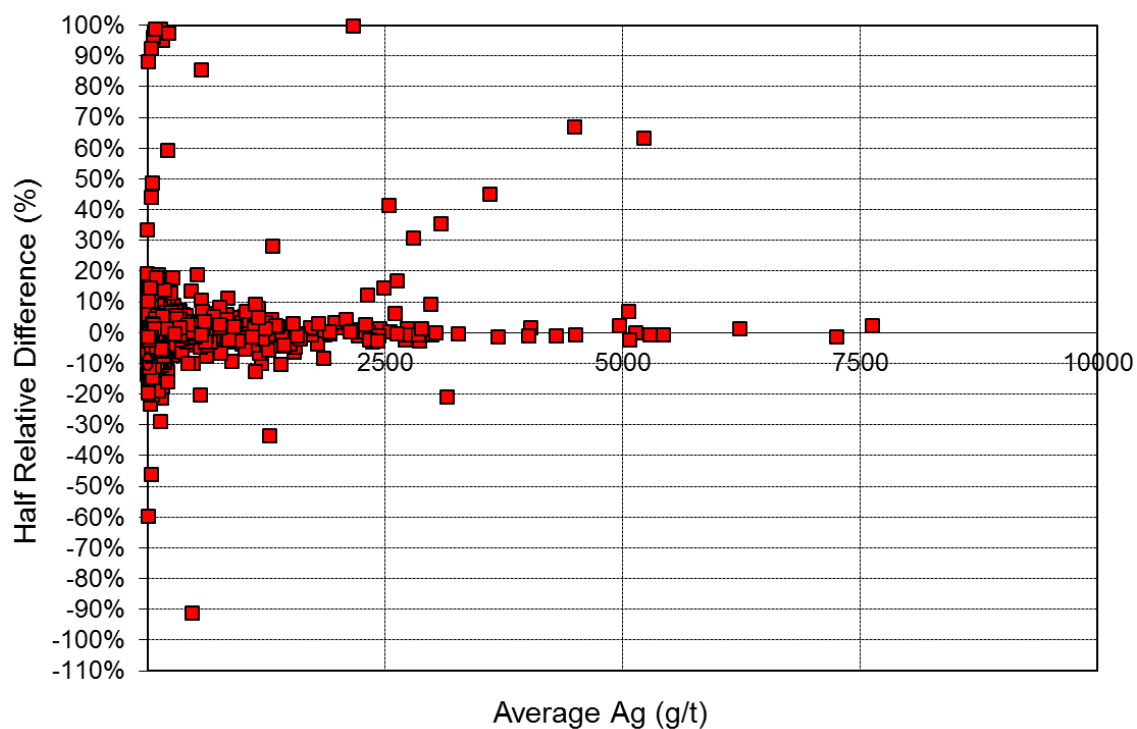


Pulp duplicates of mineralized samples have been submitted to various laboratories to make an additional assessment of laboratory bias. Figures 11-4 and 11-5 illustrate results for silver. With the exception of several analyses, Figure 11-4 shows good correlation between International Plasma Labs Ltd. (IPL) and ALS Chemex. Figure 11-5 may indicate that the ACME laboratory may be understating the silver grades in some cases. These results do not preclude estimating Mineral Resources; however, further investigation is required.

**FIGURE 11-4 CONTROL CHART IPL VERSUS ALS DUPLICATES**



**FIGURE 11-5 CONTROL CHART ACME VERSUS ALS DUPLICATES**



RPA recommends that Fresnillo's QC program include crushed reject duplicates and field duplicates. Field duplicates assess the variability introduced by selecting one half of the drill core versus the other, sampling disordering, and the nugget effect. Reject duplicates consist of a second split of the crushed sample. The split should be taken using a similar method, have the same weight, and be analyzed at the same laboratory as the original sample. Results from the reject duplicate QC program will determine if the splitting procedures are applied consistently and are appropriate. If the results are satisfactory, the coarse reject duplicate program can be discontinued.

In RPA's opinion, the QA/QC program as designed and implemented by Fresnillo is adequate and the assay results within the database are suitable for use in a Mineral Resource estimate.

## **CORE STORAGE AND SECURITY**

Drill core from the Juanicipio drilling was previously stored in two locations. Mineralized intercepts were stored in a locked shed located at the Fresnillo core handling facility near the Saucito minesite. Other core was stored alongside core from other Fresnillo projects in a large core storage facility located on Fresnillo's private land near the Saucito mine shaft. All Juanicipio drill core was moved to a secure facility dedicated to Juanicipio drill core.

Split core that has been bagged and readied for shipment is securely stored in the dedicated facility prior to shipping.

## 12 DATA VERIFICATION

The resource database was reviewed and verified during three site visits, a series of digital queries, checks of laboratory certificates, and review of Fresnillo's QA/QC results. RPA considers the resource database reliable and appropriate to prepare a Mineral Resource estimate.

MAG provided RPA a Dassault Systèmes GEOVIA GEMS (GEMS) project containing updated drill hole database, core recovery and density measurement files. Wireframes models of the veins were provided in ARANZ Geo Limited's Leapfrog software. Copies of the assay certificates were also provided.

RPA visually inspected the drill hole traces, performed GEMS database validation procedures, and reviewed the interpreted vein wireframe models.

## SITE VISIT AND CORE REVIEW

RPA has visited the property several times since the discovery of Juanicipio and Valdecañas vein systems. In December 2010, drill core from boreholes NA, NF2, PD, and JC was reviewed and compared with assay results and descriptive log records were made by Fresnillo geologists. RPA visited the core shack again in May 2011, and reviewed core from KG3 and again from NA. RPA visited the property and core shack most recently on May 27, 2014 and reviewed core from holes M40, KE, M22, and 18-R. In addition to reviewing core, RPA examined outcrops, drill rigs, sampling procedures, and other general exploration protocols in use by the Joint Venture.

## INDEPENDENT CHECK SAMPLES

During the visit to the core shack in May 2011, David Ross of RPA selected and marked out four samples of split core for duplicate analysis. The specified intervals were quarter split by Fresnillo technicians under the supervision of David Ross. The samples were bagged, tagged, and sealed in plastic bags and shipped to ALS Chemex. Sample preparation and analyses were similar to the standard procedures used by the Joint Venture.

The independent sampling by RPA confirms that there is significant mineralization in the drill holes sampled (Table 12-1). Zinc and lead mineralization was confirmed visually for a number of drill hole intervals.

**TABLE 12-1 CHECK SAMPLE RESULTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Hole ID	From (m)	To (m)	Original Sample Results				RPA Independent Check Samples			
			Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
NA	728.30	728.95	282	2.54	0.45	0.58	259	2.40	0.41	0.50
NA	748.80	749.60	656	0.17	0.13	0.06	1,020	0.18	0.15	0.06
KG3	796.70	797.70	663	2.99	11.55	3.42	712	2.13	12.75	3.37
KG3	797.70	798.70	253	0.83	0.88	5.12	264	0.76	0.74	5.09

## ASSAY TABLE REVIEW

Prior to 2011, RPA compared database assay values against both digital and hardcopy results provided by ALS Chemex and BSI Inspectorate. These included hardcopy assay certificates from ALS Chemex for holes 16P, 14P, 12P, MC, 21R, 22R, 23R, 33P, 37P, FA, and KG3 provided by MAG, and certificates for holes JU1, JU2, and JU5 from BSI Inspectorate found in Wetherup, 2006. MAG also supplied edited copies of digital assay results provided by the laboratory in MS Excel format. These files were not originals from the laboratory as a number of formulas and formatting edits were evident. Nevertheless, RPA compiled the files and compared the silver, gold, lead, and zinc results against the assay values in the resource database. No significant discrepancies were found.

In August 2011, RPA received twenty-six assay certificates in PDF format from MAG. These included holes J05, J21, J20, 17.5R, 18.5R, 18R, 20R, and J09. A total of 759 assay records were compared to the drill hole database, including 79 assays with silver values greater than 50 g/t. No significant discrepancies were identified.

In April 2014, RPA received twenty-four assay certificates in PDF format. RPA verified the silver, gold, lead, and zinc results for ten of the certificates (663 samples), with 73 of these samples located within the resource wireframe models. In addition, RPA randomly selected ten of the highest grade samples and verified analytical results. No discrepancies were

found. RPA did observe, however, that the protocol for rounding a lead or zinc analytical result ending in "50" to the nearest hundred ppm was inconsistent.

RPA recommends that MAG be directly copied on all assay results provided by the laboratory.

In RPA's opinion, the sample preparation, analysis and QA/QC procedures as designed and implemented by MAG are adequate and the assay results within the database are suitable for use in a Mineral Resource estimate.

## 13 MINERAL PROCESSING AND METALLURGICAL TESTING

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### METALLURGICAL TESTING

The metallurgical test work reports received consist of the following two reports in Spanish:

1. The May 2008 Interim Report (Proyecto Juanicipio, 2008) describes the initial tests on samples from the G, I+K, and M sections of the Valdecañas Vein.
2. The June 2009 Final Report (Proyecto Juanicipio, 2009) describes additional tests from a more representative suite of samples from the G, H+I+J, K+L+M+N+O, and Q+R+S+T+U sections of the Valdecañas Vein.

The May 2008 Interim Report included mineralogical characterization, basic work index determinations, and selective flotation tests for lead, zinc, and pyrite. The test work was carried out on an overall composite sample prepared from 79 individual samples obtained from 10 drill holes on the G, I, K, and M sections of the Valdecañas Vein, as well as separate flotation test composites from sections G, I+K, and M.

No metallurgical test work has been reported relating to the Desprendido or Juanicipio veins.

The test work determined that the gangue matrix consisted mainly of quartz, pyrite, and calcite hosting the base metal sulphides of galena and sphalerite, with silver occurring variously as sulphides (acanthite ([argentite] and aguilarite), sulphosalts (mainly pyrargyrite), and minor amounts of native silver and electrum. The mineralogical texture was found to be fine, especially with respect to the silver minerals, requiring a fine grind of 80% passing 40 µm to achieve adequate liberation for effective recovery by flotation. Comminution test work was limited to ball mill work index (BWI) tests, which showed the mineralization to be hard with a BWI of 17.4. Even at the fine grind size, a significant proportion of gold, and to a lesser extent silver, remained finely disseminated in pyrite in the 5 µm size range; hence the



tests included production of a pyrite concentrate in order to achieve acceptably low levels of gold and silver in the final tailings.

The main conclusions were that the Valdecañas Vein mineralization responded favourably to a selective flotation process for lead-zinc with high recoveries and acceptable concentrate grades being achieved. Some preliminary tests on pyrite flotation and subsequent cyanidation of the pyrite concentrate indicated the potential for recovering an additional 12% of gold and 5% silver, although insufficient test work was carried out to confirm an economically viable processing route. The presence of small amounts of native gold and silver suggested that there could be merit in including a gravity separation stage in the grinding circuit.

The June 2009 Final Report was built on the previous work and included additional tests on a more representative suite of samples from recent exploration. An overall composite was prepared from 190 m of mineralized intersections from 27 drill holes on sections G, H, I, J, K, L, M, N, O, P, Q, R, S, T, and U, and in addition, four composites from sections G, H+I+J, K+L+M+N+O, and Q+R+S+T+U were prepared and subjected to flotation tests to determine any metallurgical variability across the mineralized zones.

The flotation tests were carried out under the optimum conditions determined in the 2008 test work program where the principal requirement was for a fine grind to approximately 80% passing 40 µm. The concentrate grades and recoveries were considered satisfactory and were generally consistent with the earlier work, taking into account that the sample grades were significantly lower, but also more representative of potential mill head-grades.

Table 13-1 presents the four-product metallurgical balance calculated from the optimum conditions of open-circuit flotation testing on a general composite head sample assaying 1.6 g/t Au, 383 g/t Ag, 1.48% Pb, 2.82% Zn, 0.09% Cu, and 8.69% Fe. No locked-cycle tests have been carried out to date. Note that this balance includes a pyrite concentrate to indicate the potential for improving gold and silver recovery through a process of pyrite concentrate production and treatment, in addition to the lead-zinc selective flotation.

**TABLE 13-1 METALLURGICAL BALANCE FROM GENERAL COMPOSITE  
SAMPLE  
MAG Silver Corp. - Juanicipio Joint Venture**

Product	Weight %	Assays (g/t, %)						Distribution (%)					
		Au	Ag	Pb	Zn	Cu	Fe	Au	Ag	Pb	Zn	Cu	Fe
<b>Head</b>		1.60	383	1.48	2.82	0.09	8.69						
<b>Pb Conc</b>	3.2	34.67	9,767	43.43	6.86	1.32	8.69	69.0	81.0	93.1	7.7	44.8	3.2
<b>Zn Conc</b>	4.7	1.07	567	0.39	52.00	0.54	10.20	3.2	7.0	1.2	87.0	27.3	5.5
<b>Py Conc</b>	10.2	2.94	225	0.14	0.16	0.02	41.50	18.8	6.0	1.0	0.6	2.4	48.7
<b>Final Tail</b>	81.9	0.18	28	0.08	0.16	0.03	4.52	9.1	6.0	4.7	4.7	25.4	42.6
<b>Total</b>	100	1.60	383	1.48	2.82	0.09	8.69	100	100	100	100	100	100
<b>Pb-Zn Tail</b>	92.1	0.48	50	0.09	0.16	0.03	8.61	27.9	12.0	5.6	5.2	27.9	91.3

Table 13-2 shows a summary of the flotation tests on the four section composites as well as the general composite shown above.

There is a reasonable level of consistency across the various section composites. However, from an analysis of concentration ratio versus recovery (i.e., to normalize for head grade variations) it is worth noting that:

Section Q+R+S+T+U shows inferior silver concentration efficiency, whereas section K+L+M+N+O has inferior lead concentration efficiency, implying that silver concentration performance does not always correlate with that for lead. In fact, there is only a moderate correlation between silver head assays and lead head assays which may be a reflection of the abundance of silver sulphosalts.

Concentration efficiency of gold and silver into the pyrite concentrate appears quite variable, but this is principally related to the recovery of these metals into the lead concentrate and small differences there being magnified, in a relative sense, in the residual feed to the pyrite circuit.

**TABLE 13-2 SUMMARY OF FLOTATION TESTS ON GENERAL AND SECTION COMPOSITES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Sections	Au	Ag	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe	Au	Ag	Pb	Zn	Fe
	Heads (g/t,%)					Final Pb Concentrate (g/t,%)					Final Zn Concentrate (g/t,%)					Final Py Concentrate (g/t,%)				
General	1.60	383	1.48	2.82	8.69	34.7	9,767	43.4	6.9	10.2	1.1	567	0.4	52.0	10.2	2.9	225	0.1	0.2	41.5
G	2.22	454	1.40	2.64	7.20	45.8	10,043	35.5	8.0	10.1	2.8	809	0.3	52.2	10.1	2.1	207	0.1	0.2	37.5
H+I+J	2.09	240	1.60	2.97	8.15	41.7	5,853	43.8	10.2	11.0	1.4	468	0.4	58.7	11.0	6.0	152	0.2	0.2	42.1
K+L+M+N+O	1.54	540	1.58	3.73	12.34	29.7	12,331	38.4	9.9	12.6	0.7	484	0.6	55.2	12.6	1.7	176	0.2	0.3	39.3
Q+R+S+T+U	1.20	342	1.59	2.63	8.23	20.3	6,111	35.5	9.9	9.8	0.9	635	0.5	52.2	9.8	1.8	450	0.2	0.1	39.4
Average	1.73	392	1.53	2.96	8.92	34.4	8,821	39.3	9.0	10.7	1.4	593	0.4	54.1	10.7	2.9	242	0.18	0.18	40.0
						Final Pb Concentrate (Distribution,%)					Final Zn Concentrate (Distribution,%)					Final Py Concentrate (Distribution,%)				
General						69	81	93	8	3	3	7	1	87	6	19	6	1.0	0.6	49
G						76	82	94	11	5	5	7	1	83	6	7	3	0.7	0.4	37
H+I+J						67	82	92	12	5	3	8	1	82	6	17	4	0.8	0.4	30
K+L+M+N+O						72	86	91	10	5	3	5	2	85	6	11	3	1.3	0.7	32
Q+R+S+T+U						71	75	94	16	6	3	7	1	78	5	15	13	1.2	0.5	48
Average						71	81	93	11	5	3	7	1	83	6	14	6	1.0	0.5	39

Another key test work outcome was the development of a reagent suite for the differential flotation process, as summarized in Table 13-3. Reagent addition rates were also determined and have been used by AMC to estimate mineral processing costs.

**TABLE 13-3 FLOTATION REAGENT SUITES  
MAG Silver Corp. - Juanicipio Joint Venture**

Stage	pH	Modifier/Depressant	Collector
Grinding/Pb Flotation	8.5 (soda ash also added)	ZnSO <sub>4</sub> /NaCN NaMBS	Dithiophosphates Aerofine
Zn Flotation	10.5	CuSO <sub>4</sub>	Aerofine
Pyrite Flotation	9.0		Potassium Amyl Xanthate

## IMPLICATIONS FOR PROCESS DESIGN

Table 13-4 shows the test work head grades, plus the initial estimate of head grades on which the processing design criteria have been developed. The table also shows the final average life-of-mine (LOM) head grades from the mine plan.

**TABLE 13-4 HEAD GRADES USED FOR TEST WORK AND FOR PROCESS DESIGN  
MAG Silver Corp. - Juanicipio Joint Venture**

	Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)
Test work sample head grades	1.60	383	1.48	2.82
Process design head grades	1.90	548	2.00	3.60
Average LOM plan grades	1.30	416	1.42	2.70

Table 13-5 shows the metal distribution (Dist) to concentrates for the head grades shown in Table 13-4, assuming the metal distributions in Table 13-2. To maintain some conservatism and to allow for actual plant operating results being slightly inferior to laboratory results, no enhanced grade-recovery performance has been assumed in the cleaner circuit design (a common bottleneck), despite the process design grades being significantly higher than the test work grades. The average LOM grades are expected to be lower than process design grades, and therefore closer to the test work grades. In the absence of resource grades for pyrite, the metal recoveries to pyrite concentrate in the metallurgical test work results have been used for design purposes.

**TABLE 13-5 METAL DISTRIBUTION TO CONCENTRATES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	Wt	Gold		Silver		Lead		Zinc	
	% of feed	Grade g/t	Dist. %	Grade g/t	Dist %	Grade %	Dist %	Grade %	Dist %
<b>Test work</b>									
Pb Concentrate	3.2	34.70	69%	9,767	81%	43.4	93.1%	6.9	7.7%
Zn Concentrate	4.7	1.07	3.2%	567	7%	0.4	1.2%	52	87%
Py Concentrate	10.2	2.94	18.8%	225	6%				
<b>Design grades</b>									
Pb Concentrate	4.3	30.3	69%	10,265	81%	43	93%	6.7	8%
Zn Concentrate	6.0	0.9	3%	637	7%	0.33	1%	52	87%
<b>Plan grades</b>									
Pb Concentrate	3.1	29.2	69%	10,972	81%	43	93%	7.0	8%
Zn Concentrate	4.5	0.9	3%	645	7%	0.31	1%	52	87%

## RECOVERIES AND CONCENTRATE GRADES

A summary of the design criteria mill recoveries and concentrate grades is shown in Table 13-6.

**TABLE 13-6 MILL RECOVERIES AND CONCENTRATE GRADES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	Gold	Silver	Lead	Zinc
Recoveries to lead concentrate	69%	81%	93%	8%
Lead concentrate grades	30.3 g/t	10,265 g/t	43.0%	6.7%
Recoveries to zinc	3%	7%	1%	87%
Zinc concentrate grades	0.95 g/t	637 g/t	0.33%	52.0%
Recoveries to pyrite concentrate	19%	6%	—	—
Pyrite concentrate Au/Ag content	2.94 g/t	225 g/t	—	—

At present, there are no known processing factors or deleterious elements that could have a significant effect on potential economic extraction.

## METALLURGICAL STUDY UPDATE

A division of Peñoles (CIDT) has been contracted to run the recommended metallurgical tests, with almost 254 kg of mineralized material collected systematically along the deposit for metallurgical studies to be carried out.

## 14 MINERAL RESOURCE ESTIMATE

RPA estimated Mineral Resources for the Valdecañas and Juanicipio vein systems using drill hole data available as of December 31, 2013. At an NSR cut-off of US\$70/t, Indicated Mineral Resources are estimated to total 10.1 million tonnes of 511 g/t Ag, 1.7 g/t Au, 1.9% Pb, and 3.5% Zn. Inferred Mineral Resources are estimated to total 5.1 million tonnes of 372 g/t Ag, 2.0 g/t Au, 1.8% Pb, and 2.8% Zn. There are no Mineral Reserves estimated on the property. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The total contained metals in the Indicated Mineral Resource are 166 million ounces of silver, 544,000 ounces of gold, 419 million pounds of lead, and 778 million pounds of zinc. The Inferred Mineral Resource contains 61 million ounces of silver, 319,000 ounces of gold, 202 million pounds of lead, and 317 million pounds of zinc.

## RESOURCE DATABASE

As operator, Fresnillo maintains the resource database and provides MAG with Microsoft Excel files when requested. MAG provided most drill hole data and wireframe models in a Dassault Systèmes GEOVIA GEMS Version 6.5 software package (GEMS) project. Drill core recovery and density data were provide as Microsoft Excel files.

Listed below is a summary of records for all drilling on the property, the vast majority of which targeted the Valdecañas and Juanicipio vein systems:

- Holes: 262
- Surveys: 2,657
- Assays: 22,868
- Composites 856
- Lithology: 8,779
- Full vein width composites: 170
- Density measurements: 7,277

Failed hole 13P was also removed from the database. Hole J20 was removed due to low core recovery in the area of the vein.

Section 12, Data Verification, describes the verification steps made by RPA. In summary, no discrepancies were identified and RPA is of the opinion that the GEMS drill hole database is valid and suitable to estimate Mineral Resources for the project.

## GEOLOGICAL INTERPRETATION AND 3D SOLIDS

MAG generated wireframe models in ARANZ Geo Limited's Leapfrog Geo software version 1.4.1 (Figures 14-1 and 14-2). The veins were modelled as logged, however, narrow intercepts were "bulked out" to two metres true thickness where required. The veins were initially modelled in their entirety, despite areas of low grade or exceptionally narrow intersections.

RPA created southeast looking vertical sections spaced 50 m apart, level plans spaced 10 m apart, and inclined longitudinal sections parallel to veins. Geologic continuity was checked using the longitudinal section and level plans.

A description of each modelled vein follows:

- V1E, formerly known as the southeastern part of the Main Valdecañas Vein, is intersected by 91 drill holes. It is en echelon with V1W with an overlap zone. The previous interpretation had the east and west part of the Main Vein cut and offset by a fault with no overlap. The well mineralized part of the vein extends from approximately 400 m to more than 900 m below surface and has a strike length of 1,200 m within the property boundary. It appears to extend into Fresnillo's properties to the north and east. V1E is approximately equivalent to the eastern part of the Valdecañas Vein and parts of the eastern Desprendido Vein as defined in the 2012 PEA.
- V1W is the northwest section of the Valdecañas Vein. It spans more than 700 m towards northwest and continues beyond the property limit, with a vertical extent of approximately 600 m. It was defined based on 71 drill holes. V1W is approximately equivalent to the western part of the Valdecañas Vein as defined in the 2012 PEA.
- V2W, formerly known as Footwall Vein 1 and Footwall Vein 2. It is intersected by 56 drill holes and is lower grade and narrower than the Valdecañas Vein and discontinuous. The vein spans 700 m along strike and 400 m vertically. It was modelled as two lenses. V2W is approximately equivalent to the western part of the Desprendido Vein as defined by the 2012 PEA.
- HW1, formerly known as Hanging Wall Vein 1, is located northwest of the fault. It varies from 20 m to 100 m above the Valdecañas Vein due to a steepening dip towards the southeast. Silver grades are commonly greater than 500 g/t Ag. HW1 was not included as part of the 2012 PEA.

- JV1, also known as the Juanicipio Vein, is located 750 m south of the Valdecañas structure. The vein has a strike length of 900 m and vertical extent of 500 m.

Intercept grade, true thickness, and grade times thickness (GT) values were plotted on inclined longitudinal sections. Manual contouring of grades indicates that most zones are oriented as horizontally elongated tabular bodies with shallow silver rich areas and deeper base metal rich areas. Sharp decreases in grade and/or thickness suggest that block grades would be best estimated within “resource panels” using hard boundaries. Using an NSR cut-off value of US\$70/t, resource panels were outlined on the inclined longitudinal section and the wireframe models were clipped where required.

As noted above, the veins were modelled as logged and RPA notes that there is additional mineralization in the walls with NSR values above the breakeven cut-off value of US\$70/t. This material will become important when estimating the grade of diluting material in future Mineral Reserve estimates. RPA recommends that additional wireframe models be constructed in order to determine the grade of the diluting material.



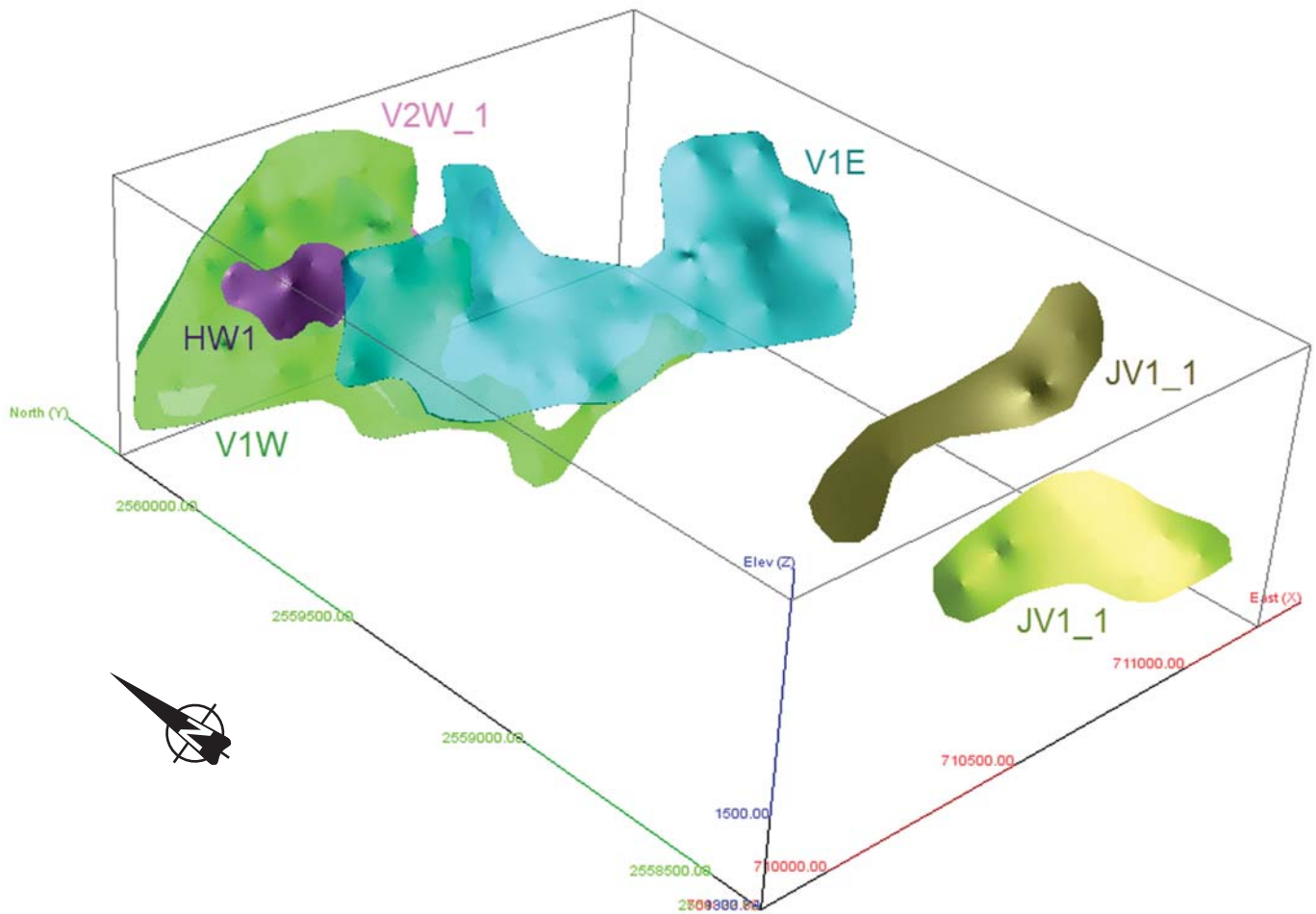
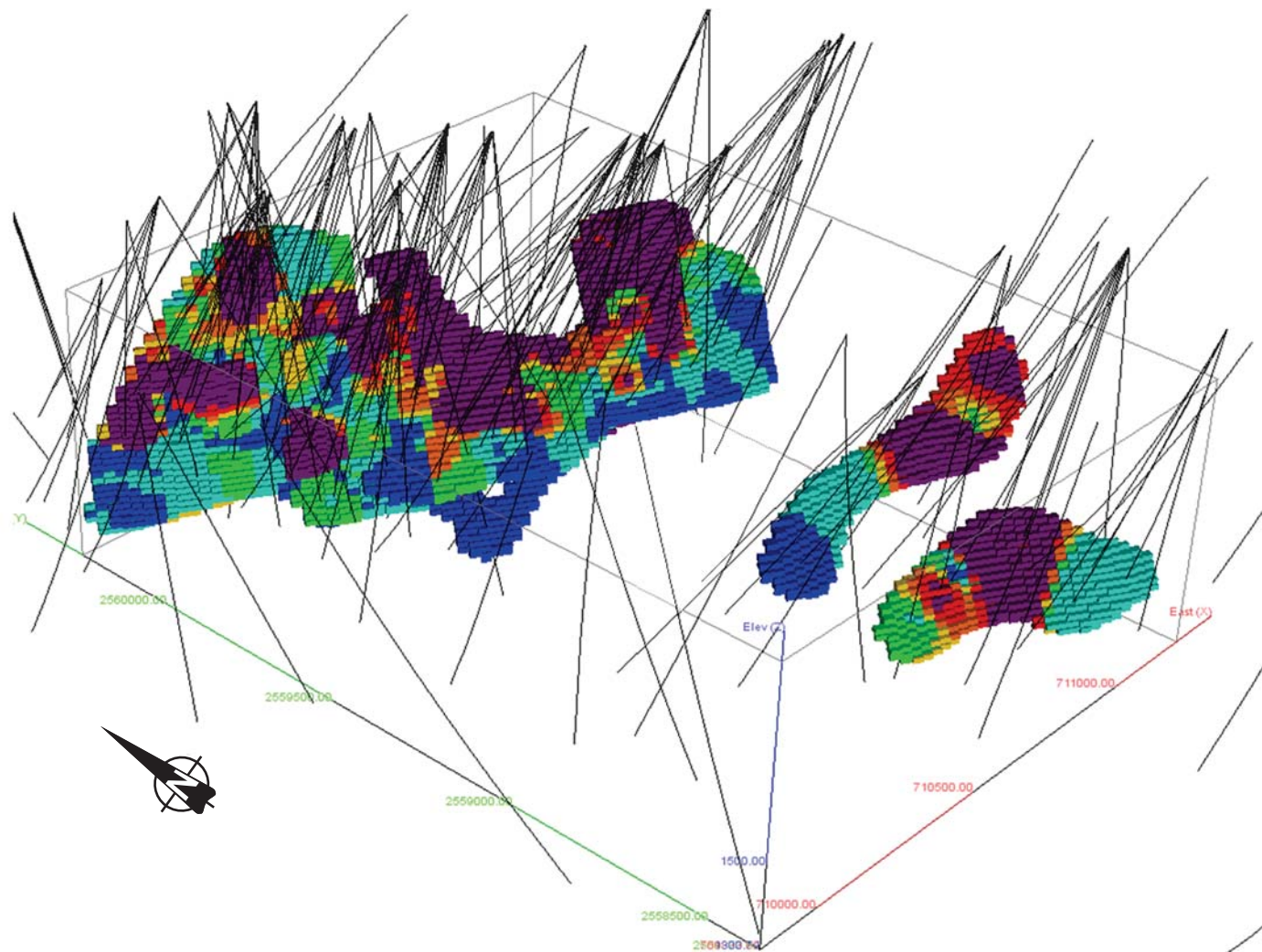


Figure 14-1

**Mag Silver Corp.**

***Juanicipio Joint Venture***  
Zacatecas State, Mexico

**3D View of Wireframe Models**










Legend: Ag (g/t)	
	<100
	100 - 200
	200 - 300
	300 - 400
	400 - 500
	500 - 600
	>600

Figure 14-2

**Mag Silver Corp.**

**Juanicipio Joint Venture**  
Zacatecas State, Mexico

**3D View of Block Model  
Silver Grades**

## STATISTICAL ANALYSIS

Assay values located inside the wireframe models were tagged with domain identifiers and exported for statistical analysis. Results were used to help verify the modelling process. Basic statistics by rock type are summarized in Table 14-1. Note that some descriptive statistics can be misleading where the number of assays is low.

**TABLE 14-1 DESCRIPTIVE STATISTICS OF RESOURCE ASSAY VALUES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Statistic	Length (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
<b>V1E</b>					
No. of Cases	473	473	473	473	473
Minimum	0.45	2	0.01	0	0
Maximum	2.4	8,530	38.1	20	29.8
Median	1	201	0.65	0.91	2.46
Arithmetic Mean	0.95	602	1.91	2.04	4.18
Weighted Mean		618	1.96	2.11	4.25
Standard Deviation	0.24	1,026	3.82	2.91	4.75
Coef. of Variation	0.25	1.7	2	1.43	1.14
<b>V1W</b>					
No. of Cases	455	455	455	455	455
Minimum	0.45	1	0.01	0	0
Maximum	3.7	15,026	42.9	30	20.1
Median	1	99	0.78	0.46	1.21
Arithmetic Mean	0.96	358	1.96	1.77	2.6
Weighted Mean		385	2.02	1.72	2.49
Standard Deviation	0.28	1,023	3.78	3.61	3.41
Coef. of Variation	0.29	2.9	1.93	2.04	1.31
<b>V2W</b>					
No. of Cases	130	130	130	130	130
Minimum	0.6	4	0.01	0	0.01
Maximum	2.2	8,930	10.05	14.75	25.1
Median	1	173	0.41	0.46	1.05
Arithmetic Mean	0.96	641	0.89	1.71	2.91
Weighted Mean		619	0.89	1.73	2.96
Standard Deviation	0.23	1,348	1.38	3	4.07
Coef. of Variation	0.24	2.1	1.55	1.75	1.4
<b>HW1</b>					
No. of Cases	31	31	31	31	31
Minimum	0.6	1	0.01	0	0.01
Maximum	3.65	10,000	9.69	6.83	11.95
Median	0.8	114	0.14	0.05	0.17
Arithmetic Mean	0.99	789	0.76	0.64	1.15
Weighted Mean		575	0.56	0.49	1

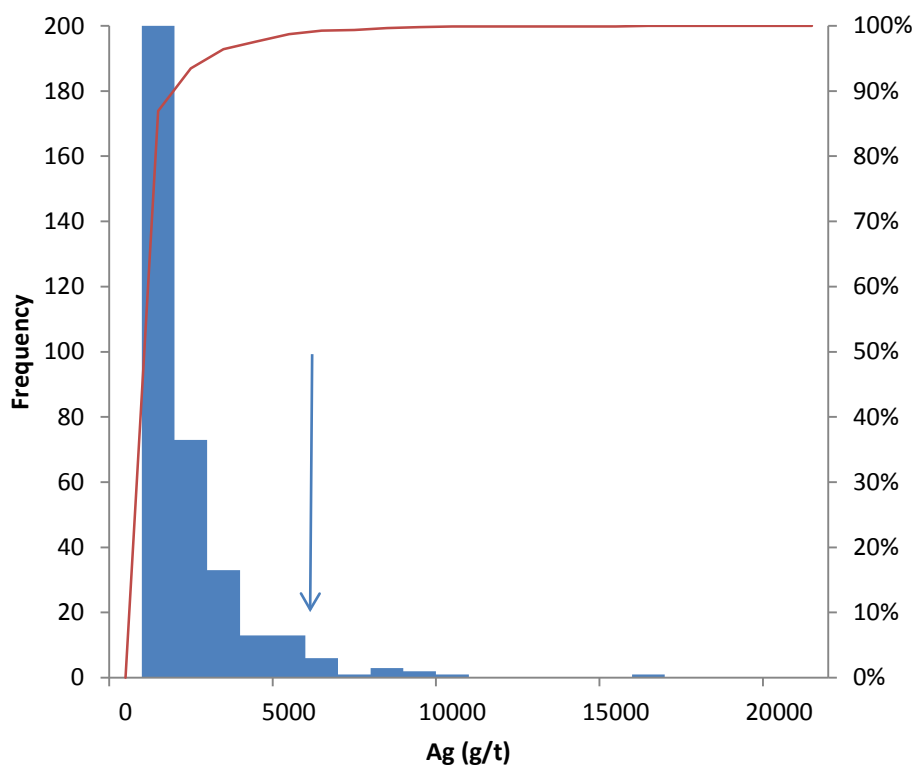
Statistic	Length (m)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Standard Deviation	0.69	2,061	2.01	1.46	2.29
Coef. of Variation	0.7	2.6	2.64	2.28	1.99
<b>JV1</b>					
No. of Cases	31	31	31	31	31
Minimum	0.6	7	0.01	0	0.01
Maximum	2.7	4,370	15.45	10.5	11.25
Median	1	121	0.52	0.3	0.54
Arithmetic Mean	1.05	745	1.81	1.14	2.39
Weighted Mean	1.22	627	2.14	0.95	2.26
Standard Deviation	0.43	1,339	3.39	2.04	3.16
Coef. of Variation	0.41	1.8	1.88	1.79	1.32

## CUTTING HIGH-GRADE VALUES

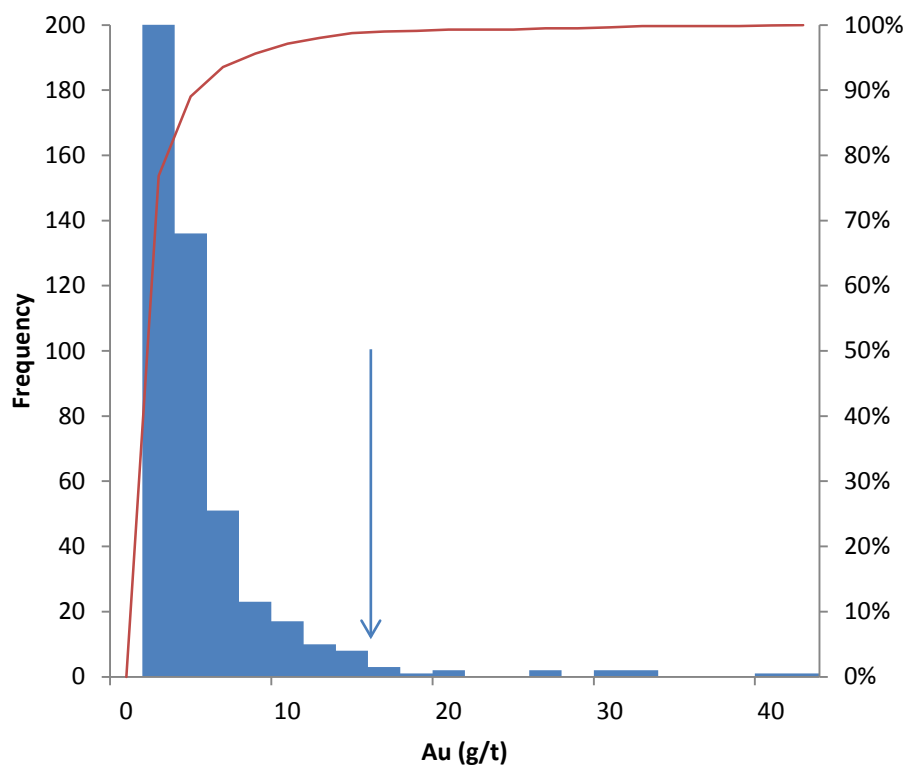
Where the assay distribution is skewed positively or approaches log-normal, erratic high-grade assay values can have a disproportionate effect on the average grade of a deposit. One method of treating these outliers in order to reduce their influence on the average grade is to cut or cap them at a specific grade level. In the absence of production data to calibrate the cutting level, inspection of the assay distribution can be used to estimate a “first pass” cutting level.

Review of the resource assay histograms within the wireframe domains (Figures 14-3 to 14-6) and a visual inspection of high-grade values on vertical sections suggest cutting erratic values to 6,000 g/t Ag, 16 g/t Au, and 15% for both lead and zinc. By cutting high values to 6,000 g/t Ag, the coefficient of variation values are mostly less than two and the average silver grade in the V1 has been reduced from 602 g/t to 594 g/t (Table 14-2).

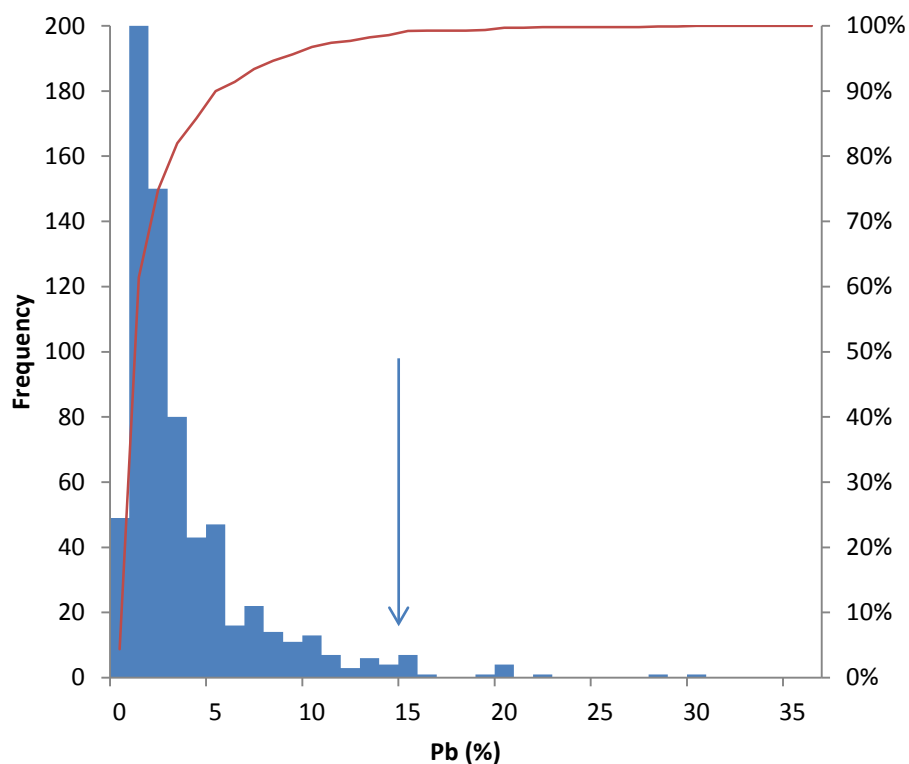
**FIGURE 14-3 HISTOGRAM OF SILVER RESOURCE ASSAYS (N=1120)**



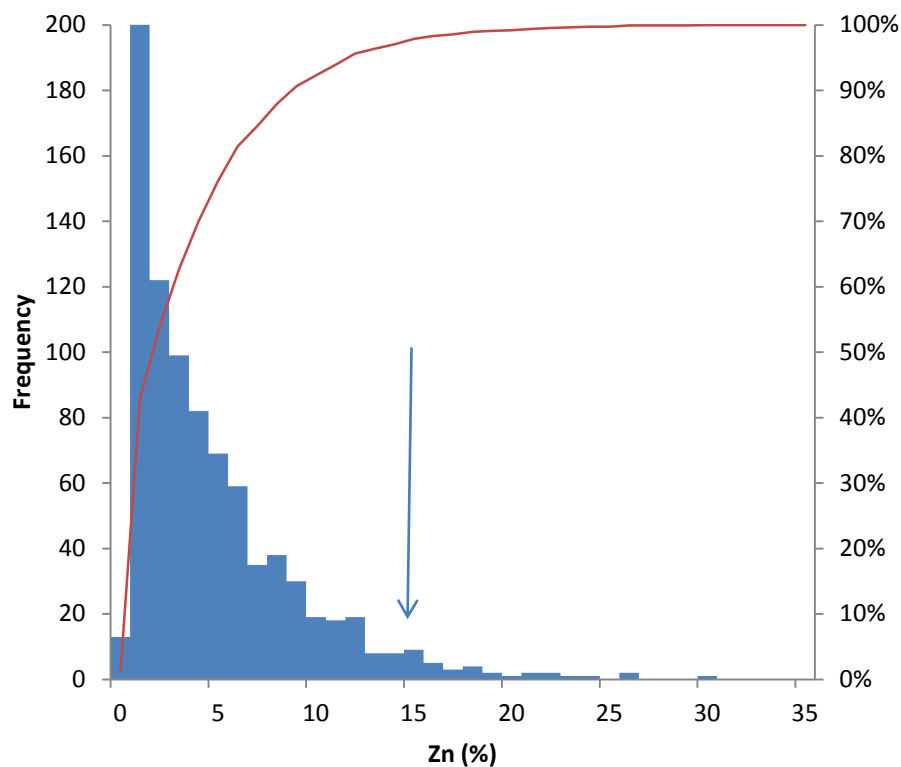
**FIGURE 14-4 HISTOGRAM OF GOLD RESOURCE ASSAYS (N=1120)**



**FIGURE 14-5 HISTOGRAM OF LEAD RESOURCE ASSAYS (N=1120)**



**FIGURE 14-6 HISTOGRAM OF ZINC RESOURCE ASSAYS (N=1120)**



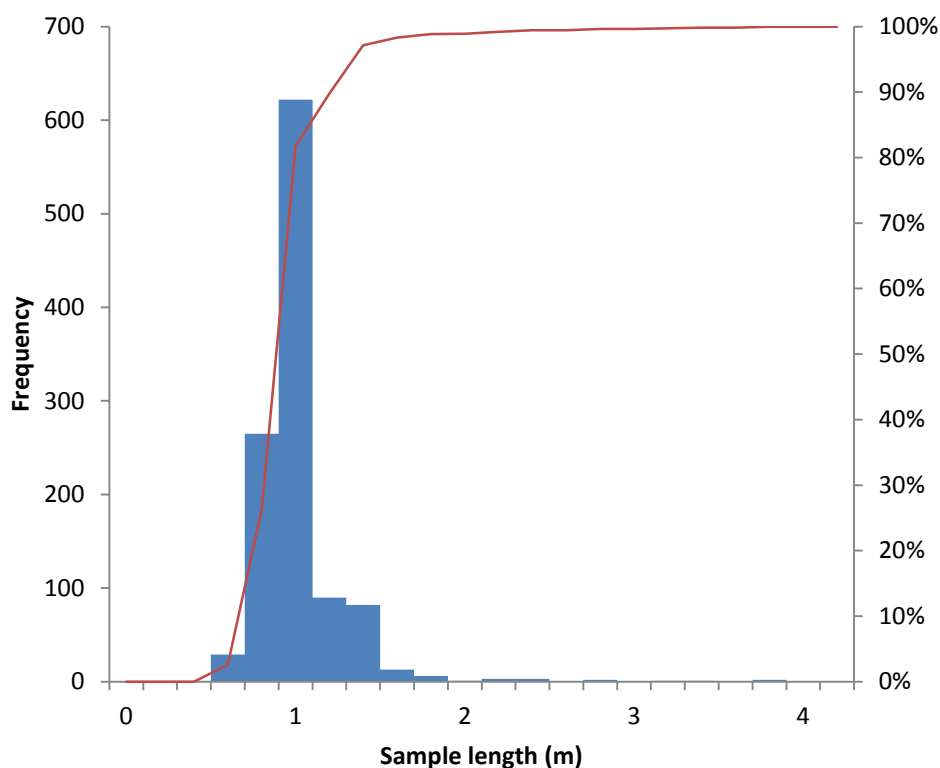
**TABLE 14-2 DESCRIPTIVE STATISTICS OF CUT RESOURCE ASSAY VALUES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Statistic	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
<b>V1E</b>				
No. of Cases	473	473	473	473
Minimum	2	0.01	0	0
Maximum	6,000	16	15	15
Median	201	0.65	0.91	2.46
Arithmetic Mean	594	1.77	2.02	4.01
Weighted Mean	609	1.82	2.09	4.08
Standard Deviation	971	2.96	2.81	4.2
Coef. of Variation	1.6	1.67	1.39	1.05
<b>V1W</b>				
No. of Cases	455	455	455	455
Minimum	1	0.01	0	0
Maximum	6,000	16	15	15
Median	99	0.78	0.46	1.21
Arithmetic Mean	332	1.82	1.67	2.56
Weighted Mean	359	1.89	1.61	2.46
Standard Deviation	748	2.75	3.01	3.27
Coef. of Variation	2.3	1.52	1.81	1.28
<b>V2W</b>				
No. of Cases	130	130	130	130
Minimum	4	0.01	0	0.01
Maximum	6,000	10.05	14.75	15
Median	173	0.41	0.46	1.05
Arithmetic Mean	616	0.89	1.71	2.83
Weighted Mean	593	0.89	1.73	2.88
Standard Deviation	1,217	1.38	3	3.71
Coef. of Variation	2	1.55	1.75	1.31
<b>HW1</b>				
No. of Cases	31	31	31	31
Minimum	1	0.01	0	0.01
Maximum	6,000	9.69	6.83	11.95
Median	114	0.14	0.05	0.17
Arithmetic Mean	660	0.76	0.64	1.15
Weighted Mean	496	0.56	0.49	1
Standard Deviation	1,519	2.01	1.46	2.29
Coef. of Variation	2.3	2.64	2.28	1.99
<b>JV1</b>				
No. of Cases	31	31	31	31
Minimum	7	0.01	0	0.01
Maximum	4,370	15.45	10.5	11.25
Median	121	0.52	0.3	0.54
Arithmetic Mean	745	1.81	1.14	2.39
Weighted Mean	627	2.14	0.95	2.26
Standard Deviation	1,339	3.39	2.04	3.16
Coef. of Variation	1.8	1.88	1.79	1.32

## COMPOSITING

Sample lengths range from 45 cm to 3.75 m within the wireframe models. Approximately 50% of the samples were taken at one metre intervals, and 80% of the samples are one metre or less (Figure 14-7). Given these distributions, and considering the width of the mineralization, RPA chose to composite to two metre lengths. Assays within the wireframe domains were composited starting at the first mineralized wireframe boundary from the collar and resetting at each new wireframe boundary. Composites less than 0.5 m, located at the bottom of the mineralized intercept, were removed from the database.

**FIGURE 14-7 HISTOGRAM OF SAMPLE LENGTHS (N=1120)**





**TABLE 14-3 DESCRIPTIVE STATISTICS OF COMPOSITE VALUES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Statistic</b>	<b>Length (m)</b>	<b>Ag (g/t)</b>	<b>Au (g/t)</b>	<b>Pb (%)</b>	<b>Zn (%)</b>
<b>V1E</b>					
No. of Cases	241	241	241	241	241
Minimum	0.55	0	0	0	0
Maximum	2	4,705	11.29	12.86	15
Median	2	268	0.82	1.23	3.33
Arithmetic Mean	1.86	584	1.73	2.02	3.96
Weighted Mean	1.92	607	1.82	2.06	4.04
Standard Deviation	0.35	782	2.31	2.32	3.49
Coef. of Variation	0.19	1.3	1.34	1.15	0.88
<b>V1W</b>					
No. of Cases	232	232	232	232	232
Minimum	0.5	2	0.01	0	0.01
Maximum	2	6,000	14.85	13.63	14.62
Median	2	131	1.01	0.53	1.56
Arithmetic Mean	1.87	352	1.87	1.59	2.43
Weighted Mean	1.93	360	1.9	1.62	2.47
Standard Deviation	0.34	679	2.37	2.38	2.63
Coef. of Variation	0.18	1.9	1.27	1.5	1.08
<b>V2W</b>					
No. of Cases	69	69	69	69	69
Minimum	0.5	5	0.01	0.02	0.03
Maximum	2	4,468	5.11	9.99	15
Median	2	322	0.45	0.63	1.46
Arithmetic Mean	1.81	598	0.85	1.7	2.83
Weighted Mean	1.91	587	0.88	1.72	2.85
Standard Deviation	0.41	894	1.08	2.42	3.34
Coef. of Variation	0.23	1.5	1.27	1.42	1.18
<b>HW1</b>					
No. of Cases	19	19	19	19	19
Minimum	0.65	0	0	0	0
Maximum	2	1,643	1.96	2.07	5.75
Median	2	178	0.16	0.11	0.37
Arithmetic Mean	1.66	385	0.44	0.43	0.91
Weighted Mean	1.8	442	0.48	0.47	0.96
Standard Deviation	0.49	512	0.6	0.64	1.36
Coef. of Variation	0.3	1.3	1.37	1.46	1.5
<b>JV1</b>					
No. of Cases	21	21	21	21	21
Minimum	0.51	9	0.02	0.01	0.02
Maximum	2	3,458	11.44	2.65	10.75
Median	2	164	0.58	0.61	1.29
Arithmetic Mean	1.67	570	1.78	0.92	2.27
Weighted Mean	1.81	581	1.98	0.88	2.09
Standard Deviation	0.51	816	2.74	0.9	2.96
Coef. of Variation	0.31	1.4	1.54	0.99	1.31

## INTERPOLATION PARAMETERS

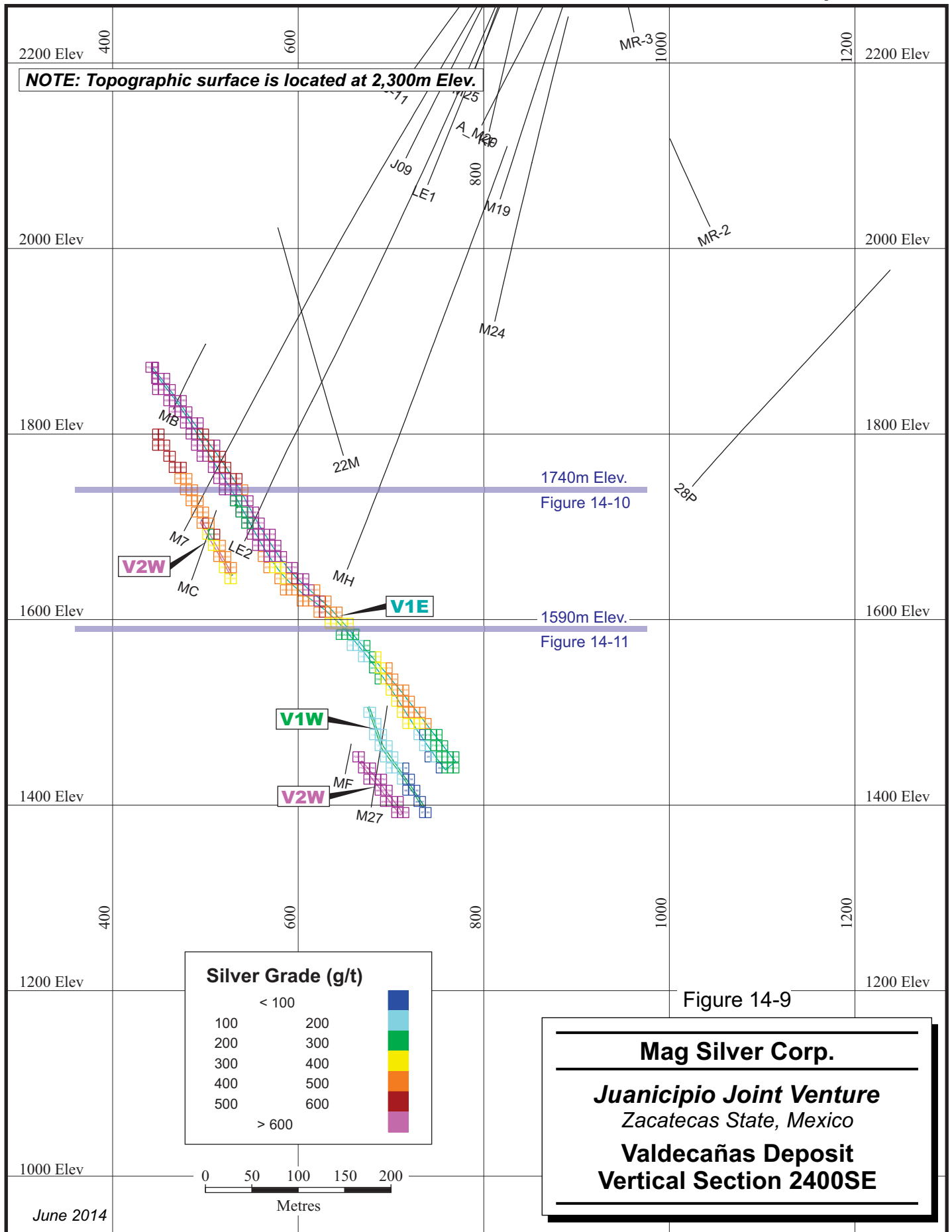
Grade interpolations for silver, gold, lead, zinc, and density were made using inverse distance cubed ( $ID^3$ ) with a minimum of one to a maximum of five composites per block estimate. The search ellipse varied slightly by vein (Table 14-4). Hard boundaries were used to limit the use of composites between veins. Figures 14-8 to 14-12 illustrate the results.

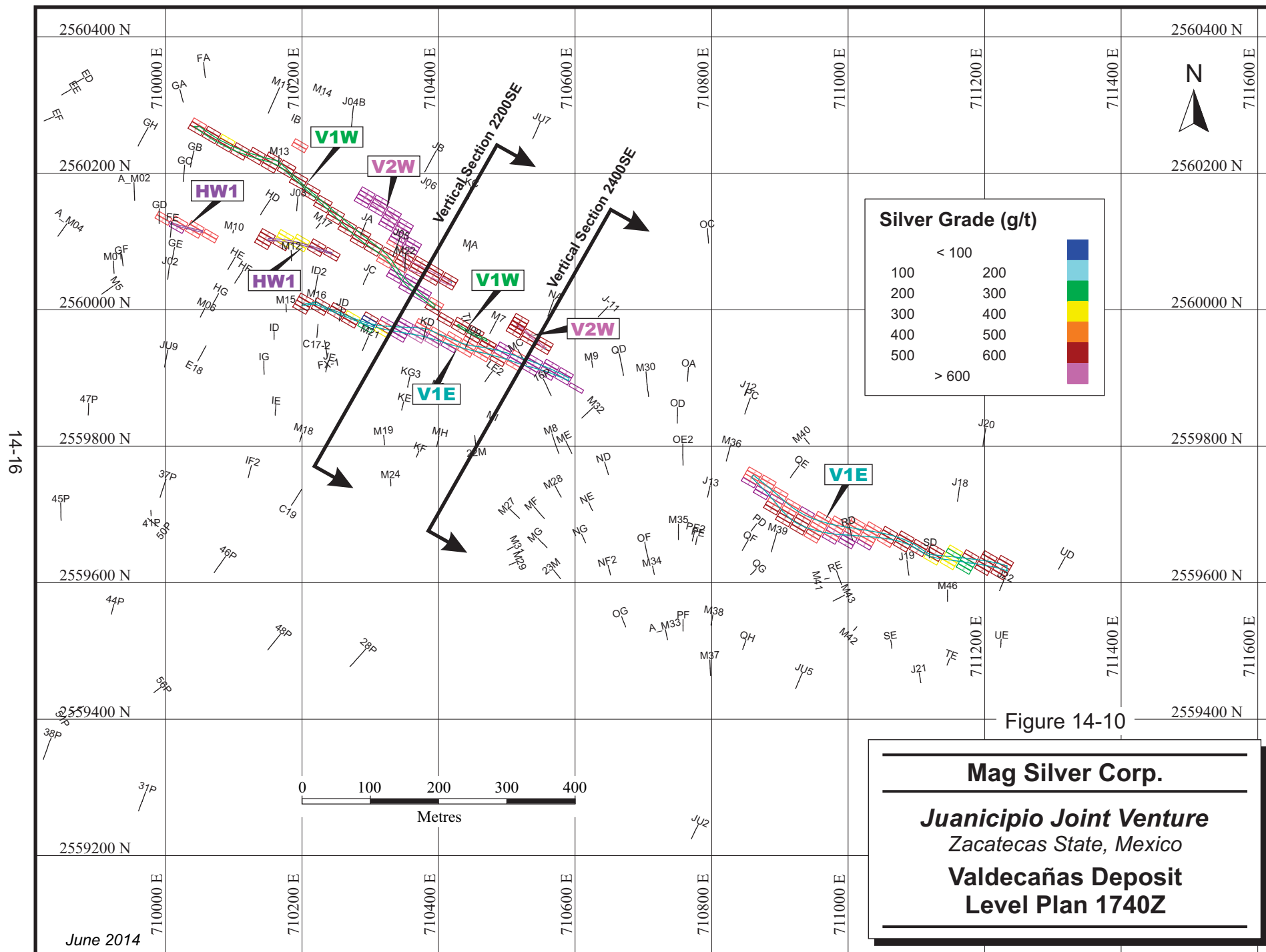
**TABLE 14-4 BLOCK ESTIMATE SEARCH STRATEGY**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Domain within each Rock Type	Z (°)	Y (°)	Z (°)	Long (m)	Inter. (m)	Short (m)
V1E	00	-55	-45	150	150	50
V1W	-05	-65	00	150	150	50
V2W	-05	-55	00	150	150	50
HW1	20	-70	00	150	150	50
JV1	10	-55	45	220	220	50

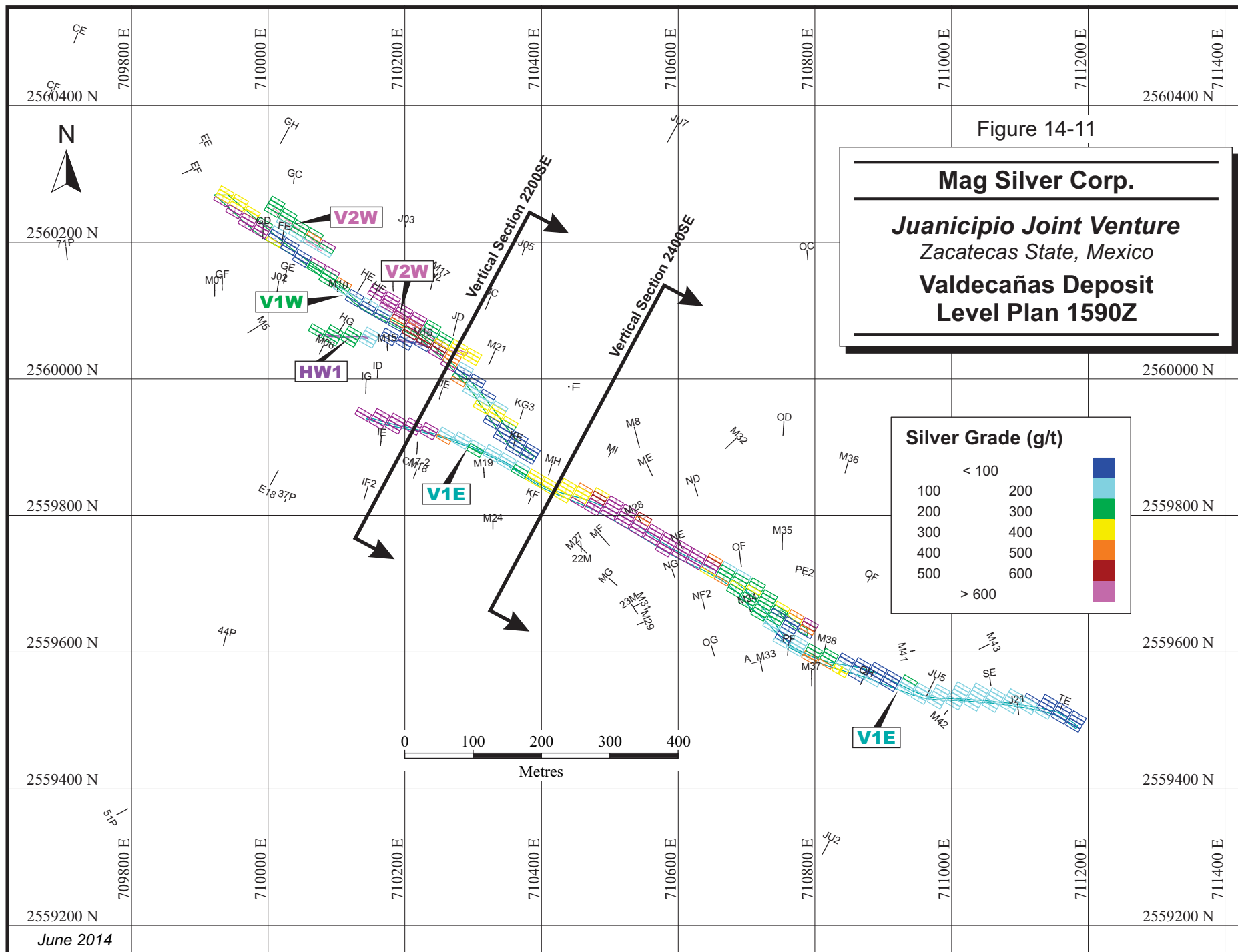
\* Note: GEMS ZYZ rotation nomenclature is used above. Positive rotation around the X axis is from Y towards Z, around the Y axis is from Z toward X, and around the Z axis is from X toward Y.

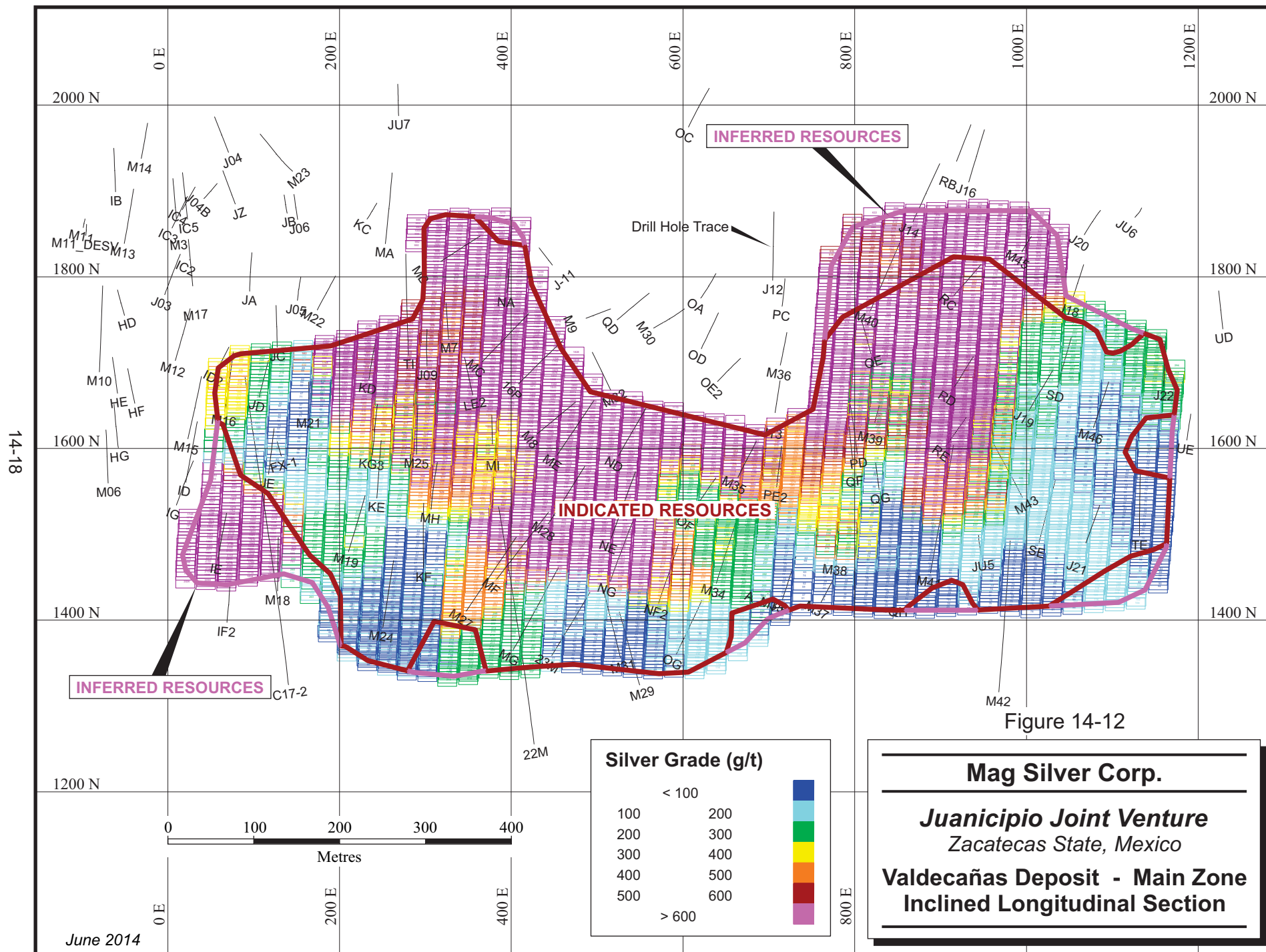






14-17





## DENSITY

Fresnillo performed 7,277 density measurements. The spacing and distribution of the measurements allows for density to be estimated throughout the block model for the Valdecañas veins. RPA used ID<sup>3</sup>, with a minimum of one and a maximum of five composites, to estimate block density. Table 14-5 compares the original density measurements with the results from the block model estimate. Blocks are in general slightly lower than the original measurements due to the spatially closer drill hole spacing in areas of higher grades, and higher density values.

**TABLE 14-5 COMPARISON STATISTICS OF DENSITY MEASUREMENTS  
AND BLOCK ESTIMATES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	<u>Sample Density</u>	<u>Block Density</u>
<b>V1E</b>		
Minimum	2.05	2.12
Maximum	4.38	3.73
Arithmetic Mean	2.91	2.88
<b>V1W</b>		
Minimum	2.08	2.14
Maximum	4.85	3.33
Arithmetic Mean	2.83	2.79
<b>V2W</b>		
Minimum	2.29	2.50
Maximum	3.89	3.47
Arithmetic Mean	2.82	2.79
<b>HW1</b>		
Minimum	2.24	2.28
Maximum	3.20	2.82
Arithmetic Mean	2.61	2.53
<b>JV1</b>		
Minimum	2.30	2.39
Maximum	3.76	3.49
Arithmetic Mean	2.89	2.78

RPA tested weighting of the compositing and block grade estimate procedures. For deposits with a positive correlation between density and grade, density weighting can cause samples with higher densities have greater influence on the results. Results from RPA tests indicated



a minor difference between density-weighted and non-density-weighted results. RPA chose to not weight by density.

## BLOCK MODEL

The GEMS block model is rotated 60° and is made up of 332 columns, 106 rows, and 88 levels for a total of 2,340,250 blocks. The model origin (lower-left corner at highest elevation) is at UTM coordinates 711,181.17 mE, 2,557,649 mN and 2,250 m elevation. Each block is 6 m wide, 12 m high, and 24 m along strike. A partial block model is used to manage blocks partially filled by mineralized rock types, including blocks along the edges of the deposit. A partial model has a parallel block model containing the percentage of mineralized rock types contained within each block. The block model contains the following information:

- domain identifiers with rock type;
- estimated grades of silver, gold, lead, and zinc inside the wireframe models;
- NSR estimates calculated from block grades and related economic and metallurgical assumptions;
- the percentage volume of each block within the mineralization wireframe models;
- tonnage factors, in tonnes per cubic metre;
- the distance to the closest composite used to interpolate the block grade; and
- the resource classification of each block.

## NSR CUT-OFF VALUE

NSR factors were developed by RPA for the purposes of geological interpretation and resource reporting. NSR is the estimated value per tonne of mineralized material after allowance for metallurgical recovery and consideration of smelter terms, including payables, treatment charges, refining charges, price participation, penalties, smelter losses, transportation, and sales charges.

Input parameters used to develop the NSR factors have been derived from recent metallurgical test work on the Valdecañas Vein and smelter terms from comparable projects.

These assumptions are dependent on the processing scenario, and will be sensitive to changes in inputs from further metallurgical test work. Key assumptions are listed below:

- Metal prices:
  - US\$21.50 per ounce of silver
  - US\$1,250 per ounce of gold
  - US\$0.99 per pound of lead
  - US\$0.91 per pound of zinc
- Recoveries based on preliminary metallurgical testing:
  - 81% Ag recovery to Pb concentrate
  - 69% Au recovery to Pb concentrate
  - 93% Pb recovery to Pb concentrate
  - 7% Ag recovery to Zn concentrate
  - 3% Au recovery to Zn concentrate
  - 87.4% Zn recovery to Zn concentrate
  - 6% Ag recovery to Fe concentrate
  - 19% Au recovery to Fe concentrate

The net revenue from each metal was calculated and then divided by grade to generate an NSR factor. These NSR factors represent revenue (US\$) per metal unit (per g/t Ag, for example), and are independent of resource grade. RPA used the following factors to calculate NSR:

Ag:	\$0.51 per g/t
Au:	\$30.11 per g/t
Pb:	\$12.21 per %
Zn:	\$9.07 per %

These NSR factors were multiplied by block grades to calculate an NSR value (\$ per tonne) for each block in the block model, which was compared directly to unit operating costs required to mine that block. For the purposes of developing an NSR cut-off value, a total unit operating cost of US\$70 per tonne milled was estimated, which includes mining, processing, and general and administrative expenses. The previous RPA Mineral Resource estimate was reported at a US\$55 per tonne NSR cut-off value. The higher cut-off value used for the current estimate reflects the cost estimates provided in the 2012 PEA. Tonnage and grades are reported at multiple cut-offs in Table 14-8.

## CLASSIFICATION

Definitions for resource categories used in this report are consistent with those defined by CIM (2010) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is

defined as “a concentration or occurrence of natural, solid, inorganic or fossilized organic material in or on the Earth’s crust in such form and quantity and of such grade or quality that it has reasonable prospects for economic extraction”. Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the “economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study”. Mineral Reserves are classified into Proven and Probable categories. No Mineral Reserves have been estimated for the Juanicipio property.

Mineral Resources were classified as Indicated or Inferred based on drill hole spacing and the apparent continuity of mineralization (Figure 14-12). The Indicated Resource in the V1E (eastern and central part of Valdecañas Vein system) displays good continuity of higher grade mineralization and is reasonably well established with drill holes spaced less than 100 m. The Hanging Wall Vein was classified as Indicated because of the good continuity at approximately 100 m drill hole spacing. A large, contiguous part of the V1W Vein was also classified as Indicated given the drill hole spacing and both geologic and grade continuity. A smaller portion of the V2W Vein was also classified as Indicated. The JV1 Vein was classified as Inferred.

Drill holes with documented low core recovery within the mineralized intercepts were reviewed, including holes IB, KE, M12, M16, M17, M22, M23, M40, M45, NG, and RD. Most of them were found to have comparable grades with the nearby holes. The area around hole M3 was downgraded to Inferred because of reported recovery issues in the mineralized intercept and a higher grade relative to surrounding drill holes.

## MINERAL RESOURCE REPORTING

RPA estimated Mineral Resources for the Valdecañas and Juanicipio vein systems using drill hole data available as of December 31, 2013 (Table 14-6). At an NSR cut-off of US\$70/t, Indicated Mineral Resources are estimated to total 10.1 million tonnes of 511 g/t Ag, 1.7 g/t Au, 1.9% Pb, and 3.5% Zn. Inferred Mineral Resources are estimated to total 5.1 million tonnes of 372 g/t Ag, 2.0 g/t Au, 1.8% Pb, and 2.8% Zn. The Mineral Resources are contained within the Valdecañas vein system and the Juanicipio Vein. The Mineral Resources include all blocks that are contained within a mineralized wireframe that has been clipped using a nominal cut-off grade of \$70/tonne. Less than 3% of the total tonnage has a NSR value less than the cut-off value. This material was included as part of the Mineral

Resource estimate to preserve the mineable continuity. There are no Mineral Reserves estimated on the property. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

The total contained metals in the Indicated Resource are 166 million ounces of silver, 544,000 ounces of gold, 419 million pounds of lead, and 778 million pounds of zinc. The Inferred Resource contains 61 million ounces of silver, 319,000 ounces of gold, 202 million pounds of lead, and 317 million pounds of zinc.

**TABLE 14-6 JUANICIPIO JOINT VENTURE MINERAL RESOURCES (100% BASIS) – DECEMBER 31, 2013**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Classification/Vein Vein Name	Tonnage (Mt)	Grade				Contained Metal			
		Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Ag (Moz)	Au (koz)	Pb (Mlb)	Zn (Mlb)
INDICATED									
V1E	5.9	558	1.7	2.1	4.1	105	316	266	533
V1W	3.4	375	1.9	1.7	2.6	41	210	129	191
V2W	0.6	839	0.8	1.6	3.6	17	15	22	50
HW1	0.2	396	0.5	0.4	0.8	3	3	2	4
Total Indicated	10.1	511	1.7	1.9	3.5	166	544	419	778
INFERRED									
V1E	0.7	531	2.2	1.6	3.5	11	48	24	52
V1W	2.5	245	2	2.4	3.2	20	159	133	182
V2W	0.7	415	0.9	1.6	2.2	9	21	25	34
JV1	1.2	530	2.4	0.8	1.9	20	91	20	50
Total Inferred	5.1	372	2.0	1.8	2.8	61	319	202	317

Notes:

1. CIM definitions were followed for the classification of Mineral Resources.
2. Mineral Resources are estimated at an incremental NSR cut-off value of US\$70 per tonne
3. NSR values are calculated in US\$ using factors of \$0.57 per g/t Ag, \$30.11 per g/t Au, \$9.07 per % Pb, and \$12.21 per % Zn. These factors are based on metal prices of \$21.50/oz Ag, \$1,250/oz Au, \$0.91/lb Pb, and \$0.99/lb Zn and estimated recoveries and smelter terms.
4. The Mineral Resource estimate uses drill hole data available as of December 31, 2013.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Totals may not add correctly due to rounding.

The Valdecañas and Juanicipio veins display the vertical grade transition from upper silver rich zones to deep gold and base metal dominant areas that is typical of Fresnillo District veins and epithermal silver veins in general. The resource estimate was manually divided into the Bonanza Grade Silver Zone (BGS Zone) and the Deep Zone to reflect this vertical compositional zonation and highlight the definition of the Deep Zone (Table 14-7).

**TABLE 14-7 MINERAL RESOURCES BY METAL ZONE – DECEMBER 31, 2013**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Zone	Tonnage (Mt)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Ag (Moz)	Au (koz)	Pb (Mlb)	Zn (Mlb)
<b>Bonanza Grade Silver Zone</b>									
Indicated	8.3	601	1.7	2.0	3.7	160	448	365	676
Inferred	2.4	626	1.9	1.4	2.2	48	146	74	114
<b>Deep Zone</b>									
Indicated	1.8	93	1.7	1.4	2.6	5	97	54	102
Inferred	2.7	146	2.0	2.1	3.4	13	173	128	203

See Notes on Table 14-6.

Table 14-8 reports tonnage and grade by cut-off value and confirms that the deposit is relatively insensitive to NSR cut-off values up to US\$100 per tonne.

**TABLE 14-8 TONNAGE AND GRADE BY CUT-OFF – DECEMBER 31, 2013**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Class/Cut-off (US\$/t)	Tonnage (Mt)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
<b>Indicated</b>					
200	6.9	694	1.9	2.4	4.3
150	8.1	612	1.8	2.2	4.0
100	9.1	559	1.7	2.0	3.8
<b>70</b>	<b>10.1</b>	<b>511</b>	<b>1.7</b>	<b>1.9</b>	<b>3.5</b>
<b>Inferred</b>					
200	3.1	550	2.2	2.3	3.3
150	4.1	445	2.2	2.0	3.1
100	4.7	400	2.0	1.9	3.0
<b>70</b>	<b>5.1</b>	<b>372</b>	<b>2.0</b>	<b>1.8</b>	<b>2.8</b>

See Notes on Table 14-6.

## MINERAL RESOURCE VALIDATION

RPA validated the block model by visual inspection, volumetric comparison, and swath plots. Visual comparison on vertical sections and plan views, and a series of swath plots found good overall correlation between the block grade estimates and supporting composite grades.

The estimated total volume of the wireframe models is 5,340,000 m<sup>3</sup>, while the volume of the block model at a zero grade cut-off is 5,340,200 m<sup>3</sup>. Results are listed by vein in Table 14-9.

**TABLE 14-9 VOLUME COMPARISON  
MAG Silver Corp. - Juanicipio Joint Venture**

<b>Vein</b>	<b>Volume Wireframes (m<sup>3</sup> x 1,000)</b>	<b>Volume Blocks (m<sup>3</sup> x 1,000)</b>
V1E	2,262.0	2,262.1
V1W	2,097.3	2,097.3
V2W	472.3	472.3
HW1	88.3	88.3
JV1	420.1	420.1
<b>Total</b>	<b>5,340.0</b>	<b>5,340.2</b>

## COMPARISON TO PREVIOUS ESTIMATE

Table 14-10 compares the current and previous estimates by RPA. The additional tonnage classified as Indicated is primarily due to recent drilling.

The decrease in silver grade for the Indicated Resources is due to several contributing factors. The current vein wireframes were modelled at a nominal true thickness of two metres, whereas the previously model used a 1.5 m minimum thickness. The wider minimum thickness was used to align with work in the 2012 PEA which incorporates a minimum two metre mining width. This effectively increases the tonnage, lowers the average grades, and increases the overall contained metal. The resource veins have a similar footprint as before, but with the addition of several deeper intercepts. The additional material with lower silver grades also contributed to lowering the overall silver grade. This effect was more notable for V1E, V1W, and HW1 Indicated Resources. Finally, the metal prices used in the NSR calculation have also been increased; however, this change may have been offset by using a higher cut-off NSR value.

**TABLE 14-10 COMPARISON TO RPA 2011 RESOURCE ESTIMATE  
MAG Silver Corp. - Juanicipio Joint Venture**

	Tonnage (Mt)	Grade				Contained Metal			
		Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Ag (M oz)	Au (k oz)	Pb (M lb)	Zn (M lb)
Current Estimate									
Indicated	10.1	511	1.7	1.9	3.5	165.7	544	419	778
Inferred	5.1	372	2.0	1.8	2.8	60.9	319	202	317
December 2011									
Indicated	6.2	728	1.9	1.9	3.9	146	384	267	539
Inferred	7.1	373	1.6	1.5	2.6	85	370	236	400
Difference									
Indicated	3.9	-217	-0.2	0.0	-0.4	19.7	160	152	239
Inferred	-2.0	-1	0.4	0.3	0.2	-24.1	-51	-34	-83
Percent Difference									
Indicated	63%	-30%	-12%	-1%	-10%	13%	42%	57%	44%
Inferred	-28%	0%	22%	20%	9%	-28%	-14%	-14%	-21%

See Notes on Table 14-6 with respect to current estimate.

RPA notes that the 2012 PEA was carried out using the block model and resource estimate created by Strathcona dated November 2011. Table 14-11 compares the current RPA estimate to 2011 Strathcona estimate used as the basis for the 2012 PEA. The differences in two estimates are primarily attributed to:

- The current database includes approximately 65 additional boreholes.
- RPA applied an NSR cut-off value that included Ag, Au, Pb, and Zn; whereas Strathcona used a straight silver cut-off grade of 100 g/t Ag. RPA's resource estimate includes material grading less than 100 g/t Ag, but above an NSR value of \$70/t which in addition to Ag, considers Au, Pb, and Zn. The material in the RPA estimate, but not included in the Strathcona estimate, is mostly located in the base metal rich zone towards the deeper part of the deposit.
- RPA included resources in the Hanging Wall Vein whereas Strathcona did not.

**TABLE 14-11 COMPARISON OF RPA AND STRATHCONA RESULTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	<b>Tonnage (Mt)</b>	<b>Ag (g/t)</b>	<b>Au (g/t)</b>	<b>Pb (%)</b>	<b>Zn (%)</b>	<b>Ag (Moz)</b>	<b>Au (koz)</b>	<b>Pb (lb)</b>	<b>Zn (lb)</b>
Strathcona June 2011 (PEA)									
Indicated	5.7	702	1.9	2.2	4.2	129	348	276	528
Inferred	4.3	513	1.4	1.6	3.0	71	194	152	284
RPA (current)									
Indicated	10.1	511	1.7	1.9	3.5	166	544	419	778
Inferred	5.1	372	2.0	1.8	2.8	61	319	202	317
Difference									
Indicated	77%	-27%	-12%	-14%	-17%	29%	56%	51%	47%
Inferred	18%	-28%	39%	12%	-6%	-14%	65%	33%	11%

See Notes on Table 14-6 with respect to current estimate.



## 15 MINERAL RESERVE ESTIMATE

There are currently no Mineral Reserves estimated at the project.

## 16 MINING METHODS

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas et al., 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### GEOTECHNICAL CONSIDERATIONS

Geotechnical assessments by AMC of the veins and the surrounding rock mass have been based on data collected by Minera Juanicipio and site inspections by AMC's geotechnical consultant. The geotechnical data relates mainly to the Valdecañas Vein. No geotechnical data has been analyzed relating to the Inferred Mineral Resources in the Desprendido or Juanicipio veins.

### ROCK CHARACTERIZATION

Four geotechnical domains impacting on the mine design have been identified, corresponding to rock types: Tertiary volcanic rocks, Cretaceous sediments, veins, and faults.

The Tertiary volcanic rocks overlie the Cretaceous sediments, which host the veins across the majority of the project site, except for two surface outcrops located southwest of the Valdecañas Vein. The Tertiary volcanic rocks vary in thickness from zero to approximately 350 m, with an average thickness of 150 m to 200 m. Rock quality within the volcanic rocks varies greatly from extremely poor to good (based on derived Q values, Rock Quality Index, after Barton, Lien and Lunde, 1974). A conglomerate unit, immediately underlying the Tertiary volcanic rocks, typically consists of several metres of very poor quality rock with high fracture frequency and/or rubble zones, and is highly to completely weathered.

The Cretaceous sediments comprise predominantly sandstone, shale, and inter-bedded sandstone-shale lithologies. The sediments are also inter-bedded with andesite volcanic rocks. Unweathered Cretaceous sediments typically consist of good quality rocks with local zones of high fracture frequency, often associated with increased intensity of shale laminations. Rock quality in moderate to slightly weathered Cretaceous sediments is

typically poor to fair with localized zones of high fracture frequency, low RQD, and narrow rubble zones up to one metre wide, often associated with lithological contacts. Based on limited data, the depth of weathering appears to vary significantly across the site with the limit of weathering at depths of approximately 250 m in drill hole 28P, and 400 m in drill hole MH. Variation in rock quality in both the Tertiary volcanic rocks and the Cretaceous sediments may be associated, at least in part, with the degree of weathering.

Vein lithologies are characterized by typically good rock quality, but geotechnical data relating to the veins is extremely limited, with only 8.25 m of geotechnical logging and 164 m of RQD logging within the vein (including veinlets and stockworks).

Geotechnical logging of fault zones is limited and there is uncertainty regarding the nature and rock quality within the area formerly interpreted as the ID fault. Additional faults have been identified within the geological logging data, but there is limited geotechnical and RQD logging data in these zones, which generally appear to consist of zones of poor to fair rock quality up to several metres in width.

## **HYDROGEOLOGICAL ASSESSMENT**

Hydrogeological information on the project area has not yet been collected. The study assumes that the rock mass in the project area will be generally dry except in fault zones, which have been assumed to produce medium inflows.

## **STOPE STABILITY**

An assessment of stable stoping spans indicates that stopes with vertical heights of up to 60 m and strike lengths of 24 m will be stable, although hangingwall support using cable bolts will be required in some stopes.

## **DEVELOPMENT GROUND SUPPORT**

Ground support requirements for the study consider the calculated Q value of the rock mass and the proposed use of the excavation. The minimum recommended support standards incorporate surface support (mesh or a minimum 50 mm of shotcrete) in all permanent and long-term development drifts. Solid-bar, fully grouted, or resin encapsulated rock bolts are recommended in all declines and level accesses.

## MINING METHOD

AMC has carried out a number of studies to identify suitable design strategies for the project. The studies include identification of the most suitable stoping method, production rate, backfilling method, access, and haulage method.

AMC has investigated the following stoping methods:

- Down-hole benching with uncemented rockfill (modified Avoca)
- Long-hole open stoping (LHOS) with cemented backfill
- Cut-and-fill with uncemented backfill

Methods that provide high recovery and low dilution have a significant advantage over other methods that may be cheaper, but result in greater loss or dilution.

AMC considers that LHOS with cemented backfill is the most suitable method for the veins, mainly because of the higher recovery achievable using this method. LHOS with cemented backfill can be used in both steeply dipping and shallow dipping parts of the deposit, providing benefits of standardization of equipment and mining skills.

Dilution is likely to be significantly lower using the LHOS method than in the cut-and-fill method, mainly because of the amount of waste that must be mined with the latter method to accommodate the mining equipment in shallower dipping narrow stopes, and from mucking off a backfill floor. Mining recovery is expected to be similar.

Any of the three mining methods considered would be suitable in the steeply dipping parts of the vein (dipping at more than 55°). However, the LHOS method is expected to provide higher recovery than the other methods, mainly because of the ability to recover a greater percentage of the sill (crown) pillar, but also because mining losses from other sources are more easily managed with this method.

Dilution is anticipated to be similar to the modified Avoca method and less than the cut-and-fill method. The benefits of higher recovery are expected to more than offset the higher mining cost of the LHOS method. However, it may be more appropriate to use the Avoca method in some of the lower grade areas west of the ID fault. Both the LHOS and Avoca methods expose miners to less risk of rock falls than the cut-and-fill method.

The 2012 PEA considered a total mine life of 14.8 years.

## PRODUCTION RATE

In AMC's opinion, a nominal production rate of 0.85 Mtpa for the combined Valdecañas and Desprendido veins will be achievable. Production from the Juanicipio Vein has the potential to add a further 0.1 Mtpa bringing the overall project production rate to 0.95 Mtpa. The production rates envisaged are based on comparing the mineral resource tonnage within the potential mining areas with benchmark production rates from other operations. The strike length, dip, and thickness of the veins were also analyzed to assess their ability to support the proposed production rates.

## BACKFILLING METHOD

The shallow dipping nature of large parts of the veins requires use of a flowable backfill type. Two types of backfill could potentially meet these requirements:

- Cemented paste backfill, using the whole tailings size fraction.
- Cemented hydraulically placed backfill, using a coarse, self-draining fraction of the tailings stream.

The cemented paste fill method is proposed because paste fill has a higher instantaneous filling rate, and fill containment structures are easier and cheaper to construct. Greater consistency and predictability can also be achieved in the curing time and strength development of the fill. The metallurgical test work carried out to date indicates that the tailings will contain insufficient coarse particles to create a viable cemented hydraulic fill.

## HAULAGE

A number of alternative methods have been considered for transferring ore and waste from the mine workings to surface: trucking, shaft hoisting, and conveying.

The trucking option has been selected on the basis of its lower up-front capital cost and lower overall net present cost. However there are relatively small cost differences between the options and the trucking option is sensitive to future increases in fuel and labour costs. In

AMC's opinion ongoing consideration is warranted on the option of constructing a hoisting shaft to a depth of about 450 m.

## **ACCESS DEVELOPMENT**

A main access portal is proposed between the Valdecañas and Juanicipio veins in an area where the underlying sediments crop out at surface. From the portal, a main access decline would spiral down in the sediments before crosscutting to the footwall side of the Valdecañas and Desprendido veins. At the base of the spiral decline a branch would provide access to the Juanicipio Vein.

On October 28, 2013, the Juanicipio Joint Venture commenced the underground development at the Juanicipio project. To date, the entry portal, surface explosive magazines and associated infrastructure have been completed and the ramp decline has advanced primarily utilizing a continuous miner. MAG reports that in mid-March of 2014, the contractor hired by Fresnillo to construct the ramp decline on behalf of Minera Juanicipio, received its full explosives permit from the Mexican Ministry of Defense. Development of the Juanicipio ramp decline is now advancing with conventional drill and blast cycles as well as with the continuous miner.

The Valdecañas and Desprendido veins would be accessed by three sectional declines positioned in the footwall of the veins. Two declines are proposed on the eastern side of the ID fault and one on the western side. The declines would provide access to sublevels, spaced at 15 m intervals in the flatter dipping area to the east of the fault, and at 20 m intervals to the west of the fault.

## **VENTILATION**

It is proposed that the main access decline and an intake air raise, positioned alongside, would provide the main intake airways. Air would be transferred to the footwall side of the Valdecañas and Desprendido veins via the access decline and a parallel intake airway. Exhaust air would be transferred back from the mining areas to a pair of exhaust raises also positioned close to the spiral decline. Separate intake and return raises are proposed for the Juanicipio Vein.

Axial flow ventilation fans would be installed at surface on top of the main exhaust raises. Based on the surface climatic conditions and the depth of the mine workings, no heating or cooling of the ventilating airflow is envisaged.

## **STOPING**

It is envisaged that the veins would be divided into six stoping sections (three pairs) with each pair accessed by a decline. Access crosscuts from the declines to the veins would be positioned approximately in the centre of each pair of stoping sections to enable stope extraction to progress from the end of each stoping section to the central access. Each stoping section would have a maximum strike length of approximately 250 m.

It is envisaged that sill pillars would separate the stoping sections into a number of independently accessed stoping areas providing flexibility in production scheduling and simplifying ventilation, stope mucking, and truck loading arrangements.

Images of the proposed mine design are shown in Figures 16-1 and 16-2.

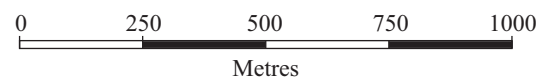
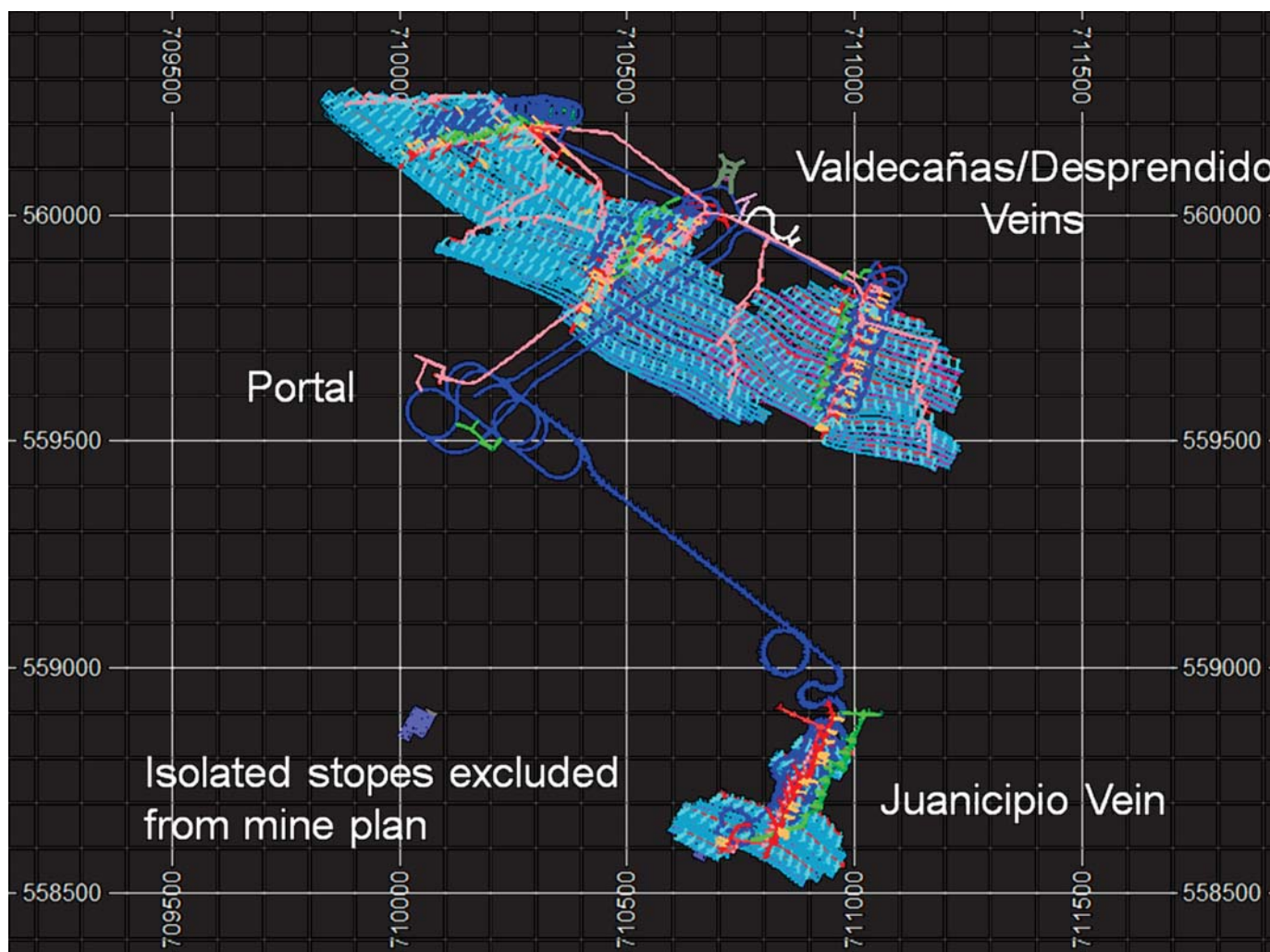


Figure 16-1

**Mag Silver Corp.**

***Juanicipio Joint Venture***  
Zacatecas State, Mexico

**Plan of the  
Mine Development Layout**



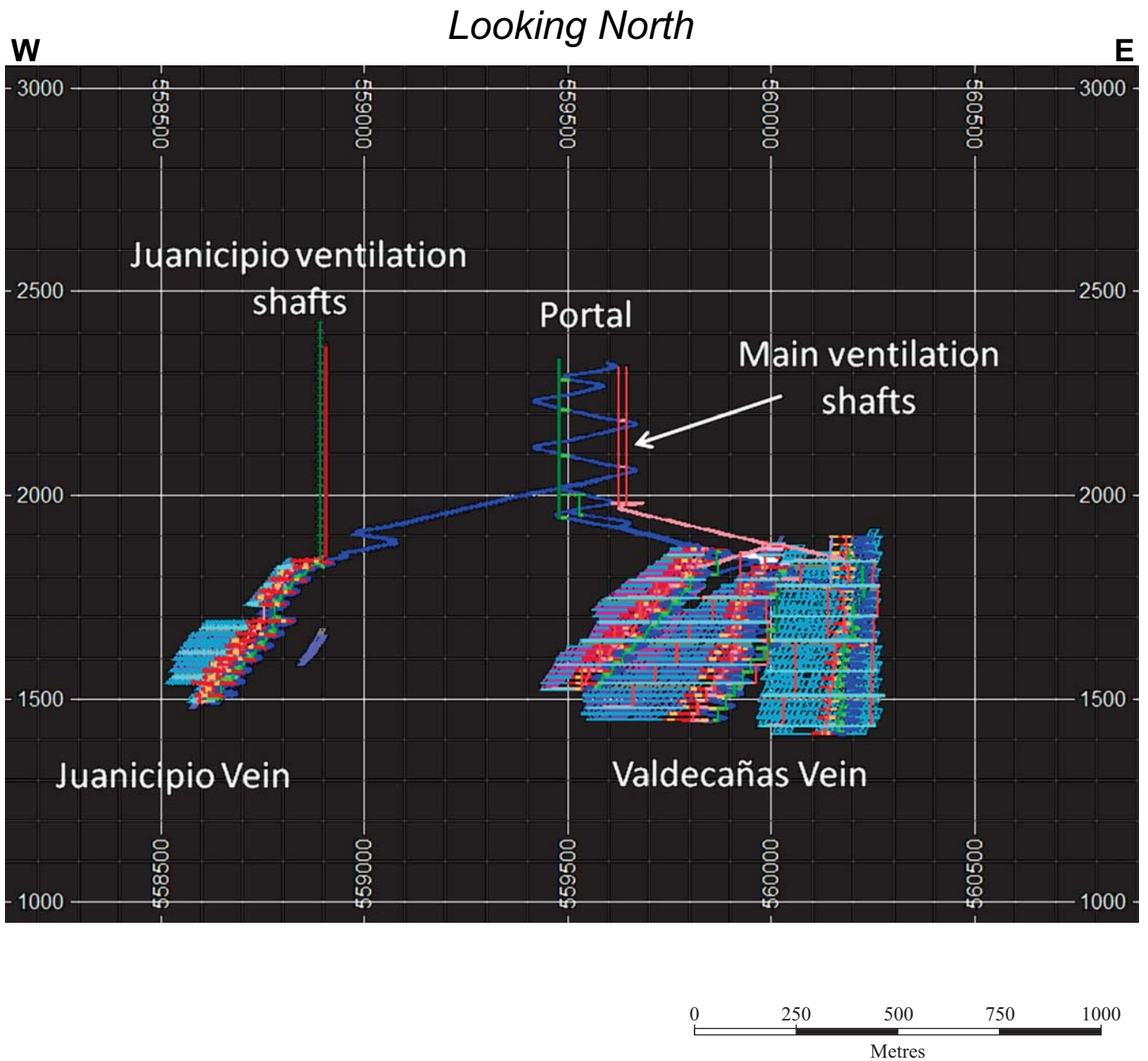


Figure 16-2

**Mag Silver Corp.**

***Juanicipio Joint Venture***  
Zacatecas State, Mexico

**Sectional View of the  
Mine Development**

## TONNAGE AND GRADE OF MATERIAL TO BE MINED AND MILLED

Table 16-1 shows the tonnage and grade of material to be mined and milled, which forms the basis of the 2012 PEA.

**TABLE 16-1 TONNAGE OF MATERIAL MINED AND PROCESSED AS A BASIS FOR THE PRELIMINARY ECONOMIC ASSESSMENT**  
**MAG Silver Corp. - Juanicipio Joint Venture**

	Million Tonnes	Grade				Contained Metal			
		Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)	Au (koz)	Ag (Moz)	Pb (Mlb)	Zn (Mlb)
Material derived from Indicated Resources	5.3	1.88	667	2.1	4.1	318	113	242	472
Material derived from Inferred Resources	4.9	1.46	408	1.6	2.9	230	65	169	311
External dilution	0.2	1.80	209	1.8	3.0	9	1	6	11
Waste	3.0	0	0	0	0	0	0	0	0

Note: The tonnage and grades of the material mined and processed were derived from the 2011 Strathcona Mineral Resources. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability

The tonnages and grades shown in Table 16-1 do not reflect the 2014 updated Mineral Resource estimate that includes 40 new infill diamond drill holes completed since the previous resource estimate, but rather have been derived from the Mineral Resource estimation and vein model prepared by Strathcona by applying a \$65.00 NSR cut-off grade to the resource model and then allowing for dilution and mine and design losses. Metal prices used in the NSR calculation were US\$1,210 per ounce gold, US\$22.10 per ounce silver, US\$0.94 per pound lead, and US\$0.90 per pound zinc and an exchange rate of 12.50 Mexican pesos to one US dollar. The prices used were determined at the commencement of the study and differ slightly from those used in the 2012 PEA. The differences do not materially impact on the tonnage and grade of material used as a basis for the economic assessment.

In developing the tonnage and grade estimates, all stope blocks that were in contact with the Property boundaries were excluded and diluting material was assumed to have “zero” grade. It is noted that in practice, it is likely that the diluting material will contain some minor metal values.

Because the Juanicipio Vein is isolated from the Valdecañas and Desprendido veins, an assessment was carried out of the potential of the Juanicipio Vein to add value to the 2012 PEA. The study indicated that despite the relatively small Inferred Mineral Resource tonnage in the vein, there is a reasonable expectation that it might become economic if extracted together with the Valdecañas and Desprendido veins.

The design parameters including dilution and recovery, used to estimate the tonnage and grade of material, shown in Table 16-1 are summarized in Table 16-2. The recovery and dilution assumptions result in an overall silver recovery from the planned mining outlines of 93%. Dilution totals approximately 3 Mt or 29% of the material mined and milled.

**TABLE 16-2 DESIGN ASSUMPTIONS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Assumptions</b>	<b>Value</b>
<b>Design Parameters</b>	
Stope strike length	24 m
Vertical height of stope east of ID Fault and Juanicipio Vein	15 m
Vertical height of stope west of ID Fault	20 m
Minimum design mining width	2 m
<b>Dilution Estimates</b>	
Approximate true thickness of overbreak added to stopes and crown pillars	1.0 m*
Backfill dilution added to stopes and crown pillars	3%
<b>Recovery Estimates</b>	
Recovery of diluted resources from development	100%
Recovery of diluted resources from stopes	95%
Recovery of diluted resources from crown pillars	65%

\*Comprising a nominal dilution skin of 0.5 m on both the stope hangingwall and footwall.

## UNDERGROUND MOBILE EQUIPMENT

The required underground mobile equipment fleet will vary over the life of the project. Table 16-3 shows the required fleet during the peak development and production period.

**TABLE 16-3 UNDERGROUND MOBILE EQUIPMENT FLEET**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Equipment</b>	<b>Units</b>	<b>Indicative Type/Model</b>
Scooptram	4	10 t Capacity/Sandvik LH410
Scooptram	2	20 t Capacity/Sandvik LH621
Haul truck	13	42 t Capacity/Sandvik TH540
Development jumbo	5	2 Boom/Sandvik DD420
Development bolter	3	Diesel-Electric/Sandvik DS310 C/D/E
Production drill (long-hole)	3	51-89 mm/Atlas Copco SIMBA M4C
Charge-up unit	3	Normet/Charmec 1605B
Integrated tool carrier	6	CAT IT38H with bucket/basket/forks
Grader	1	CAT 140M motor grader
Boom truck	2	Getman A64 Knuckle/Boom Truck
Toyota (man-carrier)	5	10 Person/ENS Personnel Carrier
Toyota (flat deck)	2	1 t Capacity/ENS FDC Flat Deck
Toyota (scissor lift)	3	1 t Capacity/ENS SL7C Scissor Lift
Toyota (mechanics truck)	3	1T Capacity/ENS MT7 Mech. Truck
Sprayer	3	4-19 m <sup>3</sup> /h Normet Spraymec 6050WP
Transmixer	3	Locally supplied
Water truck	1	Locally supplied

Six 15-person self-contained refuge stations together with mine rescue equipment, including self-contained breathing apparatus would be provided. It is envisaged that all persons working underground will carry a self-rescuer capable of protecting employees against exposure to carbon monoxide in the event of an underground fire.

## **UNDERGROUND SERVICES**

### ***DEWATERING***

No provision has been included in the mine design for advance dewatering of the deposit or the overlying strata. To form a basis for the design of the mine pumping system, AMC has assumed a requirement to pump approximately 80 L/s from the Valdecañas/Desprendido area. It has been assumed that one third of this quantity will need to be pumped from the Juanicipio area.

A main pump chamber similar to that installed at the adjacent Saucito Mine is envisaged for the Valdecañas/Desprendido area. The pumps would be installed in a central position at the top of the deposit. Each sectional decline would be equipped with staged pumping systems,

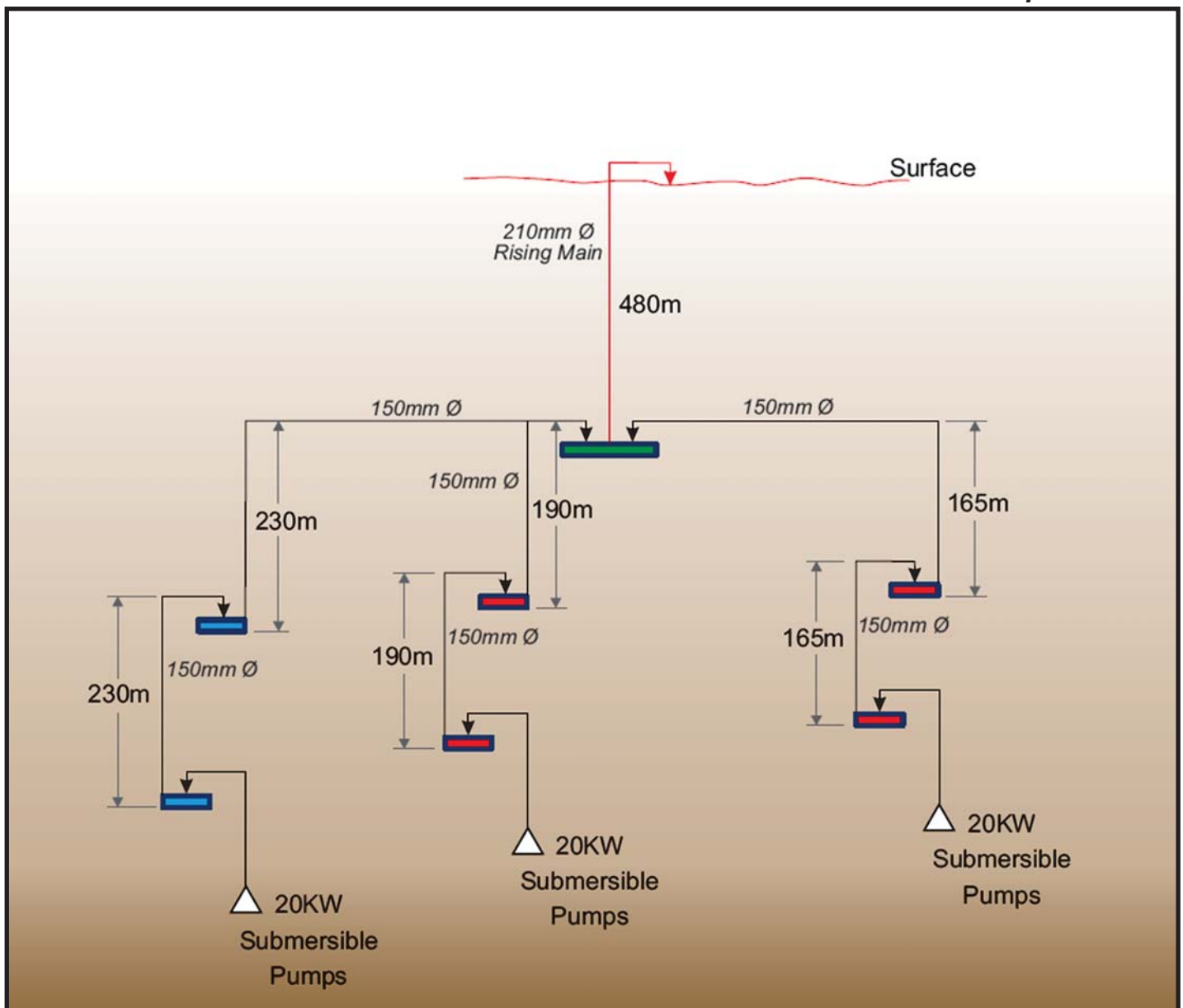
which would be extended as the declines were developed. A number of submersible electric pumps would be used to remove water from the base of the sectional declines. A schematic of the proposed pumping system is shown in Figure 16-3. A similar staged pumping system is envisaged for the Juanicipio Vein.

The proposed staged pumping system comprises Mono type progressing cavity pumps, each complete with a water collection/storage tank, motor, and valves. It is envisaged that a staged pumping system comprising Mono type progressing cavity pumps, each complete with a water collection/storage tank, motor, and valves, will suffice for the Juanicipio area.

#### ***UNDERGROUND POWER DISTRIBUTION AND COMMUNICATIONS***

Power at 13.8 kV would be fed to the underground workings from isolating switchgear located at the portal site. The main supply cable would be installed in the intake raise or in a dedicated borehole. Switchgear will be installed at the base of the raise, and 13.8 kV cables will feed power via the access declines to main sub-stations constructed close to the main pump stations. At this point the voltage would be reduced to 4.16 kV. Power would then be distributed to the pump chamber and to sectional sub-stations positioned close to the sectional declines. Additional transformers and switchgear would be installed as required at suitable locations accessible from the sectional declines. Cables feeding these sub-stations would be routed down raises and boreholes to minimize cable lengths.

It is proposed that a fibre optic cable will provide video and data communication between key underground facilities and a control room on surface. Motor control centres in the pump stations would be monitored and controlled remotely. Video monitors would be installed at appropriate locations. Wireless radio communication would be provided to all underground equipment and to key personnel. Telephones would be installed at key locations.



- Main pump station (4 x Sulzer M Series 5 Stage pumps). Capacity 240l/s
- Secondary pump stations (2 x Mono E104 pump units). Capacity 34l/s
- Secondary pump stations (2 x Mono E106 pump units). Capacity 34l/s

Figure 16-3

**Mag Silver Corp.**  
**Juanicipio Joint Venture**  
 Zacatecas State, Mexico  
**Schematic of the Proposed**  
**Valdecañas/Desprendido**  
**Pumping System**

**MAGAZINES**

Provision has been included in the mine design for a main underground magazine located at the top of the Valdecañas Vein, close to the exhaust airway. A small surface magazine for use during initial decline sinking has been constructed. MAG reports that it is fully approved by the relevant permitting agencies and the Mexican army. It is currently in use and will remain so until such time as the underground magazine can be constructed.

**WORKSHOPS AND FUEL STORAGE**

Provision has been included in the design for an underground workshop located in the Valdecañas/Desprendido area. The workshop would be suitable for the daily and routine maintenance of scoops and drilling equipment. The workshop would be equipped with an overhead crane and wash-down bay, and be suitable for component change-out work, but would not be intended for major maintenance work. Equipment requiring significant maintenance work would be removed to surface.

To reduce the quantity of fuel and oils stored underground, it is envisaged that the truck fleet and the majority of utility vehicles will be fuelled on surface and maintained in a surface heavy equipment workshop. Only equipment not travelling to surface as part of their daily routine will be fuelled underground. It is proposed that a proprietary fuel delivery and storage system be installed underground. Fuel will be delivered underground from the surface fuel tanks in 2.5 kL modules. Underground fuel usage is estimated to be between 1.8 kL and 2.6 kL per day.

A simple maintenance bay and refuelling facility is proposed for the Juanicipio area.

**UPDATE SINCE THE 2012 PEA**

Minera Juanicipio began the development permitting process in the fall of 2012 and has since begun a variety of development studies. A hydrogeology (water management) study has been commenced. A geotechnical study has been completed with the assistance of Peñoles' (a related party of Fresnillo) Geotechnical & Construction Group, which has included a visit to the nearby Fresnillo Saucito operation in order to analyze rock quality in anticipation of stope preparation and development at Juanicipio.

Further work has been carried out in the development of the mine portal, which is now complete, and the development of the Juanicipio ramp decline is now advancing with conventional drill and blast cycles as well as with the continuous miner.



## 17 RECOVERY METHODS

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### PROCESSING PLANT AND OPERATIONS

The proposed process plant consists of a comminution circuit followed by the sequential flotation of a silver-rich lead concentrate, a zinc concentrate, and a gold-rich pyrite concentrate.

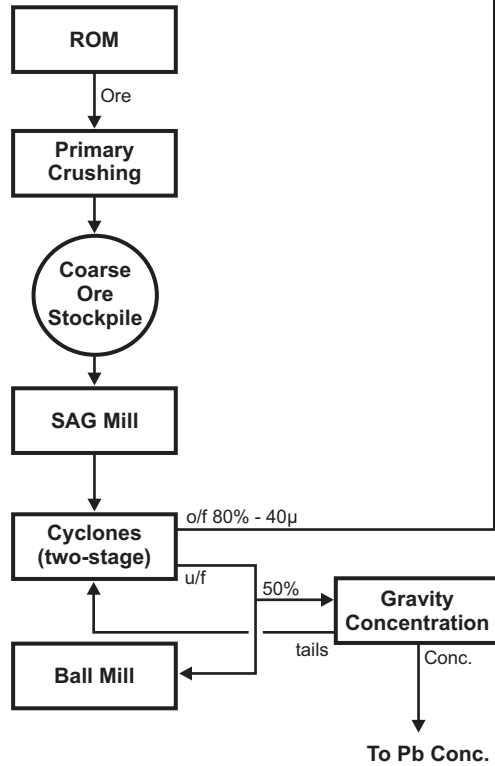
It is envisaged that run-of-mine (ROM) material will be delivered to a stockpile positioned near the underground mine portal prior to being reclaimed from the stockpile by front-end loader feeding a primary 1,000 mm x 760 mm jaw crusher. An 850 m long conveyor will transfer mill feed material from the crusher to a stockpile ahead of the mill.

The proposed milling circuit comprises a 1.0 MW semi-autogenous grinding (SAG) mill and a 3 MW ball mill, producing feed to the flotation circuit at 80% minus 40 µm. Separate lead, zinc, and pyrite concentrates would be thickened, filtered, and stockpiled for dispatch by road to customers.

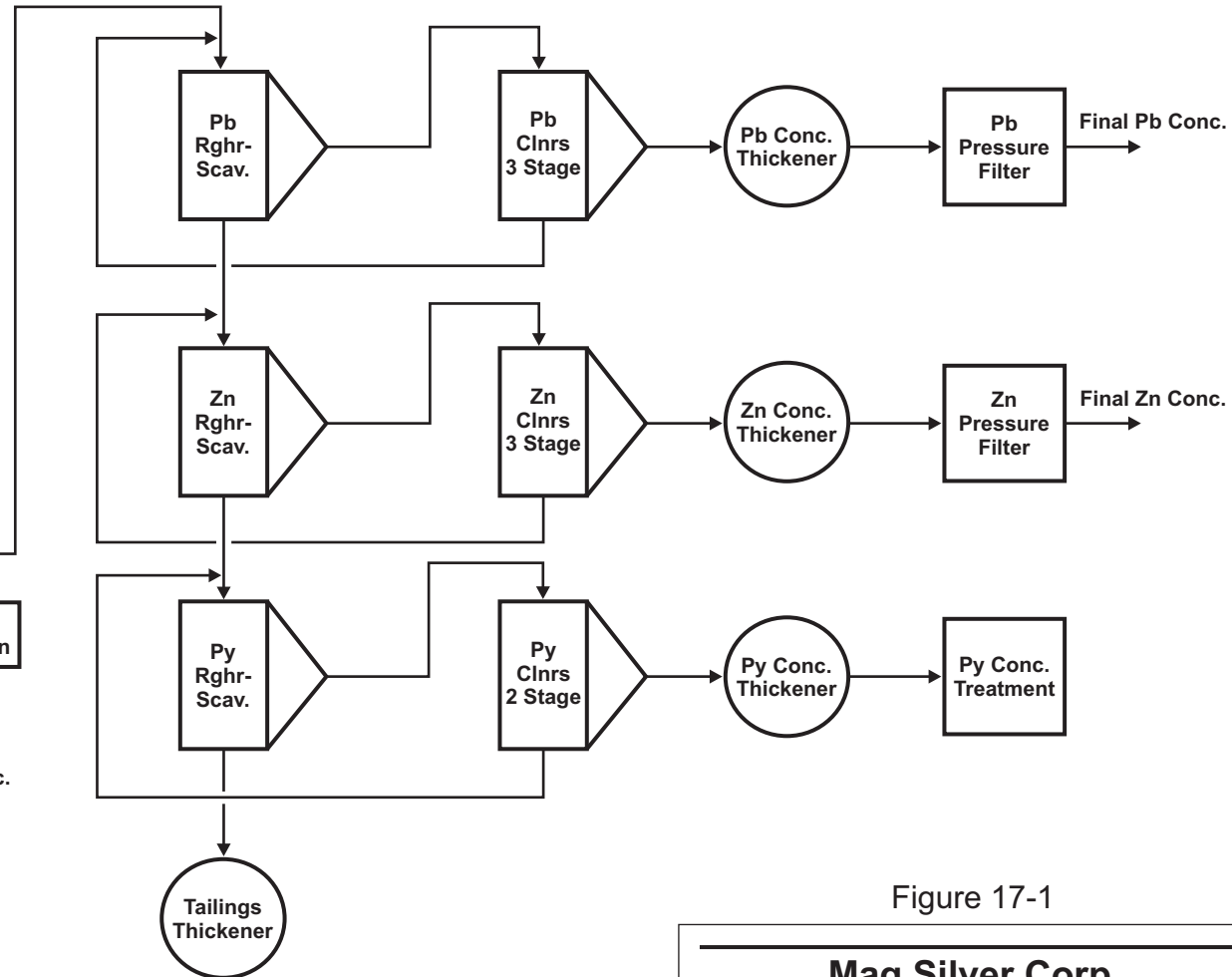
It is envisaged that the process plant will commence operation at a throughput rate of 850,000 tpa which will be increased to 950,000 tpa when production from the Juanicipio Vein commences.

The proposed flowsheet is shown in Figure 17-1. The plant layout is shown in Figures 17-2 and 17-3.

# COMMUNICATION



# FLOTATION



# FILTRATION

Figure 17-1

**Mag Silver Corp.**

**Juanicipio Joint Venture**  
Zacatecas State, Mexico  
**Process Flow Sheet**

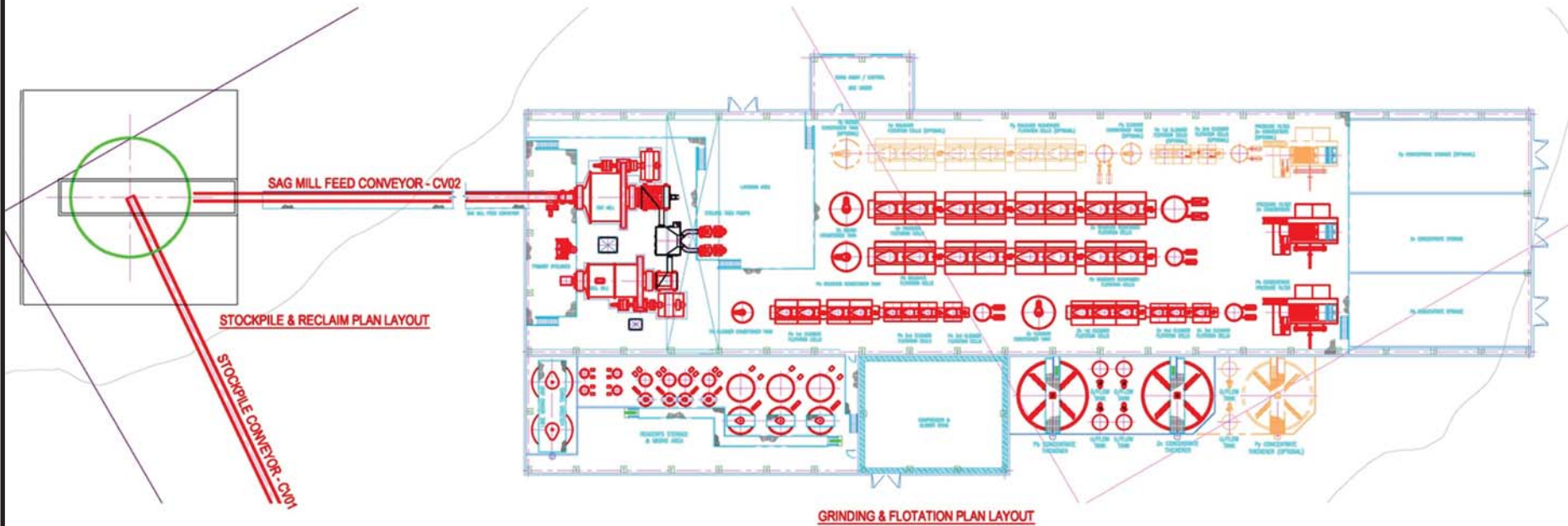


Figure 17-2

**Mag Silver Corp.**

**Juanicipio Joint Venture**  
Zacatecas State, Mexico

**Plant General Arrangement**

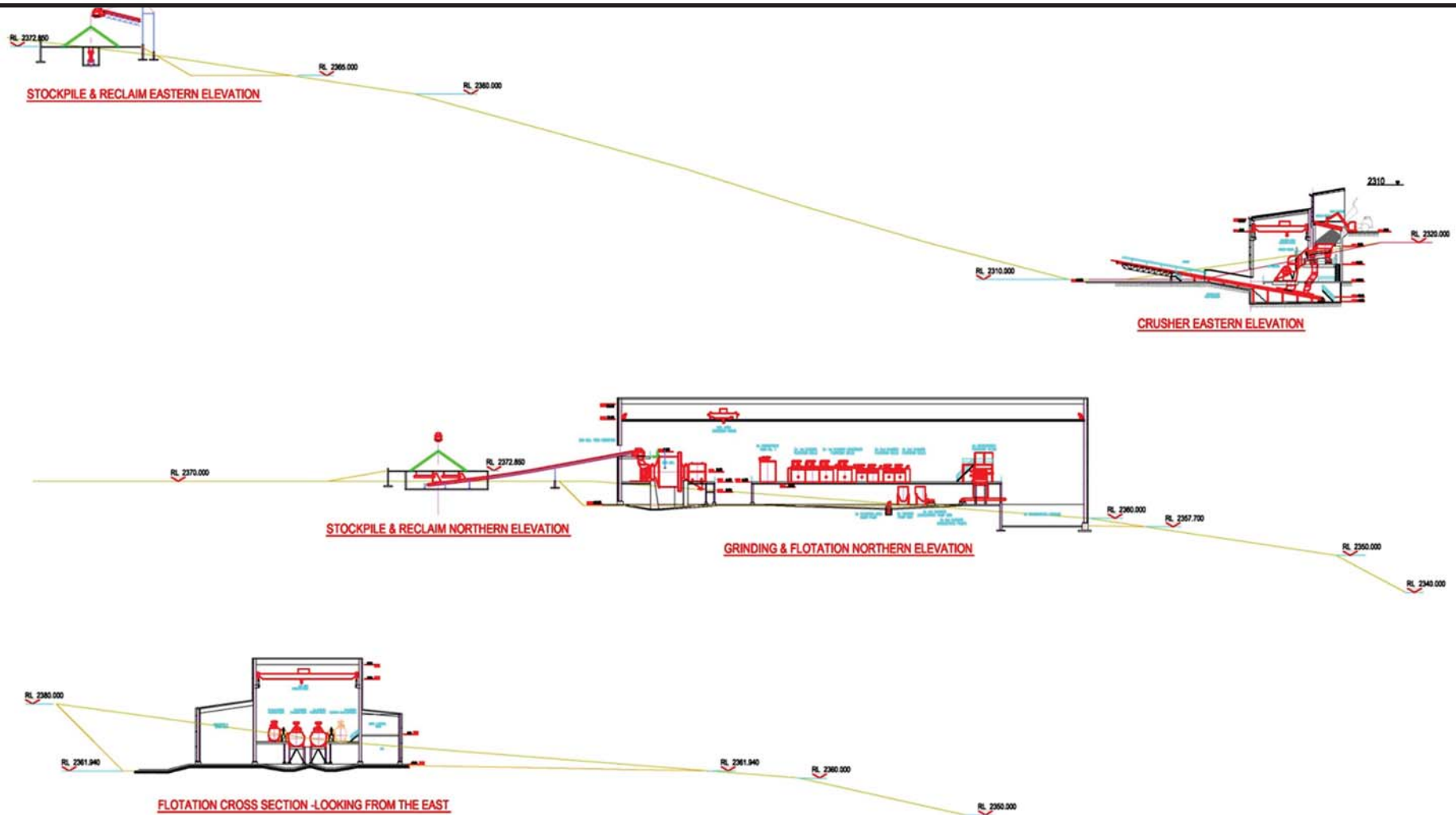


Figure 17-3

**Mag Silver Corp.**

***Juanicipio Joint Venture***  
Zacatecas State, Mexico

**Plant Sections**

## **COMMINUTION**

It is envisaged that the ROM ore stockpile will be positioned near the underground mine portal with ore reclaimed from the stockpile by front-end loader. The design provides for ore to be fed via a 150-tonne capacity bin and apron feeder to the primary 1,000 mm x 760 mm jaw crusher. Crusher discharge would be via a sacrificial 30 m conveyor with tramp metal protection discharging onto the main 850 m long crushed ore conveyor to the crushed ore stockpile.

Ore withdrawn from the crushed ore stockpile through two reclaim apron feeders would be fed to the 1 MW SAG mill. The SAG mill discharges into the cyclone feed pump-box with slurry pumped to the cyclone classification stage, where the cyclone overflow at 80% minus 40  $\mu$ m passes to the flotation circuit. The cyclone underflow would be gravity fed into the 3 MW ball mill. The ball mill discharge joins the SAG mill discharge to complete the mill closed circuit.

Although no gravity test work has been carried out, the design includes up to 50% of the cyclone underflow passing through a gravity circuit, based on a 30 in. Knelson concentrator. As well as gravity test work, the next stage of study should include additional comminution testing and simulation to better define the grinding circuit parameters and also to investigate the potential benefits of two-stage cyclone classification.

Reagent additions to the grinding circuit would consist of lime and soda ash for pH modification, as well as sodium cyanide, zinc sulphate, and sodium metabisulphite for pyrite depression, especially considering the possibility of soluble copper ions being present.

## **LEAD FLOTATION CIRCUIT**

The cyclone overflow would be fed to the lead rougher conditioning tank where flotation collectors would be added, specifically Aerofloat 31 and Aerofine 3481 to promote precious metal recovery, as well as Aerofloat 238 to enhance recovery of any precious metals associated with the very small amounts of copper in the ore. Final adjustment of the pH to 8.5 would also take place, with milk of lime addition to the conditioning tank.

The proposed lead circuit configuration consists of four rougher and two scavenger Outotec TC30 cells, followed by three stages of cleaning with three OK16s and two OK16s in the first

and second cleaners respectively, and four OK3s in the third cleaners. Additional flotation collector and modifier/depressant dosing would take place in the cleaner conditioning tank as well as in each cleaner stage as required.

Cleaner tails and scavenger concentrate would be returned to the head of the circuit.

Final lead concentrate would be thickened in a conventional five metre diameter thickener and then filtered in a Larox PF 12.5/16 MI 60 pressure filter. Because of the high silver content of the concentrate, fine solids lost in the thickener overflow would be recovered in a plate and frame pressure filter. To ensure that concentrate handling capacity does not become a bottleneck, future studies should consider installing the same size pressure filter (Larox PF 22/25) as proposed for the zinc (and pyrite) circuit. The additional capital cost would be less than \$200,000, offset to some extent by the benefit derived from commonality of spares.

## **ZINC FLOTATION CIRCUIT**

The lead scavenger tails would be pumped to the zinc rougher conditioning tank where sphalerite would be activated with copper sulphate solution and the pH increased with lime to 10.5.

The proposed zinc circuit configuration is identical to the lead circuit, except that the third cleaners would comprise five OK3 cells.

Final zinc concentrate would be thickened in a conventional five metre diameter thickener and then filtered in a Larox PF 22/25 MI 60 pressure filter.

## **PYRITE FLOTATION CIRCUIT**

The zinc scavenger tails would be pumped to the pyrite rougher conditioning tank where potassium amyl xanthate would be added to maximise pyrite (and gold) recovery.

Pyrite rougher and scavenger configuration would be similar to the lead and zinc circuits, but only two stages of cleaning are proposed with three OK16s and two OK16s in the first and second cleaners respectively.

In the pyrite concentrate treatment circuit, the final pyrite concentrate would be thickened and filtered in an identical fashion to the zinc concentrate.

### **CONCENTRATE STORAGE AND LOAD-OUT**

Concentrate discharged from the pressure filters would be stored in separate covered storage areas awaiting load-out to trucks. It is envisaged that concentrates would either be trucked directly to a smelter in Mexico or transferred at a railhead for on-shipment to offshore customers.

### **REAGENTS AND SERVICES**

The reagent storage and mixing facilities are mainly designed around the receipt, handling, and mixing of flotation collectors and modifiers/depressants in one-tonne bags/boxes or 220 L drums, with the exception of hydrated lime, the silo for which is assumed to be vendor supplied.

Services will include flotation blowers, plant air and instrument compressors, raw and process water pumps.

## 18 PROJECT INFRASTRUCTURE

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### SITE LAYOUT

A concept has been developed for the site layout. Because of the topography, the mill complex is separated from the proposed portal area and mine offices by a distance of approximately 600 m. As a consequence, offices and other facilities serving the mine and mill have been separated into two areas. The proposed site layout is shown in Figure 18-1.

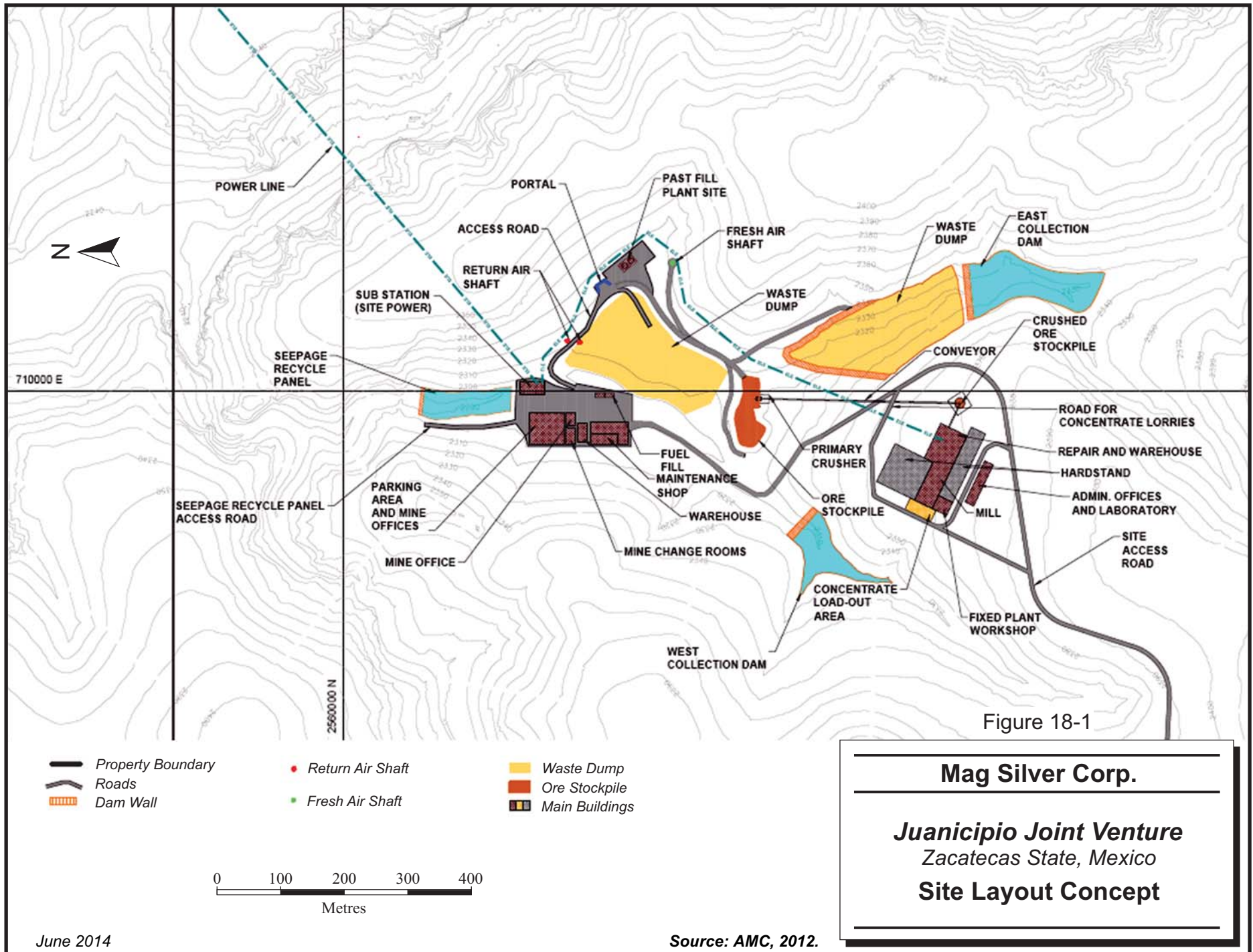
### ACCESS ROAD

The proposed access road to the site is shown in Table 18-1. The road has a length of approximately 9.8 km, of which approximately 2.5 km will need to be constructed over relatively flat terrain. The remaining 7.2 km will traverse hilly terrain with some steep grades. It is envisaged that the road will be a two-lane unsealed road suitable for use by heavy vehicles hauling concentrates.

### POWER SUPPLY

Power would be supplied to a main substation at the site via a 115 kV overhead power line from an existing power line and substation located to the north of the Property. The line would have a length of approximately 5.2 km and a step-down transformer would be installed midway along the line to supply a branch line to the tailings storage facility (TSF). Overhead lines at 13.8 kV would deliver power to the mill, crusher, the mine portal area, and to the workshop and offices. Step down transformers and control switch gear would be positioned at these locations as required. An overhead line at 4.6 kV would transfer power to the surface ventilation fan at the Juanicipio exhaust shaft.





The estimated power demand for the site is shown in Table 18-1.

**TABLE 18-1 ESTIMATED SITE POWER DEMAND**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Purpose	Total Installed Power (kW)	Overall load factor	Average load (kW)	GWh per annum
Mine Ventilation	1,750	90%	1,575	13.8
Mine Dewatering	4,280	44%	1,883	16.5
Other Underground	2,866	65%	1,863	16.3
Mill	8,163	78%	6,367	55.8
Infrastructure	300	65%	195	1.7
<b>Total</b>	<b>17,359</b>	<b>68%</b>	<b>11,883</b>	<b>104</b>

\*Includes compressors, secondary ventilation fans and mobile equipment

## WATER SUPPLY

Three water catchment dams have been planned for the site. The dams would be used to store water from the mine dewatering system and from rainfall. It has been assumed that sufficient water will be obtained from these sources to meet the project's process and potable water requirements. This assumption is dependent on the findings of a hydrogeological study to be carried out during further studies. It is proposed that potable water be supplied by a water treatment plant using water from the mine dewatering system.

The estimated water usage for the project is shown in Table 18-2.

**TABLE 18-2 ESTIMATE OF SITE WATER USAGE**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Water Usage	ML per annum
Process plant (0.7 kL/t processed)	595
Potable water	26
Mine	252
Other surface uses	100
<b>Total</b>	<b>973</b>

## STOCKPILES

A ROM ore stockpile has been designed to provide a buffer between the mine and mill. A maximum capacity of 150,000 t may be required prior to mill commissioning. After mill commissioning, the ore stockpile is not expected to exceed 50,000 t.

A total of approximately 4.2 Mt of waste rock is expected to be produced over the mine life. It is envisaged that waste rock produced during the initial development period will be used for road and tailings dam construction. Later in the mine life, a portion of the waste produced will be backfilled to stopes and worked out areas. Waste rock dumps have been designed near the portal and to the east of the mill site.

## PASTE FILL PLANT

It is proposed that a vacuum filtration plant will be located next to the mine portal to dewater the cycloned tailings pumped from the tailings thickener located at the concentrator. It is expected that approximately 47% of the tailings will be dewatered to a filter cake consistency of approximately 80-85% solids w/w for paste fill production. The dewatered tailings will be fed to a mixing plant that will continuously mix the dewatered tailings with cement and water to create a paste fill that is discharged into a feed hopper. It is proposed that cemented pastefill will be delivered from the feed hopper to one of two 250 mm diameter boreholes for delivery underground. Surplus water from the paste fill plant will be returned to the process water tank at the concentrator.

## TAILINGS STORAGE

It is envisaged that tailings not required for pastefill (approximately 53%) will be discharged to a TSF with a total volume of approximately 5 Mm<sup>3</sup>. Several sites have been considered, including a location in a valley adjacent to the proposed mine and mill site.

Following a brief site inspection of the valley and discussions with personnel from Minera Juanicipio, a potential five million cubic metres tailings storage facility (TSF) site was identified on relatively flat lying land to the northeast of the project site, close to the proposed access road from the Joint Venture area to the regional highway. The Joint Venture has purchased 125 ha of relatively flat-lying land suitable and adequate for the proposed five

million cubic metres TSF. The detailed environmental and geotechnical studies for this TSF site have been outlined but are yet to be carried out on the site.

A turkey's nest construction is envisaged with materials, including clays, for the construction of the dam walls sourced from within the dam and from mine development waste. It is envisaged that the dam would be lined with locally sourced clays, or if necessary a high density polyethylene (HDPE) liner. Because of the high evaporation rate in the region and the plan to pump thickened tailings to the dam, no water reclaim facility has been included in the design. The proposed design has the capacity to hold approximately 5 Mm<sup>3</sup> of tailings. The concept design of the facility is shown in Figure 18-2.

It is envisaged that tailings will be delivered to the TSF by a 200 mm inside diameter HDPE pipe installed in a suitable spillage containment ditch alongside the mine access road. A total pipe length of approximately seven kilometres will be required. The TSF will be fenced and provided with security equipment.

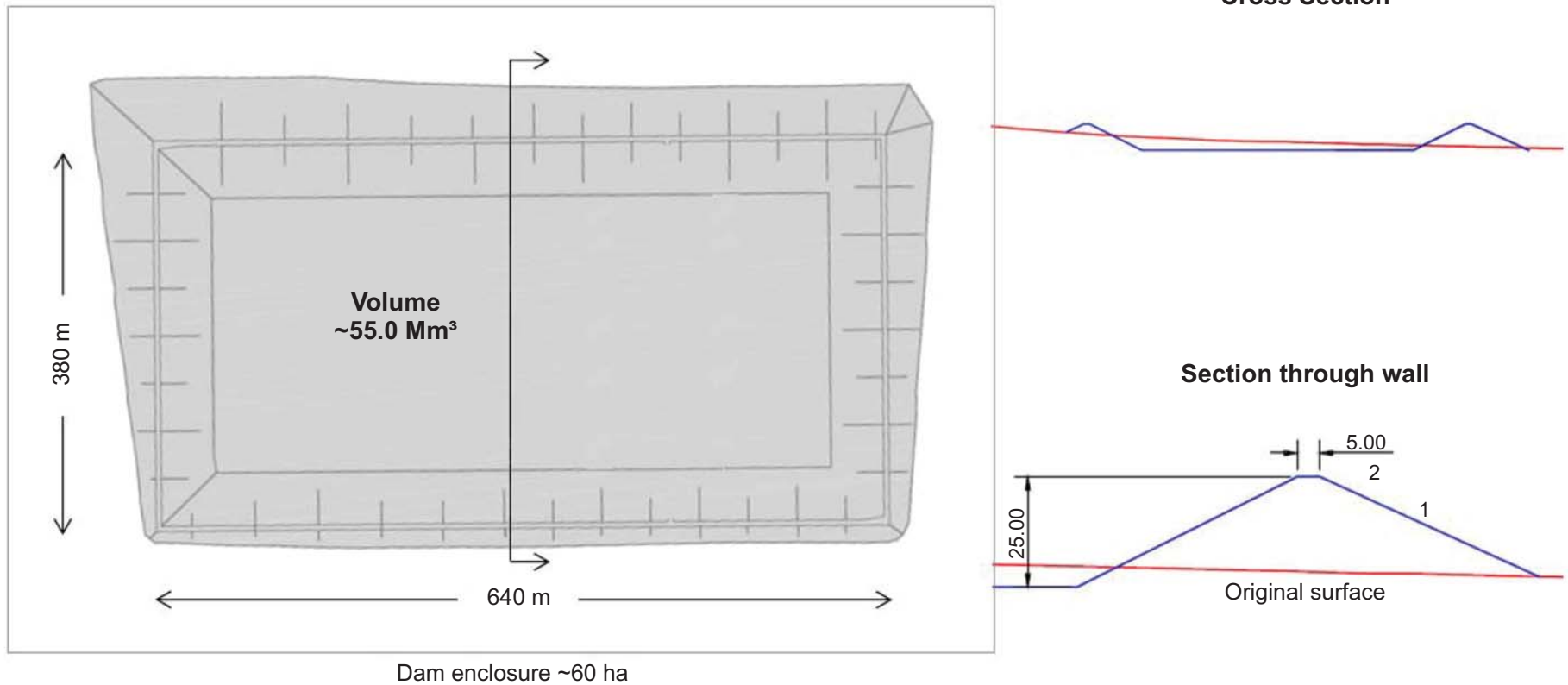


Figure 18-2

**Mag Silver Corp.**

**Juanicipio Joint Venture**  
Zacatecas State, Mexico

**Concept Design of  
Tailings Storage Facility**

## **OTHER SURFACE FACILITIES**

### **OFFICES AND CHANGE HOUSE**

It is envisaged that an office complex located close to the concentrator will accommodate the metallurgical staff, project administration staff, and the site laboratory.

A mine office complex is proposed to accommodate mine engineering staff, geology staff, mining supervisors, and maintenance supervisors. The facility would be air conditioned and equipped with individual offices, a computer room, kitchenette, restrooms, and meeting rooms. Extensions to the office complex would accommodate a mine control room, the mine cap-lamp room, a small first aid room, and a mine rescue station.

A change room and shower facility is proposed to service the mining and maintenance crews. The building will include fresh water showers, toilets, individual lockers, changing areas, and dry basket storage for each person's clothes and personal equipment.

### **WORKSHOPS AND FUEL STORAGE**

A fixed plant maintenance workshop and warehouse facility would be attached to the mill building. The building would also house a small change room and other facilities for the mill operating personnel.

A surface shop would be constructed to facilitate all major and minor mobile fleet repairs. It is expected that equipment which regularly exits the mine, such as the haulage fleet and light vehicles, would be serviced at the surface shop, while equipment such as production scoops, jumbos, and production drills would generally be serviced in the underground workshop. All major overhauls and large component change-outs would be performed in the surface shop.

The shop is envisaged to be a five bay configuration with provisions for a pit in one of the bays and a 10-tonne overhead crane. It is anticipated that one bay would be allocated to tire change-outs, two to lubrication and routine service, and two to general repair work.

A small secure warehouse holding spare parts for mine equipment will be attached to the workshop.

It is anticipated that a dedicated light vehicle workshop will be constructed as a separate building and will provide appropriate space and equipment for two light vehicles to be maintained simultaneously.

A 110 kL fuel storage and dispensing facility is proposed. This will allow for approximately ten days fuel storage during normal operations. The tank is planned to be a double-walled tank installed in combination with appropriate pumps, emergency shut-off mechanisms, concrete containment area, and fire suppression equipment.



## 19 MARKET STUDIES AND CONTRACTS

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### METAL PRICES

Project economics have been analyzed using the following metal prices which are based on the three year trailing average prices to the year ending December 2011 as reported by the Bank of Montreal (MacInnis, 2012). It has been assumed that the prices remain stable over the project life.

- Silver price = \$23.39/oz
- Gold price = \$1,257/oz
- Lead price = \$0.95/lb
- Zinc price = \$0.91/lb

### MARKETING

No detailed market studies have been undertaken at this stage of the project.

It is envisaged that silver-rich zinc concentrate will be sold primarily to smelters in the Asian region. Lead concentrate could potentially be sold to a smelter in Mexico or exported to offshore smelters. If sold to a local smelter, transport costs would be reduced, but it is reasonable to anticipate that these savings would need to be shared with the smelter.

Treatment terms for lead and zinc concentrates used to estimate revenue have been advised by Neil S. Seldon & Associates Ltd (NSA, 2012) and are shown in Tables 19-1 and 19-2. Both lead and zinc concentrates are expected to incur minor treatment penalties for impurities. The Qualified Person responsible for Section 19 has reviewed the advice and the supporting study by NSA and accepts responsibility for use in this report of the treatment terms set out in Tables 19-1 and 19-2.



**TABLE 19-1 LEAD CONCENTRATE TREATMENT TERMS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Treatment Term</b>	<b>Value</b>
Gold payment terms (% of contained metal in concentrate)	95%
Minimum deduction from gold grade	1.0 g
Silver payment terms (% of contained metal in concentrate)	95%
Minimum deduction from silver grade	50 g
Lead payment terms (% of contained metal in concentrate)	95%
Minimum deduction from lead concentrate grade	3 units
Lead concentrate treatment charge	\$270/dmt
Deduction for penalty elements (per tonne of concentrate)	\$9.07/dmt
Price participation - threshold price per tonne of lead metal in concentrate	\$2,000/t
Price participation for each dollar the metal price is below threshold price	\$0.04/dmt
Price participation for each dollar the metal price is above threshold price	\$0.06/dmt
Gold refining charge applied to payable gold metal	\$7.00/oz
Silver refining charge (% of silver price) applied to payable silver metal	4%

**TABLE 19-2 ZINC CONCENTRATE TREATMENT TERMS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Treatment Term</b>	<b>Value</b>
Minimum deduction from gold grade	1.0 g
Silver payment terms (% of contained metal in concentrate)	75%
Minimum deduction from contained silver in concentrate	3 oz
Zinc payment terms (% of contained metal in concentrate)	85%
Minimum deduction from zinc concentrate grade	8 units
Zinc concentrate treatment charge	\$245/dmt
Deduction for penalty elements (per tonne of concentrate)	\$2.31/dmt
Price participation - threshold price per tonne of zinc metal in concentrate	\$2,500/t
Price participation for each dollar the metal price is below threshold price	\$0.04/dmt
Price participation for each dollar the metal price is above threshold price	\$0.06/dmt
Gold refining charge applied to payable gold metal	—
Silver refining charge (% of silver price) applied to payable silver metal	0%

Assumed concentrate transport costs are shown in Table 19-3.

**TABLE 19-3 CONCENTRATE TRANSPORT COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Transport Cost</b>	<b>Value</b>
Lead concentrate moisture content	11%
Zinc concentrate moisture content	10%
Concentrate transport cost (assumes lead and zinc concentrates are sold to offshore smelters)	\$125/wmt

The pyrite concentrate is expected to be of relatively low value (3 g/t Au, 225 g/t Ag). Three marketing options are possible for this material:

1. Sale to the Chinese market.
2. Sale to a Mexican smelter.
3. Process the concentrate in an as yet to be built local treatment facility.

Option 1 involves selling into a currently receptive market but is likely to provide a low return because of the high freight costs. Option 2 would reduce the impact of freight costs, but payable metal values are expected to be at the low end of the range. Option 3 would require the establishment of a custom leach treatment facility, possibly designed to also process pyrite concentrates from other mining operations in the Fresnillo District.

AMC's best estimate of payable metal in pyrite concentrate is 60% for both gold and silver.

## **20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT**

**Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.**

No environmental investigations or studies have yet been carried out on the areas likely to be disturbed by the proposed project. A mine closure plan has not yet been developed.

The project area is located in a region that hosts a number of significant mining operations where the community is accustomed to mining activities. AMC is not aware of any environmental permitting or licensing requirements to which the Property will be subject, other than the normal permitting and licensing requirements as set forth by the Mexican Government prior to undertaking mine development and operations.

The key permits and licences likely to be required by the project are:

- Land Purchasing by Minera Juanicipio.
- Environmental Impact Assessment Report required by the Environmental Authority.
- Land Use Change Authorization by the Environmental Authority.
- Justifying Technical Study required by the Environmental Authority.

MAG reports that the operator, Fresnillo, has obtained all the required licences and permits needed for the ramp, access roads and mill site preparation, and is in the process of applying for any additional licences and permits required for production and milling.

## 21 CAPITAL AND OPERATING COSTS

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

In RPA's opinion, the assumptions used in the 2012 PEA remain reasonable.

### CAPITAL COSTS

Capital expenditure estimates have been prepared for both project and sustaining capital. Project capital has been defined as capital expenditure prior to first concentrate production and occurs in Years 1 to 4. Sustaining capital is subsequent capital expenditure for ongoing mine development and equipment replacement. As development of the Juanicipio Vein is envisaged to take place after Year 4, the cost of developing the vein is included in sustaining capital.

An estimate of the total capital expenditure requirement is shown in Table 21-1. The project capital is estimated at \$302M, inclusive of capitalized operating costs (costs usually related to the operation of the mine, but incurred prior to first concentrate production). Sustaining capital of \$267M results mainly from the need for ongoing mine development after concentrate production commences, and the need for mobile equipment replacements over the mine life.

**TABLE 21-1 SUMMARY CAPITAL COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	Capital Type (\$M)		Total
	Project	Sustaining	
Mine	102	234	337
Mill	58	16	74
Infrastructure	34	16	50
Indirects (incl. owners costs and EPCM)	77	<1	77
Contingency	31	–	31
<b>Total</b>	<b>302</b>	<b>267</b>	<b>569</b>

## MINE CAPITAL COSTS

Underground mine capital costs have been estimated based on the following methodology:

- All underground development, excluding ore development, has been capitalized.
- Quantities and sizes of mobile fleet and capital installations are based on the design concepts outlined in this report.
- Unit costs of equipment and installations have been sourced from suppliers. Where supplier's quotes were not available, recent costs from comparable projects have been used.
- The installations and mobile equipment required to support the underground mine have been scheduled to match the mine development schedule.

A breakdown of the direct costs of mine development is shown in Table 21-2.

**TABLE 21-2 MINE CAPITAL COSTS (DIRECT COSTS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	Capital Type (\$M)		Total
	Project	Sustaining	
Underground excavations	37.2	133.4	170.7
Underground mobile equipment	30.1	66.1	96.2
Mine dewatering	7.0	11.4	18.4
Ventilation	5.5	5.3	10.3
Underground Power supply & distribution	3.0	4.0	7.0
Underground Infrastructure	2.5	4.9	7.4
Paste fill plant and distribution system	11.1	6.5	17.6
Drilling (geotech, exploration & service holes)	5.2	0.9	6.1
Safety	1.3	1.8	3.1
<b>Total</b>	<b>102.3</b>	<b>234.4</b>	<b>336.8</b>

## MILL CAPITAL COSTS

Mill capital costs have been estimated using the following methodology:

- Detailed equipment list per section down to the level of pumps, etc.
- Vendor quotes for major equipment items with sizing based on the design criteria cited, and mass balance calculated for main flows.
- Comparable project estimates for common items e.g. bins, chutes, etc.
- Factors for process piping, platforms and walkways, and electrics/instrumentation.
- Average steel cost of \$3,120 per tonne.

- Concrete cost of \$520 per tonne.
- Mill capital costs were scheduled based on a two year construction period, with a 10% initial deposit on equipment and a standard “S-curve” spend profile thereafter.
- Mill sustaining capital costs were grouped together as an allowance under “General” at 1% of total mill project capital.
- Project capital cost of surface mobile fleet supporting the mill has been included under Infrastructure.

Table 21-3 shows a breakdown of the direct capital costs for the mill.

**TABLE 21-3 MILL CAPITAL COSTS (DIRECT COSTS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	Capital Type (\$M)		Total
	Project	Sustaining	
Crushing	3.7	0.8	4.5
Grinding	11.6	2.5	14.2
Flotation	29.6	6.4	36.0
Reagents	1.0	0.2	1.3
Tailings	2.6	0.6	3.1
Services	3.4	0.7	4.1
Infrastructure	4.3	0.9	5.2
Mill upgrade to 950 ktpa	-	2.4	2.4
Mobile equipment	1.5	1.5	2.9
<b>Total</b>	<b>57.7</b>	<b>16.1</b>	<b>73.7</b>

## INFRASTRUCTURE CAPITAL COSTS

The capital costs of general mine infrastructure have been estimated using the following methodology:

- Quantities and sizes of capital installations are based on the design concepts described in this report.
- Unit costs of installations have been sourced from suppliers. Where supplier’s quotes were not available, recent costs from comparable projects have been used.
- Infrastructure capital costs have been scheduled to match the requirements of the mine development schedule and the mill construction schedule.
- No provision has been made for the sale of assets at the end of the mine life. It is assumed that income from the sale of assets would offset the cost of site rehabilitation.

Table 21-4 shows a breakdown of the direct capital cost of project infrastructure.

**TABLE 21-4 INFRASTRUCTURE CAPITAL COSTS (DIRECT COSTS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	Capital Type (\$M)		Total
	Project	Sustaining	
Surface mobile equipment	1.3	2.7	4.0
Surface buildings and infrastructure	5.8	2.6	8.3
Water supply	5.2	1.9	7.1
Power supply and site distribution	4.9	1.6	6.4
Technical services	0.4	1.1	1.6
Earthworks	3.0	0.1	3.1
Tailings storage facility and pipeline	13.6	6.3	19.9
<b>Total</b>	<b>34.2</b>	<b>16.2</b>	<b>50.5</b>

## INDIRECT CAPITAL COSTS

Indirect costs are those relating to engineering, procurement, and construction management (EPCM), the costs associated with servicing and maintaining the mine during the construction period, and operating costs incurred prior to first concentrate production.

Indirect capital costs have been estimated using the following methodology:

- The cost of freight and where appropriate the costs associated with importation of goods have been included in the direct costs.
- Management, supervisors, and engineering staff required to engineer and manage the mining of the excavations and much of the general underground construction work have been included in the manpower estimates and are allowed for under “Capitalized Opex (Mine)” and “Capitalized Opex (G&A)”.
- It is envisaged that the majority of spare parts for mobile equipment will be held on a consignment stock basis by equipment suppliers. Only a minor allowance has been included for first fills and spares for the underground mine.
- Indirect costs for the mill have been calculated as a percentage of the direct costs as follows:
  - Feasibility study and EPCM costs: 16.3%.
  - First fills and spares: 7%.
  - Other costs: approximately 2%.
  - Owner’s costs: 10%.

Table 21-5 shows the summary of indirect capital costs.

**TABLE 21-5 INDIRECT CAPITAL COST SUMMARY**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Indirect Costs</b>	<b>(\$M)</b>
Owners Costs	18.9
EPCM	15.9
Capitalized Opex (Mine)	32.6
Capitalized Opex (G&A)	9.0
<b>Total</b>	<b>76.4</b>

Totals do not necessarily equal the sum of the components due to rounding adjustments

Details of the Owners and EPCM costs are shown in Table 21-6.

**TABLE 21-6 OWNERS AND EPCM COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Description</b>	<b>\$(M)</b>
Feasibility study	1.6
Environmental studies	0.4
Land acquisition for road, TSF, powerline etc.)	2.1
Permitting and legal fees	0.5
General owners costs (Mine)	3.9
General owners costs (Mill) - including first fill	10.6
<b>Total owners costs</b>	<b>18.9</b>
Mine EPCM	2.1
Mill EPCM	9.2
Infrastructure EPCM	3.1
Temporary mine construction facilities	1.6
<b>Total EPCM costs</b>	<b>15.9</b>

Details of capitalized operating costs are shown in Table 21-7.



**TABLE 21-7 DETAILS OF CAPITALIZED OPERATING COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Mine Development</b>	<b>(\$M)</b>
Ore development	3.3
Stoping - drill and blast	0.1
Production mucking	<0.1
Ore trucking	0.6
Production ground support	<0.1
General mine services	11.6
Power	4.8
Mine management and technical services	12.0
<b>Total</b>	<b>32.6</b>
G&A	
Site Administration	1.0
Safety and Environment	1.2
Human Resources	1.1
Finance and Purchasing	2.3
General Maintenance	3.0
Power - G&A	0.4
<b>Total</b>	<b>9.0</b>

## **CAPITAL CONTINGENCY**

Contingency amounts are shown in Table 21-8. The amounts are based on percentages applied to individual detailed line items. Weighted average contingencies applied to project capital costs are mine 9%, mill 20%, and infrastructure 23%.

**TABLE 21-8 CAPITAL CONTINGENCY**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Contingency</b>	<b>(\$M)</b>
Mine	8.8
Mill	11.3
Infrastructure	7.9
Indirect costs	3.3
<b>Total</b>	<b>31.4</b>

## **OPERATING COSTS**

All expenditure, other than capital expenditure, taking place after the commencement of concentrate production, has been classified as operating expenditure. All mining activities,

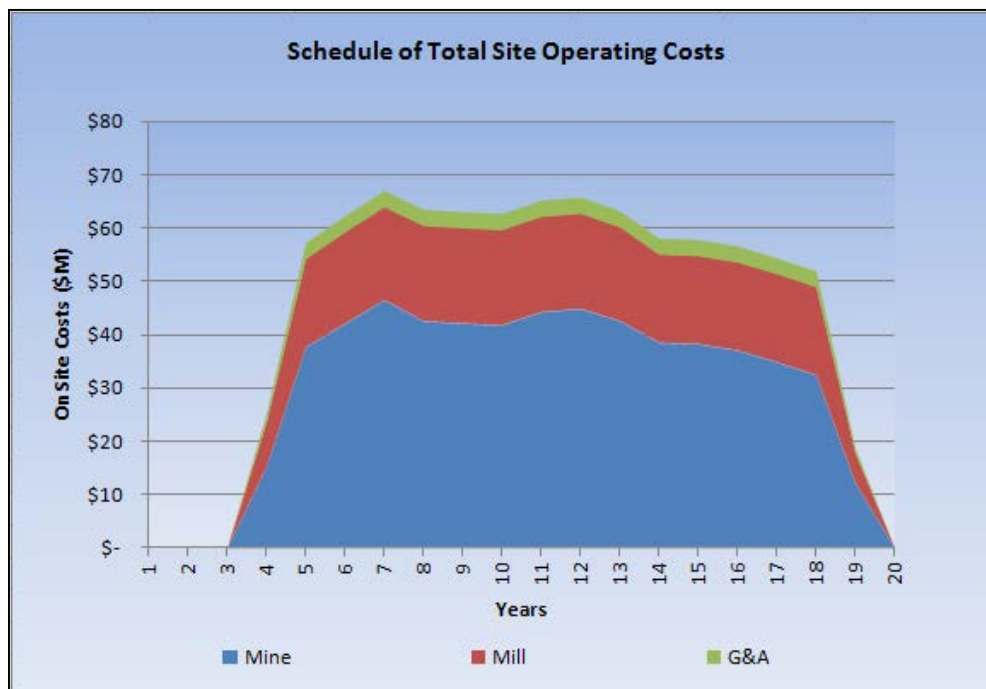
including the development of ore drives, have been included in the operating cost estimate. The mining of drawpoints and other waste development have been included in either project or sustaining capital.

Total LOM site operating cost is shown in Table 21-9, and graphically in Figure 21-1.

**TABLE 21-9 SUMMARY OF LIFE-OF-MINE SITE OPERATING COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Department	(\$M)
Mine	585
Mill	255
G&A	46
<b>Total</b>	<b>886</b>

**FIGURE 21-1 SCHEDULE OF SITE OPERATING COSTS**



Unit site operating costs have been estimated at \$67/t milled. The cost breakdown is shown in Table 21-10.

**TABLE 21-10 OPERATING COSTS PER TONNE MILLED**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	\$M
Mine	43.92
Mill	19.18
G&A	3.46
<b>Total</b>	<b>66.56</b>

### **MINE OPERATING COST**

Mine operating costs have been estimated using the following methodology:

- Detailed first principles estimates were made of the unit costs for mining activities; including backfill, ore development, stope support, production mucking, production trucking, stope drilling, and stope blasting. The unit costs include operating labour (up to, but excluding shift supervision), maintenance labour, equipment maintenance, fuel, and power. The unit costs were then multiplied by the scheduled quantities of each activity.
- Mine management and technical services costs have been estimated from a detailed labour schedule and the labour rates shown in Table 2-11. An allowance has been included in the overall management and technical services costs to cover the cost of materials and consumables used under this cost centre.
- General mine services costs have been based on a schedule of the service personnel required multiplied by the appropriate labour rates. Consumables and materials costs within the general mine services cost centre have been estimated by applying factors to the labour cost and to the capital purchases within the mine services area.
- Mine power consumption was estimated based on underground activities and the estimate of installed power of electrical equipment.

**TABLE 21-11 AVERAGE TOTAL EMPLOYMENT COSTS PER PERSON PER YEAR**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Category	Annual Employment Cost (\$)
Miners	18,000
Mill Operators	17,000
Tradesmen	22,500
Supervision	67,500
Professionals	90,000
Senior Management	170,000

Mine operating costs incurred prior to first concentrate production have been capitalized as owner's costs.

Table 21-12 shows a summary of the LOM mine operating cost by activity and the unit cost per tonne mined. The costs exclude tonnages mined and costs incurred prior to the mill startup.

**TABLE 21-12 LIFE-OF-MINE UNDERGROUND MINE OPERATING COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	LOM Operating Cost	
	\$M	\$/t
Ore development	81	6.14
Stoping - drill and blast	84	6.39
Production mucking	24	1.82
Ore trucking	100	7.60
Backfilling	73	5.58
Production ground support	22	1.64
General mine services	83	6.30
Power	57	4.36
Mine management and technical services	61	4.66
<b>Total</b>	<b>585</b>	<b>44.50</b>

### MILL OPERATING COST

Mill operating costs have been prepared based on the estimated unit costs per tonne milled for reagents, consumables, and power. Labour costs have been based on a detailed labour schedule and the appropriate labour rates. Maintenance costs have been based on 2% of mill capital. A total of \$0.624M per annum has been added to cover miscellaneous costs.

Table 21-13 shows the total LOM mill operating costs together with the unit cost per tonne milled.

**TABLE 21-13 LIFE-OF-MINE MILL OPERATING COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	LOM Mill Cost	
	\$M	\$/t
Stockpile reclaim	0.2	0.01
Power - (mill)	72.4	5.44
Steel liners and media	27.5	2.06
Reagents	83.2	6.25
Wages and salaries	40.7	3.06
Maintenance (per capital cost)	22.1	1.66
Other fixed	9.3	0.70
<b>Total</b>	<b>255.3</b>	<b>19.18</b>

## GENERAL AND ADMINISTRATION OPERATING COST

General and administration (G&A) costs have been estimated at \$3.46 per tonne milled using the following methodology:

- Site administration, safety and environment, human resources, financing, and purchasing have been estimated by developing a labour schedule and applying the appropriate unit labour costs. An allowance has been made to cover materials and consumables used by these departments.
- General services and maintenance costs have been estimated by applying a factor to the cost of capital purchases for infrastructure.
- Power consumption has been estimated based on the installed power of electrical equipment.

Operating costs incurred prior to first concentrate production have been capitalized as owner's costs.

Table 21-14 shows the total LOM G&A costs.

**TABLE 21-14 LIFE-OF-MINE GENERAL AND ADMINISTRATION OPERATING COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Area	LOM G&A Cost	
	\$M	\$/t
Site administration	4.4	0.33
Safety and environment	4.8	0.36
Human resources	4.5	0.33
Finance and purchasing	14.4	1.08
General services & maintenance	15.8	1.19
Power - (G&A)	2.3	0.17
<b>Total</b>	<b>46.1</b>	<b>3.46</b>

## POWER

Estimated annual power costs for each of the major activities during the main operating period are summarized in Table 21-15. Costs have been based on an assumed unit cost of \$0.0936 /kWh. The total power cost represents approximately 16% of the site operating cost.

**TABLE 21-15 ESTIMATED ANNUAL POWER COSTS (YEAR 10)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Cost Centre</b>	<b>\$(000)</b>
Mine	4.4
Mill	5.2
G&A	0.2
<b>Total</b>	<b>9.7</b>

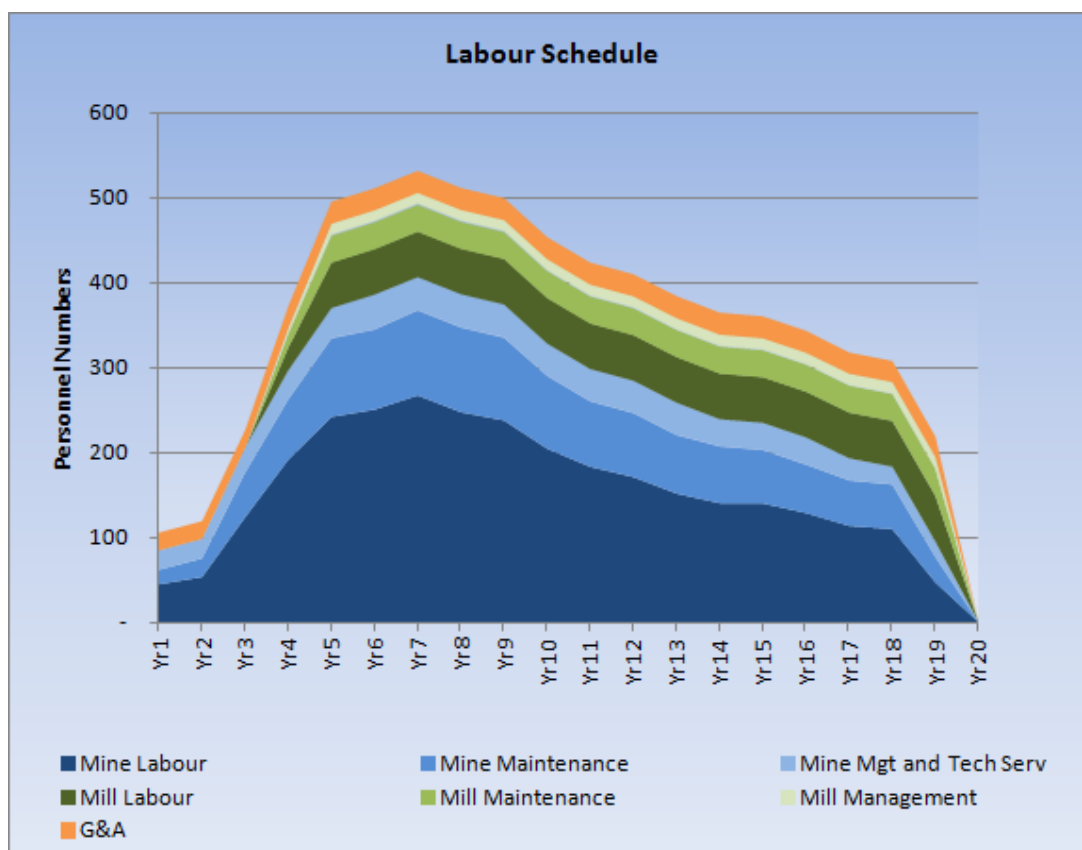
## LABOUR

The estimated number of employees in each area of the operation is shown in Table 21-16. Staffing levels are expected to peak in Year 7 and remain at approximately 500 for three years. Staffing levels are expected to drop progressively from Year 10 as underground development reduces.

**TABLE 21-16 ESTIMATED EMPLOYEE NUMBERS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>YEAR</b>	<b>Mining</b>			<b>Mill</b>			<b>G&amp;A</b>	<b>Total</b>
	<b>Operations</b>	<b>Maint'ce</b>	<b>Mgt &amp; Tech Serv</b>	<b>Mill</b>	<b>Maint'ce</b>	<b>Mgt</b>		
Yr1	45	17	23	-	-	-	21	105
Yr2	53	22	23	-	-	-	21	119
Yr3	124	52	29	-	-	-	21	226
Yr4	192	71	34	27	16	7	26	372
Yr5	242	92	36	54	32	14	26	496
Yr6	251	94	41	54	32	14	26	511
Yr7	267	100	39	54	32	14	26	532
Yr8	247	99	39	54	32	14	26	512
Yr9	238	97	39	54	32	14	26	500
Yr10	204	85	38	54	32	14	26	454
Yr11	183	77	38	54	32	14	26	424
Yr12	171	75	38	54	32	14	26	410
Yr13	152	69	38	54	32	14	26	384
Yr14	140	67	32	54	32	14	26	365
Yr15	140	63	32	54	32	14	26	361
Yr16	129	57	32	54	32	14	26	343
Yr17	113	53	26	54	32	14	25	318
Yr18	110	52	21	54	32	14	25	308
Yr19	47	30	18	54	32	14	24	219

**FIGURE 21-2 SCHEDULE OF ESTIMATED EMPLOYEE NUMBERS**



## 22 ECONOMIC ANALYSIS

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

In RPA's opinion, the assumptions used in the 2012 PEA were reasonable at the time and remain currently valid and relevant as a projection of economic potential for the project. Mineral Resources that are not mineral reserves do not have demonstrated economic viability.

The economic analysis in the PEA is preliminary in nature and is based, in part, on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the PEA will be realized.

### OVERVIEW AND MODELLING ASSUMPTIONS

AMC has prepared a financial model for the project using the following assumptions:

- No allowance has been made for cost inflation or price escalation.
- Annual cash flow projections have been estimated over the project life based on capital expenditures, production costs, and sales revenue. No allowance has been made for corporate costs. The financial indicators examined included after-tax cash flow, net present value (NPV), and internal rate of return (IRR).
- Capital and operating costs are consistent with the values described in Section 21 of this Report.
- The capital structure is assumed on a 100% equity basis, with no debt or interest payments.
- The cost base of the capital and operating costs is January 1, 2012. The model is assessed in constant United States Dollar terms.
- No working capital allowances have been made in the financial analysis. Assuming two month payment terms, working capital would be approximately one sixth of the average annual operating cost of \$60M, or approximately \$10M. This would be recovered at the end of the mine life.



- The project is assumed to have no terminal value. The assumption has been made that any terminal value would be used to meet the costs of final site rehabilitation.

## TAXES

Estimates of taxation payments and other mandatory deductions have been made based on advice from the Mexican Branch of Price Waterhouse Coopers.

The following assumptions have been applied when calculating the corporate tax payable:

- It has been assumed Minera Juanicipio is a single business entity for tax purposes and that taxes are paid annually.
- Project assets have been depreciated on a straight line basis over their useful life as follows:
  - Assets related to the process plant and mine infrastructure, have been depreciated at 6% per year.
  - Assets related to fixed plant such as pumps, fans, etc., have been depreciated at 12% per year.
  - Assets such as trucks and mobile equipment have been depreciated at 25% per year.
- With the exception of certain trucks and mobile equipment, depreciation does not commence until the start of concentrate production in Year 4. The trucks and mobile equipment that will carry out the mine development have been depreciated from the time they are purchased.
- Corporate tax has been estimated based on the higher of the following two tax calculation methods. A conventional profit based tax using a tax rate of 28%, being the corporate tax rate planned to apply from 2014, and an alternative flat tax known as IETU, which is based on cash flows. An IETU tax rate of 17.5% has been used.
- Tax losses from previous activities amounting to 282 million Pesos have been carried forward. The tax losses have been converted to US Dollars at a Mexican Peso to US Dollar exchange rate of 12.86. No future tax losses relating to other projects or corporate activities have been assumed.
- Employee profit sharing (PTU) is not included in the financial estimates and the NPV and IRR of the project may fluctuate depending on how the project is structured once it is in operation.

The Mexican Senate approved Tax Reform changes in Mexico that became effective January 1, 2014. The effects of these changes are not reflected in the 2012 PEA, but they would have an insignificant impact on the overall economic results.

## REVENUE ASSUMPTIONS

Project economics have been analyzed using the following metal prices (Base Case Prices) which are based on the three year trailing average prices to the year ending December 2011 as reported by the Bank of Montreal (MacInnis, 2012). It has been assumed that the prices remain stable over the project life.

- Silver price = \$23.39/oz
- Gold price = \$1,257/oz
- Lead price = \$0.95/lb
- Zinc price = \$0.91/lb

It is envisaged that silver-rich zinc concentrate will be sold primarily to smelters in the Asian region. Lead concentrate could potentially be sold to a smelter in Mexico or exported to offshore smelters. If sold to a local smelter, transport costs would be reduced, but it is reasonable to anticipate that these savings would need to be shared with the smelter.

Both lead and zinc concentrates are expected to incur minor treatment penalties for impurities.

It is envisaged that the gold-rich pyrite concentrate will be sold to a customer able to recover gold and silver using a conventional cyanide leach process.

Treatment terms for lead and zinc concentrates used to estimate revenue have been advised by NSA (2012) and are shown in Section 19.

## ANALYSIS OF PROJECT ECONOMICS

A summary of the key physical parameters of the project are shown in Table 22-1, costs are summarized in Table 22-2, and key financial results are shown in Table 22-3.

**TABLE 22-1 SUMMARY OF PROJECT PHYSICAL PARAMETERS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Item	Units	Value
Drift metres (including waste)	km	103
Mineral tonnes (milled)	Mt	13.3
Au grade	g/t	1.30
Ag grade	g/t	416
Pb grade	%	1.42
Zn grade	%	2.70
Au payable metal	Moz	0.43
Ag payable metal	Moz	153
Pb payable metal	Mlb	362
Zn payable metal	Mlb	584

Note: "Mineral tonnes (milled)" was derived from Mineral Resources as shown in Table 16-1. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

**TABLE 22-2 SUMMARY OF PROJECT COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Item	Units	Value
Project capital	\$M	302
Sustaining capital	\$M	267
Operating costs (excludes capitalized operating cost)	\$M	886
Off-site costs	\$M	524
<b>Total Costs</b>	<b>\$M</b>	<b>1,979</b>
Site operating cost	\$/t	67
Total cash operating costs (on and off-site)	\$/t	109
Cash cost \$/oz Ag (net of by-product credits)	\$/oz	(0.03)
Total cash cost* per AgEq**oz payable	\$/oz	6.61

Notes:

\*Excludes project and sustaining capital, but includes smelter, refining, and transportation costs.

\*\*AgEq is calculated by dividing the total revenue by the Base Case silver price.

**TABLE 22-3 SUMMARY OF FINANCIAL RESULTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Item	Units	Value
Revenue	\$M	4,992
Cash flow before tax	\$M	3,013
Tax	\$M	851
Cash flow after tax	\$M	2,162
Discount rate	%	5%
NPV before tax (5% discount rate)	\$M	1,762
IRR before tax	%	54%
NPV after tax (5% discount rate)	\$M	1,233
IRR after tax	%	43%
Peak debt	\$M	(302)
Payback from Year 1 (approximate)	yrs	5.6
Payback from mill start-up (approximate)	yrs	2.1
Project life from Year 1	yrs	19

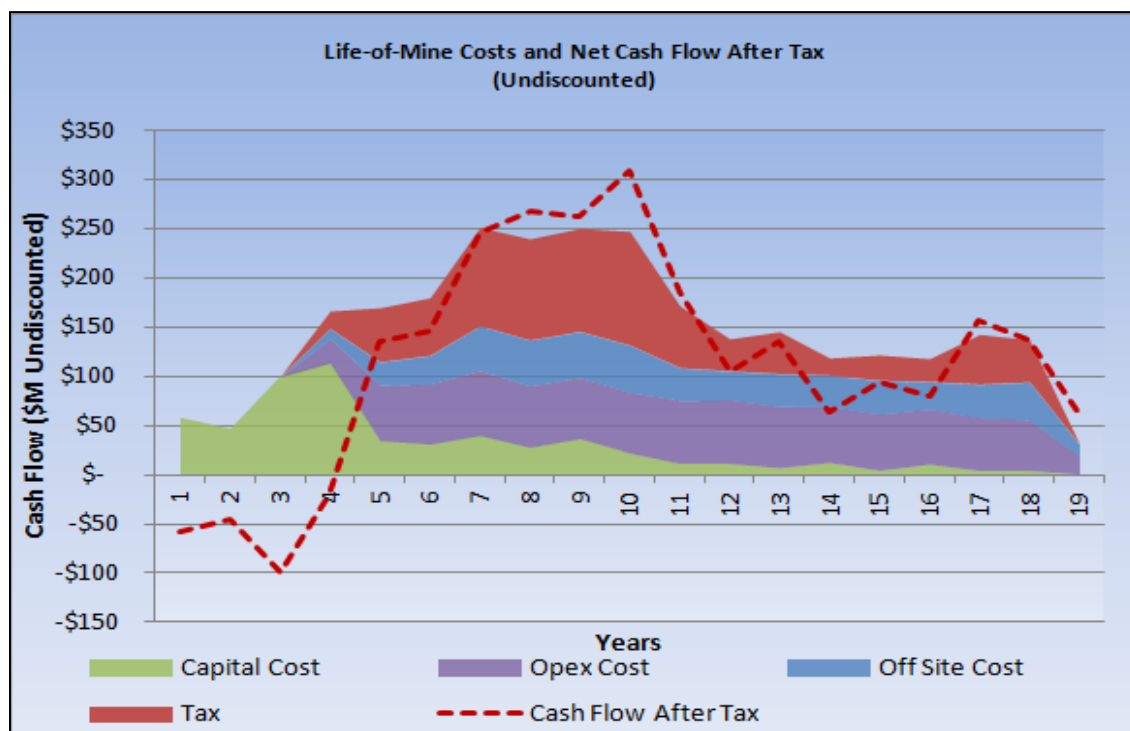
Note: PTU is not included in the financial estimates

## LIFE-OF-MINE CASH FLOW

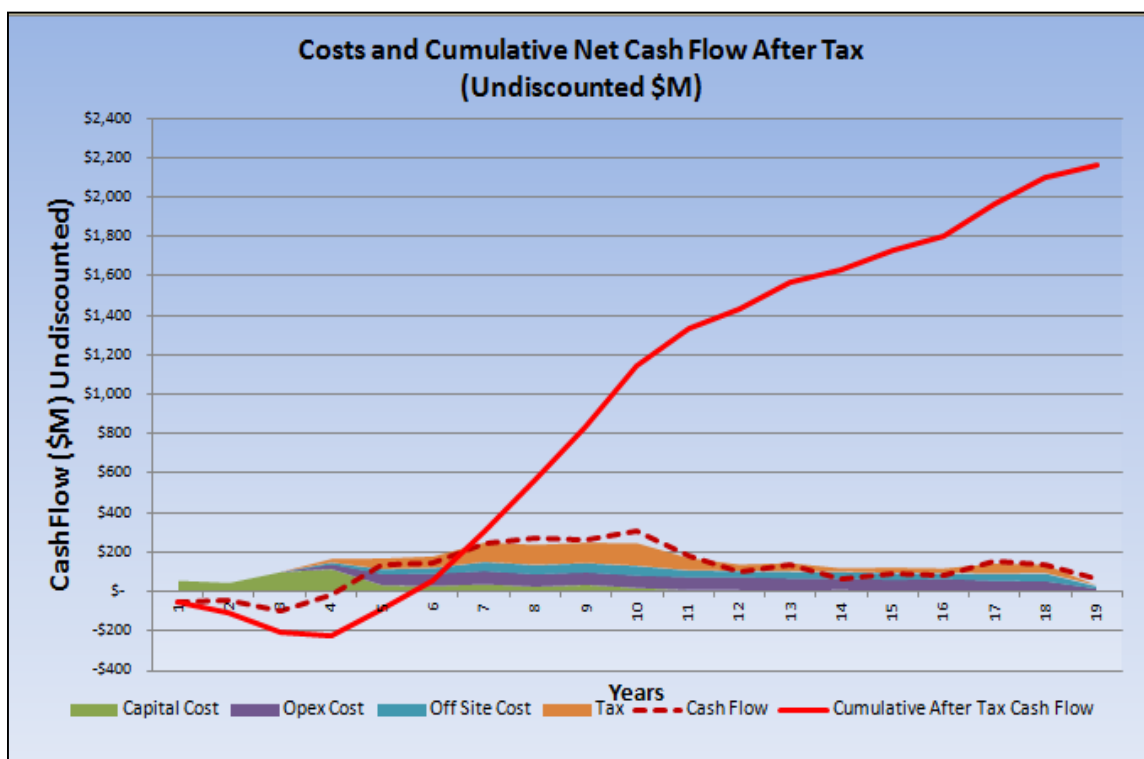
Figures 22-1 and 22-2 show the LOM costs, net cash flow, and cumulative net cash flow. The project is expected to have a positive cash flow from Year 4 onwards and payback in Year 6.

RPA notes that from the beginning of Year 5 onwards, the projected average annual after tax cash flow over the remaining 14.8 year life of mine is \$161.2 million per year, including an average annual after tax cash flow of \$228.2 million per year from the beginning of Year 5 until the end of Year 10.

**FIGURE 22-1 LIFE-OF-MINE COSTS AND NET CASH FLOW AFTER TAX (UNDISCOUNTED)**



**FIGURE 22-2 COSTS AND CUMULATIVE NET CASH FLOW AFTER TAX (UNDISCOUNTED)**



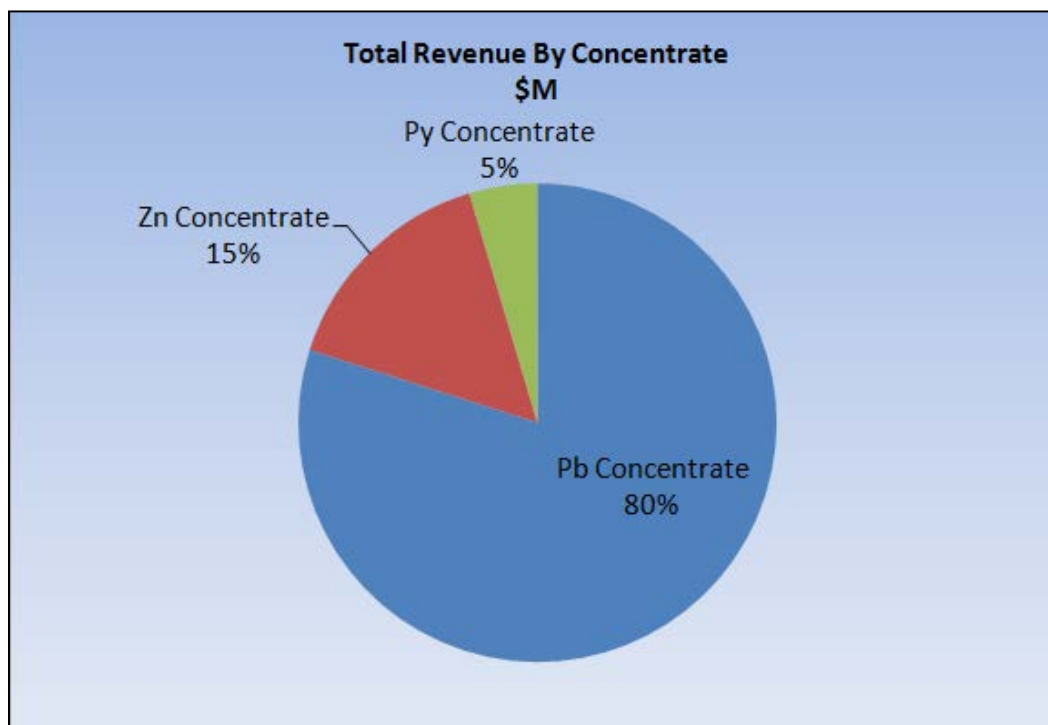
## REVENUE

Total revenue by concentrate type and by contained metal is shown in Table 22-4 and graphically in Figures 22-3 and 22-4. Table 22-4 shows total revenue by metal over the mine life.

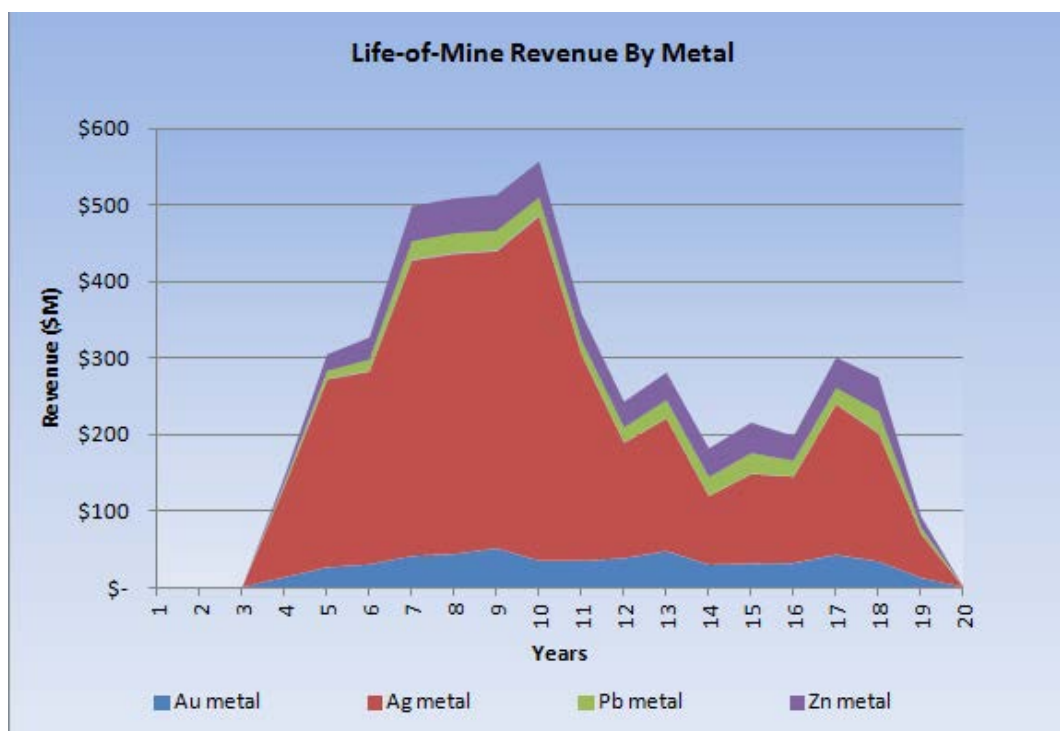
**TABLE 22-4 REVENUE BY CONCENTRATE TYPE AND BY METAL  
MAG Silver Corp. - Juanicipio Joint Venture**

<b>By Concentrate</b>	<b>\$M</b>
Pb Concentrate	4,011
Zn Concentrate	751
Py Concentrate	230
<b>By Metal</b>	
Au metal	540
Ag metal	3,578
Pb metal	343
Zn metal	531
<b>Total Revenue</b>	<b>4,992</b>

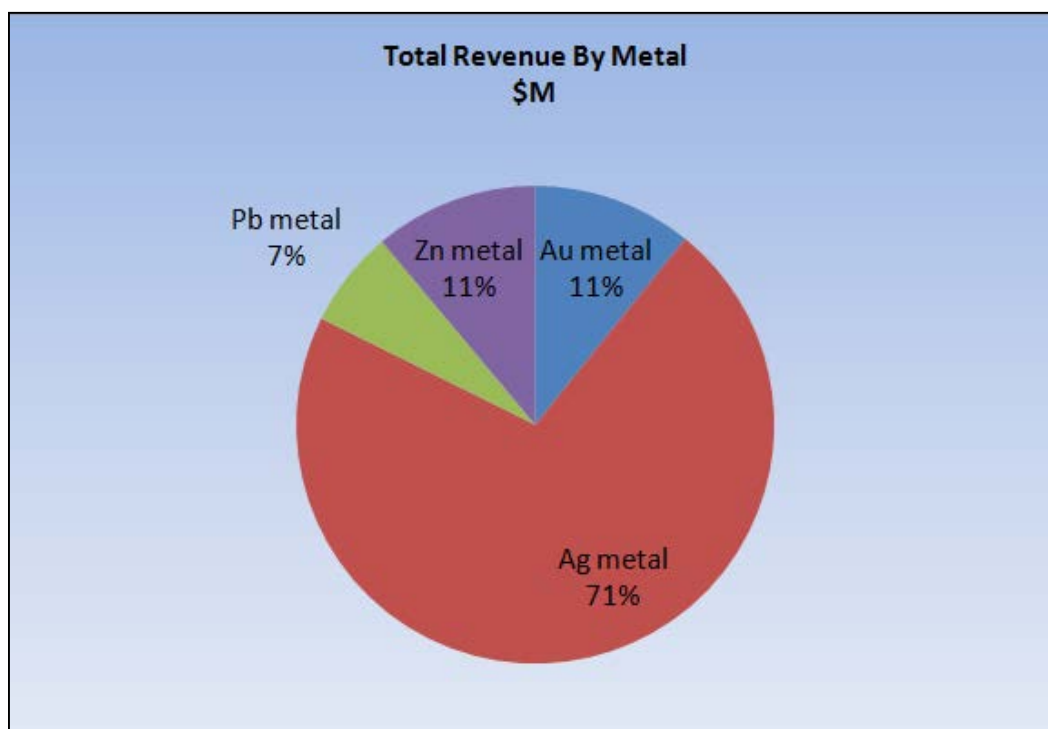
**FIGURE 22-3 REVENUE BY CONCENTRATE TYPE**



**FIGURE 22-4 TOTAL REVENUE BY METAL**



**FIGURE 22-5 LIFE-OF-MINE REVENUE BY METAL**



## OFF-SITE COSTS

Table 22-5 shows the estimated total off-site costs over the mine life.

**TABLE 22-5 OFF-SITE CONCENTRATE TREATMENT COSTS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Lead Concentrate</b>	<b>Charge/Unit</b>	<b>\$M</b>
Treatment	\$270/dmt conc.	110
Penalties	\$9.07/dmt conc.	4
Price participation	-	>1
Refining (silver & gold)	-	131
Transport	\$125/wmt conc.	57
<b>Total Cost</b>		<b>302</b>
<b>Zinc Concentrate</b>	<b>Charge/Unit</b>	<b>\$M</b>
Treatment	\$245/dmt conc.	148
Penalties	\$2.31/dmt conc.	1.4
Price participation	-	(10)
Refining (silver & gold)	-	-
Transport	\$125/wmt conc.	83
<b>Total Cost</b>		<b>222</b>
<b>Total Off-site Costs</b>		<b>524</b>

## SENSITIVITY TO METAL PRICES AND COSTS

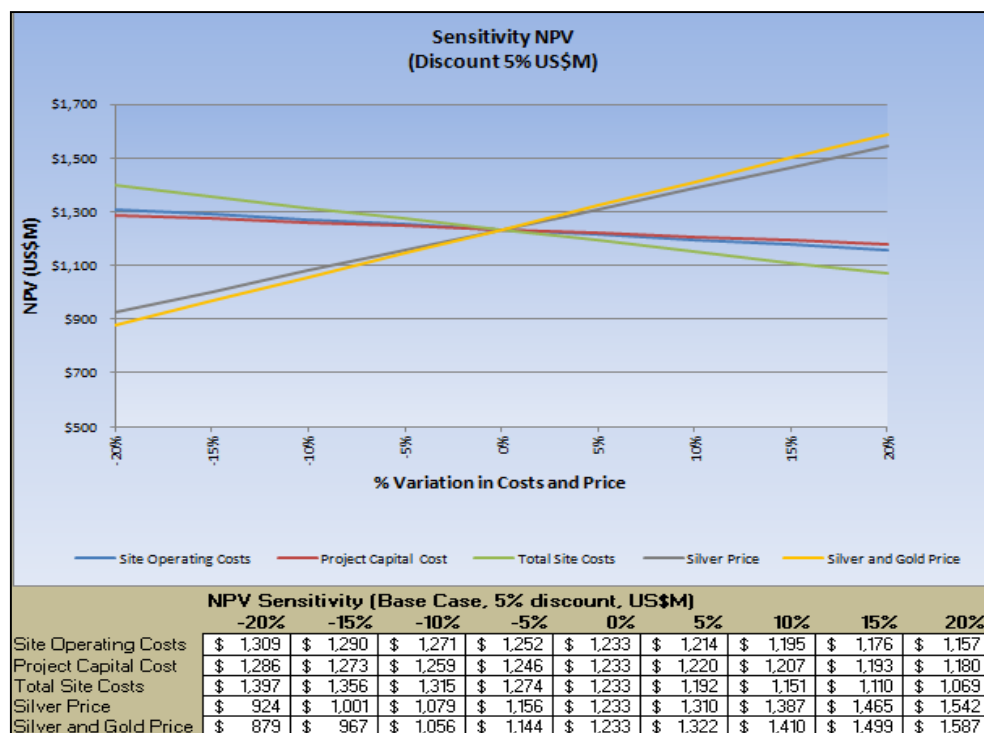
The sensitivity of the project to changes in metal prices and costs is shown in Figure 22-6. The NPV of the project is most sensitive to changes in the silver price and will have similar sensitivity to silver head grade. The NPV is less sensitive to costs. The project maintains a positive NPV over the range of sensitivities tested.

Figure 22-7 shows the sensitivity of the NPV after tax to changes in gold and silver prices where the gold to silver price ratio is maintained at the ratio of the Base Case prices (53.74: 1), and the silver price varies from \$18/oz to \$48/oz. Prices for lead and zinc have been retained at the Base Case prices of \$0.95/lb and \$0.91/lb respectively.

Table 22-6 shows the sensitivity of the key economic parameters to changes in the gold and silver prices where the gold to silver price ratio is maintained at 53.74: 1. Prices for lead and zinc have been retained at Base Case prices. A 5% discount rate has been used.

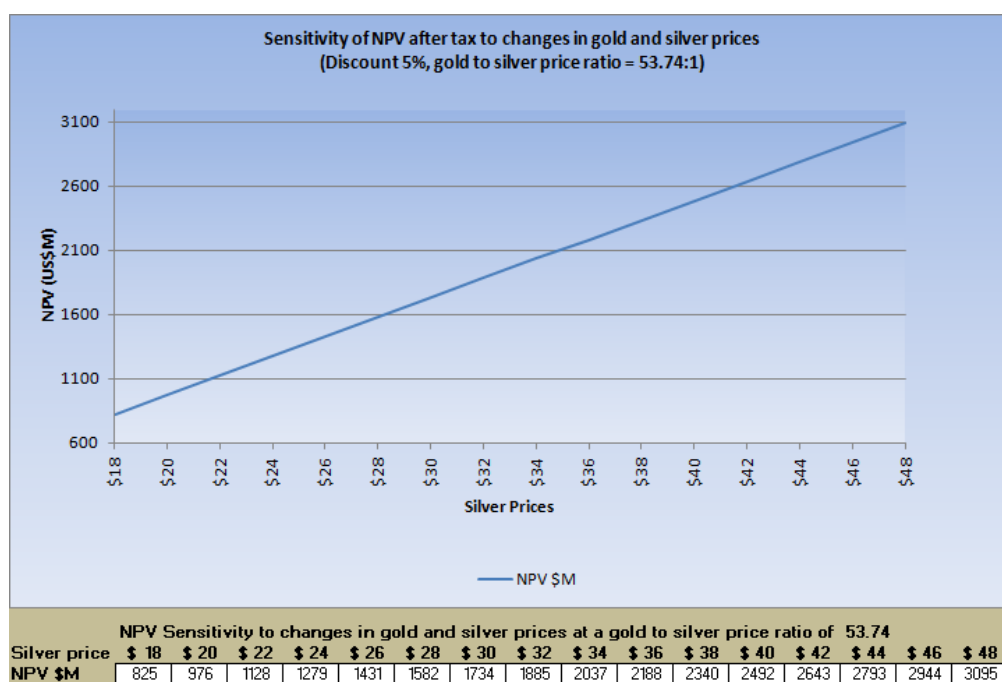


**FIGURE 22-6 SENSITIVITY OF AFTER TAX NPV TO CHANGES IN METAL PRICES AND COSTS**



Note: PTU is not included in the NPV estimates.

**FIGURE 22-7 SENSITIVITY OF NPV AFTER TAX TO CHANGES IN SILVER AND GOLD PRICES**



Note: PTU is not included in the NPV estimates.

**TABLE 22-6 COMPARISON OF ECONOMIC PARAMETERS TO CHANGES IN METAL PRICES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Metal Prices</b>		<b>Base Case</b>					
Au (\$/oz)	1,079	<b>1,257</b>	1,344	1,478	1,612	1,747	1,881
Ag (\$/oz)	20.00	<b>23.39</b>	25.00	27.50	30.00	32.50	35.00
<b>Economic Parameters</b>							
NPV before tax (\$M)	1,407	<b>1,762</b>	1,931	2,193	2,455	2,717	2,979
NPV after tax (\$M)	976	<b>1,233</b>	1,355	1,544	1,734	1,923	2,113
IRR before tax (%)	47%	<b>54%</b>	57%	61%	65%	69%	73%
IRR after tax (%)	37%	<b>43%</b>	46%	50%	53%	57%	60%
Cash cost \$/oz Ag (net of by-product credits)	0.36	<b>(0.03)</b>	(0.21)	(0.50)	(0.79)	(1.08)	(1.36)
Cash cost* \$/AgEq**oz	6.33	<b>6.61</b>	6.72	6.89	7.05	7.19	7.33
Payback (Yrs) after plant start-up (approximate)	2.6	<b>2.1</b>	1.9	1.7	1.5	1.4	1.3

Notes:

PTU is not included in the financial estimates.

\*Excludes project and sustaining capital, but includes smelter, refining, and transportation costs.

\*\*AgEq is calculated by dividing the total revenue by the silver price.

Table 22-7 shows the sensitivity of the NPV and IRR to changes in metal prices and discount rates. Prices for gold have been varied using a ratio of 53.74: 1 to the silver price. Lead and zinc have been maintained at Base Case prices.

**TABLE 22-7 SENSITIVITY OF NPV TO CHANGES IN PRICES AND DISCOUNT RATES**

**MAG Silver Corp. - Juanicipio Joint Venture**

Silver Price \$/oz	Discount Rate	NPV before tax (\$M)	IRR before tax	NPV after tax (\$M)	IRR after tax
<b>\$20.00</b>	0%	2,435	47%	1,743	37%
	5%	1,407	47%	976	37%
	8%	1,032	47%	700	37%
<b>Base Case \$23.39</b>	0%	<b>3,013</b>	<b>54%</b>	<b>2,162</b>	<b>43%</b>
	5%	<b>1,762</b>	<b>54%</b>	<b>1,233</b>	<b>43%</b>
	8%	<b>1,304</b>	<b>54%</b>	<b>897</b>	<b>43%</b>
<b>\$25.00</b>	0%	3,288	57%	2,361	46%
	5%	1,931	57%	1,355	46%
	8%	1,434	57%	990	46%
<b>\$27.50</b>	0%	3,714	61%	2,670	50%
	5%	2,193	61%	1,544	50%
	8%	1,634	61%	1,135	50%
<b>\$30.00</b>	0%	4,140	65%	2,979	53%
	5%	2,455	65%	1,734	53%
	8%	1,835	65%	1,280	53%
<b>32.50</b>	0%	4,567	69%	3,288	57%
	5%	2,717	69%	1,923	57%
	8%	2,036	69%	1,425	57%
<b>\$35.00</b>	0%	4,993	73%	3,579	60%
	5%	2,979	73%	2,113	60%
	8%	2,237	73%	1,570	60%

Note: PTU is not included in the financial estimates.

Table 22-8 shows the sensitivity of the NPV at Base Case metal prices and a 5% discount rate to changes in the silver refining charge.

**TABLE 22-8 SENSITIVITY TO THE SILVER REFINING CHARGE**

**MAG Silver Corp. - Juanicipio Joint Venture**

Silver Refining Charge	NPV before tax (\$M)	NPV after tax (\$M)
3.20%	1,778	1,245
4%	1,762	1,233
5%	1,742	1,219
Lead concentrate smelted in Torreon	1,776	1,243

Note: PTU is not included in the NPV estimates

RPA notes a number of changes since the 2012 PEA that would have an insignificant impact on the overall economic results:

- Updated Mineral Resource as described in this report
- Metal Prices
- Payment Terms for concentrate
- Cost Escalation
- New Gold and Silver Tax (0.5% Gross Revenue)
- New Mining Tax (7.5% on EBITDA)
- Increased corporate tax rate (30% from 28%)

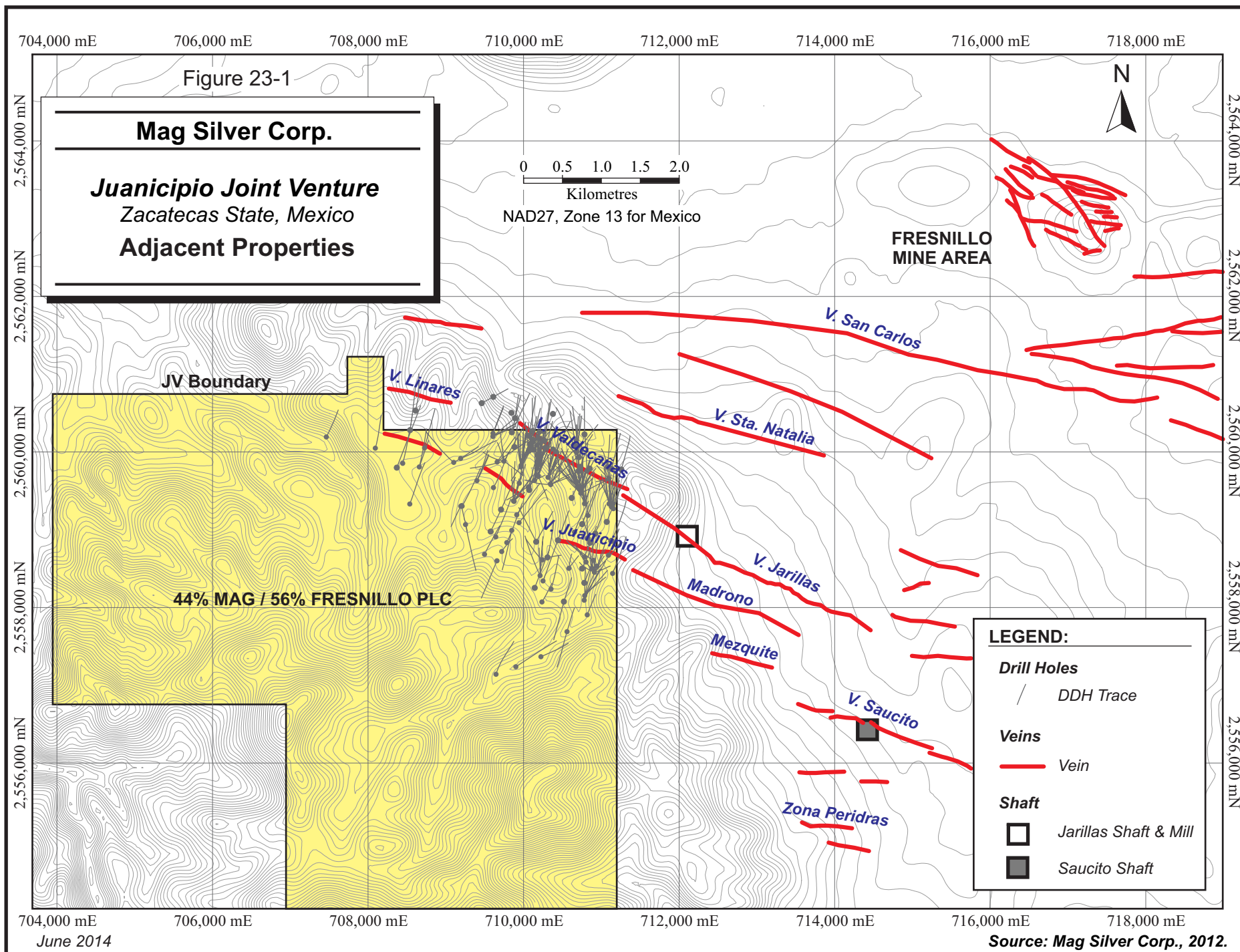
RPA would expect an updated PEA to have similar economic results as the 2012 PEA, and believes that the 2012 PEA remains a reasonable representation of the property's economic potential.

## 23 ADJACENT PROPERTIES

Fresnillo holds the mining concessions to the north and east of the Juanicipio property. In recent years, Fresnillo has focused exploration activity on tracing the San Carlos Vein to the west from the known Fresnillo mining centre and on exploration for parallel veins, both to the north and south. It has been successful in following the San Carlos Vein for over six kilometres and in discovering several parallel veins lying between the San Carlos and Saucito Veins to the south. This includes the Jarillas Vein, which appears to be the eastern extension of the Valdecañas Vein. Fresnillo initially referred to the veins to the south of San Carlos, including the Juanicipio Joint Venture area as its Fresnillo II development project (Fresnillo, 2009), but since mid-2009 has referred to their 100% owned properties as the Saucito project, separate from the Juanicipio Joint Venture.

The Saucito project lies west of the Fresnillo Mine and east of Juanicipio (Figure 23-1). The project is made up of three main vein structures: El Saucito, Jarillas, and Santa Natalia. Smaller veins include Madroño and Mesquite. Fresnillo reports Measured plus Indicated Resources for Saucito at 10.81 Mt grading 446 g/t Ag, 2.22 g/t Au, 2.00% Pb, and 3.37% Zn. Inferred Resources are reported to be 33.58 Mt grading 336 g/t Ag, 1.19 g/t Au, 1.17% Pb, and 2.07% Zn (Fresnillo, 2013). The operation consists of an underground mine and a flotation plant with a current production rate of 3,000 tpd or 990,000 tpa. Fresnillo is currently building a second plant similar to the one operating at Saucito, but with an additional circuit to produce pyrite concentrates, which will be processed to increase recovery rates of gold and silver.

RPA was unable to verify the information above and the information above may not be indicative of the mineralization on the property that is the subject of this Technical Report.



## 24 OTHER RELEVANT DATA AND INFORMATION

Unless otherwise noted, this section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

### PROJECT DEVELOPMENT SCHEDULE

Project development schedules have been prepared as a basis for the cash flow estimates used in the 2012 PEA. The schedules include lateral development, raise boring, stoping, and backfilling.

Key parameters used to develop the schedules are shown in Table 24-1.

**TABLE 24-1 KEY SCHEDULING PARAMETERS**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Scheduling Parameter</b>	<b>Maximum Rate</b>
Single heading development rate (decline face excluding stockpiles)	115 m/month
Raise-bored raises	160 m/month
Mucking rate per stope	800 t/day
Backfilling rate	1,300 m <sup>3</sup> /day
Minimum delay between end of filling and start of mucking the next stope	37 days

### MINE DEVELOPMENT SCHEDULE

The total lateral development requirement over the mine life is estimated at 59 km in waste and 43 km within the veins. Approximately 17,200 m<sup>3</sup> of bulk excavation in waste is required to establish the mine infrastructure. Total LOM development quantities are shown in Table 24-2.



**TABLE 24-2 TOTAL MINE DEVELOPMENT QUANTITIES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Lateral development</b>	<b>Units</b>	<b>Value</b>
Access decline	km	18.2
Ventilation development	km	9.4
Remuck bays and miscellaneous.	km	3.1
Sublevel access	km	8.1
Footwall drive	km	9.8
Drawpoints	km	10.9
Ore development	km	43.3
<b>Total lateral development</b>	<b>km</b>	<b>102.7</b>
Bulk excavation	(000)m <sup>3</sup>	17.2
Vertical development	km	7.7

Based on the assumed scheduling parameters, it will take approximately three and a half years to develop the mine from the start of the decline to mill start-up. Key milestones relating to the initial mine development are shown in Table 24-3.

**TABLE 24-3 PROJECT DEVELOPMENT MILESTONES**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Milestone</b>	<b>Period</b>
Start access box cut and portal	Month 1
Start access decline	Month 3
Vein development commences	Month 33
Commission primary ventilation shafts	Month 35
First stope production	Month 36
Mill start-up	Month 42

## MILL FEED SCHEDULE

The mill feed schedule is shown in Table 24-4. The production schedule is shown graphically in Figures 24-1 and 24-2. Mill feed from vein development comprises approximately 19% of total mill feed, with the remainder from stoping operations.

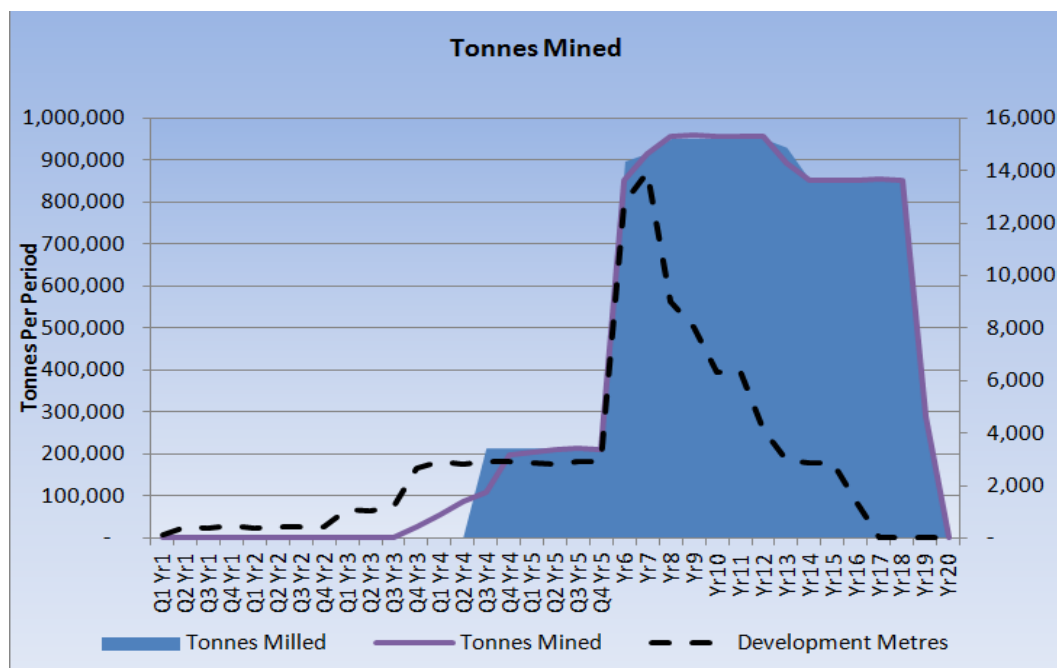


**TABLE 24-4 MILL FEED SCHEDULE**  
**MAG Silver Corp. - Juanicipio Joint Venture**

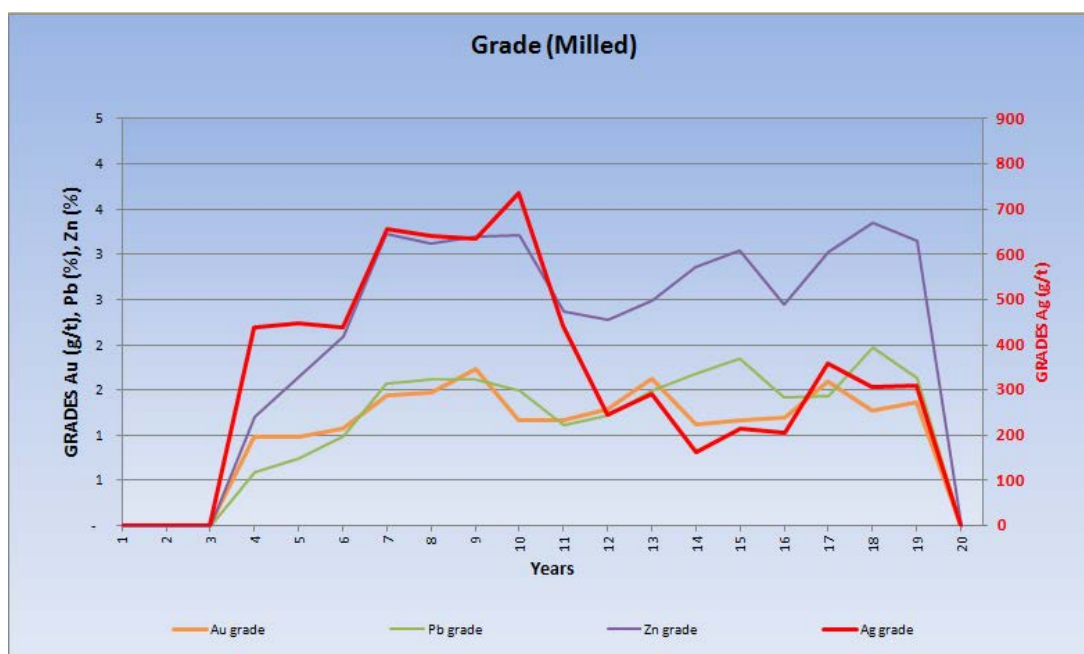
Year	Mill feed (kt)	Gold (g/t)	Silver (g/t)	Lead (%)	Zinc (%)
Years 1 - 3	—	—	—	—	—
Year 4	425	0.98	438	0.59	1.20
Year 5	850	0.98	449	0.75	1.64
Year 6	896	1.08	437	0.99	2.10
Year 7	916	1.44	655	1.58	3.23
Year 8	950	1.47	641	1.62	3.12
Year 9	950	1.73	635	1.62	3.19
Year 10	950	1.17	736	1.50	3.21
Year 11	950	1.17	441	1.11	2.36
Year 12	950	1.29	247	1.22	2.28
Year 13	929	1.63	290	1.50	2.50
Year 14	851	1.12	163	1.68	2.86
Year 15	851	1.17	214	1.85	3.04
Year 16	851	1.20	206	1.42	2.45
Year 17	854	1.60	358	1.43	3.03
Year 18	851	1.27	305	1.97	3.35
Year 19	290	1.36	311	1.64	3.15
<b>Total</b>	<b>13,314</b>	<b>1.30</b>	<b>416</b>	<b>1.42</b>	<b>2.70</b>

Note: "Mill feed tonnes" was derived from Mineral Resources as shown in Table 16-1. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

**FIGURE 24-1 PRODUCTION SCHEDULE BY PERIOD**



**FIGURE 24-2 MILL FEED GRADE BY YEAR**



## WASTE ROCK PRODUCTION

The production of waste rock from mine development is shown in Table 24-5. A total of approximately 4.2 Mt of waste is expected to be produced over the mine life. It is envisaged that waste rock produced during the initial development period will be used for road and tailings dam construction. Later in the mine life, a portion of the waste produced will be backfilled to stopes and worked out areas. Waste stockpiles have been designed near the portal and to the east of the mill site.

**TABLE 24-5 DEVELOPMENT WASTE PRODUCTION**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Mine Production	Units	Value
Production from stopes	Mt	10.8
Production from development	Mt	2.5
<b>Total mine production</b>	<b>Mt</b>	<b>13.3</b>
Development waste mined	Mt	4.2
<b>Total material mined</b>	<b>Mt</b>	<b>17.5</b>

Note: "Total Mine Production" was derived from Mineral Resources as shown in Table 16-1. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

## **RUN-OF-MINE STOCKPILE**

A ROM stockpile has been designed to provide a buffer between the mine and mill. A maximum capacity of 150,000 t may be required prior to mill commissioning. After mill commissioning, the stockpile is not expected to exceed 50,000 t.

## **VERTICAL DEVELOPMENT**

The mine design includes raise bored ventilation shafts, nominally 3.5 m in diameter. A number of short ore passes are also planned for the upper parts of the deposit. In total 4,330 m of raise boring is planned. A total of 3,370 m of smaller diameter sectional ventilation raises is also planned. It is envisaged that these will mostly be mined using long-hole raising techniques.

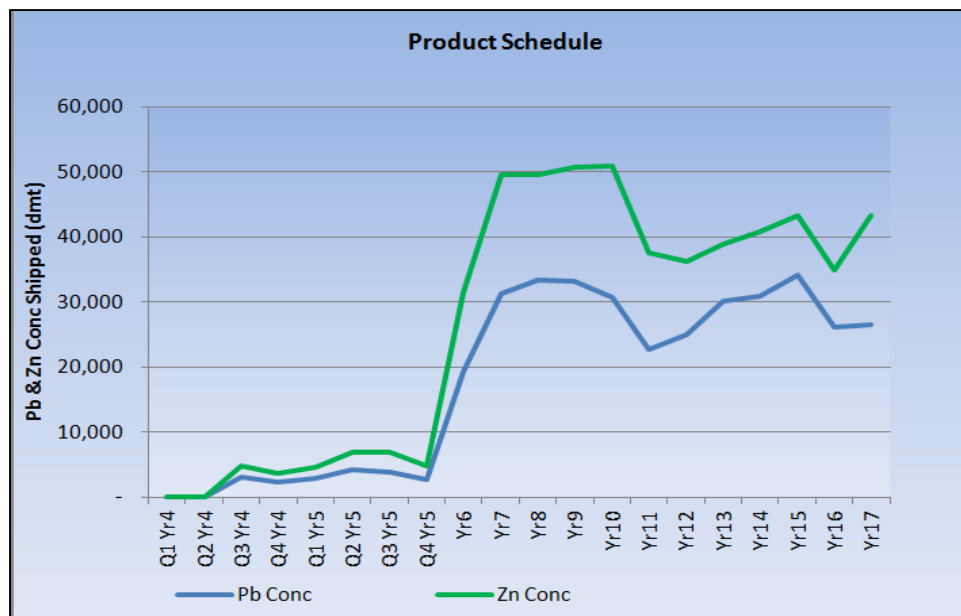
## **TRUCKING SCHEDULE**

After allowing for some waste to be backfilled to stopes, the quantity of material mined and hauled to surface over the life of the project is estimated to total 17.2 Mt. The average one way truck haulage distance is estimated at 5.36 km resulting in approximately 94 million tonne-kilometres of truck haulage.

## **CONCENTRATE PRODUCTION SCHEDULE**

The mill has been designed to produce three saleable products; lead concentrate, zinc concentrate, and a gold-rich pyrite concentrate. The production schedule for lead and zinc concentrate is shown in Figure 24-3. As pyrite grades are not currently estimated in the mineral resource model, no detailed schedule of pyrite concentrate production has been prepared.

**FIGURE 24-3 LEAD AND ZINC CONCENTRATE PRODUCTION – TONNAGE SCHEDULE**



## 25 INTERPRETATION AND CONCLUSIONS

The following interpretation and conclusions have been divided into separate sections for the current 2014 Mineral Resource estimate and the 2012 PEA.

### 2014 MINERAL RESOURCE ESTIMATE INTERPRETATION AND CONCLUSIONS

MAG and joint venture partner Fresnillo have made a major discovery of low-sulphidation epithermal vein mineralization, located in the southwest part of the world-class Fresnillo silver mining district. The discovery is located in the northeast corner of the property and consists of two silver-gold-lead-zinc epithermal structures known as the Valdecañas and Juanicipio vein systems. Most exploration on the property has focused on these two vein systems. There is good exploration potential remaining at the Juanicipio Vein and elsewhere on the property, which remains largely underexplored. A significant exploration budget is warranted.

RPA estimated Mineral Resources for the Valdecañas and Juanicipio vein systems using drill hole data available as of December 31, 2013. At an NSR cut-off value of US\$70/t, Indicated Mineral Resources are estimated to total 10.1 million tonnes of 511 g/t Ag, 1.7 g/t Au, 1.9% Pb, and 3.5% Zn. Inferred Mineral Resources are estimated to total 5.1 million tonnes of 372 g/t Ag, 2.0 g/t Au, 1.8% Pb, and 2.8% Zn. The Mineral Resources are contained within the Valdecañas vein system and the Juanicipio Vein.

The total contained metals in the Indicated Resource are 166 million ounces of silver, 544,000 ounces of gold, 419 million pounds of lead, and 778 million pounds of zinc. The Inferred Resource contains 61 million ounces of silver, 319,000 ounces of gold, 202 million pounds of lead, and 317 million pounds of zinc.

## 2012 PEA INTERPRETATION AND CONCLUSIONS

This section is taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012 (Thomas, 2012) and is based on the Mineral Resource estimate by Strathcona dated November 2011.

The economic analysis in the PEA is preliminary in nature and is based, in part, on Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. There is no certainty that the PEA will be realized.

In AMC's opinion, the PEA clearly indicates that the Juanicipio Project has the potential to be developed into an economically robust, high-grade underground silver project. Further drilling and investigation work aimed at upgrading Inferred Mineral Resources and increasing the geotechnical and hydrogeological understanding of the deposit is required to form a firm base for the next stage of project design and evaluation. However, a number of key risks and uncertainties currently exist that will need to be a focus of further studies:

### KEY RISKS AND UNCERTAINTIES

- Because of the high proportion of Inferred Mineral Resources underpinning the 2012 economic assessment (49% of the tonnage and 36% of the silver content as of the date of the 2012 economic assessment), there is considerable uncertainty surrounding the cash flow projections and other economic projections included in the PEA. It cannot be assumed that Inferred Mineral Resources will be upgraded to a higher Mineral Resource classification with further exploration, or that Mineral Resources will be converted to Mineral Reserves.
- There is currently limited information available on the quality of the rock mass surrounding the veins. If the rock mass is weaker than is currently anticipated, this will increase dilution, causing a reduction in the grade of material that can be recovered from the veins. Uncertainty also exists regarding the quality of the rock mass in the area of the access decline and ventilation raises. Weaker than anticipated rock mass conditions in these areas would result in increased capital development costs.
- Metal prices may vary significantly from those used in the PEA.
- Capital and/or operating costs may be higher than estimated in the economic assessment.

- Because limited test work has been carried out on production of a gold-rich pyrite concentrate, there is no certainty that a saleable concentrate can be economically produced.

There is no certainty that all the required regulatory approvals for the project will be granted. There is also no certainty that Minera Juanicipio will be able to acquire the surface tenure to enable construction of the tailings storage facility, roads, power lines, or other infrastructure. RPA notes a number of changes since the 2012 PEA that would have an insignificant impact on the overall economic results:

- Updated Mineral Resource as described in this report
- Metal Prices
- Payment Terms for concentrate
- Cost Escalation
- New Gold and Silver Tax (0.5% Gross Revenue)
- New Mining Tax (7.5% on EBITDA)
- Increased corporate tax rate (30% from 28%)

RPA would expect an updated PEA to have similar economic results as the 2012 PEA, and believes that the 2012 PEA remains a reasonable representation of the property's economic potential.

## 26 RECOMMENDATIONS

The Juanicipio property hosts a significant silver-gold-lead-zinc deposit and merits considerable additional exploration and development work. RPA recommends a budget of US\$22.6 million (Table 26-1) for 2014 to advance the access ramp to the Valdecañas vein system and to and explore elsewhere on the property. Work should include:

**TABLE 26-1 PROPOSED BUDGET (100% BASIS)**  
**MAG Silver Corp. - Juanicipio Joint Venture**

<b>Item</b>	<b>US\$ M</b>
Ramp advancement	11.4
Drilling (~20,000 m)	3.6
Interpretation, resource update, etc.	0.1
Geotechnical and Engineering Studies	1.2
Metallurgical and Mill Design Studies	1.1
Permitting and Environmental Work	0.9
Operating Costs / Office	1.2
Infrastructure Studies	1.0
<b>Sub-total</b>	<b>20.5</b>
Contingency (10%)	2.1
<b>Total</b>	<b>22.6</b>

- Continuing to advance the underground access ramp. The budget in the 2012 PEA estimates this work to be \$11.4 million with MAG's 44% share of \$5 million.
- 10,000 m of drilling at the Valdecañas vein system to obtain a drill hole spacing no greater than 100 m in both the along-strike and up- and down-dip directions.
- 10,000 m of drilling for a property-wide exploration program including mapping, and drilling of new targets. Key criteria should be known mineralization, lineaments, and alteration.

In addition to the ramp advancement and continued drilling, RPA recommends the continuation of the environmental, engineering, and metallurgical studies as recommended in the 2012 PEA.



The following recommendations are taken from the NI 43-101 Technical Report on the Juanicipio Property prepared by AMC dated July 1, 2012. RPA has reviewed and concurs with AMC's recommendations.

## **GEOTECHNICAL AND HYDROGEOLOGY INVESTIGATION AND STUDIES**

1. The assumption that sufficient water will be obtained from mine dewatering to meet project requirements is critically dependent on the findings of hydrogeological investigations recommended to be carried out as part of detailed further study. A depression in the contact zone between the Tertiary volcanics and the Cretaceous sediments in the area overlying the Valdecañas Vein is an area that could potentially host a significant aquifer.
2. Further geotechnical data collection is necessary to increase confidence in the estimation of stable stope dimensions and to better define ground support requirements. A program of geotechnical core logging is also recommended for all infill drill holes targeting the Valdecañas, Desprendido, and Juanicipio veins.
3. Geotechnical interval logging of core is recommended from at least ten additional drill holes that intersect the Valdecañas and Desprendido veins at "pierce-points" evenly distributed across the vein. Interval logging should be of "raw" geotechnical parameters to allow rock mass classification by either the Q system (after Barton et al., 1974) or RMR. The number of joint sets and joint surface roughness should also be recorded to enable calculation of Q values. Joint surface roughness should be recorded as a description (e.g., Rough and Undulating) rather than as an index value. If more than one value of each parameter is recorded per interval, it should be explicitly stated what each represents. It is recommended that the entire length of core be logged for approximately half of the drill holes.
4. Of the ten drill holes required for geotechnical interval logging, core from at least five should be oriented to allow detailed structural logging. Structural logging should incorporate collection of orientation data ("alpha" and "beta" angles) together with surface roughness and mineral infill properties for each natural structure in the core.
5. Specific geotechnical drill holes will be required for investigation of planned infrastructure including box cut and portal location, decline route, and ventilation raise/shaft alignments. Other geotechnical drilling will be required for other surface infrastructure, including the mill site and tailings storage facility.
6. Compilation and interpretation of rock mass weathering data is recommended to develop a 3D model of the weathering profile.
7. A structural model should be developed to assist in geological interpretation and geotechnical understanding of the rock mass conditions associated with each fault interpreted.
8. The development of minimum ground support standards is recommended before any mine development commences.

## MINE DESIGN

1. The option of installing a hoisting shaft to a depth of approximately 450 m should be investigated in more detail, particularly in regard to establishing a reliable cost estimate for constructing the shaft. However, the decision on whether or not to construct a hoisting shaft is not critical to a decision to proceed with the proposed decline trucking option. A decision to proceed with the decline trucking option does not preclude construction of a shaft at a later date.
2. Geotechnical investigations and further cost analysis are required to determine the most cost effective way of constructing the proposed ventilation shafts, either by raise boring at larger diameters than those proposed in the study, or by blind sinking a single exhaust shaft.
3. Test work is recommended to determine the likely tailings sizing curve and to determine the need, or otherwise, to cyclone the tailings stream prior to the paste fill plant. The tailings sizing curve will be required to determine the proportion of the tailings stream that could be used for paste fill.
4. A program of paste fill test work is recommended during the next stage of study. The tests should include:
  - Uniaxial compressive strengths at 7, 14, and 28 day cure age on test samples containing 3%, 6%, and 9% cement.
  - Measurement of the shear yield stress of the cemented tailings as a function of solids concentration for shear yield stresses in the range of 50 Pa to 500 Pa.
  - Measurement of the shear stress (and hence viscosity) as a function of shear rate for the cemented tailings at a solids concentration corresponding to a shear yield stress of 250 Pa.
5. It is recommended that the proposed mine design be updated with the results of the geological, geotechnical, and hydrogeological investigations and other studies described above.

## METALLURGY

1. Additional comminution tests are recommended including specific tests such as the JKMRRC drop weight test, and simulation to better define grinding and cyclone classification parameters.
2. Gravity test work utilizing centrifugal concentrator devices is recommended to confirm the potential for enhancing gold recovery and provide design parameters for a gravity circuit.
3. A final round of flotation test work, including locked cycle tests, is recommended to confirm design parameters for a full circuit, including cleaners, and re-circulated streams. The test work should include variability testing on high-grade lead and zinc samples to ensure that floatation capacity is sufficient to handle short term peaks in grade.
4. Further studies and test work are recommended to assess technical requirements for producing a gold-rich pyrite concentrate for sale. The studies should include investigations relating to concentrate marketing.

5. Discussions with potential customers are recommended to better define likely concentrate payment terms. The discussions should be directed towards establishing provisional concentrate off-take agreements.

## **INFRASTRUCTURE**

1. Detailed studies, including geotechnical investigations will be required leading to the design of the surface infrastructure, (plant site, roads, TSF, water supply, and power supply options).
2. Investigations into sharing of existing infrastructure used by other mines in the district should be carried out.

## **ENVIRONMENTAL AND PERMITTING**

1. Environmental and social impact studies will be required for the proposed mine site access road and TSF.
2. Tenure and access rights to land required for the access road, TSF, and power line route will need to be investigated during further studies.

## **UPDATE COST ESTIMATION**

1. Project cost estimates should be prepared at a level consistent with those required for a detailed feasibility study.

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## 28 DATE AND SIGNATURE PAGE

This report titled “Technical Report on the Mineral Resource Update for the Juanicipio Joint Venture, Zacatecas State, Mexico” and dated June 12, 2014, as amended on June 30, 2014, was prepared and signed by the following authors:

**(Signed & Sealed) “David Ross”**

Dated at Toronto, Ontario  
June 30, 2014

David Ross, P.Geo.  
Principal Geologist

**(Signed & Sealed) “Jason Cox”**

Dated at Toronto, Ontario  
June 30, 2014

Jason Cox, P.Eng.  
Principal Mining Engineer

**(Signed & Sealed) “Holger Krutzelmann”**

Dated at Toronto, Ontario  
June 30, 2014

Holger Krutzelmann, P.Eng.  
Principal Metallurgist

## 29 CERTIFICATE OF QUALIFIED PERSON

### DAVID ROSS

I, David Ross, P.Geo., as an author of this report entitled "Technical Report on the Mineral Resource Update for the Juanicipio Joint Venture, Zacatecas State, Mexico" (the "Technical Report"), prepared for MAG Silver Corp. and dated effective June 12, 2014, as amended on June 30, 2014, do hereby certify that:

1. I am a Director of Resource Estimation and Principal Geologist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave., Toronto, ON, M5J 2H7.
2. I am a graduate of Carleton University, Ottawa, Ontario, Canada, in 1993 with a Bachelor of Science degree in Geology and Queen's University, Kingston, Ontario, Canada, in 1999 with a Master of Science degree in Mineral Exploration.
3. I am registered as a Professional Geoscientist in the Province of Ontario (Reg.#1192). I have worked as a geologist for a total of 20 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Mineral Resource estimation work and reporting on numerous mining and exploration projects around the world; and
  - Exploration geologist on a variety of gold and base metal projects in Canada, Indonesia, Chile, and Mongolia
4. I have read the definition of "qualified person" set out in National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I visited the Juanicipio property most recently on May 27, 2014 for one full day.
6. I am responsible for the preparation of Sections 2 to 12, 14, 23, and 30 (Appendix) and share responsibility with my co-authors for Sections 1, 25, 26, and 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. In 2007, I made an internal review of the Juanicipio Joint Venture exploration program; in 2009, 2010, and 2012, I updated the Mineral Resource estimated and filed NI 43-101 reports.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.



10. As of the effective date of this Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 30<sup>th</sup> day of June, 2014

**(Signed & Sealed) “David Ross”**

David Ross, P.Geo.

**JASON J. COX**

I, Jason J. Cox, P.Eng., as an author of this report entitled "Technical Report on the Mineral Resource Update for the Juanicipio Joint Venture, Zacatecas State, Mexico" (the "Technical Report"), prepared for MAG Silver Corp., and dated effective June 12, 2014, as amended on June 30, 2014, do hereby certify that:

1. I am a Principal Mining Engineer and Director, Mining Engineering, with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.
2. I am a graduate of the Queen's University, Kingston, Ontario, Canada, in 1996 with a Bachelor of Science degree in Mining Engineering.
3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90487158). I have worked as a Mining Engineer for a total of 17 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Review and report as a consultant on many mining operations and projects around the world for due diligence and regulatory requirements
  - Feasibility Study project work on several mining projects, including five North American mines
  - Operational experience as Planning Engineer and Senior Mine Engineer at three North American mines
  - Contract Co-ordinator for underground construction at an American mine
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Juanicipio Property.
6. I am responsible for the preparation of Sections 15, 16, 18 to 22, and 24, and share responsibility with my co-authors for Sections 1, 25, 26, and 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 30<sup>th</sup> day of June, 2014

**(Signed & Sealed) “Jason J. Cox”**

Jason J. Cox, P.Eng.

**HOLGER KRUTZELMANN**

I, Holger Krutzelmann, P. Eng., as an author of this report entitled "Technical Report on the Mineral Resource Update for the Juanicipio Joint Venture, Zacatecas State, Mexico" (the "Technical Report"), prepared for MAG Silver Corp. and dated effective June 12, 2014, as amended on June 30, 2014, do hereby certify that:

1. I am Vice President, Metallurgy & Environment, and Principal Metallurgist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON M5J 2H7.
2. I am a graduate of Queen's University, Kingston, Ontario, Canada in 1978 with a B.Sc. degree in Mining Engineering (Mineral Processing).
3. I am registered as a Professional Engineer with Professional Engineers Ontario (Reg. #90455304). I have worked in the mineral processing field, in operating, metallurgical, managerial; and engineering functions, for a total of 35 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Reviews and reports as a metallurgical consultant on a number of mining operations and projects for due diligence and financial monitoring requirements
  - Senior Metallurgist/Project Manager on numerous gold and base metal studies for a leading Canadian engineering company.
  - Management and operational experience at several Canadian and U.S. milling operations treating various metals, including copper, zinc, gold and silver.
4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
5. I have not visited the Juanicipio Property.
6. I am responsible for the preparation of Sections 13 and 17 and share responsibility with my co-authors for Sections 1, 25, 26, and 27 of the Technical Report.
7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.
8. I have had no prior involvement with the property that is the subject of the Technical Report.
9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 30<sup>th</sup> day of June, 2014

**(Signed & Sealed) “Holger Krutzelmann”**

Holger Krutzelmann, P.Eng.

## **30 APPENDIX 1**

### **LIST OF DRILL HOLES**

**TABLE 30-1 SUMMARY OF DRILLING**  
**MAG Silver Corp. - Juanicipio Joint Venture**

Hole	Easting (m)	Northing (m)	Elevation (m)	Orientation		Length (m)
				Azimuth	Dip	
10P	711,090	2,558,654	2,429	22	-60	822
11P	711,143	2,558,420	2,414	22	-55	961
12P	710,782	2,558,630	2,318	20	-55	823
14P	710,557	2,557,673	2,343	195	-55	861
15P	710,351	2,558,219	2,386	20	-55	843
16P	710,713	2,559,522	2,266	340	-52	738
16Q	710,911	2,558,434	2,338	42	-52	895
16R	710,910	2,558,434	2,338	73	-75	845
16S	710,785	2,558,134	2,329	44	-70	1,023
16T	710,785	2,558,135	2,329	42	-71	983
17.5P	710,909	2,558,436	2,339	3	-64	726
17.5Q	710,909	2,558,436	2,339	359	-74	859
17.5R	710,785	2,558,134	2,329	12	-69	959
17P	710,910	2,558,435	2,339	20	-63	841
17Q	710,910	2,558,435	2,339	31	-76	835
17R	710,784	2,558,134	2,329	29	-63	1,119
17S	710,785	2,558,135	2,329	22	-69	957
18.5R	710,581	2,558,485	2,423	38	-77	947
18P	710,877	2,558,483	2,346	5	-63	841
18Q2	710,909	2,558,434	2,338	344	-66	845
18R	710,878	2,558,483	2,346	330	-79	806
19.5Q	710,907	2,558,435	2,339	291	-77	1,009
19.5R	710,907	2,558,436	2,339	320	-76	923
19.5S	710,784	2,558,135	2,329	3	-70	966
19P	710,782	2,558,630	2,318	316	-66	715
19P1	710,782	2,558,630	2,318	315	-53	90
19Q	710,781	2,558,630	2,318	318	-67	441
19Q2	710,802	2,558,566	2,316	314	-68	124
19Q3	710,891	2,558,588	2,362	302	-64	818
19R	710,581	2,558,485	2,423	9	-78	1,074
20P	710,248	2,558,323	2,376	17	-55	938
20R	710,240	2,558,594	2,348	66	-77	944
21P	710,211	2,558,392	2,365	0	-51	858
21Q	710,211	2,558,393	2,365	1	-61	855
21R	710,211	2,558,394	2,365	0	-68	918
22M	710,425	2,559,987	2,249	168	-70	1,103
22P	710,211	2,558,392	2,365	334	-53	966
22R	710,238	2,558,592	2,348	314	-69	976
23M	710,735	2,559,452	2,268	309	-68	1,034
23R	709,717	2,558,701	2,403	35	-77	928
24P	710,235	2,558,053	2,396	30	-70	895
25P	708,659	2,559,788	2,374	15	-66	897
27P	708,536	2,559,312	2,402	21	-52	919
28P	709,941	2,559,072	2,367	39	-51	854
31P	709,783	2,558,816	2,400	23	-53	911
33P	709,645	2,557,124	2,378	20	-55	841
35P	709,899	2,557,221	2,362	59	-51	936
36P	710,222	2,557,349	2,359	63	-66	900
37P	709,870	2,559,352	2,306	20	-55	859
38P	709,641	2,558,889	2,385	21	-53	853
39P	709,497	2,558,664	2,393	21	-62	859
41P	709,963	2,559,805	2,292	172	-78	672

Hole	Easting (m)	Northing (m)	Elevation (m)	Orientation		Length (m)
				Azimuth	Dip	
42P	709,966	2,559,808	2,292	215	-63	564
43P	709,870	2,559,353	2,306	18	-63	583
44P	709,869	2,559,353	2,306	16	-69	833
45P	709,868	2,559,352	2,306	356	-60	791
46P	709,877	2,559,345	2,307	33	-61	786
47P	709,869	2,559,352	2,306	1	-49	761
48P	709,911	2,559,173	2,350	35	-61	883
49P	709,878	2,559,345	2,307	36	-52	646
50P	709,750	2,559,863	2,333	128	-64	716
51P	710,143	2,559,613	2,322	227	-62	864
52P	709,209	2,559,284	2,363	30	-55	888
53P	709,253	2,559,048	2,383	169	-55	938
54P	709,203	2,559,291	2,362	168	-54	613
55P	709,847	2,558,973	2,375	193	-54	855
56P	709,867	2,559,349	2,306	54	-77	705
57P	709,657	2,558,582	2,407	203	-55	860
58P	709,867	2,559,350	2,306	38	-63	510
59P	709,192	2,559,283	2,360	207	-55	552
60P	709,399	2,559,611	2,386	30	-54	648
61P	709,611	2,559,522	2,381	29	-55	883
62P	709,398	2,559,611	2,386	26	-62	839
63P	709,400	2,559,612	2,386	25	-48	663
64P	709,101	2,559,846	2,358	61	-58	695
65P	709,749	2,559,864	2,333	278	-65	683
66P	709,190	2,559,897	2,362	72	-49	861
67P	708,446	2,559,835	2,392	15	-57	860
68P	708,094	2,560,029	2,403	15	-57	910
69P	709,101	2,559,846	2,358	311	-55	964
70P	709,747	2,559,863	2,333	253	-61	864
71P	709,748	2,559,862	2,333	354	-62	891
72P	707,464	2,560,173	2,229	27	-54	632
73P	709,747	2,559,862	2,334	341	-61	547
A_FX-1	710,203	2,560,235	2,242	179	-60	328
A_M02	709,966	2,559,808	2,292	356	-57	746
A_M04	709,659	2,559,853	2,319	35	-59	809
A_M20	710,345	2,559,568	2,376	359	-59	511
A_M26	710,317	2,559,655	2,372	22	-45	424
A_M33	710,782	2,559,318	2,289	346	-69	780
A_M44	711,138	2,559,316	2,426	353	-58	330
C17	710,259	2,560,237	2,240	190	-58	540
C17-2	710,260	2,560,241	2,240	189	-59	927
C19	710,377	2,560,018	2,245	215	-53	730
CD	709,606	2,560,220	2,382	21	-64	916
CE	709,606	2,560,219	2,382	22	-69	1,012
CF	709,606	2,560,220	2,381	21	-75	966
E18	710,203	2,560,235	2,242	210	-53	873
EC	709,604	2,560,180	2,383	50	-54	733
ED	709,604	2,560,180	2,383	60	-63	836
EE	709,604	2,560,180	2,382	62	-67	856
EF	709,604	2,560,179	2,382	66	-69	894
FA	710,131	2,560,009	2,360	346	-63	731
FE	709,963	2,559,791	2,294	10	-58	851
FE2	709,963	2,559,789	2,294	9	-57	34
FX-1	710,203	2,560,235	2,242	179	-60	648
GA	710,131	2,560,010	2,360	341	-61	731
GB	709,964	2,559,809	2,292	10	-45	833



Hole	Easting (m)	Northing (m)	Elevation (m)	Orientation		Length (m)
				Azimuth	Dip	
GC	709,965	2,559,808	2,292	11	-51	851
GD	709,966	2,559,808	2,292	8	-56	852
GE	709,964	2,559,808	2,292	9	-62	970
GF	709,965	2,559,807	2,292	354	-62	960
GH	709,750	2,559,864	2,333	31	-56	953
HD	709,963	2,559,789	2,294	22	-51	799
HE	709,963	2,559,789	2,294	24	-60	869
HF	709,964	2,559,788	2,294	22	-64	895
HG	709,963	2,559,789	2,294	25	-64	1,017
IB	710,093	2,560,045	2,352	15	-69	642
IC2	710,168	2,559,767	2,370	6	-58	601
IC3	710,190	2,559,846	2,369	5	-58	646
IC4	710,180	2,559,810	2,371	8	-54	644
IC5	710,130	2,560,008	2,360	32	-69	556
ID	710,167	2,559,766	2,370	359	-70	884
ID2	710,141	2,559,612	2,322	9	-53	909
IE	710,141	2,559,611	2,322	1	-66	846
IF	710,066	2,559,532	2,311	15	-65	220
IF2	710,060	2,559,525	2,311	16	-65	1,001
IG	710,141	2,559,612	2,322	3	-62	961
J02	709,963	2,559,792	2,294	9	-65	984
J03	710,179	2,559,809	2,371	4	-58	880
J04	710,133	2,560,009	2,360	38	-61	624
J04B	710,173	2,559,771	2,371	12	-53	856
J05	710,187	2,559,668	2,346	23	-51	932
J06	710,179	2,559,809	2,371	32	-58	747
J09	710,318	2,559,658	2,372	26	-63	775
J-11	710,316	2,559,658	2,372	44	-51	800
J12	710,809	2,559,738	2,365	6	-75	677
J13	710,736	2,559,506	2,267	20	-65	671
J14	711,091	2,559,636	2,395	331	-68	625
J16	711,093	2,559,639	2,395	357	-68	615
J18	711,098	2,559,320	2,424	7	-55	902
J19	711,127	2,559,276	2,425	352	-65	869
J20	711,144	2,559,318	2,426	9	-51	960
J21	711,127	2,559,276	2,425	354	-75	960
J22	711,140	2,559,315	2,426	15	-67	805
JA	710,180	2,559,809	2,371	24	-63	768
JB	710,174	2,559,770	2,371	23	-53	844
JC	710,172	2,559,765	2,370	22	-62	990
JD	710,192	2,559,667	2,346	12	-60	942
JE	710,191	2,559,666	2,346	12	-66	972
JU1	710,945	2,558,511	2,365	20	-60	749
JU2	710,654	2,558,951	2,302	20	-62	902
JU3	710,778	2,558,076	2,329	23	-60	840
JU4	710,557	2,557,671	2,343	15	-70	925
JU5	710,826	2,559,163	2,297	20	-62	928
JU6	711,139	2,559,319	2,426	15	-53	743
JU7	710,422	2,559,981	2,249	20	-60	811
JU8	710,817	2,557,887	2,334	20	-68	700
JU9	709,943	2,559,579	2,300	10	-59	748
JZ	710,129	2,560,008	2,360	47	-68	536
KC	710,316	2,559,656	2,372	9	-54	834
KD	710,316	2,559,656	2,372	8	-62	786
KE	710,316	2,559,656	2,372	9	-70	899
KF	710,314	2,559,652	2,372	17	-76	928

Hole	Easting (m)	Northing (m)	Elevation (m)	Orientation		Length (m)
				Azimuth	Dip	
KG	710,314	2,559,655	2,372	8	-67	336
KG2	710,312	2,559,655	2,372	8	-67	274
KG3	710,314	2,559,655	2,372	8	-67	885
LE1	710,315	2,559,653	2,372	28	-68	327
LE2	710,316	2,559,656	2,372	28	-68	758
M01	709,965	2,559,807	2,292	345	-64	1,032
M06	709,964	2,559,810	2,292	29	-69	1,020
M10	710,092	2,560,045	2,351	359	-78	825
M11	709,966	2,559,810	2,292	20	-48	920
M11_DESV	709,966	2,559,810	2,292	20	-48	716
M12	710,181	2,559,810	2,372	0	-65	949
M13	710,130	2,560,005	2,360	14	-70	708
M14	710,129	2,560,003	2,360	21	-62	685
M15	710,180	2,559,806	2,371	356	-71	1,014
M16	710,181	2,559,810	2,371	4	-71	1,034
M17	710,129	2,560,003	2,360	40	-75	858
M18	710,141	2,559,613	2,322	16	-70	1,043
M19	710,345	2,559,568	2,376	352	-68	1,102
M21	710,141	2,559,614	2,322	26	-57	923
M22	710,316	2,559,655	2,372	9	-52	832
M23	710,093	2,560,046	2,351	70	-54	690
M24	710,345	2,559,567	2,376	354	-72	1,052
M25	710,315	2,559,655	2,372	24	-68	813
M27	710,711	2,559,522	2,266	310	-62	1,019
M28	710,713	2,559,521	2,265	328	-64	837
M29	710,348	2,559,565	2,376	67	-74	1,034
M3	710,130	2,560,005	2,360	29	-70	623
M30	710,735	2,559,450	2,268	355	-52	732
M31	710,348	2,559,565	2,376	60	-73	1,067
M32	710,358	2,559,598	2,374	48	-60	969
M34	710,735	2,559,451	2,268	355	-72	972
M35	710,783	2,559,317	2,289	352	-53	885
M36	710,736	2,559,506	2,267	20	-61	791
M37	710,825	2,559,164	2,297	357	-63	901
M38	710,784	2,559,316	2,289	7	-64	791
M39	710,784	2,559,317	2,289	22	-54	775
M40	711,088	2,559,642	2,395	316	-71	709
M41	711,088	2,559,641	2,394	250	-78	921
M42	711,092	2,559,639	2,395	216	-78	1,031
M43	710,740	2,559,456	2,268	65	-60	999
M45	711,097	2,559,314	2,424	2	-51	725
M46	711,139	2,559,315	2,426	3	-70	834
M5	709,659	2,559,851	2,319	51	-61	1,100
M7	710,316	2,559,655	2,372	30	-59	777
M8	710,735	2,559,451	2,268	332	-56	876
M9	710,734	2,559,451	2,268	345	-52	711
MA	710,422	2,559,986	2,248	20	-80	523
MB	710,675	2,559,605	2,266	340	-41	666
MC	710,675	2,559,604	2,266	340	-51	754
ME	710,712	2,559,520	2,266	340	-58	841
MF	710,737	2,559,451	2,268	329	-59	963
MG	710,736	2,559,451	2,268	318	-62	929
MH	710,344	2,559,566	2,376	17	-67	951
MI	710,346	2,559,566	2,376	26	-66	860
MR-1	710,142	2,559,616	2,322	65	-42	200
MR-2	710,188	2,559,669	2,346	157	-58	600

Hole	Easting (m)	Northing (m)	Elevation (m)	Orientation		Length (m)
				Azimuth	Dip	
MR-3	710,348	2,559,562	2,376	271	-60	644
MS-1	710,263	2,552,573	2,516	7	-52	972
MS-2	710,263	2,552,573	2,516	7	-70	984
MS-3	709,940	2,552,700	2,542	13	-52	925
MS-4	709,940	2,552,700	2,542	13	-70	956
MS-5	709,500	2,553,027	2,575	11	-50	1,012
NA	710,345	2,559,566	2,376	31	-50	848
ND	710,715	2,559,522	2,266	350	-63	787
NE	710,714	2,559,521	2,266	333	-64	842
NF1	710,740	2,559,453	2,268	324	-69	115
NF2	710,737	2,559,451	2,268	324	-69	830
NG	710,713	2,559,522	2,266	319	-72	848
OA	710,713	2,559,519	2,266	8	-51	667
OB	710,678	2,560,132	2,347	360	-47	715
OC	710,809	2,559,735	2,365	360	-57	907
OD	710,713	2,559,520	2,266	10	-57	936
OE2	710,783	2,559,311	2,289	354	-46	884
OF	710,784	2,559,315	2,288	348	-55	878
OG	710,784	2,559,315	2,288	338	-62	942
PC	710,715	2,559,522	2,266	25	-53	663
PD	710,734	2,559,504	2,267	41	-64	690
PE	710,735	2,559,503	2,267	14	-70	597
PE2	710,734	2,559,499	2,267	16	-70	694
PF	710,783	2,559,325	2,289	352	-72	907
QD	710,733	2,559,504	2,267	354	-52	814
QE	710,735	2,559,503	2,267	33	-57	642
QF	710,738	2,559,454	2,267	31	-65	729
QG	710,735	2,559,503	2,267	51	-72	671
QH	710,784	2,559,315	2,288	16	-67	856
RB	711,091	2,559,636	2,395	356	-66	561
RC	711,098	2,559,319	2,424	352	-51	791
RD	711,097	2,559,316	2,424	343	-61	826
RE	711,125	2,559,276	2,425	337	-64	868
SD	711,098	2,559,329	2,423	4	-61	868
SE	711,097	2,559,316	2,424	347	-74	924
SHAFT-2	710,139	2,559,616	2,322	0	-90	500
TE	711,099	2,559,318	2,424	15	-75	913
TI	710,422	2,559,981	2,249	0	-90	666
UD	711,144	2,559,323	2,425	29	-63	839
UE	711,154	2,559,252	2,424	22	-66	808
VP2	708,659	2,559,787	2,373	15	-55	912
VP3	708,726	2,560,032	2,399	15	-55	914
Total						211,041