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Technical Memorandum

To:	Quinton Hennigh	**Date:**	December 16, 2013
Company:	Gold Canyon Resources Inc.	**From:**	Carl Nagy
Copy to:	Anton Bloem, Julia Kramer, James Siddorn	**Project #:**	2CG026.002
Subject:	Structural Model of the Springpole Project		

1 Introduction

In August 2013, Gold Canyon Resources Inc. (Gold Canyon) requested SRK Consulting (Canada) Inc. (SRK) construct a 3D structural model of their Springpole gold project in northwest Ontario. This study is a portion of a pre-feasibility study being completed by SRK for the Springpole project, and was focused on identifying structures that could impact geotechnical design and hydrogeological controls.

This study consisted of a site visit from September 7 – 12, 2013 and subsequent desktop 3D structural modelling. The structural model was constructed in Leapfrog™ using data provided by Gold Canyon and collected by SRK. The field work was completed by Dr. Julia Kramer Bernhard and Mr. Carl Nagy. The 3D structural modelling was completed by Mr. Nagy. The following memorandum summarizes the completed work and describes the modelled structures.

2 Geological Setting

The Springpole gold project is located 110 kilometres (km) northeast of Red Lake, Ontario, and is composed of a polyphase alkali, trachyte intrusive with an autolithic breccia (Armstrong et al., 1996, and references cited therein; Barron, 1996). The intrusive comprises a system of multiple phases of trachyte that is believed to be part of the roof zone of a larger syenite intrusive. Fragments displaying phaneritic textures were observed from deeper drill core in the southeast portion of the zone underlying Springpole Lake. Early intrusive phases consist of megacrystic feldspar phenocrysts of albite and orthoclase feldspar in an aphanitic groundmass. Successive phases show a progressively finer grained porphyritic texture while the final intrusive phases are aphanitic. Within the country rocks to the north and east are trachyte and lamprophyre dykes and sills.

The main intrusive complex appears to contain many of the characteristics of alkaline, porphyry-style mineralization associated with diatreme breccia in aphanitic trachyte (e.g., Cripple Creek, Colorado or Rattlesnake Hills, Wyoming). Ductile shearing and brittle faulting have played a significant role in redistributing structurally controlled blocks of the mineralization. Diamond drilling in the winter of 2010 revealed a more complex alteration with broader, intense zones of potassic alteration replacing the original rock mass with biotite and pyrite. Fine grained disseminated gold mineralization occurs with biotite, the primary potassic alteration mineral, gold displays a good correlation with potassium/rubidium.

3 Methodology

Prior to the site visit, the following data sets were compiled in 2D (ArcGIS™) and 3D (Leapfrog™):

- Regional data (including satellite, bathymetry, digital elevation model, and LiDAR);
- Historic geological maps;
- Springpole drillhole database;
- 3D wireframe of the indicated resource.

Based upon these available data, targeted geological mapping, structural observations, and re-logging of 18 drillholes were completed during the site visit. Surface observations were then integrated with regional 2D data sets and historic geological mapping to determine the location of major structures in the Springpole area. All structural data are reported according to the Right hand Rule.

Observations and interpretations made in 2D were subsequently integrated in Leapfrog™ to model structures in 3D. The 3D data included data from the Springpole drillhole database and from the 18 drillholes re-logged by SRK. The drillhole observations made by SRK were used to complement and validate the Springpole drillhole database. The following drillhole data fields were used to define the modelled structures: RQD, lithology, argillic alteration, and structure (faults and shear zones). Observations from a previous structural interpretation (SRK 2011) were also considered throughout the 3D modelling process.

4 3D Structural Modelling

Twelve faults and five shear zones were identified during 3D structural modeling. These structures were subdivided into four groups based on their relative age, orientation, and character. In addition, five zones (weak zones), characterized by very low RQD (e.g., <10%), advanced argillic alteration and gold mineralization were modelled. All faults, shear zones, and weak zones were assigned confidence levels (Table 1). Figure 1 displays faults and shear zones with a confidence level of 1-4, Figure 2 displays faults with a confidence level of 5 (lowest confidence level), and Figure 3 illustrates the weak zones. The characteristics of all faults, shear zones, and weak zones, and their respective confidence level, and orientation are summarized in Table 2. Wireframes of the faults in DXF format can be found in the following location on the Vancouver server:

Z:\2CG026.002_PFS Data Acquisition\090_Rock Geotech Evaluation\Structural Assessment*SRK_GoldCanyon_Springpole_StructuralModelWireframes_2CG026002_ CN_20131210*

The oldest generation of modelled shear zones are northwest-striking and steep-dipping (orange in Figure 1). These shear zone trend parallel to regional northwest-trending lineaments that roughly define the northeast and southwest boundaries of Springpole Lake, and to mapped northwest-striking dextral shear zones (Figure 1b). In addition, these shear zones bound the northeast and southwest extent of the three steep-dipping weak zones (Figure 3), and are interpreted to be truncated and/or offset along west- and southwest-striking brittle faults (Figure 1). Field observations of shear zones suggest they can either strengthen or weaken the rock mass (Table 2). Strong and weak shear zones comprise cohesive chlorite schist and fissile sericite altered mica schist, respectively.

The shear zones are crosscut by west-striking and steep-dipping faults (blue in Figure 1). These faults are parallel to regional east-west trending lineaments (Figure 1b) and are interpreted as brittle faults. These faults bound the north and south extent of the steep-dipping weak zones, and the north extent of the two southernmost shallow-dipping weak zones (Figure 3). The west-striking faults are interpreted to truncate and/or offset northwest-trending shear zones, and are offset along southwest-striking faults.

Table 1: Fault Confidence Level Descriptions

Confidence Levels	Explanation
1 (High)	Structure and orientation defined by **all** of the following: • Surface lineament/geological expression; • **Multiple** supporting data points; • Defines offset/extent of other structural domain(s) and/or indicated resource.
2 (Medium)	Structure and orientation defined by **all** of the following: • Surface lineament/geological expression; • **Limited** supporting data points; • Defines offset/extent of other structural domain(s) and/or indicated resource.
3 (Low)	Structure and orientation defined by **two** of the following: • Surface lineament /geological expression; • **Limited** supporting data points; • Defines offset/extent of other structural domain(s) and/or indicated resource.
4 (Very Low)	Structure and orientation defined by **one** of the following: • Surface lineament/geological expression; • **Limited** supporting data points; • Defines offset/extent of other structural domain(s) and/or indicated resource.
5 (Extremely Low)	Structure and orientation defined only by: • Offset/extent of indicated resource.

The youngest generation of faults are southwest-striking, steep-dipping (green in Figure 1), and interpreted as brittle faults. These faults are consistent with southwest-trending lineaments (Figure 1b). The steep-dipping weak zones, northwest-trending shear zones, and east-west striking faults are truncated/offset along these faults.

Several additional low confidence faults were modelled (Figure 2). These faults appear to bound and/or offset the indicated resource but are not observed in any other data set. The relative timing of these faults could not be determined, and they therefore crosscut surrounding faults. These faults strike southeast, south, and northeast, and are interpreted as brittle faults.

The thicknesses of many modelled faults and shear zones are poorly constrained as they are modelled from offsets of low RQD zones and the indicated resource. Therefore, at this stage, it is only possible to provide an approximate estimate of their thickness (Table 2).

Two orientations of weak zones are present in the Springpole project (Figure 3): northwest-striking, steep-dipping weak zones in the northwest portion of the project, and southwest-striking, shallow-dipping weak zones in the southeast part of the project. The northwest-striking steep-dipping zones enclose the majority of the gold mineralization, are confined by northwest- and west-striking faults and shear zones, and are offset along southwest-striking faults. They are separated from the shallow-dipping weak zones to the southeast by a west-striking fault. The southeast weak zones are shallow-dipping southwest-striking tabular zones. The orientation of these zones is likely controlled by lithological contacts, as opposed to fault controlled (to be investigated further in the geological model).

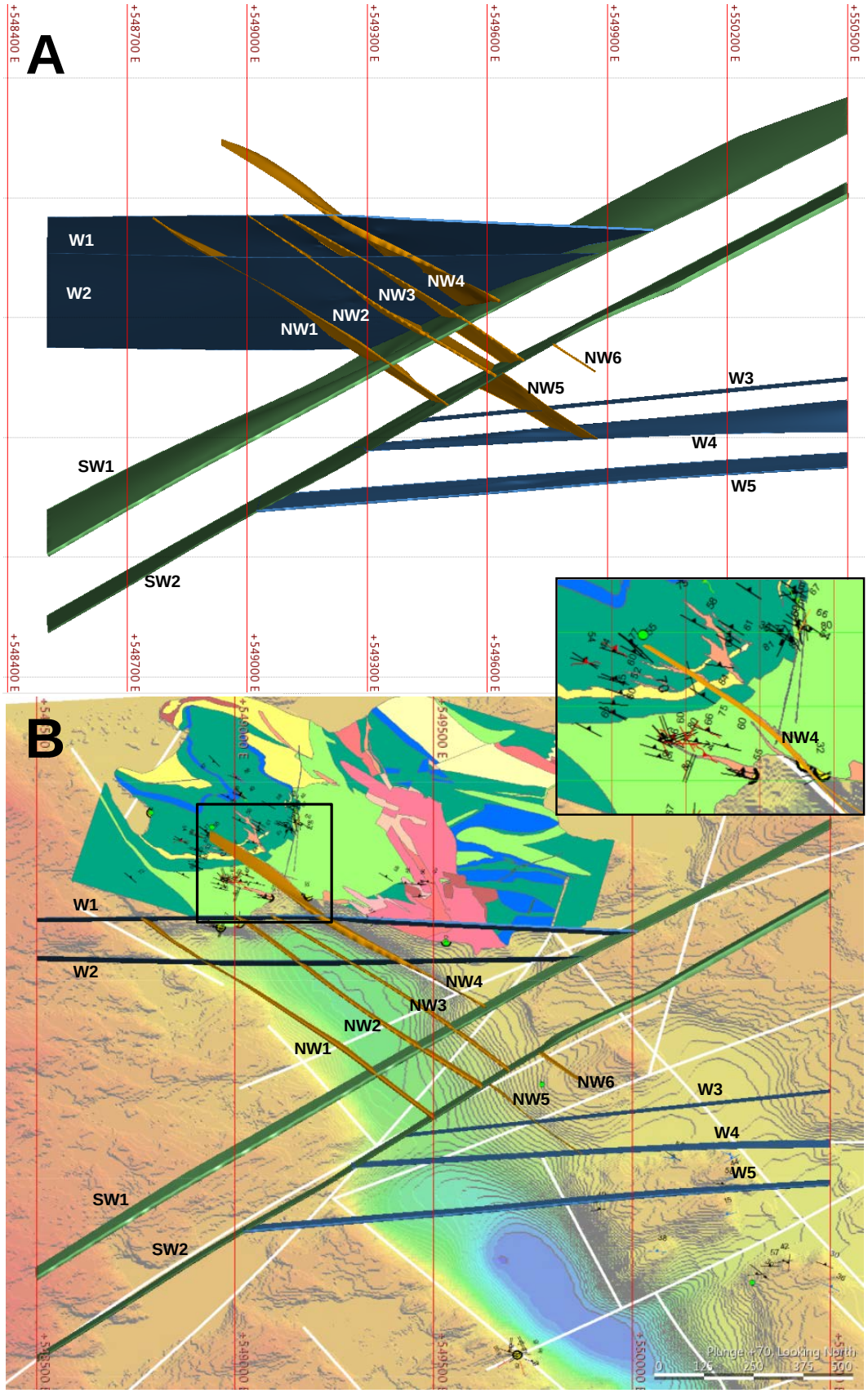

Figure 1: (A) Modelled structures with confidence levels 1-4, grouped by relative age and orientation. (B, including inset) - Intersection of structures with bathymetry. All images look north and plunge approximately 65 degrees.

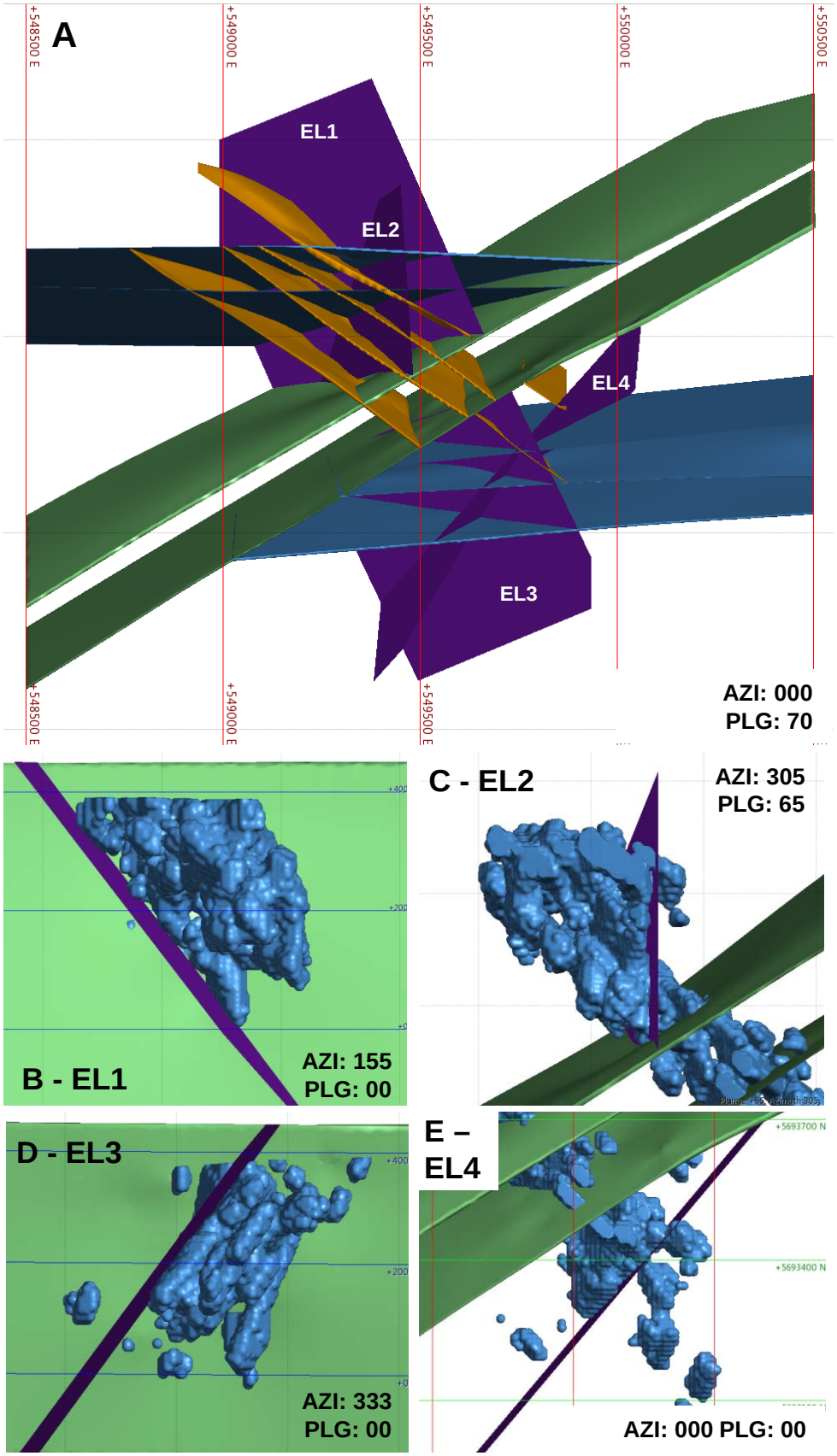

Figure 2: (A) All modelled structures. Purple structures are extremely low confidence (level 5). (B-E) Various views of extremely low confidence structures that bound and/or offset indicated resource (blue volume). Abbreviations: AZI – azimuth, and PLG – plunge.

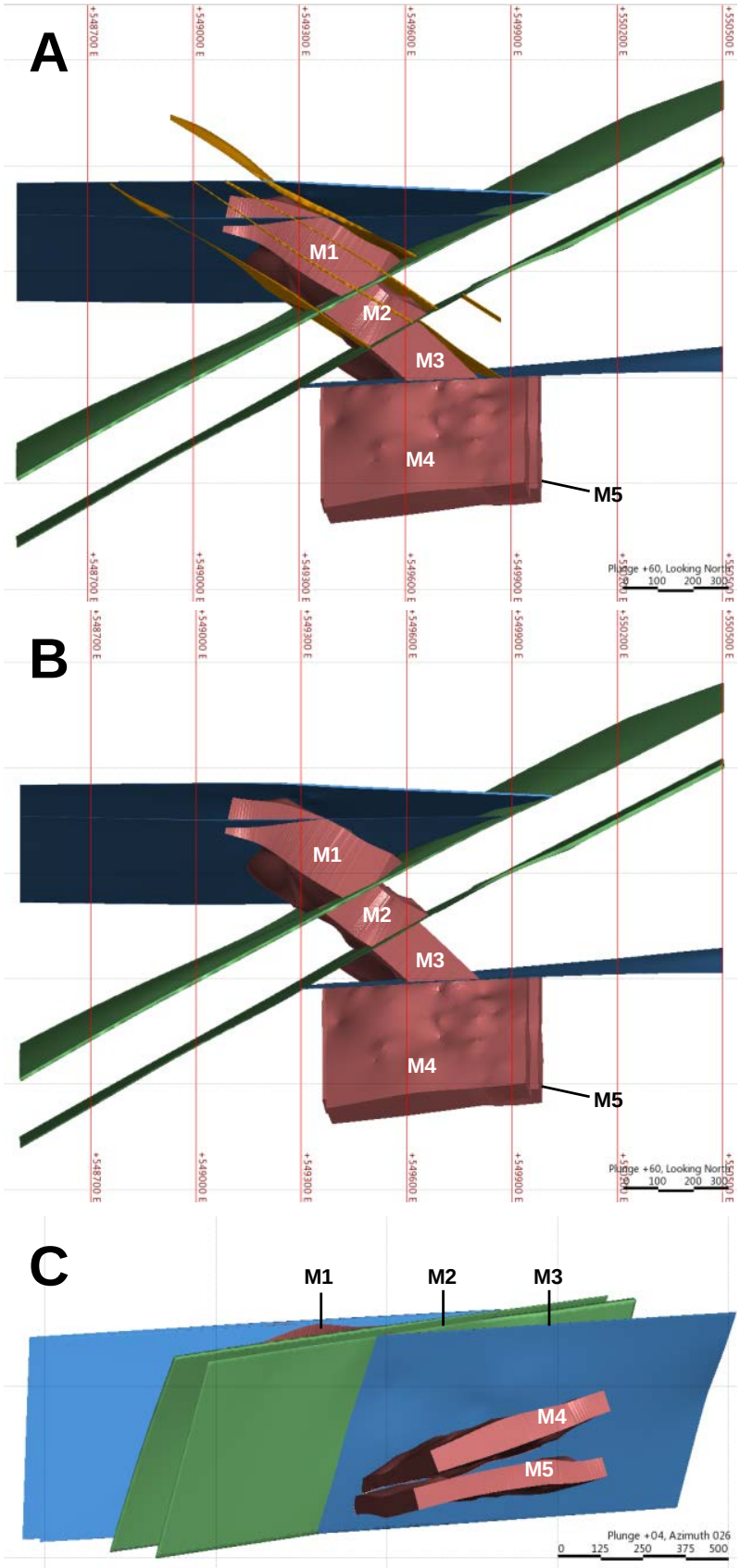

Figure 3: Modelled weak zones displayed with (A) all structures with a confidence level of 1-3, and (B) all interpreted brittle structures with a confidence level of 1-3. Images look north and plunge 60. (C) Side view (azimuth 026, plunge 04) of southern shallowly dipping weak zones.

Table 2: Summary of Structures in the Springpole Project Area

Name	Confidence	Orientation		Description	Comments
		Strike	Dip		
NW1	2	~300	~65	Early northwest-striking shear zone	Defined by southeast extent of low RQD data (e.g. SP12-133: 485-490 metres), weak zones M1 and M2, and argillic alteration. Northern portion of shear zone coincident with surface lineament and orientation of Springpole Lake. Truncated along fault SW2. Thickness poorly constrained and inferred to be similar to thickness observed in shear zone NW4.
NW2	2	~300	~65	Early northwest - striking shear zone	Defined by break in low RQD data and multiple shear zone intervals (e.g. SP11-109: 420-425 metres). Orientation consistent with orientation of Springpole Lake. Offset along fault SW2 based on a moderate change in orientation to the southeast of fault SW2. Thickness modelled from fault intervals, and is approximately consistent with thickness observed in shear zone NW4.
NW3	3	~300	~65	Early northwest - striking shear zone	Defined by break in low RQD data and limited shear zone intervals (e.g. SP11-109: 364-370 metres). Consistent with orientation of Springpole Lake. Truncated/offset along fault SW2. Thickness is weakly constrained from limited fault intervals, and is approximately consistent with thickness observed in shear zone NW4.
NW4	2	~300	~65	Early northwest - striking shear zone	Defined by northeast extent of low RQD data, weak zone M1, and argillic alteration. Northern portion of structure coincident with mapped shear zone (Figure 1B– inset) and with a lineament defining the northeast boundary of Springpole Lake. Truncated along fault SW1. Modelled thickness of ~2-5 metres based on mapped shear zone (see Figure 1B – inset). Mapped shear zone composed of penetratively foliated cohesive chlorite schist (549030E 5694130N).
NW5	2	~300	~70	Early northwest - striking shear zone	Defined by northeast extent of low RQD data, weak zone M3, and argillic alteration. Orientation consistent with orientation of Springpole Lake and potentially with weak lineament defining northeast boundary of lake. Interpreted to be the continuation of shear zone NW2, NW3 or NW4. Thickness poorly constrained and inferred to be similar to thickness observed in shear zone NW4.

Name	Confidence	Orientation		Description	Comments
NW6	4	~300	~60-65	Early northwest - striking shear zone	Defined by limited low RQD intervals (e.g. SP12-128: 112-116.5 metres). Orientation and dip are consistent with other northwest-trending shear zones. Truncated along fault SW2.
W1	2	~270	~80	West-striking fault	Defined by limited fault intervals (e.g. SP12-116: 191.4-196.2 metres), potential offset of indicated resource, and northern extent of low RQD data, weak zone M1 and argillic alteration. Central portion of fault defines northern boundary of Springpole Lake. Truncated along fault SW1. Thickness is very weakly constrained from limited fault intervals.
W2	3	~270	~80	West -striking fault	Defined by offset of the indicated resource and well-defined surface lineament along the W portion of the fault. An offset of low RQD data may also occur along this structure, but is loosely constrained. Truncated along fault SW1. Thickness of structure is not constrained and estimated to be similar to thickness of fault W1.
W3	4	~270	~60	West -striking fault	Defined only by a potential offset of the indicated resource. Assigned a confidence value of 4 and not 5 as it is in the same orientation as nearby fault W4. Truncated along fault SW2. Thickness of structure is not constrained.
W4	2	~270	~60	West -striking fault	Defined by (1) south extent of low RQD data and argillic alteration defining weak zone M3, (2) north extent of low RQD data and argillic alteration defining weak zones M4 and M5, (3) an intense east-west surface lineament and (4) a potential offset of the indicated resource. Structure truncates shear zone NW5, and is truncated along fault SW2. Thickness is not constrained and estimated to be similar to thickness of fault W1.
W5	4	~270	~60	West -striking fault	Defined only by an offset/truncation of the indicated resource and a very weak surface lineament. Assigned a confidence value of 4 and not 5 as it is in the same orientation as nearby fault W4. Truncated along fault SW2. Thickness is not constrained.
SW1	2	~240	~60	Young southwest-striking fault	Defined by offset in indicated resource and argillic alteration, a minor offset in low RQD data, a prominent surface lineament, and very limited fault intervals (e.g. SP11-034: 340-342).

Name	Confidence	Orientation		Description	Comments
					Interpreted as young structure that truncates/offsets structures W1, W2, and NW4, and weak zones M1 and M2. Thickness is poorly constrained by limited fault intervals.
SW2	2	~240	~60	Young southwest-striking fault	Defined by offsets in indicated resource, argillic alteration, low RQD data, and a prominent surface lineament. Interpreted as young structure that truncates/offsets structures W3, W4, W5, NW1, NW2, NW3, NW5, and NW6, and weak zones M2 and M3. Thickness is poorly constrained by breaks in RQD data.
EL1	5	~160	~50	Offset/ boundary of mineralization	Defines the northeast extent of the indicated resource north of fault SW1 (see Figure 2b). May correspond with the western boundary of the pink intrusive unit (see Figure 1b). Thickness not constrained.
EL2	5	~175	~65	Offset/ boundary of mineralization	Based only on offset of the indicated resource (see Figure 2c). Does not correspond to any surface lineaments or geology. Thickness not constrained.
EL3	5	~155	~55	Offset/ boundary of mineralization	Defines the southwest extent of the indicated resource south of fault SW2 (see Figure 2d). Corresponds with lineament defining eastern shore of Springpole Lake. Thickness not constrained.
EL4	5	~220	~90	Offset/ boundary of mineralization	Based only on offset/ south boundary of the indicated resource (see Figure 2e). Does not correspond to any surface lineaments or geology. Thickness not constrained.
M1	1	~300	~65	Weak zone	Zone enclosing all low RQD values and argillic alteration north of fault SW1. Contact between low and high RQD values well-defined along southwest boundary and more gradual along northeast boundary. Bounded to southeast, northwest, and north by structures NW1, NW4, and W1, respectively. Offset along fault SW1. Further investigation required to determine if weak zone is offset by fault W2.
M2	1	~300	~65	Weak zone	Zone enclosing all low RQD values and argillic alteration north of fault SW2, and south of fault SW1. Contact between low and high RQD values well-defined along southwest boundary and more gradual along northeast boundary. Bounded to southeast, northwest, north, and south by structures NW1, NW3, SW1 and SW2, respectively.

Name	Confidence	Orientation		Description	Comments
					Offset along faults SW1 and SW2.
M3	1	~320	~75	Weak zone	Zone enclosing all low RQD values and argillic alteration north of fault W4, south of fault SW2, and west of shear zone NW3. Fault W4 defines south extent of this zone, and of all steeply dipping weak zones. Offset along fault SW2.
M4	2	~220	~20	Weak zone	Zone enclosing a shallow dipping region of low RQD values and argillic alteration south of fault W4. Zone is sharply bounded by fault W4 to the north, and is not constrained to the south. Orientation of zone roughly parallel to lithological contact between volcanic breccia and aphanitic trachyte (to be investigated further in geological model).
M5	2	~230	~10	Weak zone	Zone enclosing a shallow dipping region of low RQD values south of fault W4. Zone is sharply bounded by fault W4 to the north, and is not constrained to the south. Orientation of zone roughly parallel to lithological contact between volcanic breccia and aphanitic trachyte (to be investigated further in geological model).

5 Structural Domains

The Springpole project can be subdivided into 6 structural domains, summarized in Table 3, and presented graphically in Figure 4. Structural domains are defined as macro-scale blocks of internally consistent fabric that were rotated and/or translated relative to one another. Structural domains in the Springpole project area are bounded by steep-dipping west- and southwest-striking brittle faults with confidence levels of 1-3.

Table 3: Summary of Structural Domains in the Springpole Project Area

Structural Domain	Description
SD1	Bounded to the south and east by faults W1 and SW1, respectively. Unconstrained to the north and west.
SD2	Bounded to the north, south and east by faults W1, W2 and SW1, respectively. Unconstrained to the west. Although this structural domain is narrow (approximately 115 metres thick), it is bounded by two well-defined brittle faults (W1 and W2) and should therefore be treated as a unique structural domain. Furthermore, fault W2 clearly offsets the indicated resource, confirming that SD2 and SD3 should be represented as separate structural domains.
SD3	Bounded to the north and southeast by faults W2 and SW1, respectively. Unconstrained to the west.
SD4	Bounded to the northwest and southeast by faults SW1 and SW2, respectively. Unconstrained to the northeast and southwest. Both bounding faults clearly offset the indicated resource, indicating that this zone should be analyzed as a separate structural domain.
SD5	Bounded to the north and west by fault SW2, and to the south by fault W4. Unconstrained to the east.
SD6	Bounded to the north and west by faults W4 and SW2, respectively. Unconstrained to the south and east.

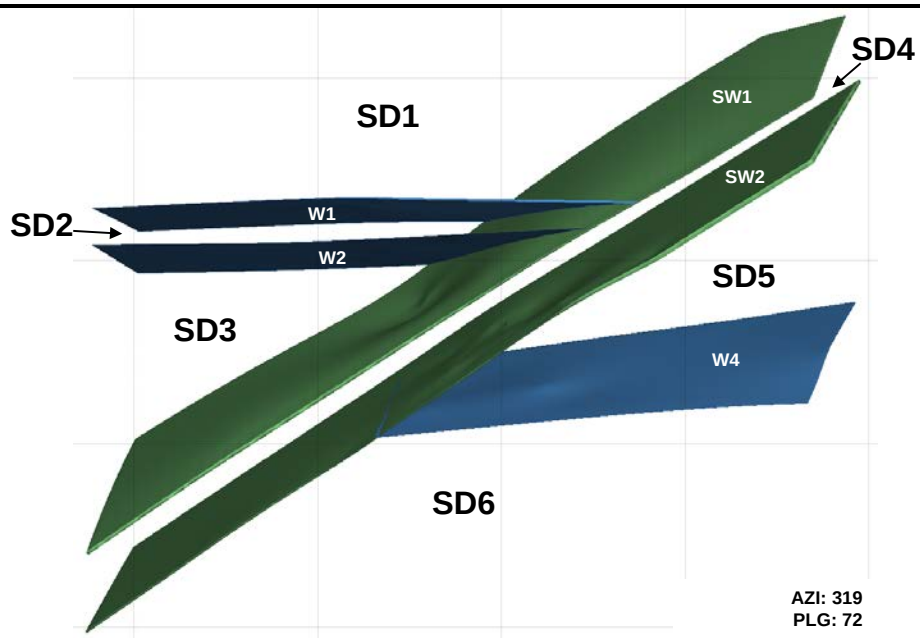

Figure 4: Structural domains (SD1-SD6) and bounding brittle faults (W1, W2, W4, SW1, SW2).

6 Conclusions

The key conclusions from the structural modelling of the Springpole project are:

- A total of 17 shear zones and faults were modelled, including:
  - Five medium confidence and one very low confidence, northwest-striking, steep-dipping early shear zones that bound the northeast and southwest extent of the weak zones;
  - Two medium, one low and two very low confidence, west-striking, steep-dipping brittle faults that bound the north and south extents of the weak zones. These faults are younger than the northwest-striking shear zones, and older than the southwest-striking faults;
  - Two medium confidence, young southwest-striking, steep-dipping brittle faults that offset the northwest- and west-striking faults, and the weak zones; and
  - Four very low confidence, southeast-, south-, and northeast- striking faults that bound and/or offset the indicated resource but are not observed in any other data set.
- A total of five weak zones, characterized by advanced argillic alteration, gold mineralization, and very low RQD values (e.g., <10%) were modelled, including:
  - Three high confidence, northwest-striking, steep-dipping zones, bounded to the northeast and southwest by northwest-striking shear zones, and to the north and south by west-striking brittle faults. These zones are offset by southwest-striking brittle faults; and
  - Two medium confidence, northwest-striking, shallow-dipping zones in the south of the deposit that are bound to the north by a west-striking fault.
- Many faults and shear zones (e.g. SW2, W2, W3, W4, W5, EL1, EL2, EL3, and EL4) are modelled from offsets in low RQD zones and gold mineralization. As a result, the thicknesses of fault zones are poorly constrained;
- A total of six structural domains bounded by steep-dipping west- and southwest-striking brittle faults can be defined;
- The orientation and distribution of modelled structures represents a reasonable interpretation of the geology of the Springpole project.

7 Recommendations

SRK recommends the following actions be undertaken to improve the Springpole structural model:

- Geological modelling of major lithologies to test and refine the modelled structural framework;
- Photo relogging/photo verification of uncut core at potential fault intersections to better constrain the character and thickness of damage zones, and the spatial distribution of faults;
- Oriented geotechnical drilling to test the spatial distribution, and characteristics of modelled faults. Drilling locations should be outside of the weak zone and oriented towards the southeast to test southwest- and west-striking faults. Additional drilling outside of the weak zones and oriented towards the southwest should be considered to test northwest-striking shear zones. SRK proposes the following two drillholes (Figure 5):
  - Drillhole SRK-01: 549286E 5693570N, dip of 40 degrees, dip azimuth of 135 degrees, depth of 500 metres; and
  - Drillhole SRK-02: 549440E 5693977N, dip of 40 degrees, dip azimuth of 130 degrees, depth of 525 metres.
- Ongoing assessment and refinement of the structural model to improve the orientation and distribution of modelled faults, and to identify any additional fault orientations.

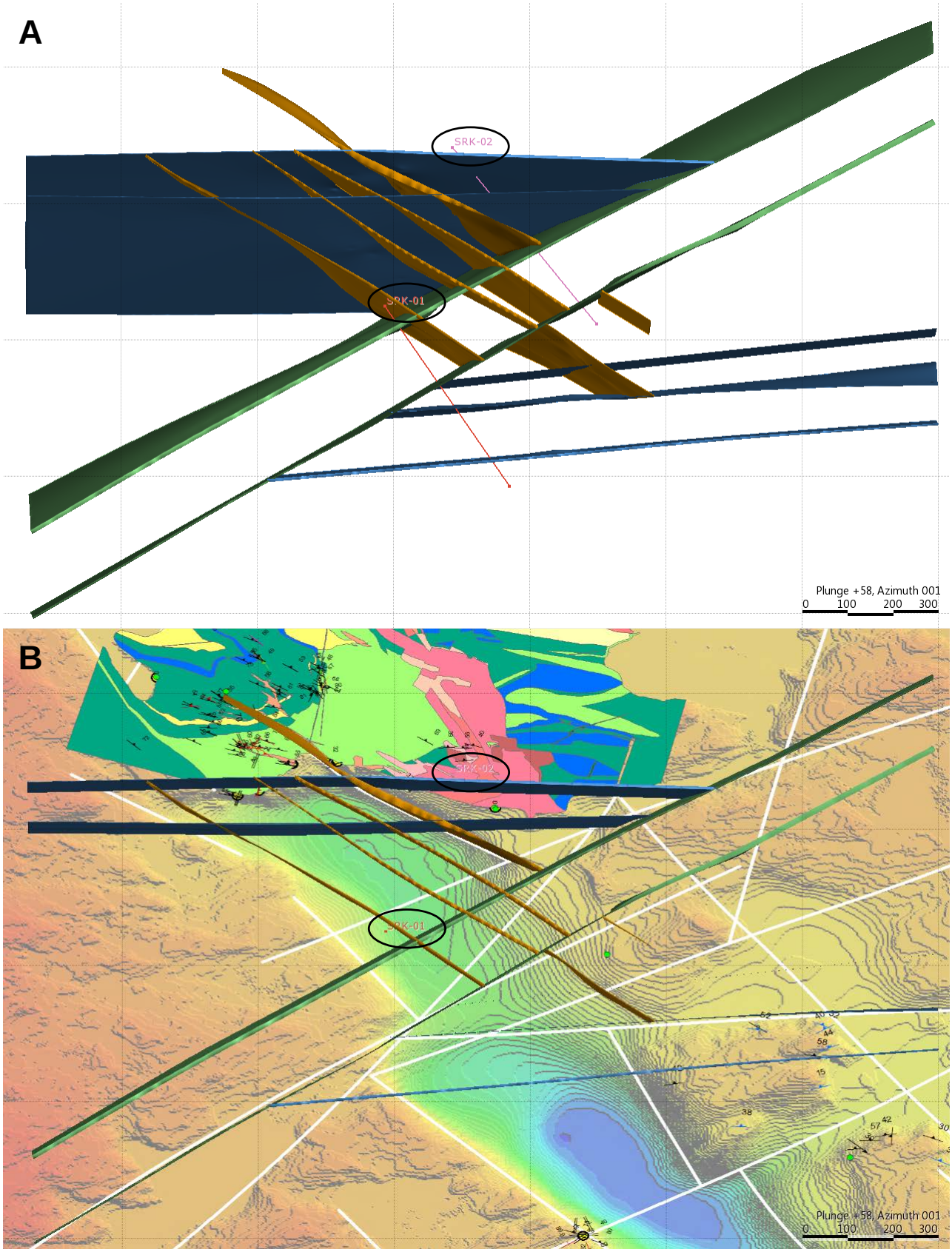

Figure 5: Two proposed drillholes to test southwest- and west-striking faults, displayed with (A) modelled structures with confidence levels 1-4, and (B) Intersection of structures with bathymetry. Both images look north and plunge approximately 60 degrees.

Yours truly,

SRK Consulting (Canada) Inc.

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Consultant (Structural Geology)

Reviewed by:

Dr. James P. Siddorn, PGeo

8 References

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Barron, K.M., 1996. The petrological and metallogenic significance of the alkaline igneous centre at the Springpole gold prospect, northwestern Ontario: Ph.D. Thesis for Department of Earth Sciences, University of Western Ontario, London, Ontario.

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