Meeting Minutes

Engineering/Minerals
Tonto National Forest
Phoenix, AZ

To: Project Record

From: Donna Morey, SWCA

Re: Resolution Geology Working Group Meeting 6/12/2018

Attendees:

USFS: Mary Rasmussen, Alex Mankin, Diane TaFoya, Judd Sampson
SWCA: Chris Garrett, Donna Morey, Charles Coyle, Mike Henderson, Nick Enos, Amir Karami, Diana Cook, Laurie Brandt
RCM: Andre Carver, Gert Van Hout, Jacques Tshisens, Matt Pierce, Bill
BLM: none
ASLD: Joe Dixon

Handouts:

Agenda
Baseline Data Request #9

Discussion:

Introductions

Project Update

- Alternatives for Detailed analysis in the EIS have been finalized.
    - Tribal comments recently have brought additional concerns for crossing the Gila River
- Clear path to write EIS, waiting on some outstanding analysis.
- Introduce Joe Dixon to group, background of group meetings. Some subsidence will occur on ASLD land.

Step by Step thru Data Request (Matt Pierce PPT)

Monte Carlo on Rock Strength

- Base case strength of White Tail now complete as Apache Leap done previously - complete intact strength data set used
- 2 ways to determine and both approaches provided similar results.
- There was a sensitivity run completed with GSI reduced by .75
    - This has 2 of the 3 conservative layers that most other units such as Apache leap unit has.
    - Model was built with GSI average values seen, not number from Monte Carlo.
    - Apache leap had 27th percentile and another figure also determined 27.
    - Does White Tail have a similar second determination number to verify with?
        - Yes, but hard to make similar blocks due to characteristics (big blocks compared to other. If White tail was changed to 5MPS, it would be like toothpaste and

unable to sink shaft thru. This was not seen in real shaft sinking, so Resolution does not feel it should be reduced further.
        - When sinking shaft – they have also seen there are no joints in White Tail and did not see a reason to make even more conservative.
    - Q? Would the higher strength and decreased variability tend to constrain the collapse zone? A: would expect it to constrain but need to look at model for how other rocks act.
    - Q? How do we speak to the very low values of whisker plot? A: Resolution will add additional information for the low values and what they represent.
    - White Tail is a conglomerate, therefore you are testing the weakest link of the matrix not each individual strong rock. Resolution feels the shaft sinking is representative for experience over testing samples. GSI is the strength of the joint, not the rock.
        - Anecdotal by Andre – working in kimberlite also has a weak conglomerate with clay and they still have higher values than we are using in this model.
    - Whisker plot shows average not median.
    - UCS not used directly in model – used for statistical sigma M, D, and S
    - Failure not always at the matrix due to how strains can form – experience typically shows failures thru most competent parts as they are firm and attract the strain.
    - Need to document – Monte Carlo is not why numbers were selected and the Monte Carlo was not done till after. The Monte Carlo also includes new data compared to initial screening.
- Resolution will look at spatial distribution, that has not been done yet
- Why was a sensitivity range value of 75% chosen? A: factor of safety
    - Base case safety are divided by 1.3 or multiplied by .75 to build in a factor of safety on open pit design. – Industry standard for slope safety. It fits in with best practice. We are predicting an outcome, but not designing to the 75%.
        - Are there other things we can point to that also consider this as an industry standard? Resolution to provide (will review MSHA and coal pillar strength first).
        - What if you are wrong? Resolution would be monitoring and adjusting as mining continues. "Operational Management" Apache Leap SMA requires annual reporting – Resolution subsidence monitoring plan to be submitted soon (est. June 22 submittal)

Faults – additional information gathered

- No drill holes in Gantt or Camp faults but they are well exposed at surface. Can be seen on satellite due to vegetation anomalies of increased porosity of fault zone. Information based entirely on field mapping.
- Are they all handled in the geotechnical modeling consistently? Based on same characterizations.
    - Difference is view of fault – on surface or blind.
    - Have also done hexagonal mapping on Oak Flat for all joints and fractures – geometric relations and strengths to also verify data.
    - Gantt leaves apache Leap and trace drops down into other rock units. Resolution does not have core photographs but does have applicable data collected. Bill and Jacques have an Excel file with determination of fault strength to relative strength assignments.

    - Will now provide pictures and other information in lieu of core hole photos. Fault descriptions and pictures of core were requested, and Resolution will provide fault descriptions and pictures of surface. Will not be able to provide drill hole interpretations by Harry Parker with no drill holes.
- Resolution had attempted vibrostudies about 8 years ago (VSP – vertical seismic processing) – relief of seismic contrast had been masked by ore – unable to determine most structures.
- West boundary – 5 drill holes and 1 tunnel intersection – Resolution will provide figures/pictures.
- Resolution fault – in 2012 model but removed in newer model for other faults seen in new drill holes.

Matt Pierce Presentation (Caving Predictions PPT)

- Request for additional Sensitives 1, 3 and 4 – Matt to add what each sensitivity represents.
- Request to overlay yielded zones on top of contours – Matt stated this is not possible
    - Angular distortion and yielded zones is possible & presented – Only angular where rock mass has fully yielded. If it has not yielded, then it is grey. Black line is new fractures expected and within the yielded limit. Beyond black line it has distorted by not high enough to yield.
- Need to show what is affecting Apache Leap
    - Industry uses standard of "limit of continuous subsidence" – Resolution has prepared a memo discussing subsidence and explicitly defining zones and how it is related to figure, and empirical data used. Used Cavieres from 2003 which has subsequently been field verified at other mines.
        - "acceptable level of damage to building" in caving per Matt
        - Structure is Apache Leap – Leap is sensitive to tilt – expect less than .2 degrees
            - Resolution did not provide where that "data/output" was done or presented.
        - Tilt is most meaningful quantity to judge for affect to leap – Andre thinks tilt is too complicated to discuss with internal stakeholders let alone the public. Resolution will revisit previous internal discussions to determine if able to be used and described easily.
    - Rock Mass Damage – different name instead of angular distortion
        - Need new GIS layer (already in Itasca report as plan view)
        - This explains how far damage will get to Apache Leap, other data will speak to what the crater will look like
        - Matt concerned with specific model "distance" from Apache Leap. Resolution will provide that outlook – Replace or Add red subsidence line with black Rock Mass damage line.
        - There is still concern knowing if a hoodoo would fall.
            - Resolution can verify 5-degree figure to topple a hoodoo and show that line. Will consider if tilt and 5-degree will answer question specific to Apache Leap.

Rationale for 0.5 Fracture Limit

  - Added in new memo as section 2.1 based on Cavveris.
- Are there other ways to look at subsidence?
  - Bound amount of subsidence at surface based on FLAC model – void ration of 11-13% and that is consistent with modeling. Average porosity is the main factor – it is higher near the ore and lower due to compaction near the surface. Matt states this is already demonstrated by sensitivity run on bulking factor.
    - Andre speaks that changing just bulking factor is not conservative as that would buttress and not expand limit propagation as much.
    - UCB paper is helpful in answering the difference between shallow cave and lower angles to caving compared to deeper caves.

Next Steps:

- Resolution to submit all data requests by 6/22
  - ID Team to digest
  - We do not schedule a July meeting and circle up again if we find something insufficient and determine it is significant to speaking to model.
- RCM might review subsidence section b4 forest to 9/26 – Chris doesn't envision draft section for Resolution to review till September
- Schedule at least 1 internal call "what are we missing, what still is a gap and is it important"
  - Receipt of data by end of June – couple weeks to digest – then mid-July conference call to make sure we are good.
    - If there is another step necessary – Judd, Mary, Peter to make sure involved!

Action Items: Will forward by email as an informal data request.

1. Resolution to add anecdotal data about sinking shaft and experience in the White Tail Conglomerate. Will also add how this is a rationale number as well as a conservative number. Document field experience and biased against weakest not accounting for cobbles seen.
2. Resolution to verify where Median is compared to Average on Whisker Plot for white tail conglomerate
3. Matt Pierce to provide reference on 75% factor of Safety on industry caving on sensitivity.
   a. Are there other things we can point to that also consider this as an industry standard? Resolution to provide.
4. Provide fault descriptions and photos available (not all are core photos depending on fault)
5. Resolution submit Matt Pierce memo on caving and zones of continuous subsidence rationale

Engineering/Minerals
Tonto National Forest
Phoenix, AZ

Agenda

To: Attendees, Project File

From: Chris Garrett, SWCA

CC:

Date: 6/12/2018

Re: **Resolution Copper Mine – Geology\Subsidence Workgroup Meeting 6/12/2018**

Location:

In Person:

SWCA, 20 E. Thomas Road, Suite 1700

Visitor parking is in the adjacent garage with entrances off Second Street or Catalina Drive. You will need to check in at the security desk in the lobby, to be let up to the 17th floor. Please bring your ticket for validation by our receptionist.

Webinar Information:

Webinar access: https://global.gotomeeting.com/join/ 131032029

Call in phone line if you do not want to use your computer audio: (872) 240-3412; Access Code: 131-032-029

Discussion Points:

9:00 – 9:15	Introductions and project updates
9:15 – 10:30	Presentation of new information (Resolution)
10:30 – 10:45	Break
10:45 – 12:00	Continued review of new information and review data request items
12:00 – 12:45	Lunch
12:45 – 2:00	Continued review of new information and review data request items
2:00 – 2:15	Break
2:15 – 3:00	Review next steps/action items

Ms. Vicky Peacey
Senior Manager, Environment & External Affairs
Resolution Copper Mining, LLC
102 Magma Heights
Superior, AZ 85173

RE: Baseline Data Request #__ - Geologic/Geotechnical Data for Subsidence

Model Review

Dear Ms. Peacey,

The Tonto National Forest (the Forest) and its consultant team have been reviewing baseline data as part of the preparation of the Environmental Impact Statement (EIS) for the Resolution Copper Mine and Land Exchange Project. The Geologic Data Validation Workgroup (Workgroup) has been tasked with assessing baseline geologic and geotechnical data, including inputs into the subsidence model provided by Resolution Copper (RCM). The Forest previously submitted Baseline Data Request #4 to RCM on October 12, 2017. In response, RCM has subsequently provided several separate sets of information and data to inform the ongoing review by the Forest. The Forest and its consultant team (Workgroup) met with RCM on March 16, 2018 to review, in detail, several requested sensitivity scenarios recently applied to the subsidence model. As a follow-up to that meeting, RCM provided 1) a Subsidence Impact Analysis Sensitivity Study on April 10, 2018, and 2) subsidence model history plots on April 20, 2018, which depict the estimated displacement and strain. A follow-up meeting between the Workgroup and RCM was held on May 16, 2018 to review this information, and the topics summarized in this data request memo.

To finalize our review, we request that Resolution provide the additional information summarized below. This information is requested because the Forest must be able to demonstrate that 1) we consider the methodology and results of the subsidence model to be reasonable, and 2) we can defend the model results in the EIS. To this end, the review by the Workgroup has centered on understanding that the modelling follows standard scientific processes, that the assumptions used in the model are well-reasoned and defensible, and that we can describe the uncertainties with the model results.

A. Rock Mass Strength

1. As demonstrated by RCM's sensitivity modelling, rock mass strength (σ_{cm}) is one of the key model parameters influencing the outward extent of modeled subsidence. In particular, conservative rock mass strength assumptions for the Apache Leap Tuff (*Tal*) and White Tail Conglomerate (*Tw*) are important towards demonstrating a reasonably conservative

model. The rock strength data set for these units is relatively small, and spatially limited. For example, there are 22 unconfined compressive strength (UCS) values available from the *Tal*, and 60 UCS values available from the *Tw*. However, for the *Tal*, RCM demonstrated through a Monte Carlo statistical distribution that the rock mass strength base-case value (25.9 MPa) and lower-sensitivity value (19.5 MPa) are conservative when compared to the observed distribution. We suggest that a similar Monte Carlo analysis be provided for the *Tw* rock mass strengths. While the base-case value for the *Tw* (9.5 MPa) and lower-sensitivity value (7.2 MPa) appear to be conservative, we would like to fully document that assumption. In addition, we would like to better document the rationale for how base-case values were developed for the *Tal* and *Tw*, why 75% of rock mass strength was selected for a lower-end sensitivity, and the level of conservativism, if any, of these assumptions. During the May 16 Workgroup meeting, it was noted that RCM could provide the rationale for the base-case values and could also re-state the 75% sensitivity value in terms of “factors of safety”.

Data Request: RCM to provide a Monte Carlo statistical distribution of *Tw* rock mass strengths, similar to Figures 2, 3, and 4 in the Subsidence Impact Analysis Sensitivity Study (Itasca, April 2018). This information to include the corresponding percentile on the Monte Carlo distribution for the *Tw* base-case and lower-sensitivity rock strength. This information should be provided in a dated addendum to the report.

Data Request: RCM to include the number of samples used for measurements on any tables, charts, or figures.

Data Request: RCM to provide additional discussion regarding the spatial distribution of key rock quality parameters, with particular emphasis on how the key rock properties as measured vary spatially, and a statistical argument that supports the assumption that rock properties vary by lithology and not by location.

Data Request: RCM to provide an explanation of how the base-case rock strength values were developed, in particular for the *Tw* and *Tal* units. The Subsidence Impact Analysis Sensitivity Study notes that the *Tal* base-case global strength corresponds to the 27th percentile strength in the Monte Carlo distribution, but we assume that the base-case value was developed deterministically. RCM to provide this explanation in a dated addendum to the Itasca report, including a discussion on the level of conservatism used in the base case assumptions.

Data Request: RCM to provide an explanation justifying the lower-sensitivity value of 75% rock mass strength, by restating the discussion in terms of “factors of safety”.

B. Faults

1. Fault descriptions and photos – As part of the Geotechnical Rock Mass

Characterization Report (RCM, October 2017), Appendix 1.2-A included fault characteristics, including geologic descriptions and core photos. This information is important to document the rationale for the fault strength ratings used in the subsidence model. As discussed in the subsidence report, several of the faults influence the progression of subsidence. Specifically, the Camp and Gant faults are anticipated to “pull” the mobilized zone further out from the extraction footprint, effectively widening the subsidence footprint at the surface. However, the summary fault descriptions and photos in Appendix 1.2-A do not include any information on the Gant or Camp faults. In order to complete our review of the fault strength assumptions in the subsidence model, we suggest that similar descriptions and core photos be provided for the Gant and Camp faults.

Data Request: RCM to provide fault descriptions and core photos for the Gant and Camp faults. This information should be provided in a dated addendum to the Geotechnical Rock Mass Characterization Report.

2. Interpreted Geologic Cross Sections – RCM’s methodology for the identification, interpretation, and modeling of faults and geologic units is well described in Parker’s March 2018 letter (Review of Geological and Structural Models at Resolution Copper Project). Specifically, the letter outlines a rigorous 9-step process used to develop the model wireframes for fault blocks and stratigraphy. Figure 7 in the letter provides an example of the manual interpretation step for the geological framework on a cross-section. We suggest that several additional cross-sections, depicting the same information, through key fault blocks could be helpful in validating RCM’s fault interpretations. In particular, we would like to better document the interpretation of the West Boundary, Gant, and Camp faults. In addition, the Resolution fault appears to be excluded from the Itasca subsidence modeling, and it is unclear if it considered a zone of weakness. The rationale for exclusion of the Resolution fault needs to be documented.

   Data Request: RCM to provide additional cross-sections, as available, through each of fault blocks 4, 8, and 10, and any additional sections that help demonstrate the interpretation of the West Boundary, Gant, and Camp faults. Included on the sections should be any manual geologic interpretation, contacts that have been digitized, and contact surfaces that were fitted through a group of sections. The detail should be similar to that depicted on Figure 6 of Parker, 2018.

   Data Request: RCM to confirm that the Resolution fault was not modeled as part of the Itasca subsidence model. RCM to provide the rationale for exclusion of the Resolution fault, as well as an expanded description of the fault to include a discussion of any post-mineral displacement.

   Data Request: RCM to clarify any differences in the numbering of fault blocks between Parker (2018) and Verly (2009).

Data Request: RCM to include the Apache Leap on any new maps depicting faults. RCM to provide a GIS layer of faults used in the subsidence model or Itasca reports.

C. Model Results

1. Itasca Caving History Plots – We have reviewed the continuous line plots from RCM, which depict the horizontal displacement, vertical displacement, and total strain at the ground surface. We have also reviewed contour plots of horizontal and vertical displacements along sections I and IV. The latter contour plots, however, did not include the yielded zones along sections, as was previously requested. In addition, the plots should depict the discernable fracture limit. It would also be informative to include contour plots depicting the angular distortion. Finally, similar line and contour plots depicting Sensitivity 1 (75% rock mass strength), Sensitivity 3 (weak case faults) and Sensitivity 4 (low residual strength) would also be helpful in visualizing these sensitivity scenarios.

   Data Request: RCM to provide plots of yielded zones along Section I and IV for the base case for Y41, and to include the discernable fracture limit profiles on each section.

   Data Request: RCM to provide continuous line plots depicting the horizontal displacement, vertical displacement, and total strain at the ground surface, for sensitivity scenarios 1 (75% rock mass strength), 3 (weak case faults), and 4 (low residual strength). RCM to include the discernable fracture limits on all line plots. Plots to include Y10, Y20, Y30 and Y41 (End of Mine Life)

   Data Request: RCM to provide contour plots of horizontal and vertical displacement along all sections (I to V) at Y41 only, and to include yielded zones on the plots. The latter may be plotted on a separate chart if displacement contours are difficult to read when yielded zones are overlaid. RCM to provide these plots for the base case (except section I and IV, as already provided) and for Sensitivity 1, 3 and 4. RCM to also include contour plots depicting angular distortion.

D. Sensitivity Impact Analysis Report

1. We have reviewed the Itasca Subsidence Impact Analysis Sensitivity Study. The selection of the total strain threshold value used to define the fracture limit significantly affects the actual location of the fracture limit relative to the Apache Leap. A small reduction in total strain threshold will move fracture limit significantly closer to the Apache Leap. During the May 16 Workgroup meeting, it was noted that the value was based on an empirical criterion developed by CODELCO in the 1980s.

   Data Request: RCM to provide the rationale for the total strain threshold value (0.5%) used to define the fracture limit. RCM to provide total strain formulation and an explanation on how it is calculated in the numerical model. RCM to explain what parameter is used to define the cave boundary, at what threshold and the rationale for this threshold.

Data Request: RCM to provide the CODELCO reference justifying the 0.5% total strain threshold value.

E. Other Information

Data Request: RCM to provide additional documentation for using the “continuous subsidence limit” as the basis for the limit of impacts, including any references that documents this as an industry standard. RCM to provide references for the purple star value on Figure 12 of Itasca 2017.

We will evaluate this information and potentially incorporate it as part of a thorough and defensible analysis process.

Please don't hesitate to contact Mary Rasmussen (480-710-7304 or mcrasmussen@fs.fed.us) of my staff if you have any questions or need further clarification on this request.

Sincerely,

NEIL BOSWORTH
Forest Supervisor

Rock Mass Global Strength: UCS Distribution

- UCS derived from Point Load data:
  - most complete intact strength data set (813 samples for Whitetail)
  - need to multiply by 80% for scale effect

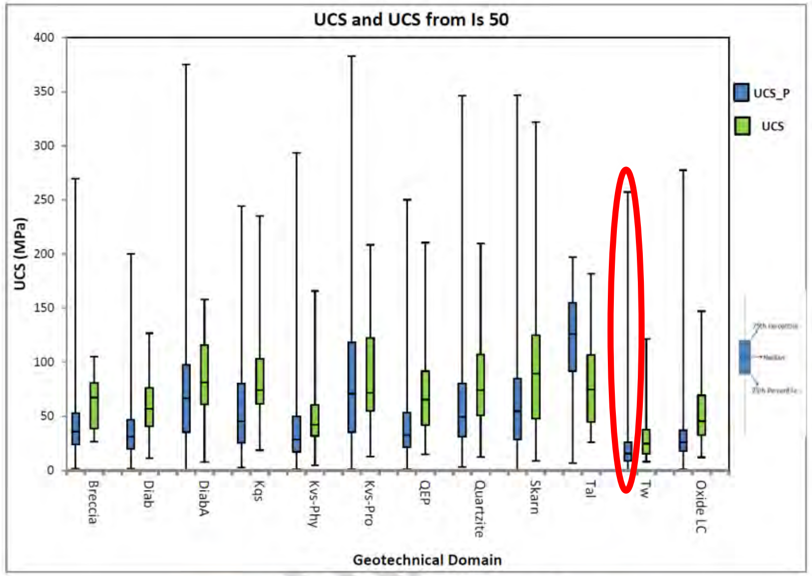
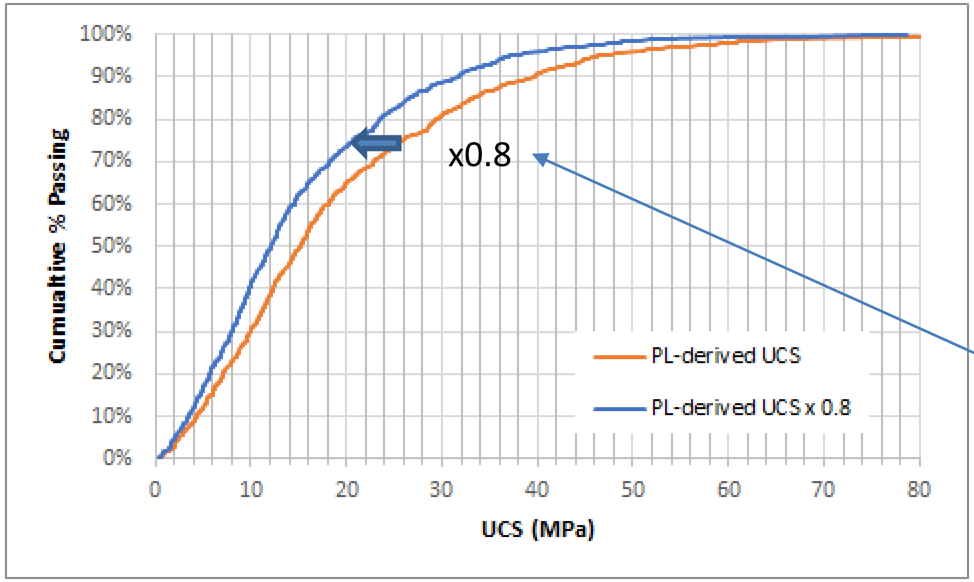
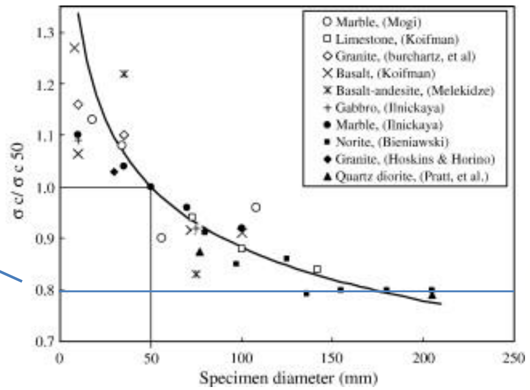


Figure 1-16 Point Loads Vs UCS for each geotechnical domains



Hoek and Brown (1980)



Rock Mass Global Strength: GSI Distribution

- The Geological Strength Index (GSI) was estimated based on block volume using the methodology proposed by Cai et al. (2004).
- Block volumes were estimated from core logging using both apparent spacing and the Joint Weighted Density methodology (Palmstrom, 2005).
  - They give very similar results
  - JWD-derived GSI used

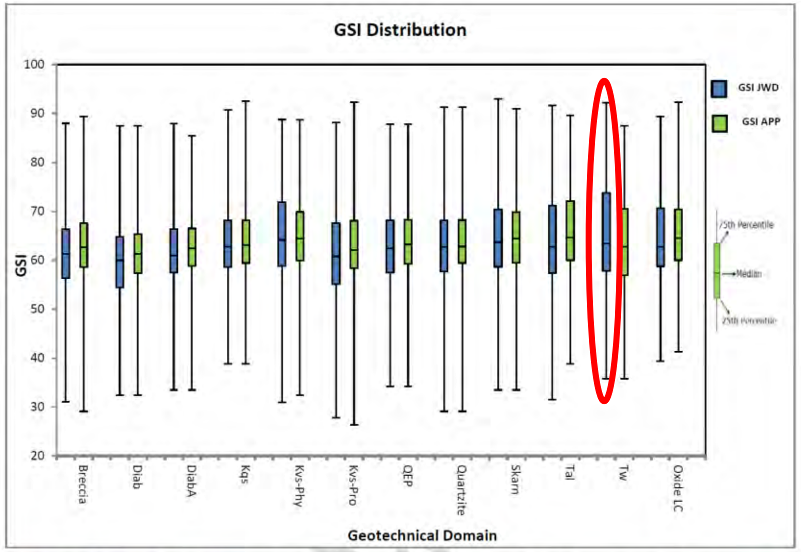
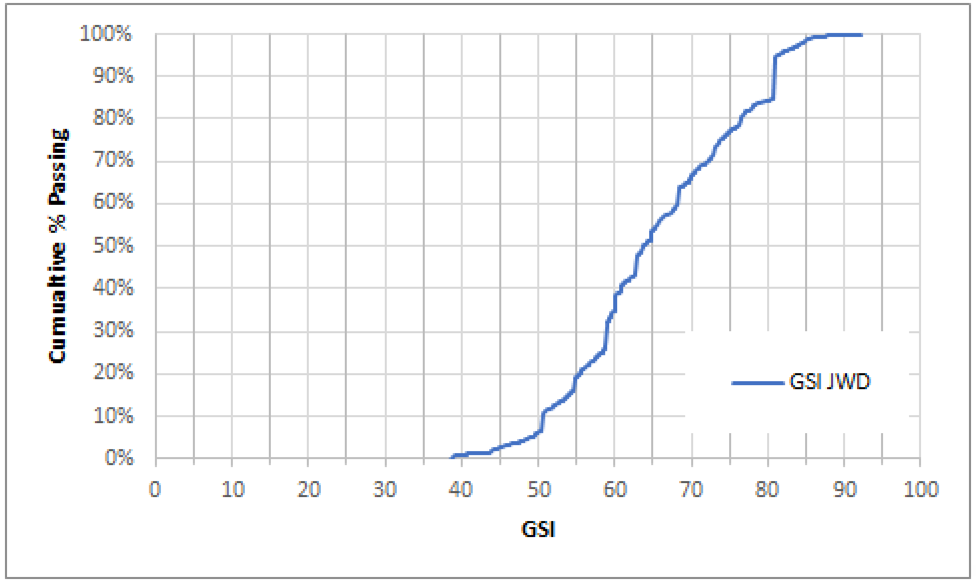


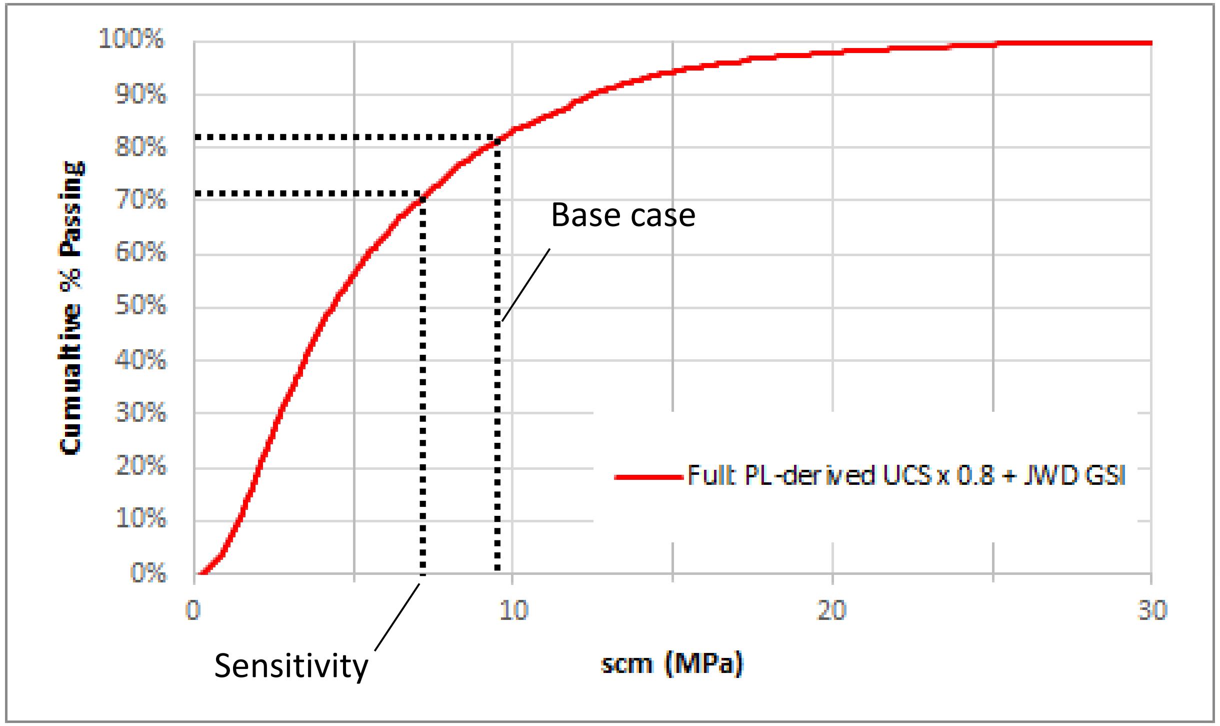
Figure 1-21 Distribution of GSI values for each geotechnical domain (block volume estimated from apparent joint spacing)



Rock Mass Strength: Monte Carlo Analysis

- UCS and GSI distributions sampled randomly and independently 5000 times (assumes no correlation between UCS and GSI)
- Sigcm (rock mass strength) calculated from each UCS-GSI pair
- Resulting distribution in sigcm reflects variability in rock mass strength at a much smaller scale than the cave
- **Base case: 82nd percentile (Sigcm=9.6 MPa)**
- **Sensitivity: 71st percentile (Sigcm 7.2 MPa)**

Estimated Range in Rock Mass Strength (sigcm) for Whitetail



Sensitivity: Use of 75% Strength

Read, John, and Peter Stacey. *Guidelines for open pit slope design*. CSIRO publishing, 2009

Table 9.9: Typical FoS and PoF acceptance criteria values

		Acceptance criteria[a]		
Slope scale	**Consequences of failure**	**FoS (min) (static)**	**FoS (min) (dynamic)**	**PoF (max) P[FoS ≤ 1]**
Bench	Low–high[b]	1.1	NA	25–50%
Inter-ramp	Low	1.15–1.2	1.0	25%
	Medium	1.2	1.0	20%
	High	1.2–1.3	1.1	10%
Overall	Low	1.2–1.3	1.0	15–20%
	Medium	1.3	1.05	5–10%
	High	1.3–1.5	1.1	≤5%

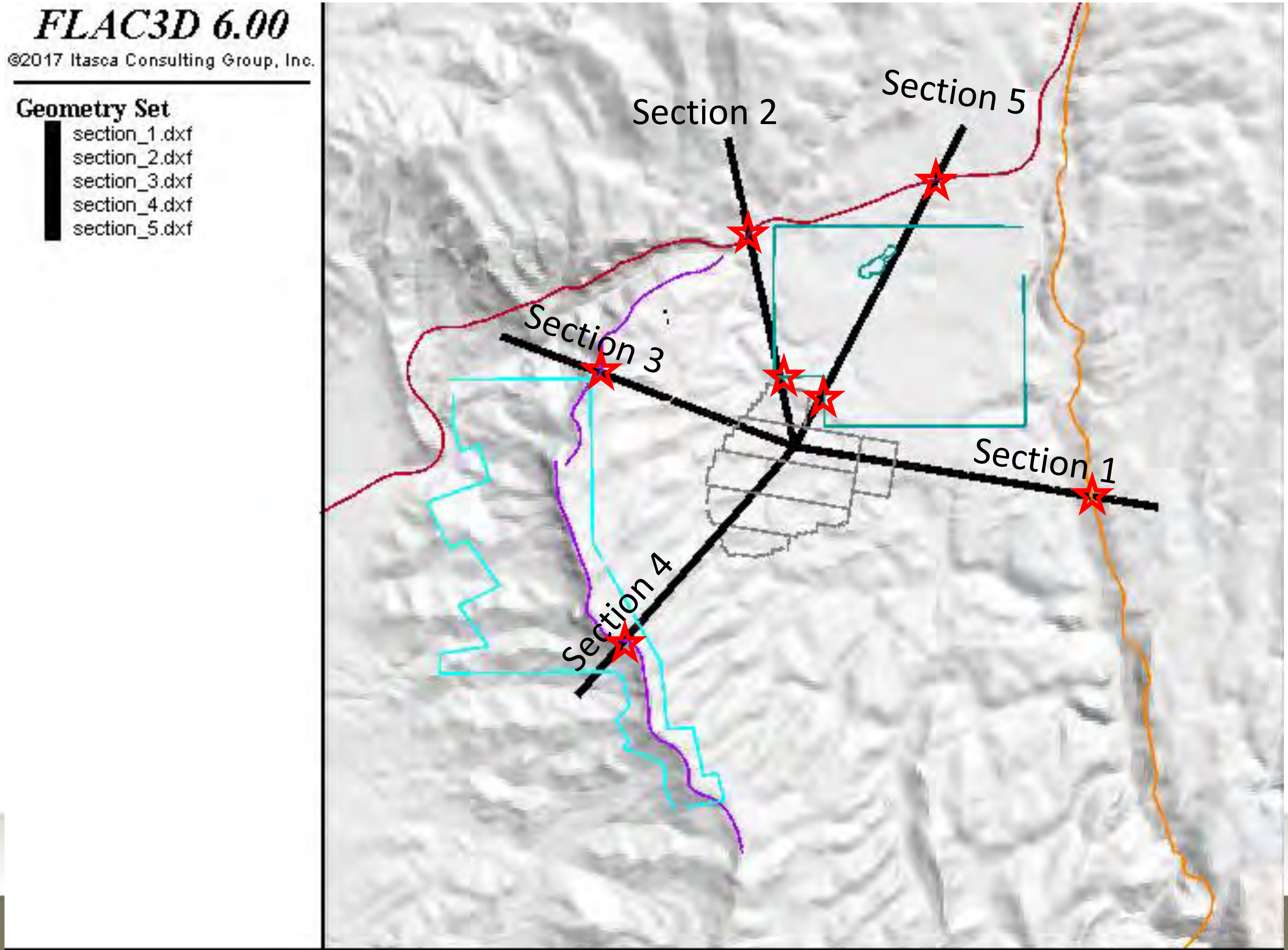
a: Needs to meet all acceptance criteria
b: Semi-quantitatively evaluated (see Figure 13.9)

CAVING PREDICTIONS FOR RESOLUTION COPPER MINE

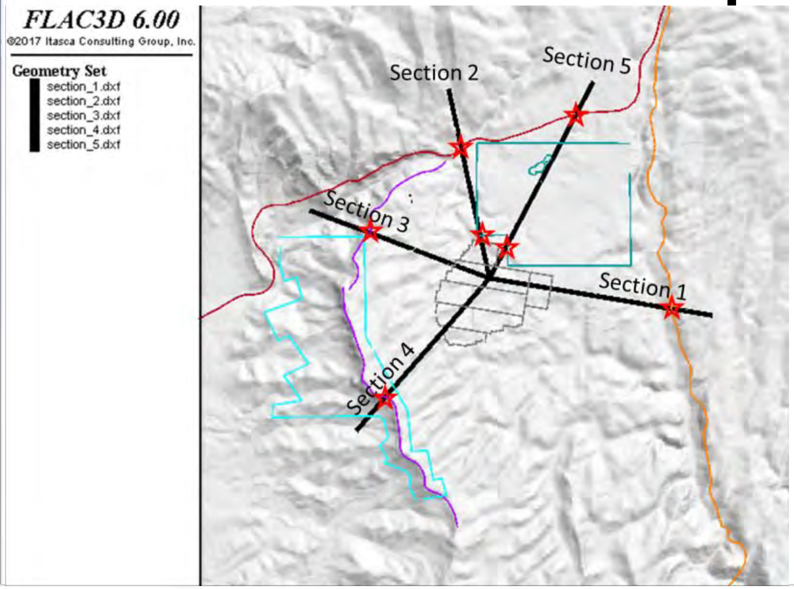
ADDITIONAL INFORMATION AT YR 41

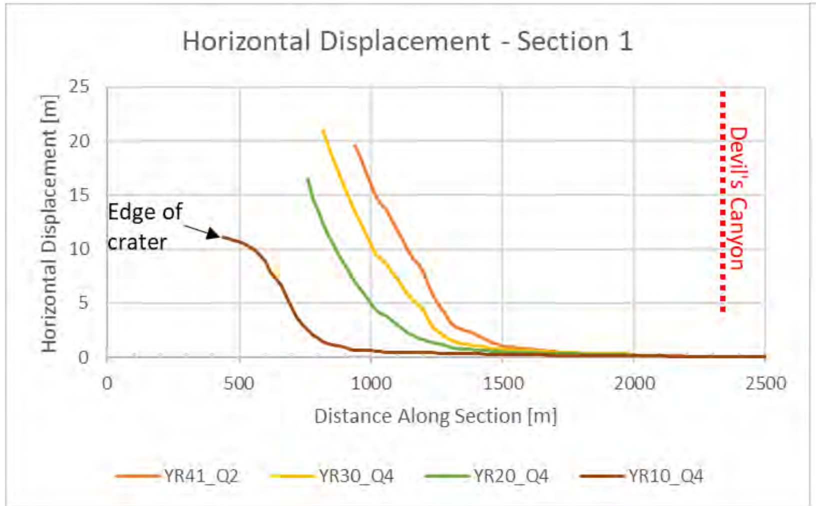
BASE CASE, SENSITIVITY 1, 3 AND 4

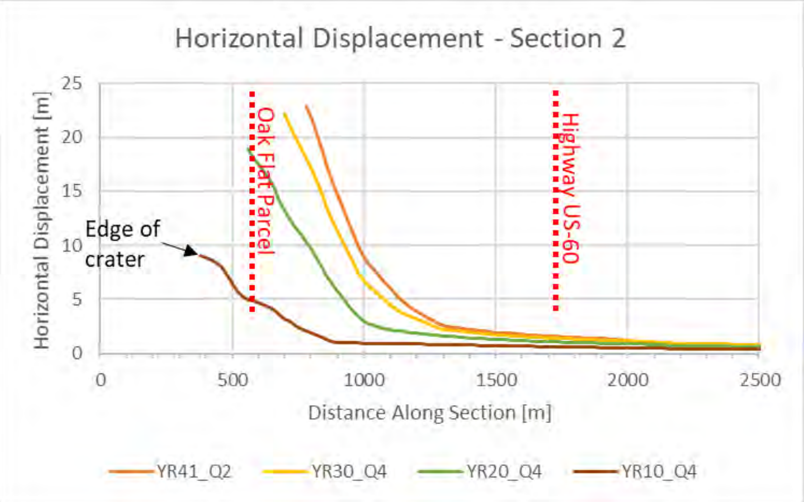
Sections Examined

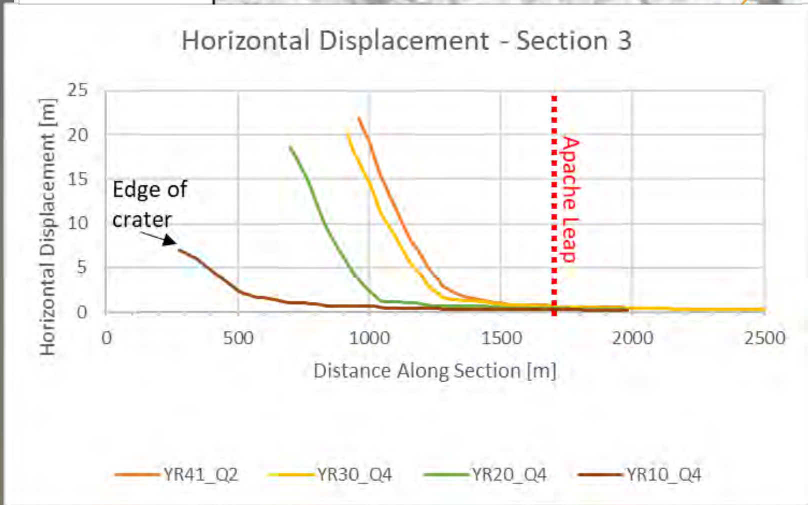


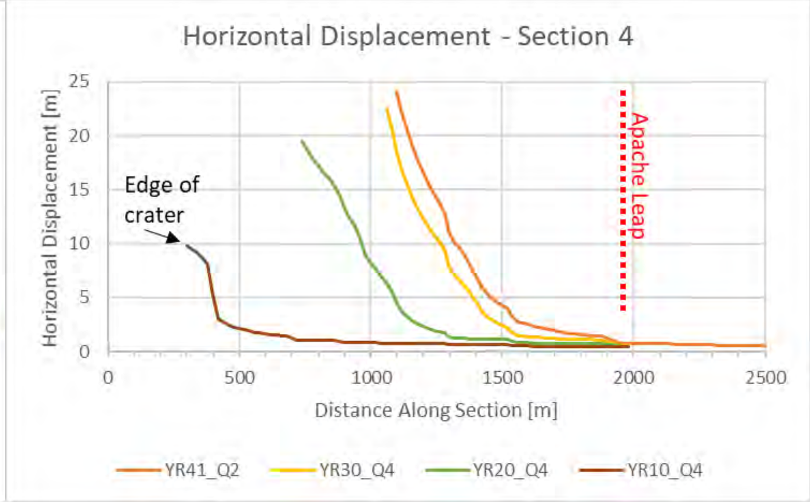
Horizontal Displacement Over Time – Sensitivity 1

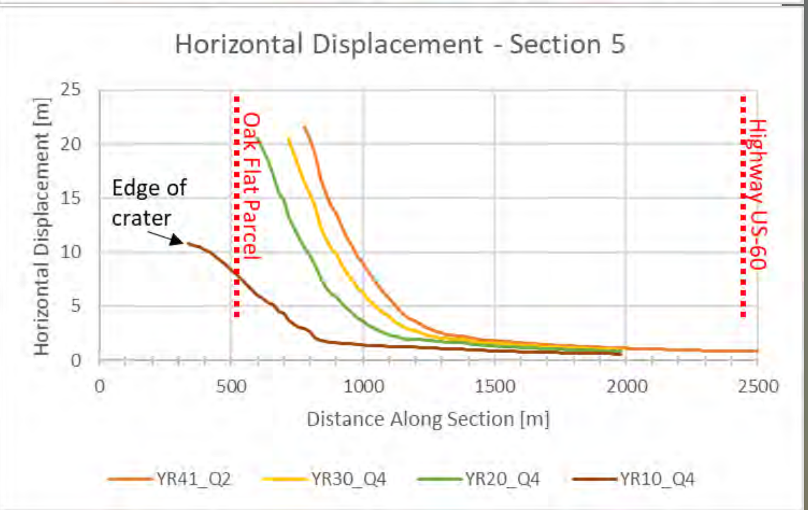




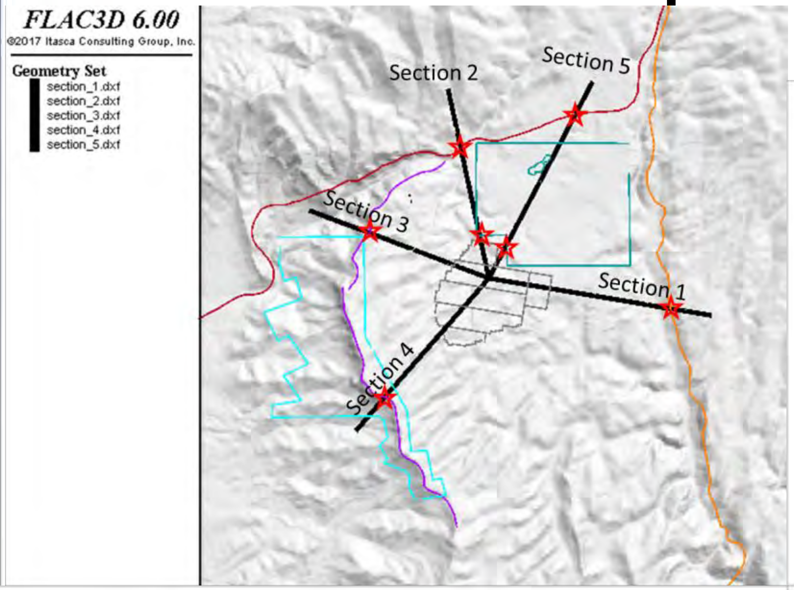


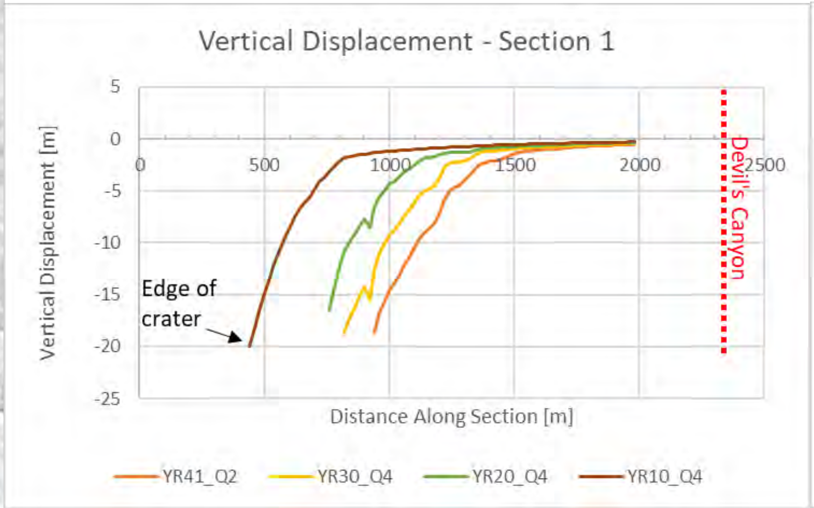


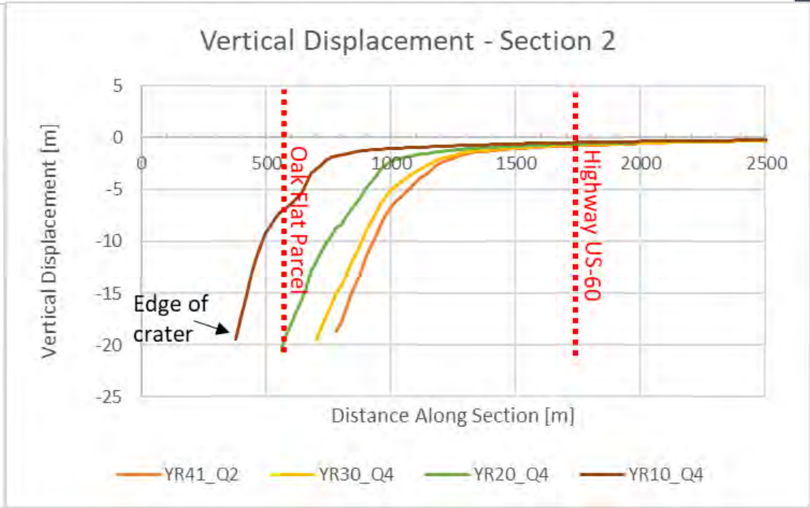


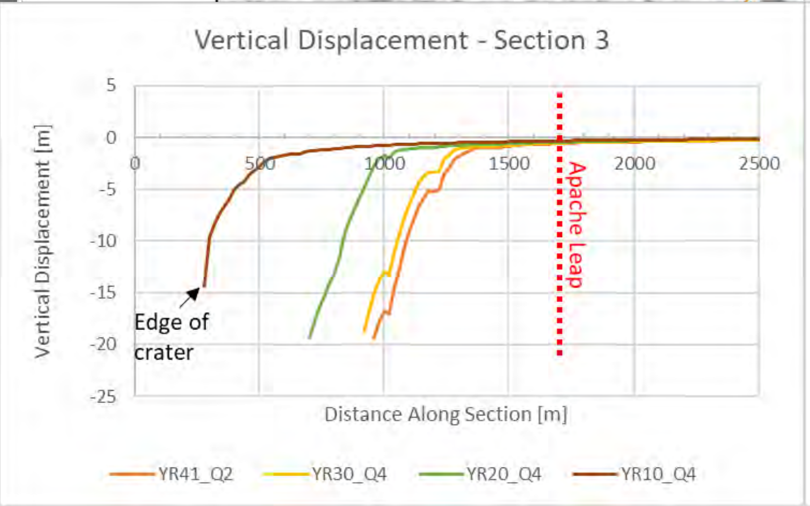


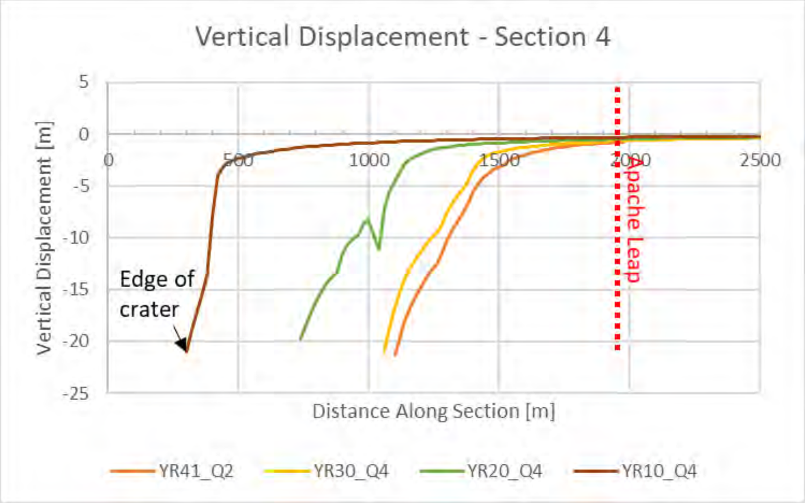
Vertical Displacement Over Time – Sensitivity 1

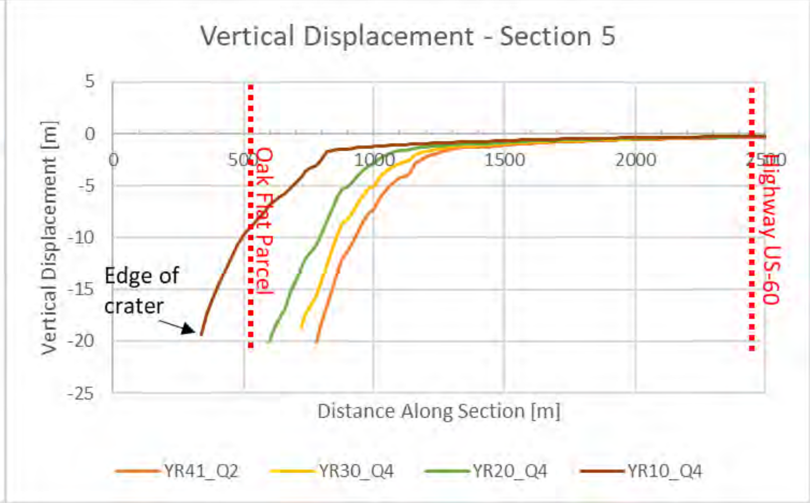




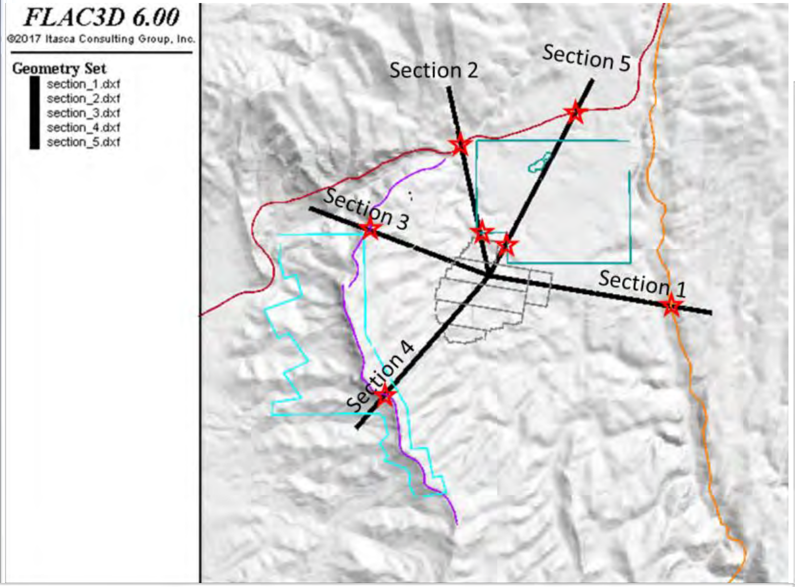


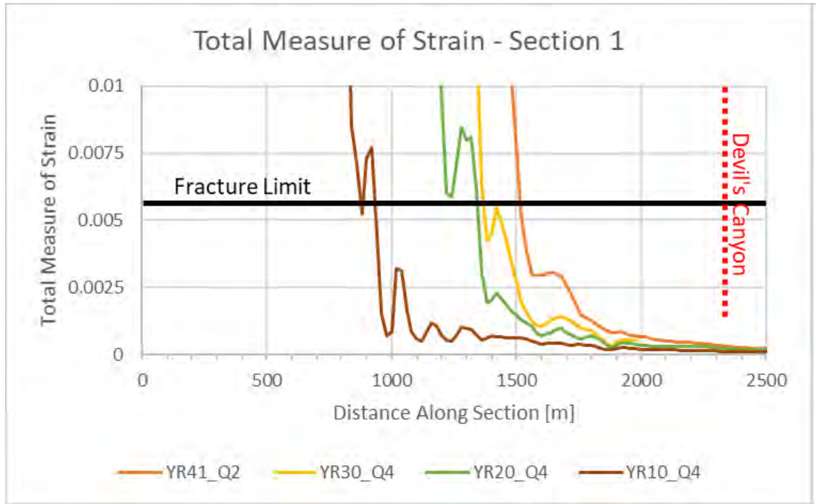


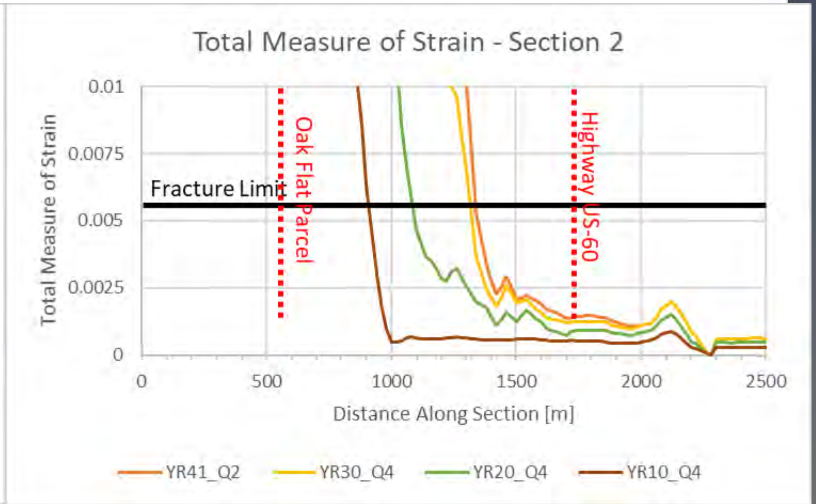


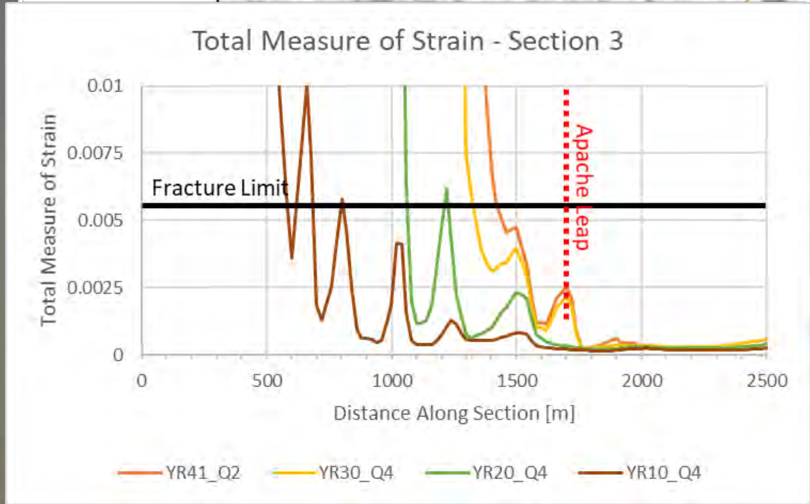


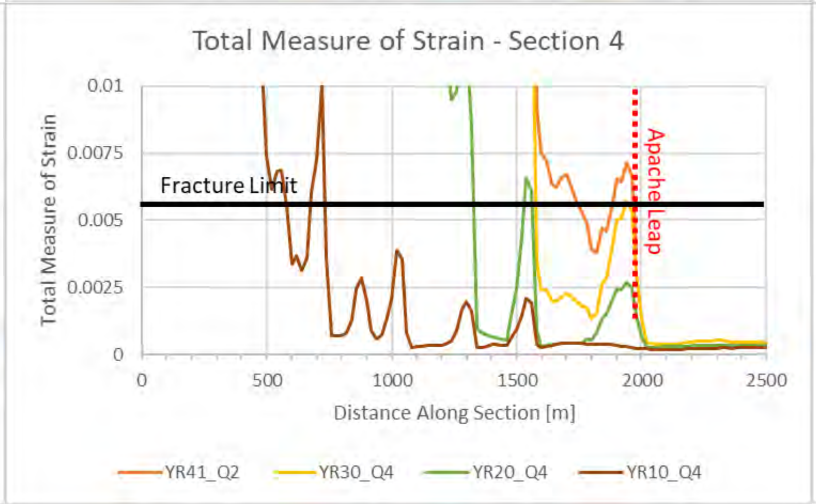
Fracture Limit Over Time – Sensitivity 1

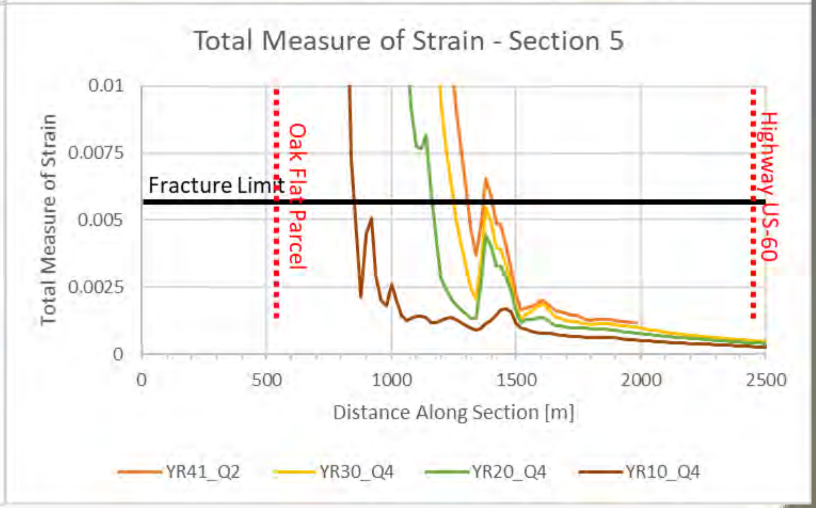




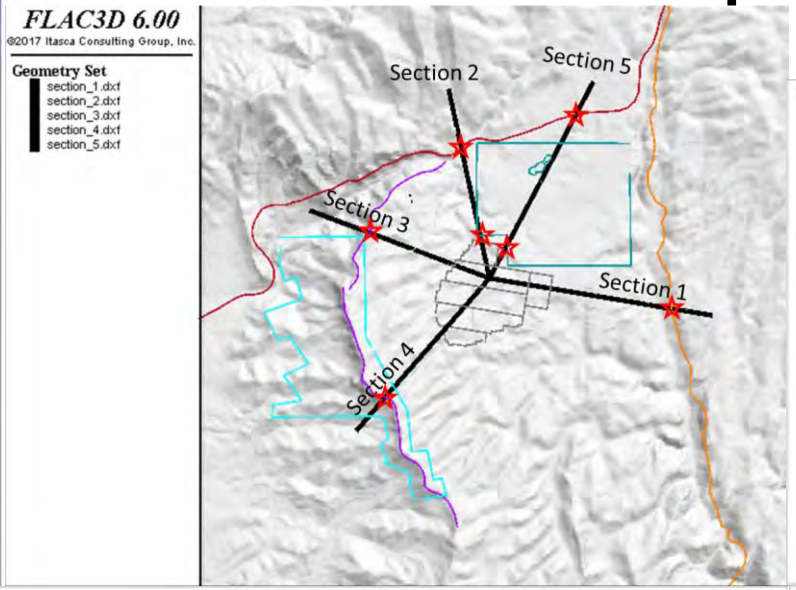


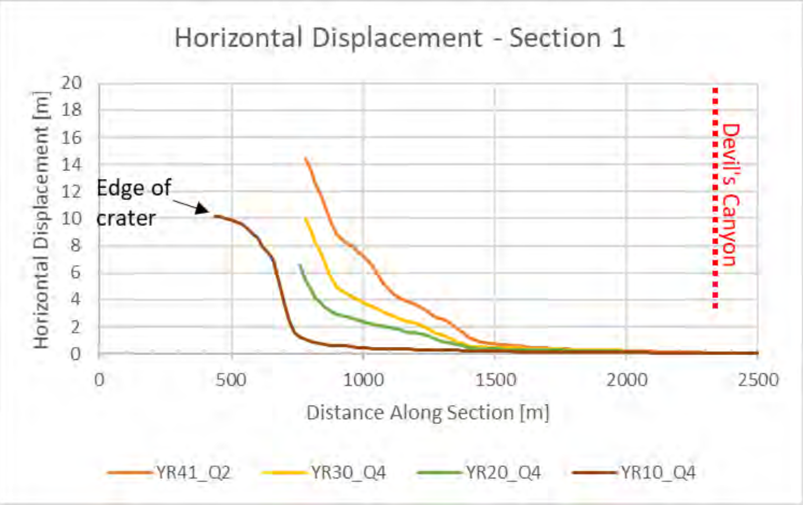


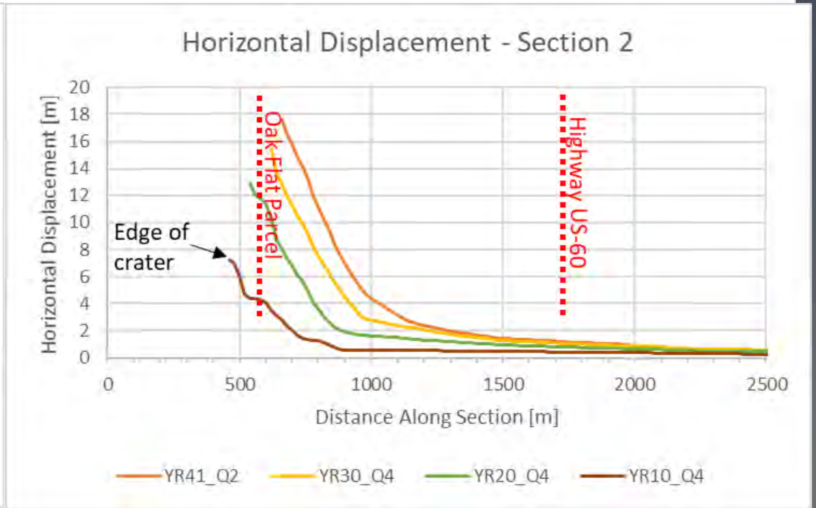


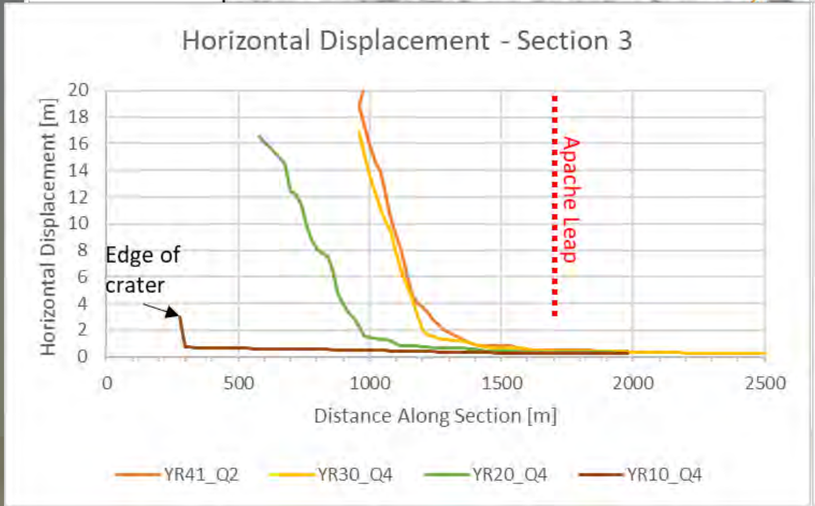


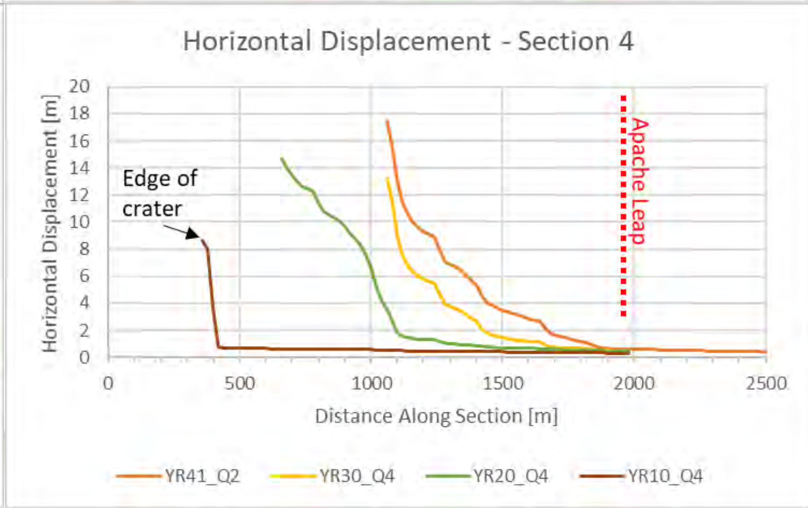
Horizontal Displacement Over Time – Sensitivity 3

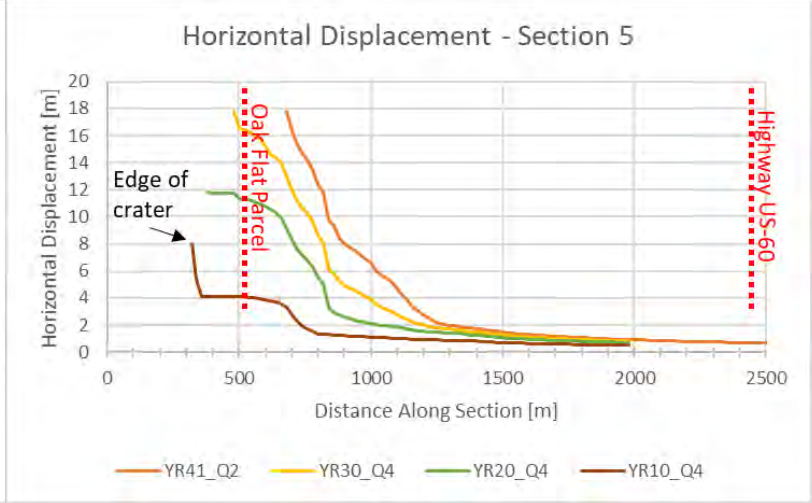




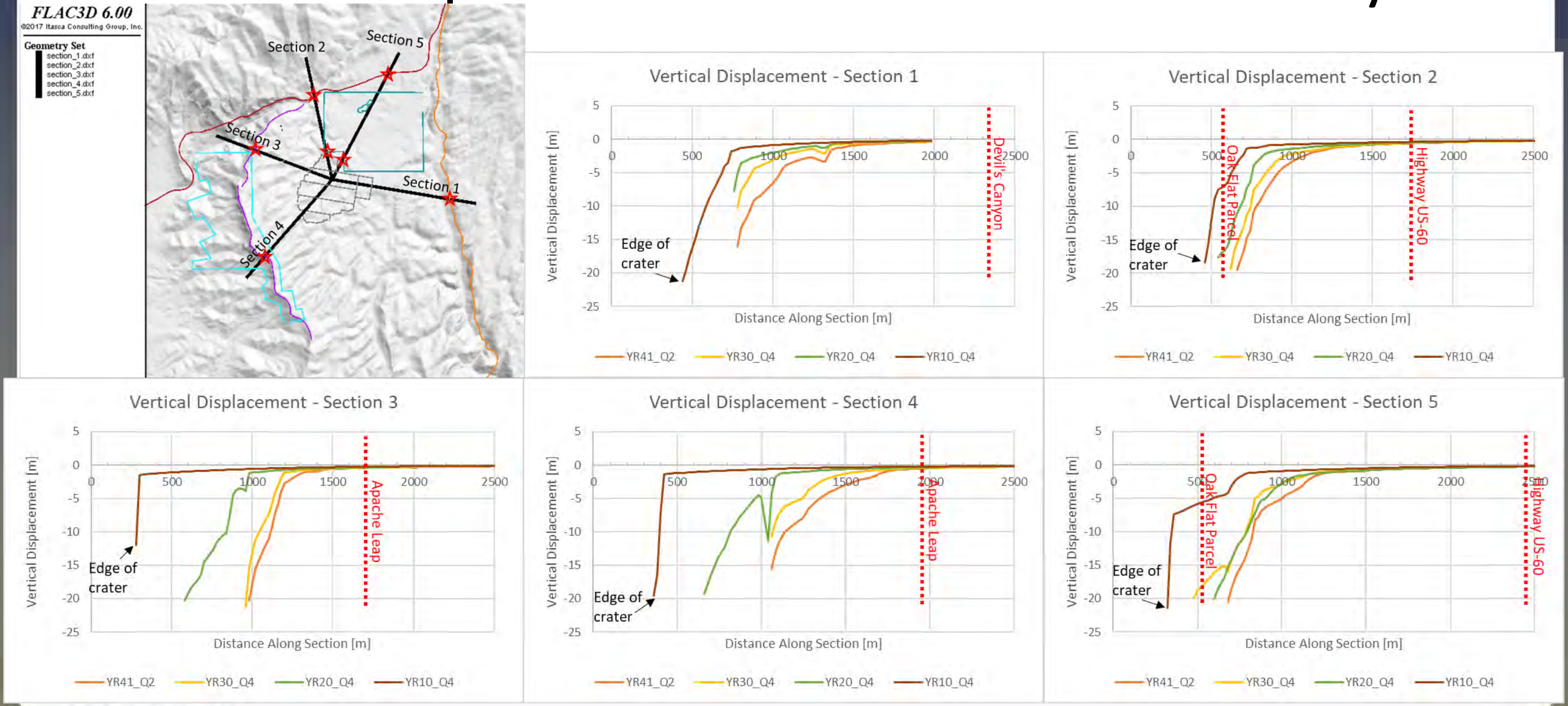




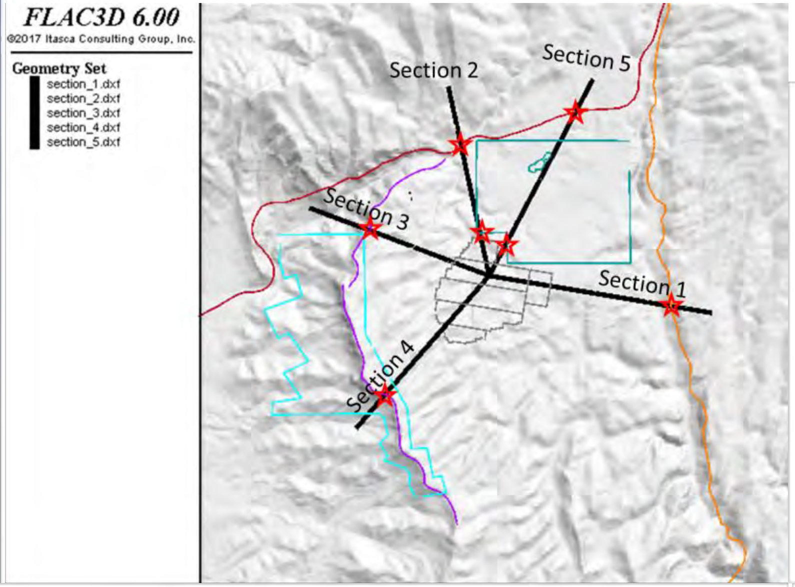


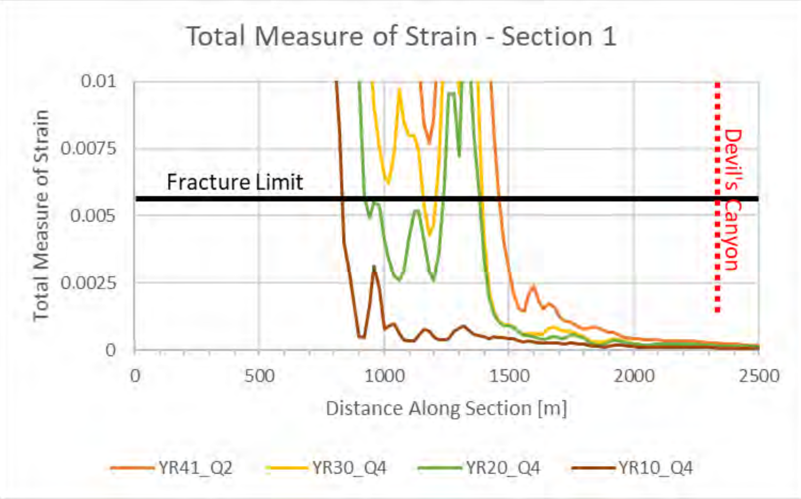


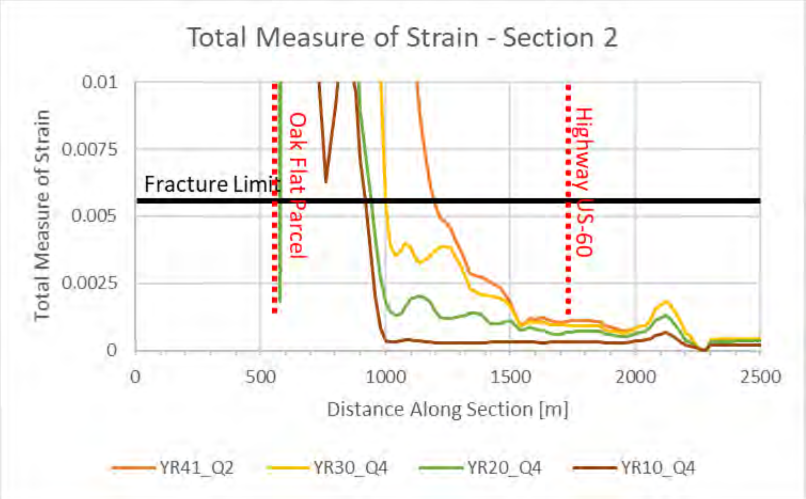
Vertical Displacement Over Time – Sensitivity 3

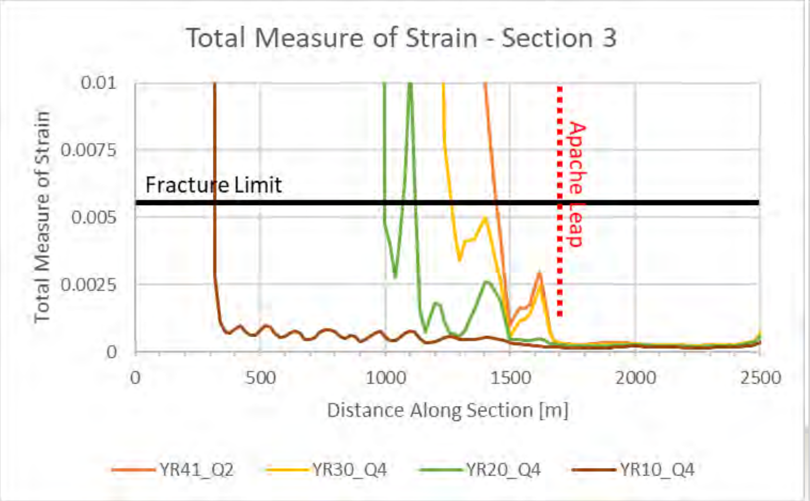


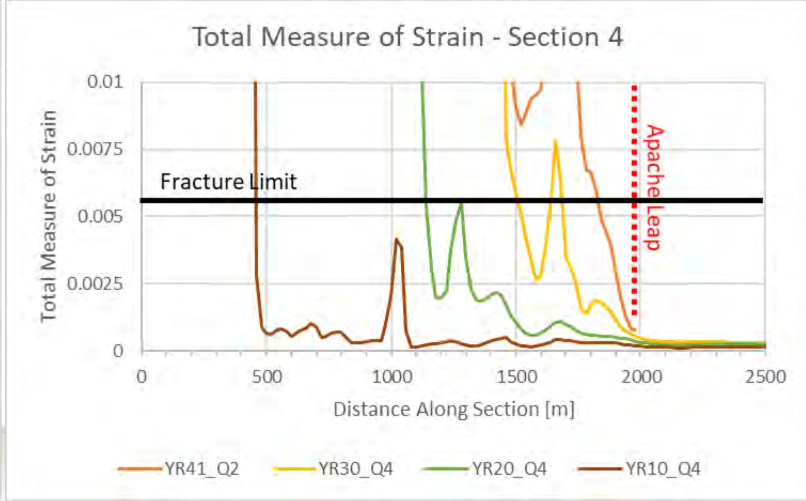
Fracture Limit Over Time – Sensitivity 3

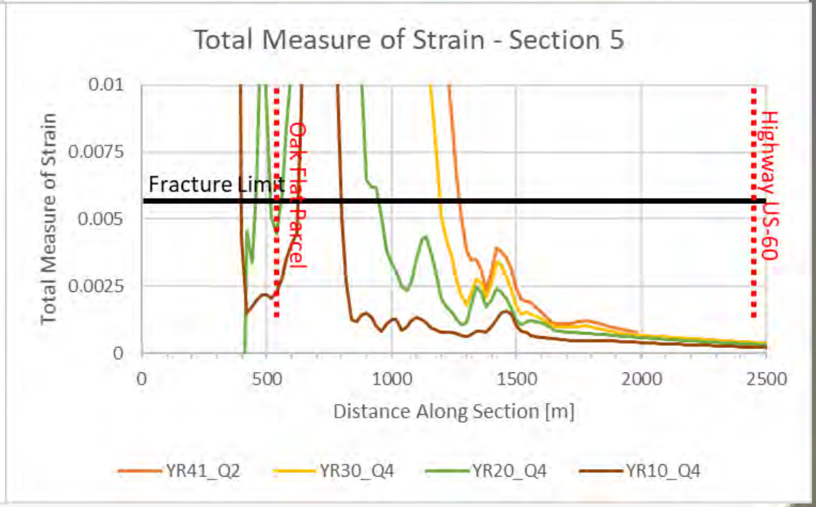




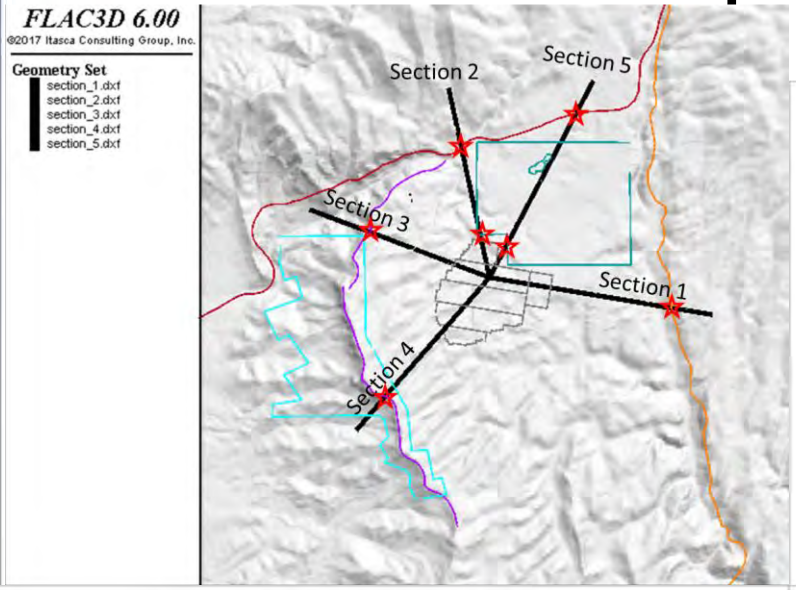


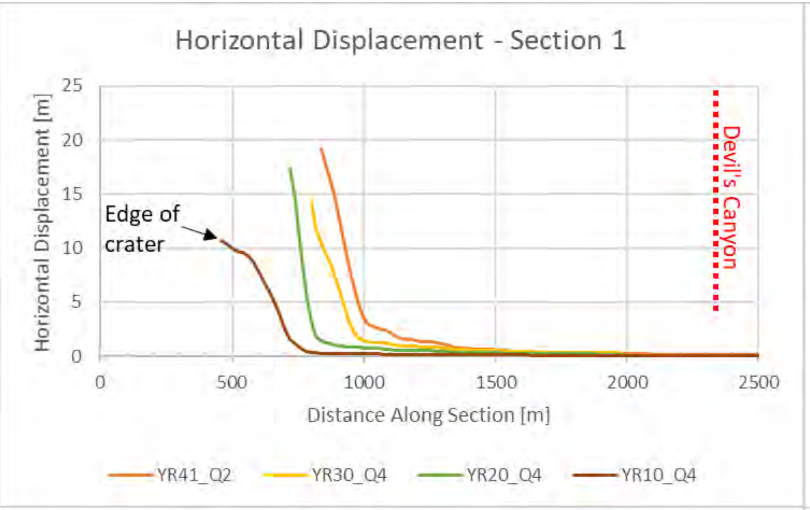


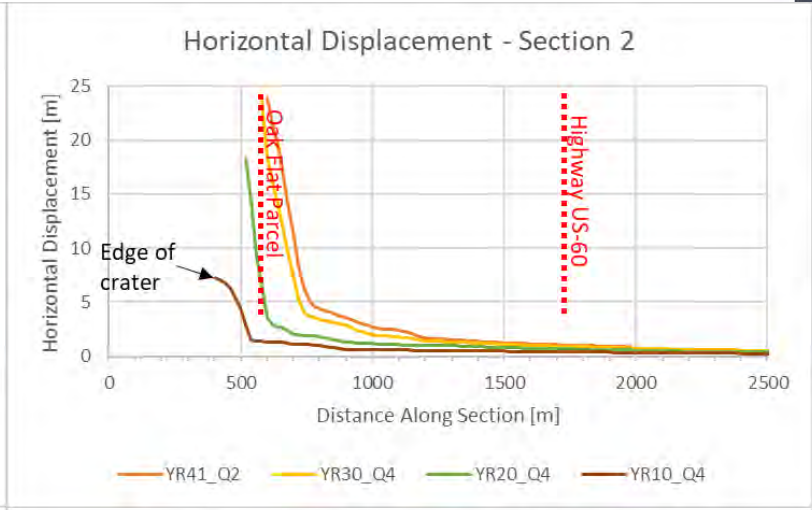


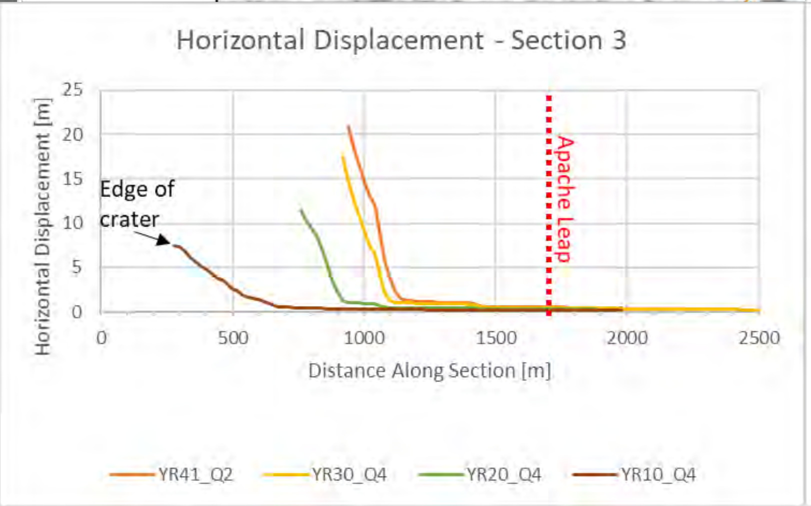


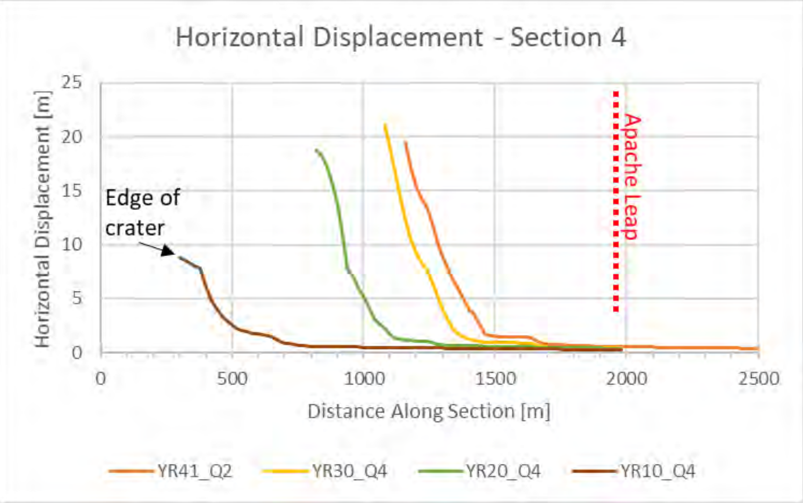
Horizontal Displacement Over Time – Sensitivity 4

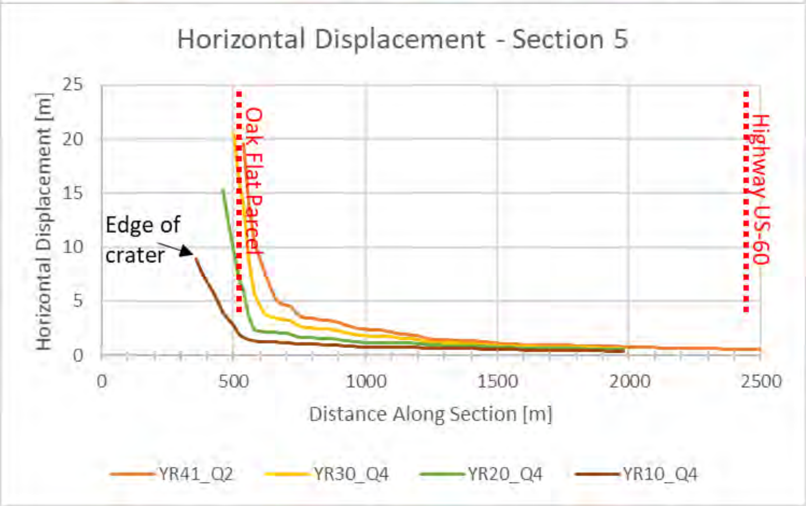




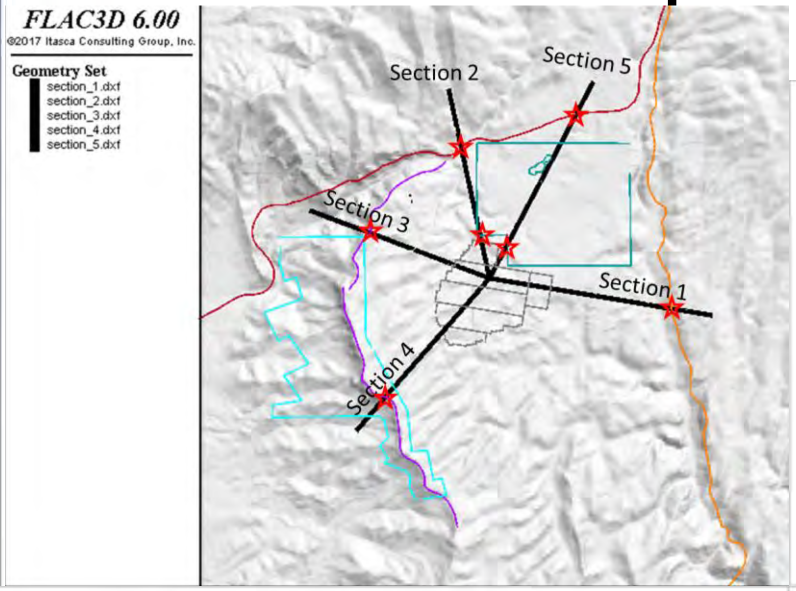


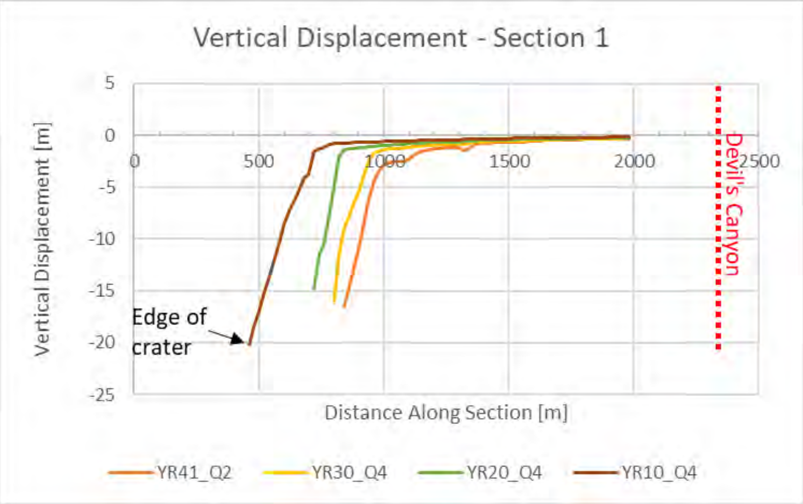


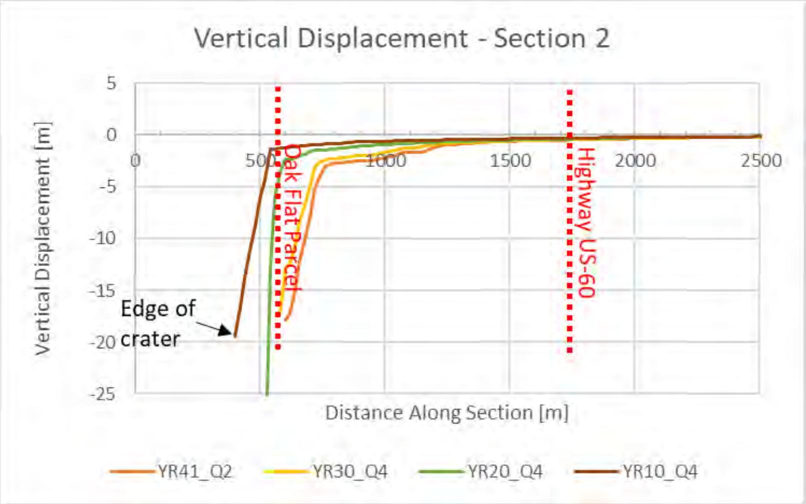


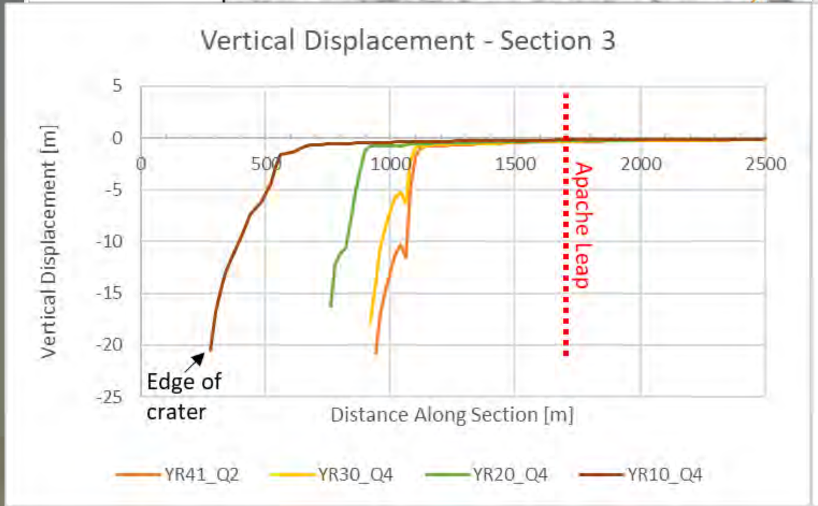


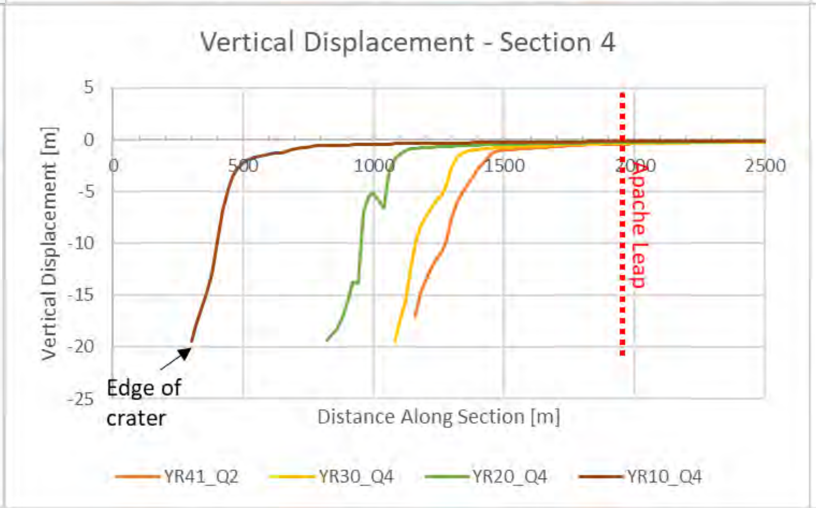
Vertical Displacement Over Time – Sensitivity 4

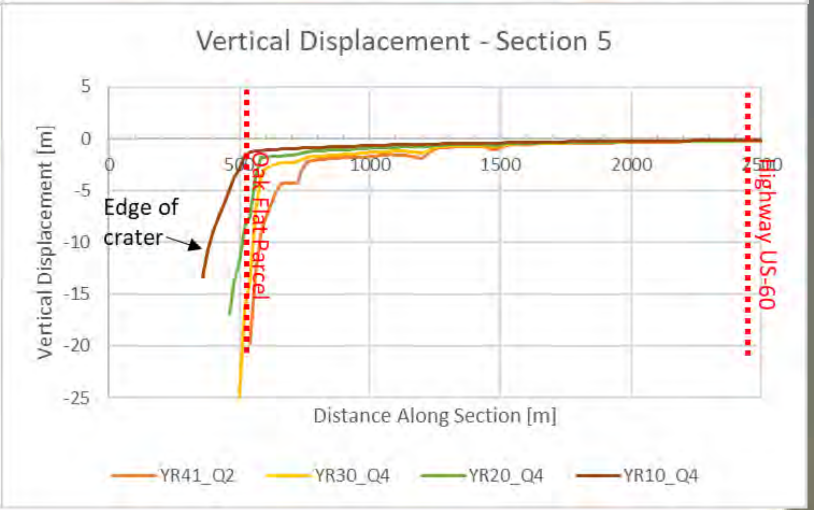




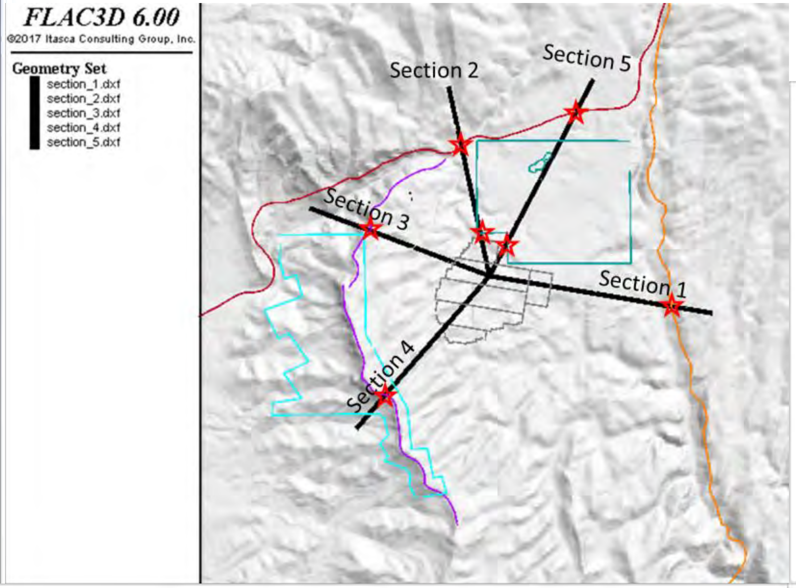


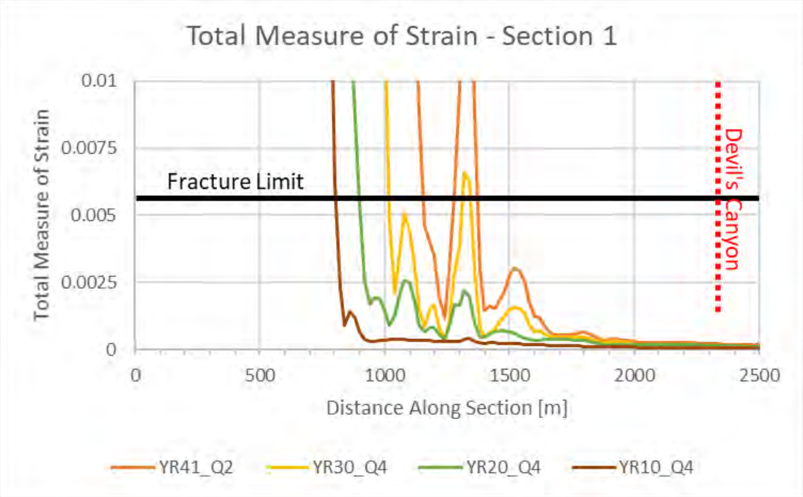


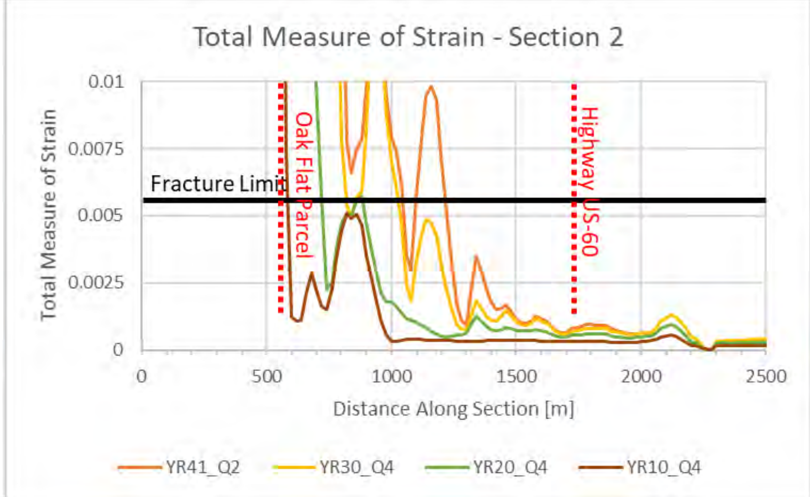


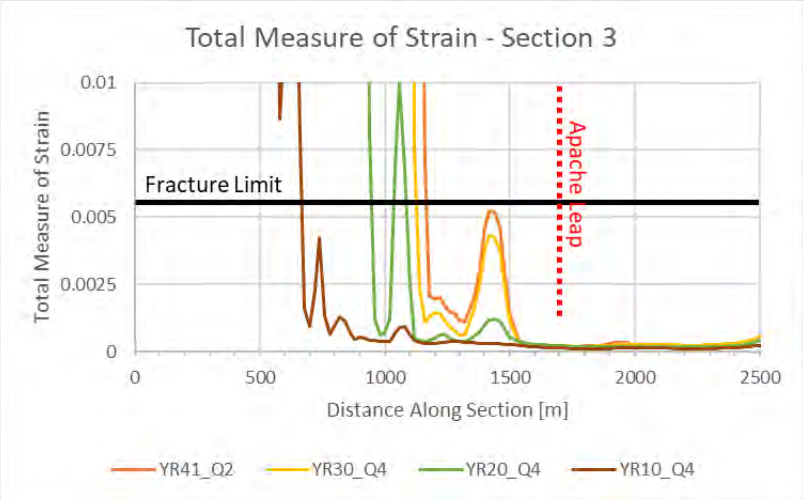


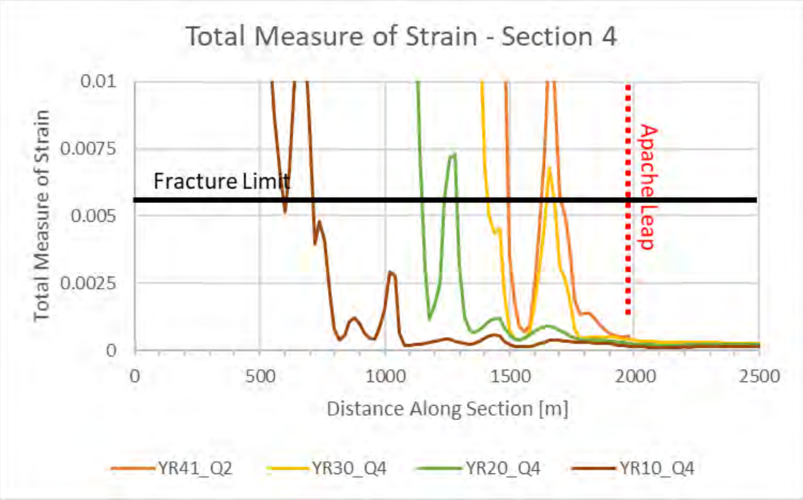
Fracture Limit Over Time – Sensitivity 4

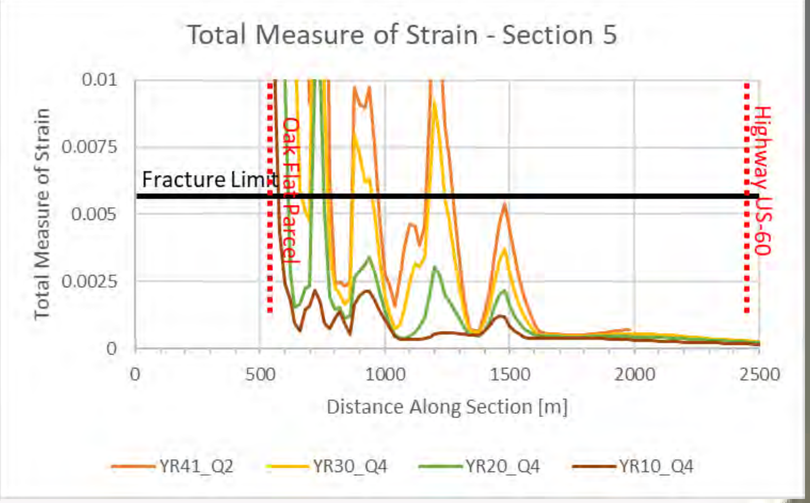


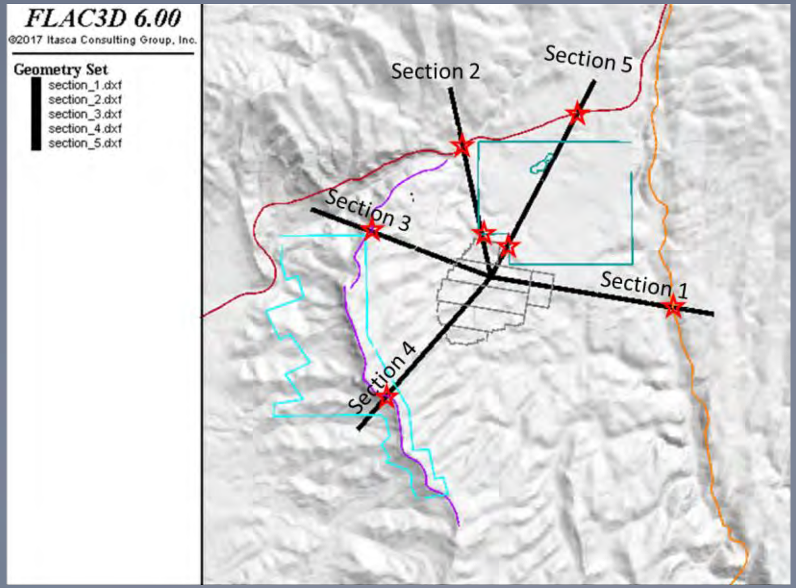






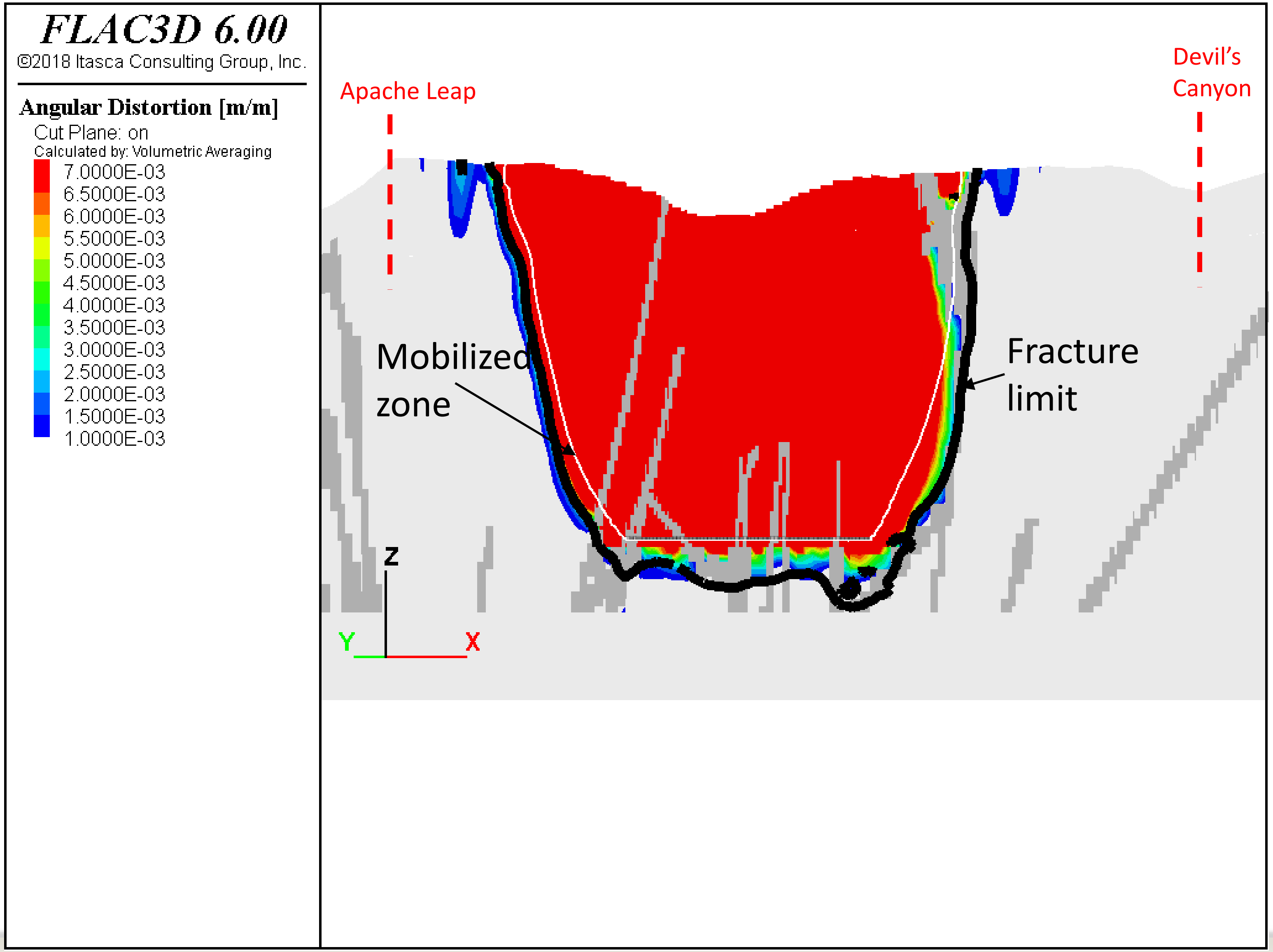


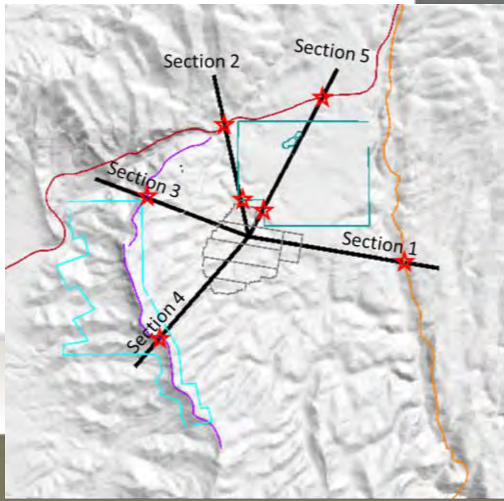




ANGULAR DISTORTION
BASE CASE

Base Case





angular_dist_sec3_YR41_Q2.sav

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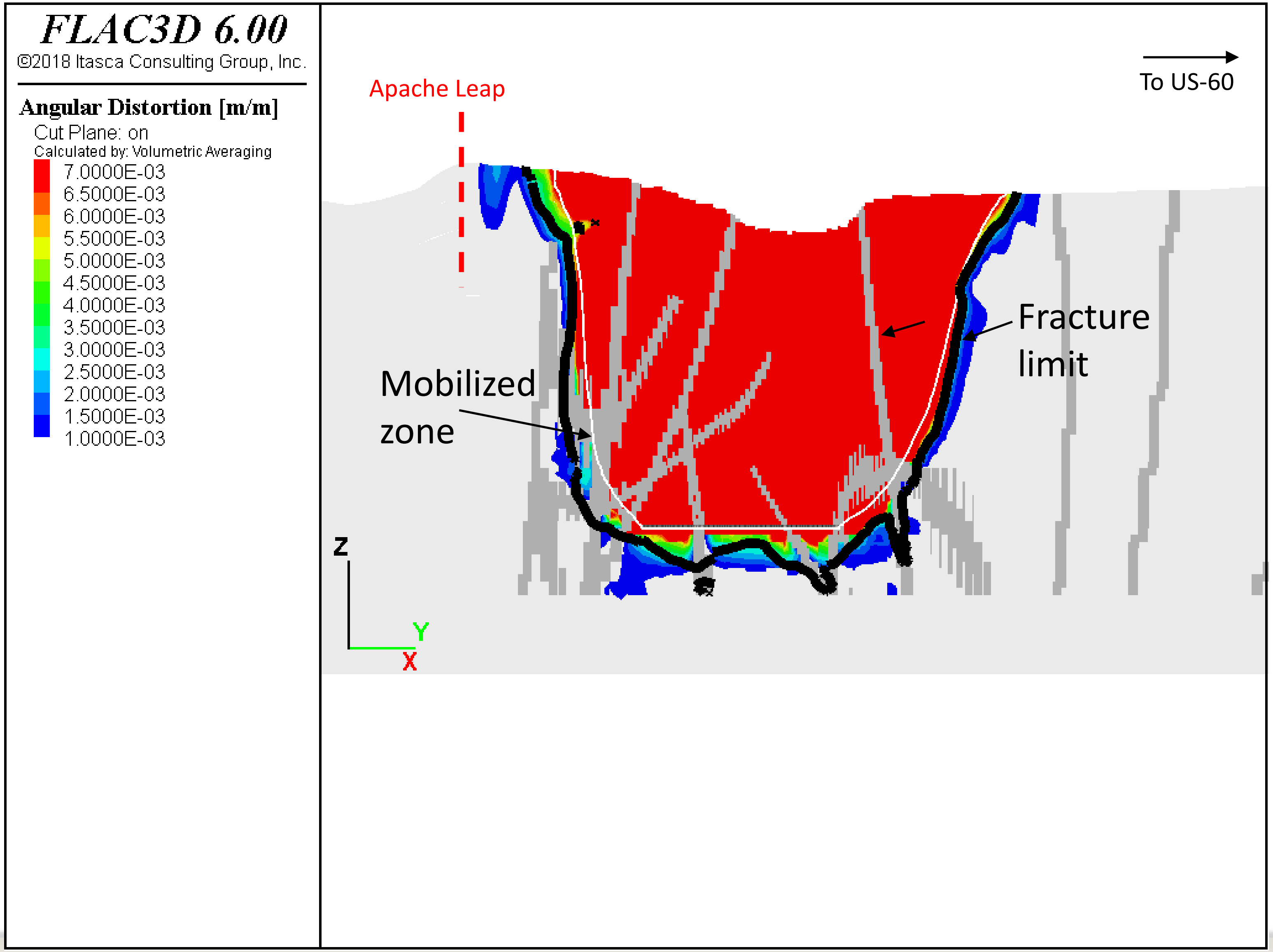
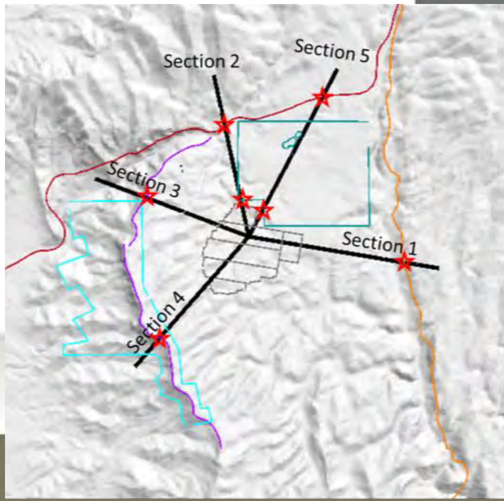
Base Case





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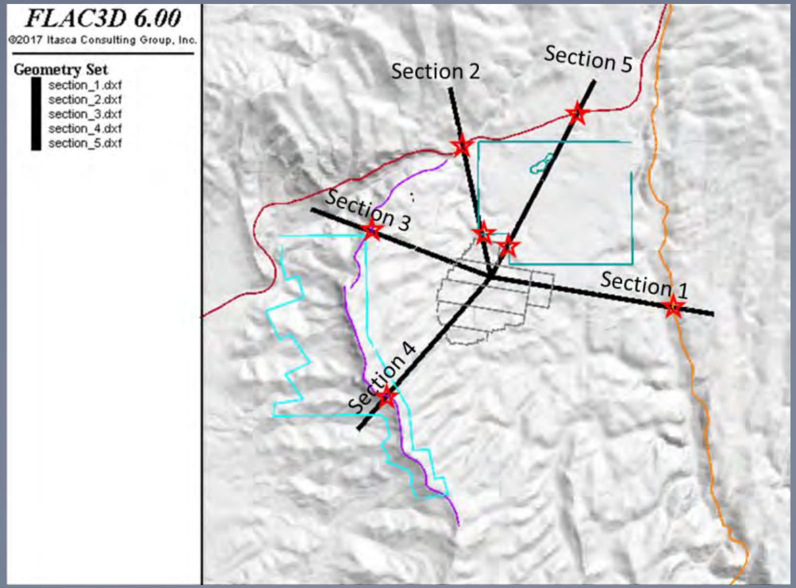
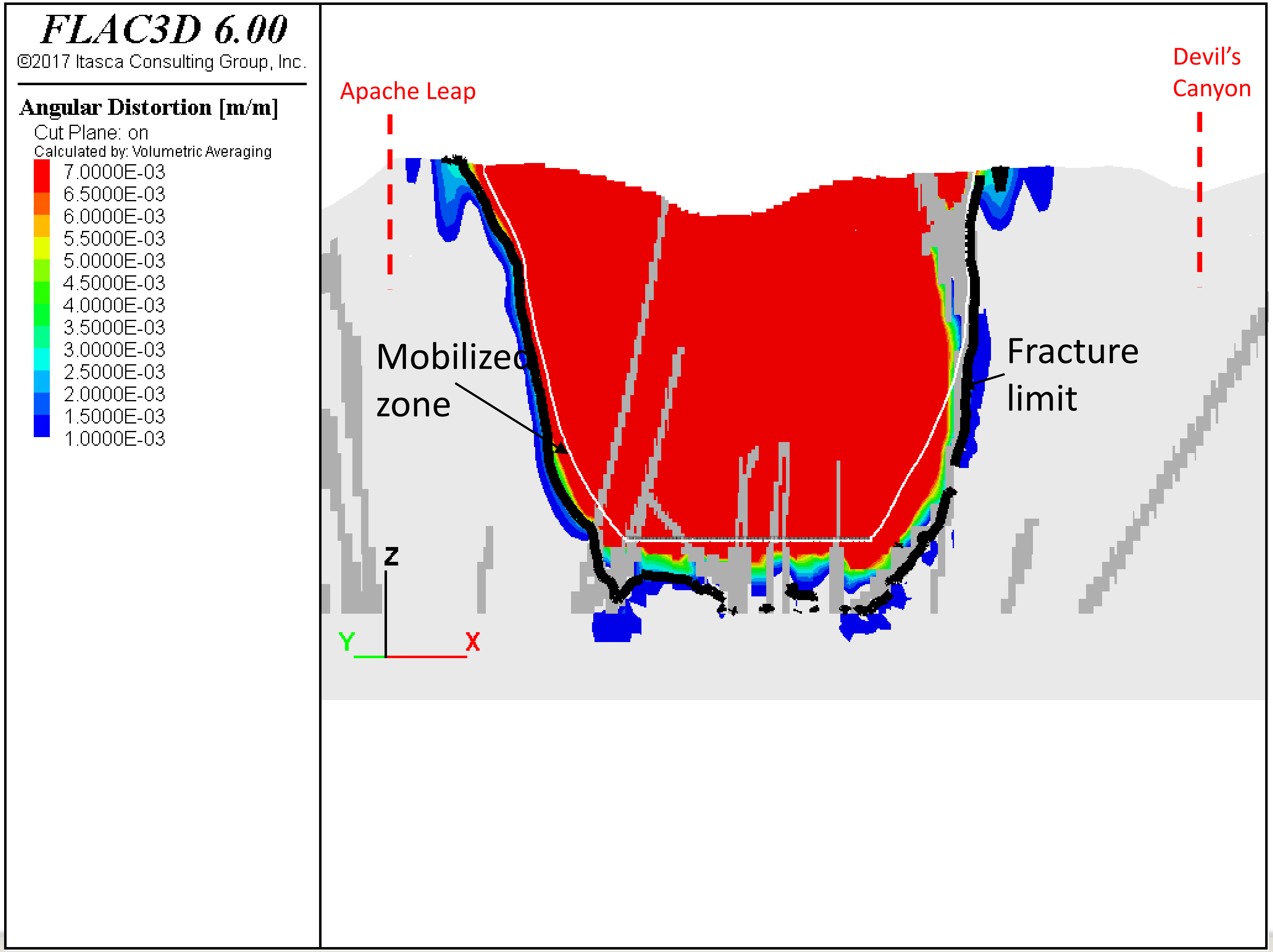


ANGULAR DISTORTION SENSITIVITY 1

Sensitivity 1 (75% Sigma_cm)



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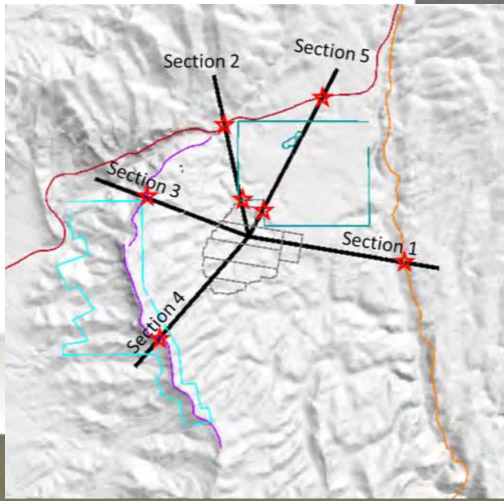

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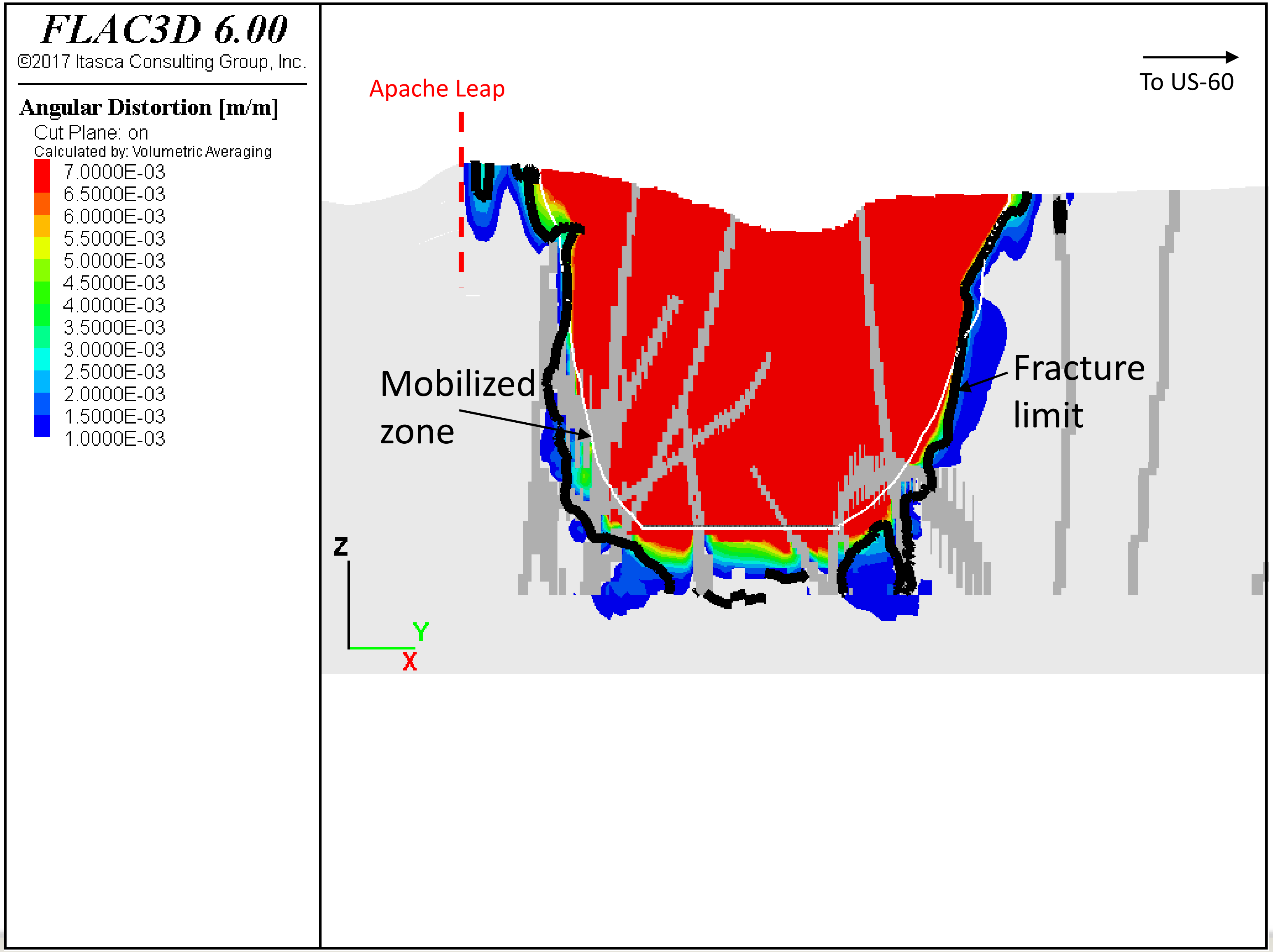
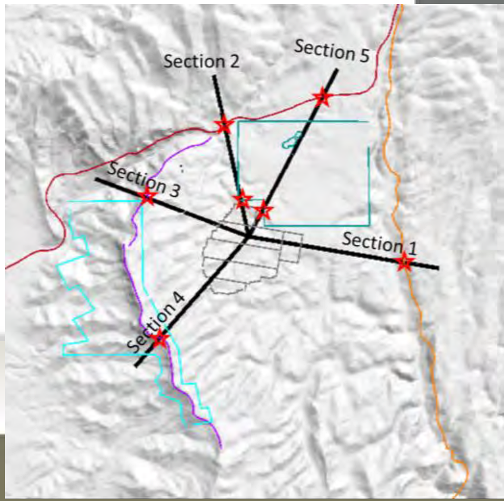
Sensitivity 1 (75% Sigma_cm)





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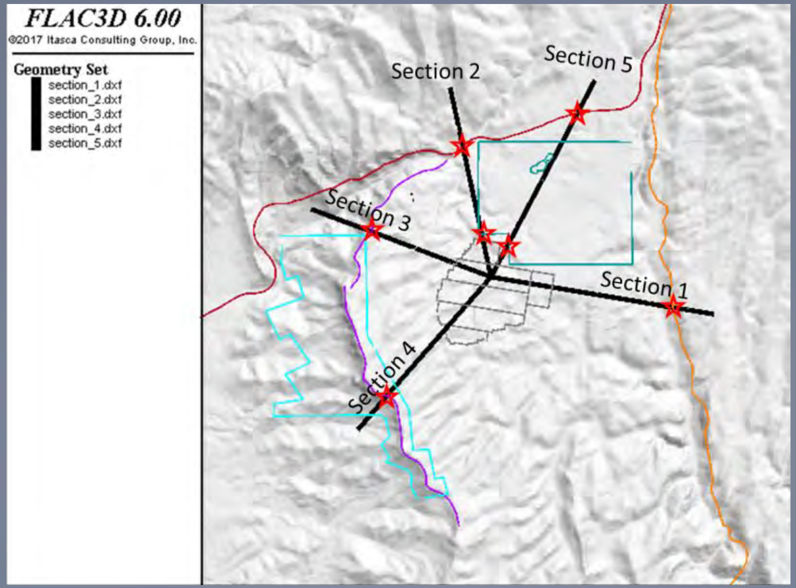
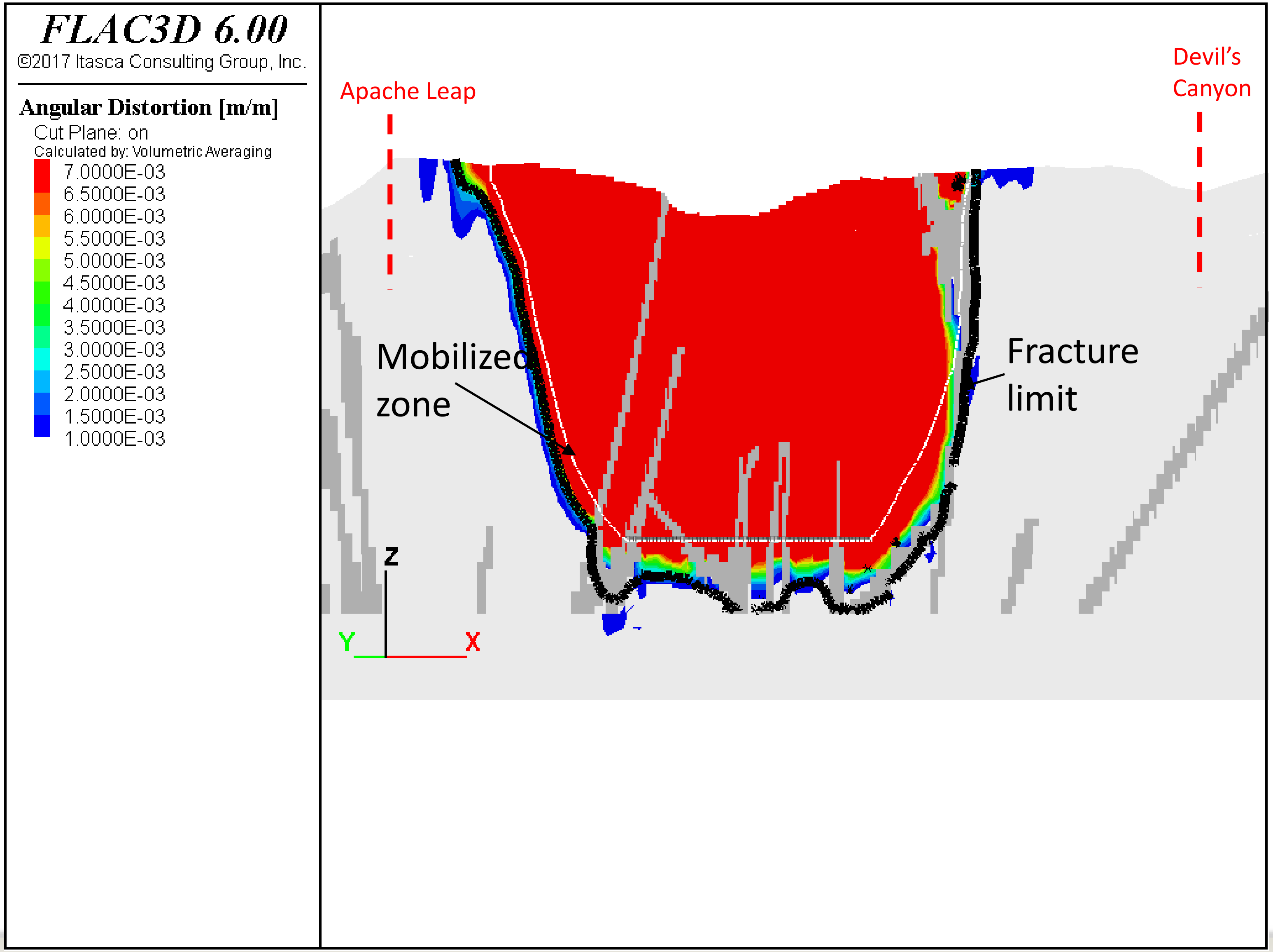
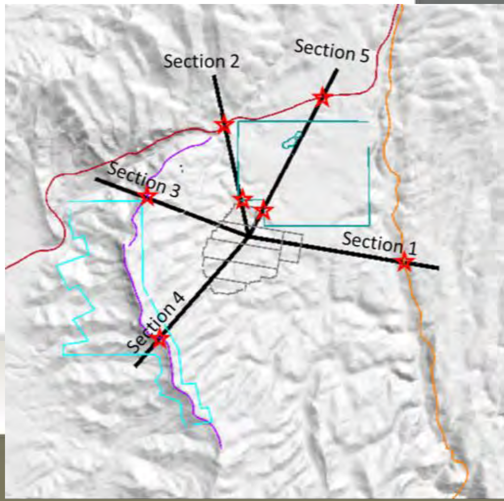


ANGULAR DISTORTION SENSITIVITY 3

Sensitivity 3 (Weaker Fault Strength)





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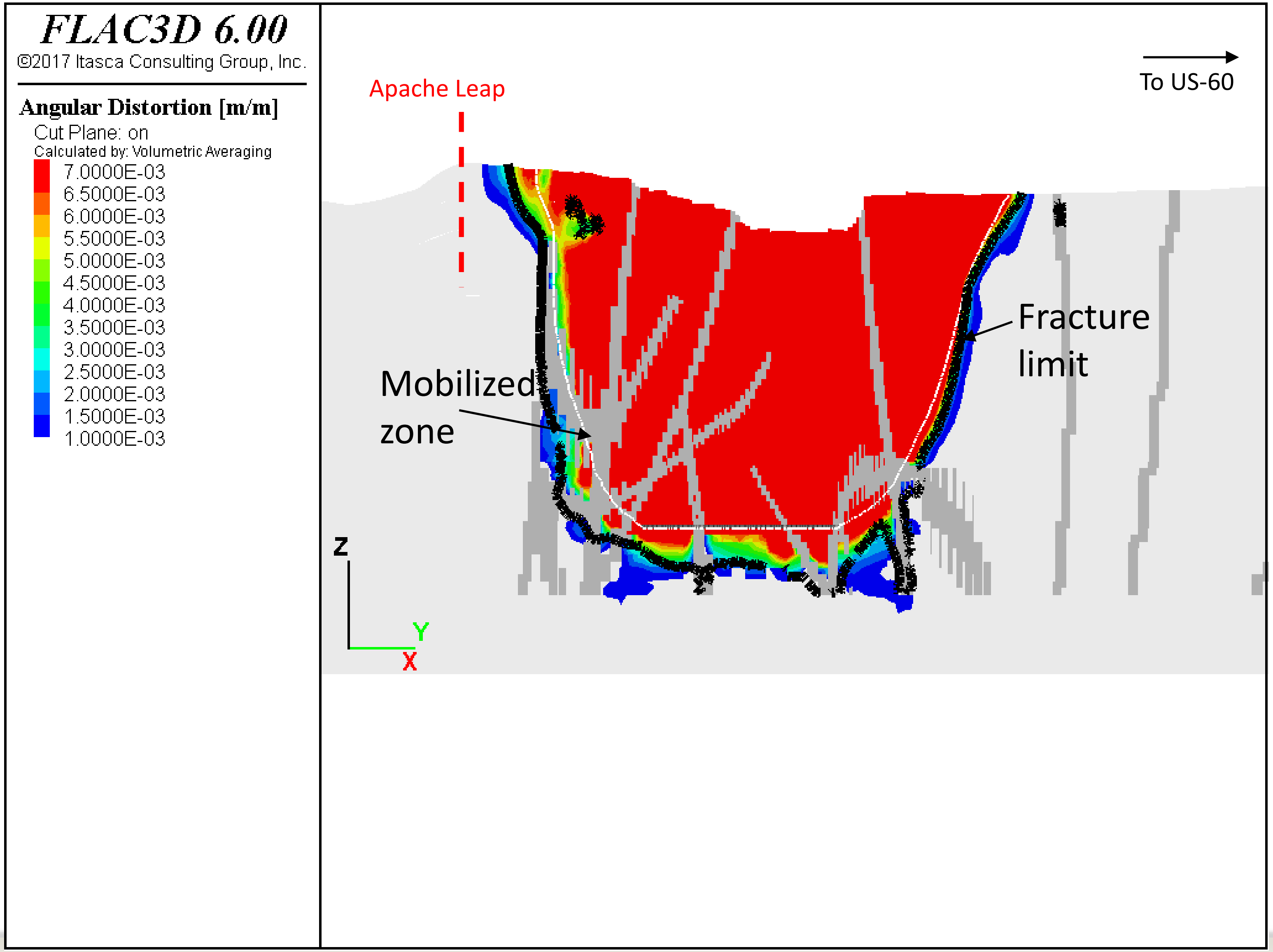
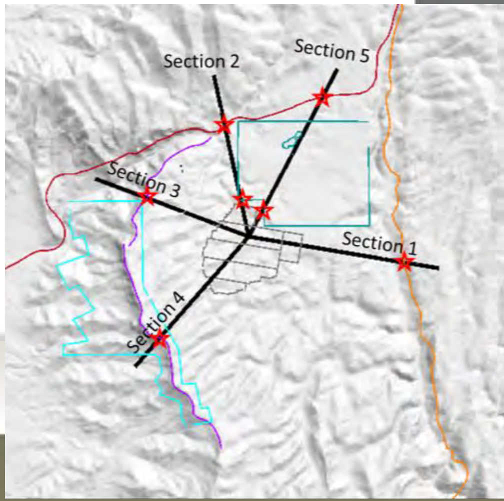
angular_dist_sec3_subsidence_sec3_4_YR41.sav

Sensitivity 3 (Weaker Fault Strength)





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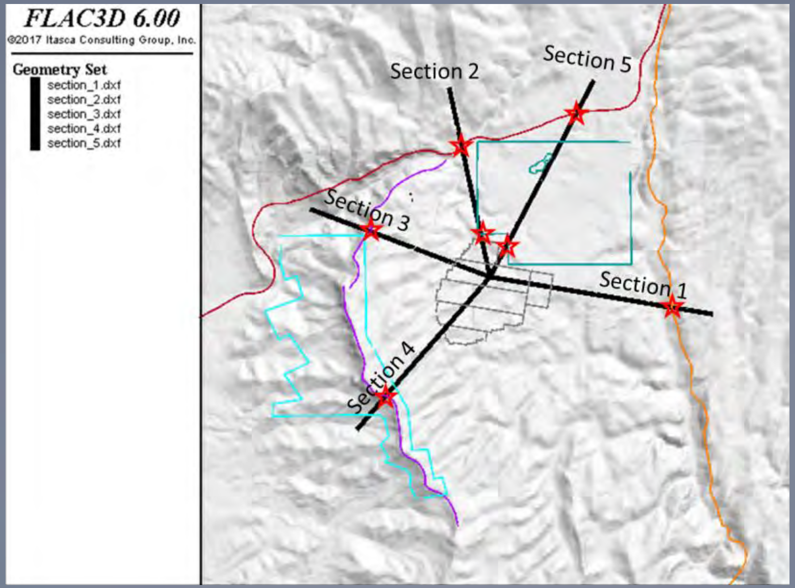
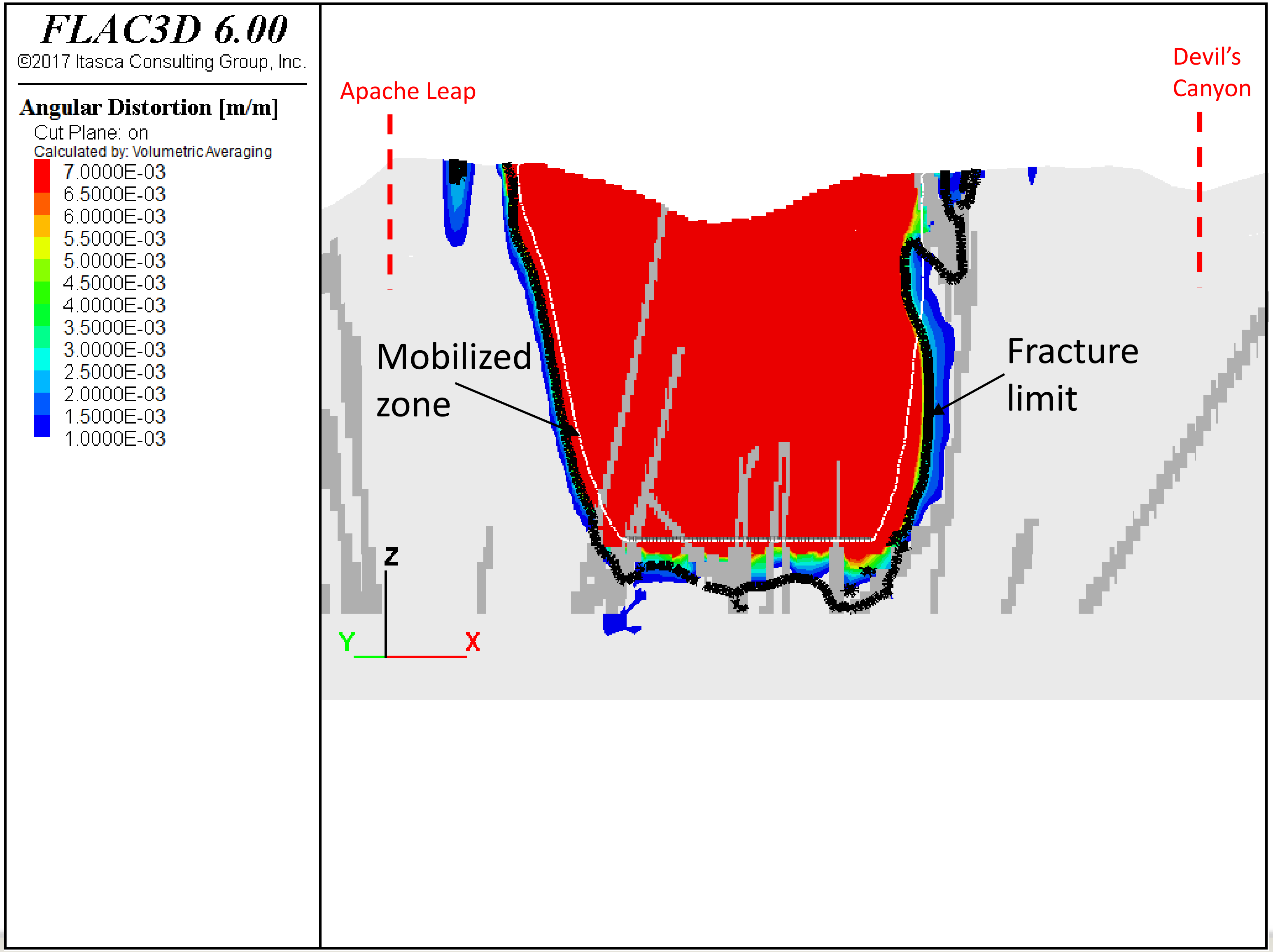
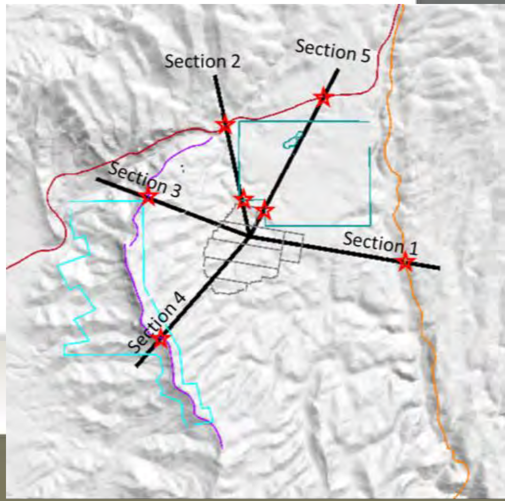


ANGULAR DISTORTION SENSITIVITY 4

Sensitivity 4 (Residual Strength = 43°)





angular_dist_sec3_subsidence_sec3_4_YR41.sav

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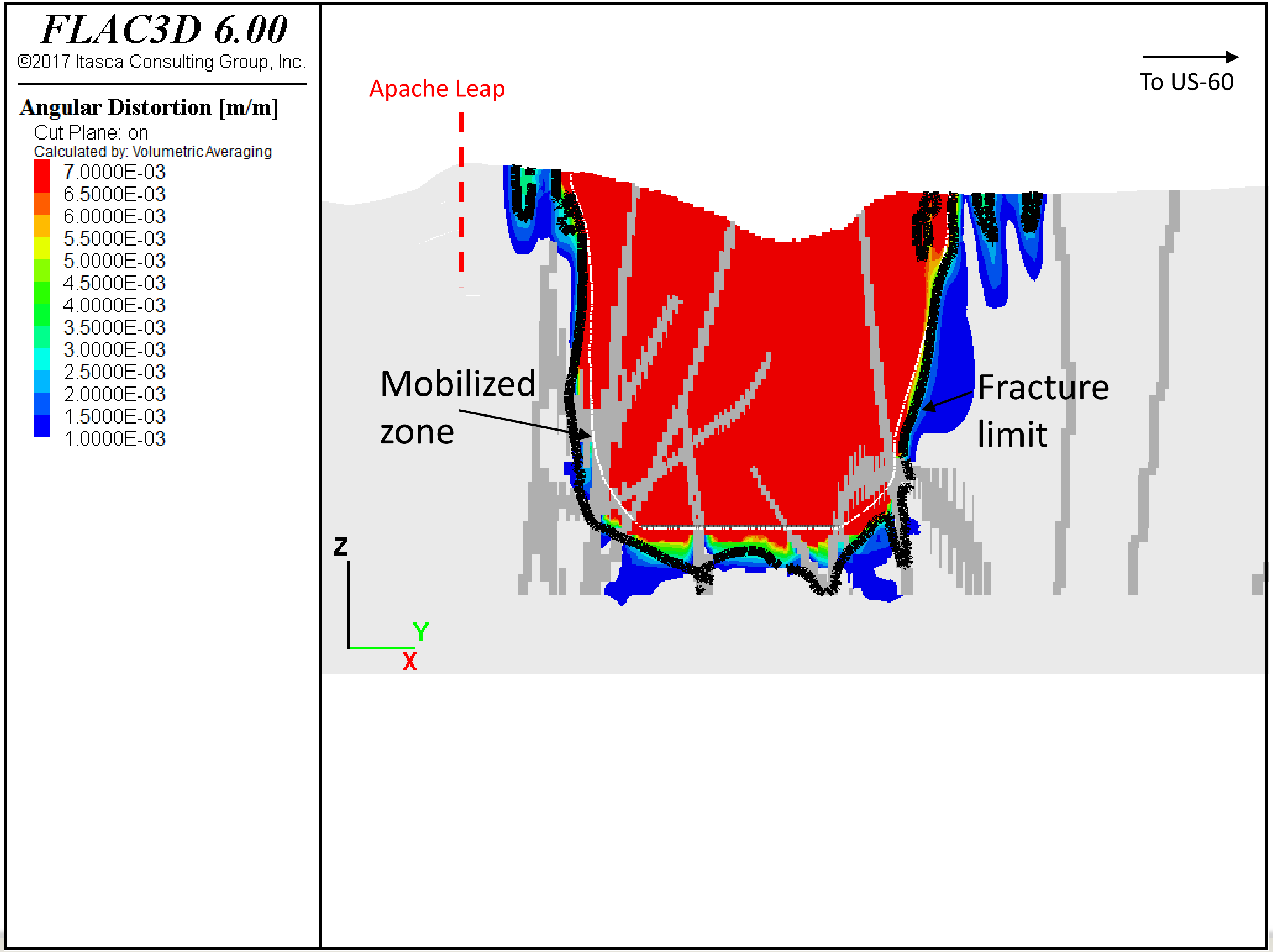
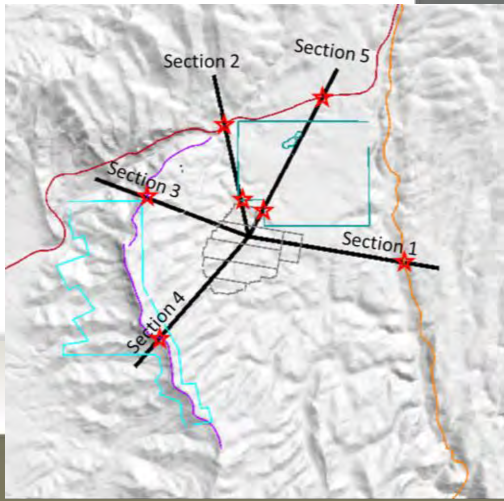
Sensitivity 4 (Residual Strength = 43°)





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angular_dist_sec4_subsidence_sec3_4_YR41.sav