



THREE KINGS QUARRY

RESOURCE CONSENT 12977

ANNUAL DEWATERING MONITORING REPORT

July 2016

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Introduction

The following report is made with regard to Section 9 of the Monitoring and Contingency Plan for Dewatering Three Kings Quarry dated September 2005.

This report contains a compilation of all monitoring data and documents any settlement alarm level events, reviews and remedial action undertaken for the period of 1 April 2015 to 31 March 2016 and includes the precise level survey completed in April 2016.

Monitoring Summary

The monitoring of groundwater levels has been undertaken monthly for the year ending 31 March 2016.

Groundwater levels within the quarry have been held above RL34m since the lowering of the groundwater table ceased in October 2002.

In the 12 months to 31 March 2015, the quarry reference bore BH2B was lost to site development. Prior to losing this bore, agreement was obtained from Auckland Council to substitute this bore with BH5B located on the edge of the quarry excavation. Bore 5B is now the quarry reference bore with respect to quarry water levels.

No new groundwater monitoring bores were installed in the 12 month period ending 31 March 2016.

A survey of all precise level benchmarks was undertaken in March-April 2016. Results were received 29 April 2016.

Precise level surveys are currently being undertaken at 12 month intervals as dewatering (lowering of the groundwater table) has not been undertaken for more than 2 years, and there has been a cessation of settlement (no settlement as a result of dewatering greater than 5mm in any continuous 12 month period).

One replacement mark was installed within the survey network in the 2016 survey.

Differential settlement alarm values were continued to be recorded between marks within the general area of Mt Albert Road and Hillsborough Road. Differential settlement alarm values were also recorded to the north-west and south-west of Three Kings Quarry (on Duke Street and McCullough Avenue/Smallfield Avenue respectively).

Groundwater levels and precise level survey results are attached to this report.

Groundwater Levels

Groundwater levels within the quarry continue to be maintained by pumping at between RL34.3m and RL36.3m. Groundwater levels in groundwater monitoring bores adjacent to and within Three Kings Quarry (especially BH6c, BH17, BH18A, BH19A and BH21 in the area

surrounding Three Kings Quarry) continue to be drawn down by the dewatering of Three Kings Quarry.

Groundwater level monitoring elsewhere generally continues to record seasonal variations.

Groundwater level monitoring results (including graphs of monitoring results since December 1996) for the year ending 31 March 2016 are attached.

Precise Level Survey Results

A survey of all precise level benchmarks was undertaken in March-April 2016. Results were received 29 April 2016.

All precise level survey marks were within 5mm of the previous reading.

One replacement mark was installed at the corner of Carr Road and Hayr Road (AP142). This mark was lost during footpath replacement works.

Differential Settlement

Differential settlement alarm values continue to be recorded between:

- AP92 and AP93, and AP92 and AP80 on Mt Albert Road,
- AP62A and AP88A at the intersection of Mt Albert and Hillsborough Road,
- AP110 and AP111 on Hillsborough Road,
- AP112 and AP113, OCP68 and AP114, AP69 and AP114, AP115 and AP116, AP70 and AP117, and AP38 and AP117 on Budock Road,
- AP74A and AP75 on Marie Avenue,
- OCP90B and SM6241 on Duke Street,
- RM3900 and RM3901 on McCullough Avenue / Smallfield Avenue, and
- RM3901 and RM3902 on Smallfield Avenue.

| Marks | Location | April-16 Differential Settlement | Distance between Marks | Adjusted Difference in Levels between Marks |
|-----------------|----------------------------|--|------------------------------|---|
| AP92 and AP93 | Mt Albert Road | 1 in 657 | 16.7m | 25mm |
| AP92 and AP80 | Mt Albert Road | 1 in 658 | 17.7m | 27mm |
| AP62A and AP88A | Mt Albert and Hillsborough | 1 in 2761 | 24.1m | 9mm |
| AP110 and AP111 | Hillsborough Road | 1 in 2920 | 17.7m | 6mm |
| AP112 and AP113 | Budock Road | 1 in 4204 | 25.7 | 6mm |
| OCP68 and AP114 | Budock Road | 1 in 1478 | 23.0m | 16mm |
| AP69 and AP114 | Budock Road | 1 in 1852 | 26.4m | 14mm |
| AP115 and AP116 | Budock Road | 1 in 3550 | 20.2m | 6mm |
| AP70 and AP117 | Budock Road | 1 in 1543 | 21.5m | 14mm |
| AP38 and AP117 | Budock Road | 1 in 1646 | 22.9m | 14mm |

| | | | | |
|-------------------|-------------------|-----------|-------|------|
| AP74A and AP75 | Marie Avenue | 1 in 4114 | 52.8m | 13mm |
| OCP90B and SM6241 | Duke Street | 1 in 4788 | 42.6m | 9mm |
| RM3900 and RM3901 | McCullough Avenue | 1 in 4068 | 82.7m | 20mm |
| RM3901 and RM3902 | Smallfield Avenue | 1 in 4035 | 82.6m | 20mm |

A trend analysis of each differential settlement alarm is attached to this report.

The actions required for Differential Settlement Alarms Values less than 1 in 5000 but greater than 1 in 2000 are to report these to the Auckland Council and Three Kings Quarry Manager, and to install additional survey marks at 50 metre centres between existing survey marks.

Please note that the spacing between marks with the exception of RM3900 and RM3901, RM3901 and RM3902, and AP74A and AP75 are already less than 50 metres.

The differential settlement alarm between RM3900 and RM3901, and RM3901 and RM3902 are not considered to be the result of dewatering Three Kings Quarry. As reported in the April 2012 Annual Monitoring Report, settlements recorded in RM3901 was considered to be partly due to an adjacent leaking water main.

The differential settlement alarm between AP74A and AP75 are also not considered to be the result of dewatering Three Kings Quarry with AP75 recording a rising level since February 2011.

The differential settlement between OCP90B and SM6241 on Duke Street has been just over 1 in 6000 since March 2008. The recent increase in the differential settlement has been a relative rise in OCP90B compared with SM6241. Trend analysis indicates this differential settlement between these two marks will remain at about 1 in 5000.

The actions required for Differential Settlement Alarm Values less than 1 in 2000 but greater than 1 in 1000 are to:

- Install additional survey marks at 25metre centres between existing marks,
- Report these settlements to the Three Kings Quarry Manager, affected property owners, South Epsom Planning, Three Kings United, Epsom Environmental Effects, and Mt Roskill and Eden-Albert Community Boards.
- Assess the potential impact of on-going settlements on building and services, and
- Undertake a review of the groundwater model and settlement predictions.

Please note that the spacing between these marks with the exception of AP69 and AP114, are less than 25 metres. The differential settlement alarm between AP69 and AP114 is not considered to be a result of dewatering.

The Differential Settlement Alarms currently being recorded between AP38, AP70 and AP117 are not a result of dewatering Three Kings Quarry. AP38 and AP70 have recorded settlements consistent with other marks in this area, while AP117 has recorded a 12mm rise since it was installed in 2003.

The Differential Settlement Alarm currently being recorded between AP114 and OCP68, and AP69 and AP114 are also not a result of dewatering Three Kings Quarry. OCP68 and AP69 have recorded settlements consistent with other marks in this area, while AP114 has recorded a 12mm rise since it was installed in 2003.

There are visual signs of deterioration or disturbance to the footpath along Budock Road (all marks along Budock Road are survey nails in the footpath or driveways). There is a noticeable deterioration in the footpath at the location of AP117 (photographs attached).

A detailed analysis of precise level survey marks in the vicinity of AP38, AP70 and AP117, and AP114, AP69 and OCP68 is presented in the following table. The locations of precise level survey marks are shown on the attached drawings. The adjusted change in level is undertaken to correct for any movement arising from the dewatering of Three Kings Quarry prior to the precise level mark being installed.

| <i>Precise Level Mark</i> | <i>Change in Level since First Survey (mm)</i> | <i>Adjusted Change in Level (mm)</i> | <i>Precise Level Marks</i> | <i>Differential Settlement</i> | |
|---------------------------|--|--------------------------------------|----------------------------|--------------------------------|-------------------------|
| | | | | Spacing (metres) | Differential Settlement |
| AP 38 | -6.20 | -6.20 | | | |
| AP 117 | +12.03 | +4.34 | AP38-AP117 | 22.9 | 1 in 1646 |
| AP 70 | -3.77 | -6.23 | AP117-AP70 | 21.5 | 1 in 1543 |
| AP 116 | -1.07 | -7.25 | AP70-AP116 | 18.7 | 1 in 18374 |
| AP 115 | -5.53 | -12.94 | AP116-AP115 | 20.2 | 1 in 3550 |
| AP 69 | -5.83 | -12.25 | AP115-AP69 | 22.0 | 1 in 31882 |
| AP 114 | +12.17 | +1.98 | AP69-AP114 | 26.4 | 1 in 1852 |
| OCP 68 | -4.10 | -13.57 | AP114-OCP68 | 23.0 | 1 in 1478 |
| AP 113 | -0.23 | -13.12 | OCP68-AP113 | 21.2 | 1 in 49419 |
| AP 112 | -4.50 | -19.23 | AP113-AP112 | 25.7 | 1 in 4204 |
| AP 67 | -8.00 | -21.71 | AP112-AP67 | 17.6 | 1 in 7098 |

The results show that the change in level of AP117 and AP114 (and to a lesser extent AP116 and AP113) is anomalous and not consistent with the settlement arising from the dewatering of Three Kings Quarry. The relative rise in level is not considered to be a result of dewatering Three Kings Quarry.

The actions required for Differential Settlement Alarm Values less than 1 in 1000 are to:

- Crease taking groundwater from Three Kings Quarry,
- Report these settlements to the Three Kings Quarry Manager, the Auckland Council, affected property owners, South Epsom Planning, Three Kings United, Epsom Environmental Effects, and Mt Roskill and Eden-Albert Community Boards.
- Assess the potential impact of on-going settlements on affected structures, and
- Assess and repair any damage in accordance with condition 21B of the consent to dewater Three Kings Quarry.

The Differential Settlement Alarms currently being recorded between AP80, AP92 and AP93 on Mt Albert Road adjacent to the St Andrews Reserve are not a result of dewatering Three Kings Quarry. AP80 and AP93 have recorded settlements consistent with other marks in this area while AP92 has risen 17mm since it was installed in 2003.

There are signs of disturbance to the footpath at the location of AP92. There is a noticeable upward lifting in the concrete footpath compared with the kerb (photographs attached).

A detailed analysis of precise level survey marks in the vicinity of AP80, AP92 and AP93 is presented in the following table. The locations of precise level survey marks are shown on the attached drawings. The adjusted change in level is undertaken to correct for any movement

arising from the dewatering of Three Kings Quarry prior to the precise level mark being installed.

| <i>Precise Level Mark</i> | <i>Change in Level since First Survey (mm)</i> | <i>Adjusted Change in Level (mm)</i> | <i>Precise Level Marks</i> | <i>Differential Settlement</i> | |
|---------------------------|--|--------------------------------------|----------------------------|--------------------------------|-------------------------|
| | | | | Spacing (metres) | Differential Settlement |
| RM 6813 | -26.83 | -26.83 | | | |
| AP 97 | -6.90 | -25.56 | RM6813-AP97 | 25.0 | 1 in 19617 |
| AP 96 | -6.90 | -25.95 | AP97-AP96 | 25.5 | 1 in 65430 |
| AP 8B | -16.20 | -27.63 | AP96-AP8B | 25.0 | 1 in 14881 |
| AP 79 | -8.60 | -21.53 | | | |
| AP 94 | -6.57 | -24.20 | AP79-AP94 | 21.8 | 1 in 8171 |
| AP 8B | -16.20 | -27.63 | AP94-AP8B | 23.2 | 1 in 6750 |
| AP 93 | -7.93 | -26.53 | AP8B-AP93 | 23.7 | 1 in 21615 |
| AP 92 | +16.87 | -1.15 | AP93-AP92 | 16.7 | 1 in 657 |
| AP 80 | -14.03 | -28.10 | AP92-AP80 | 17.7 | 1 in 658 |
| AP 91 | -9.93 | -27.75 | AP80-AP91 | 20.9 | 1 in 59820 |
| AP90 | -9.60 | -27.85 | AP91-AP90 | 21.8 | 1 in 225577 |
| RM 7647 | -26.97 | -26.97 | AP90-RM7647 | 21.0 | 1 in 23720 |

The results show that the change in level of AP92 is anomalous and not consistent with the change in levels in the surrounding precise level survey marks. Its relative rise in level is not considered to be a result of dewatering Three Kings Quarry.

These differential settlement alarm values are being carefully tracked and any further assessments will be undertaken as required by the Monitoring and Contingency Plan for Dewatering Three Kings Quarry.

Stage Control Levels

A review of the Stage Control Levels has been undertaken (Table 1, Section 7.0 of the Monitoring and Contingency Plan). Intermediate triggers have been recorded for total settlement in Settlement Zones I, II, IIB, III and V.

Section 7.1 of the Monitoring and Contingency Plan requires that if a Stage Control Trigger is recorded, dewatering (lowering of the groundwater table) is to cease. Section 7.2 requires a review of groundwater levels and precise level survey data. Section 7.3 requires that the results of this review be forwarded to the Auckland Council prior to dewatering recommencing.

Graphs showing the adjusted total settlements exceeding the Intermediate Trigger (any pre-existing settlement has been added to marks installed after dewatering commenced) of precise level marks in each Settlement Zone are attached together with the drawing showing the Settlement Zones.

In summary, the Immediate Trigger for Zone 1 for quarry groundwater drawdown at RL30m is 10mm, 20mm for Zone II, 45mm for Zone IIA, 15mm for Zone IIB, 10mm for Zones III and IV, 25mm for Zone IIIA and 5mm for Zone V. There are no precise level marks in Zone IIIB.

These triggers and the current maximum settlement recorded in each zone are summarised as follows:

| Settlement Zone | Intermediate Trigger (mm) | Current Maximum Total Settlement (mm) |
|-----------------|---------------------------|---------------------------------------|
| Zone 1 | 10 | 18 (35) |
| Zone II | 20 | 28 (35.5) |
| Zone IIA | 45 | 31 |
| Zone IIB | 15 | 16 |
| Zone III | 10 | 13 |
| Zone IIIA | 25 | 14 |
| Zone IIIB | 20 | - |
| Zone IV | 10 | 8 |
| Zone V | 5 | 7 |

Please note, precise level mark M220 in Zone 1 is currently recording 35mm of settlement, and in Zone II, two precise level marks (RM3901 and RM3895) are currently recording 35.5 and 35mm of movement respectively. These settlements however are not considered to be solely a result of dewatering Three Kings Quarry.

The movement in M220 occurred following works undertaken on the footpath and its level was adjusted upwards in March 2006 by 22.5mm.

The movement of RM3895 is considered to be a result of the removal an adjacent large tree at some time in the past, and the recent movement in RM3901 is considered to be in part due to a leaking water main.

Although further dewatering is not being proposed, a review of groundwater levels and survey data has been undertaken.

Groundwater levels have generally stabilised since dewatering (lowering of the groundwater table) ceased in October 2002. Groundwater levels have generally only varied due to season fluctuations since dewatering ceased with some rebound of groundwater levels following the reduced pumped rates being measured in isolated piezometers (bores 23, 26, 28a, 29, 30 and 33).

Precise level benchmarks surveyed levels have stabilised since dewatering ceased with cessation of settlement of precise level survey marks (no settlement as a result of dewatering greater than 5mm in any continuous 12 month period) having been recorded since September 2005.

In summary, the primary consolidation associated with dewatering ceased mid-2004. Precise level survey marks in Areas I, II, IIA and IIIA are recording some secondary consolidation but at a much reduced rate compared with the primary consolidation (3 to 4mm per year primary consolidation compared with 0.6 to 0.9mm per year secondary consolidation).

The Intermediate Stage Control Triggers are shown on the attached graphs with the location of the triggering points shown on the attached plan. The location of the triggering points are scattered but are generally grouped to the northwest and southeast of Three Kings Quarry.

Differential settlement triggers associated with these Intermediate Stage Control Triggers have been recorded between OCP90B and SM6241 on Duke Street (1 in 4788), and between RM3900 and RM3901 and RM3901 and RM3902 on the corner of McCullough Ave and Smallfield Ave (1 in 4068 and 1 in 4035 respectively).

Please note that the settlements associated with precise level mark RM3901 is considered to in part due to a leaking water main, with insignificant recent movements recorded in RM3900, RM3902 and OCP90B.

With regard to section 7.2 of the Monitoring and Contingency Plan, ground settlements are not greater than 10mm per year; there are no differential settlement (as a result of the dewatering) greater than 1 in 2000; and there is no settlement greater than 100mm for points established prior to 30 September 2002, or greater than 75mm for points established after 30 September 2002.

There is no proposal to recommence dewatering. As required by section 7.3 of the Monitoring and Contingency Plan, should dewatering be recommenced, the results of a review undertaken prior to dewatering recommencing will be forwarded to the Auckland Council.

Seasonal Variation Calculations

As required by Section 6.7 of the Monitoring and Contingency Plan, seasonal variation calculations were defined for bores 37, 38, 39 and 40 in the 2007 Annual Report. Seasonal variation for the deep and shallow piezometers respectively in bores 37, 38, 39 and 40 are as follows:

Table 1: Seasonal Variation - Deep Piezometers

| | BH37a | BH38a | BH39a | BH40a |
|-------------------------|----------------------|----------------------|----------------------|----------------------|
| 99% Confidence Limits | RL54.17m RL53.60m | RL54.73m RL53.80m | RL55.31m RL54.82m | RL62.07m RL61.23m |
| 99.9% Confidence Limits | RL54.25m RL53.53m | RL54.85m RL53.67m | RL55.37m RL54.76m | RL62.19m RL61.12m |

Table 2: Seasonal Variation - Shallow Piezometers

| | BH37b | BH38b | BH39b | BH40b |
|-------------------------|----------------------|----------------------|----------------------|----------------------|
| 99% Confidence Limits | RL54.03m RL53.56m | RL53.80m RL53.33m | RL57.42m RL56.50m | RL63.86m RL63.31m |
| 99.9% Confidence Limits | RL54.09m RL53.50m | RL53.87m RL53.26m | RL57.55m RL56.38m | RL63.94m RL63.23m |

Seasonal variation triggers are the greater of the 0.2 metres below the bottom level of the natural groundwater level range (99% confidence level), or the bottom 99.9% probability limit calculated from the first two years of data.

Table 3: Seasonal Variation Triggers

| | BH37 | BH38 | BH39 | BH40 |
|--------------------|----------|----------|----------|----------|
| Deep Piezometer | RL53.40m | RL53.60m | RL54.62m | RL61.03m |
| Shallow Piezometer | RL53.36m | RL53.13m | RL56.30m | RL63.11m |

The groundwater levels in BH40a and BH40b have generally been in excess of seasonal variation trigger since early 2008. Triggers were recorded in BH39a and BH39b in September 2015, and again in January 2016 in BH39a.

BH40 is the southern most of the Three Kings Quarry groundwater monitoring bores located on Hillsborough Road just to the north of the SH20. BH39 is located approximately 450m to the northwest of BH40.

Groundwater monitoring bores located closer to the Three Kings Quarry (boreholes 35, 36, 28 and 29) have generally recorded slightly rising groundwater levels since installation (boreholes 28, 29 and 36). Borehole 35 has recorded a slight fall. Seasonal variations are less than a metre.

The groundwater level in BH40a (deep piezometer) has fallen 0.93metres from an average level of RL61.65m (to March 2007) to an average level for the year ending 31 March 2016 of RL60.72m.

The groundwater level in BH40b (shallower piezometer) has fallen 0.83m from an average level of RL63.58m (to March 2007) to an average level for the year ending 31 March 2016 of RL62.75m.

The groundwater levels in BH40a and BH40b are currently recording seasonal variation of about 0.5metres (refer attached graphs).

The average groundwater level in BH39a for the year ending 31 March 2016 was RL54.60m with the lowest recorded level (September 2015) being RL53.63m compared with a trigger level of RL54.62m. Seasonal variation was less than 25cm. While BH39a is recording a very slow decline in groundwater levels, the very low groundwater level recorded in September 2015 is considered to be anomalous. The seasonal variation trigger recorded in January 2016 is a reflection of the slow decline in groundwater levels in this monitoring bore.

The seasonal groundwater trigger recorded in September 2015 in BH39b is considered anomalous. Relatively stable groundwater levels have been recorded in this bore otherwise.

Up until March 2008, Transits groundwater monitoring bores adjacent to the "Hillsborough Road cut" SH20 works recorded a similar or greater amount of change although the monitoring record is not complete as the Three Kings Quarry groundwater monitoring record. Transits BH15 on the crest of the Hillsborough Road cut recorded a fall in groundwater level of 1.9m since December 2006 (from RL64.44m to RL62.53m).

The Transit monitoring bores do not extend to the same depth as the Three Kings Quarry groundwater monitoring bores but all bores are located in East Coast Bays Formation (Waitemata).

As reported previously, although the monitoring results are not conclusive (with the deeper groundwater level in BH40a being drawn down more than the shallower groundwater level – BH40b), as the groundwater monitoring bores closer to the Three Kings Quarry are not being drawn down, it is considered unlikely that the falling groundwater levels being recorded in BH40a and BH40b are the result of dewatering Three Kings Quarry.

With regard to BH39a, given the absence of drawdowns being recorded in bores closer to the Three Kings Quarry, the general slow decline in groundwater levels in this bore and the trigger recorded in January 2016 is considered to be a result of either a natural variation of groundwater levels or a propagation of the drawdown being recorded in BH40.

REVIEWS

Groundwater

The results of the groundwater level monitoring are checked and reviewed as the results are received. A review of groundwater levels and precise level survey marks has been undertaken as required by Section 7.2 of the Monitoring and Contingency Plan.

Surface Levels

The results of precise level surfaces are checked and reviewed when the results are received, with the results forwarded to the Auckland Council and Three Kings United Inc.

A review of precise level survey data was undertaken by Tonkin and Taylor in 2005. This report reviewed settlement data to the March 2005 survey and included the findings of the Pattle Delamore Annual Groundwater Report dated January 2005.

The Tonkin and Taylor report concluded that while surface settlement monitoring indicates that surface settlement is typically on-going about the quarry, it is at a much reduced rate.

The on-going settlement close to the quarry was concluded to be the result of secondary consolidation induced by changes in groundwater pressure associated with past quarry dewatering. At increased distances from the quarry, Tonkin and Taylor concluded that it is possible that the ongoing surface settlement includes some delayed consolidation as a result primarily consolidation of soil strata not currently monitored by piezometers. In addition Tonkin and Taylor concluded that any groundwater drawdown effects at distance from the quarry are small and surface settlement data at the fringe of drawdown are within expected settlement tolerances.

A further review of the precise level survey information was undertaken in August 2005 to determine if cessation of settlement had occurred. It was found that cessation of settlement (as defined by the consent to dewater Three Kings Quarry) had occurred and this was reported more fully to the Auckland Regional Council in September 2005. As such, and because more than two years has elapsed since dewatering has been undertaken, precise level surveys are now required to be undertaken at 12 month intervals.

A review of the precise level data has been undertaken as required by Section 7.2 of the Monitoring and Contingency Plan – exceedance of an Intermediate Settlement Trigger. The review concluded that settlements are not in excess of 10mm per year; that the differential settlement between any two monitoring points caused by the exercise of the consent to dewater Three Kings Quarry is not greater than 1 in 2000; and total settlement is not greater than 100mm (or 75mm for precise level survey marks installed after 30 September 2002).

There is currently no proposal to further dewater Three Kings Quarry and groundwater levels will be held at or above RL34m.

REMEDIAL ACTION

No remedial action was required or undertaken for the period ending 31 March 2016.

Groundwater Level Monitoring Results and Graphs

(Groundwater Monitoring Bore Location Plan)

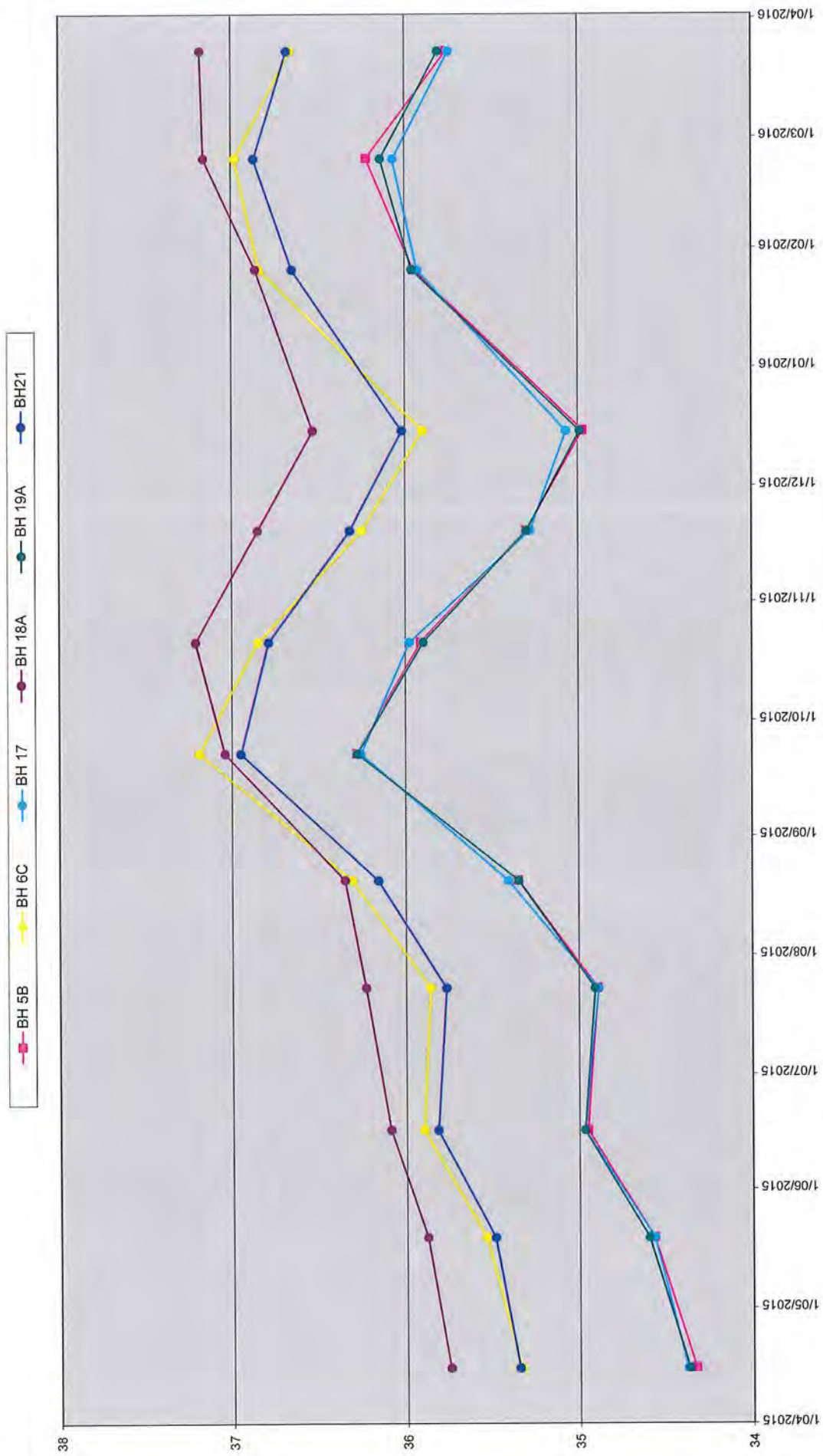
THREE KINGS GROUNDWATER LEVEL RECORD SHEET

| Date | BH 5B | BH 6A | BH 6B | BH 6C | BH 7 | BH 10a | BH 10b | BH 11b | BH 12a | BH 12b | BH 13a | BH 13c | BH 16 | BH 17 | BH 18A | BH 18B | BH 19A | BH 19B | BH 20 |
|-----------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|-------|
| 15-Apr-15 | 34.33 | 44.76 | 39.96 | 35.34 | 39.39 | 50.91 | 72.66 | 72.47 | 50.37 | 67.03 | 55.35 | 66.33 | 50.71 | 34.38 | 35.75 | 45.73 | 34.37 | 39.05 | 54.36 |
| 19-May-15 | 34.57 | 44.43 | 38.95 | 35.54 | 39.52 | 50.91 | 72.65 | 72.47 | 50.36 | 67.11 | 55.10 | 66.33 | 50.65 | 34.57 | 35.88 | 45.75 | 34.60 | 39.05 | 54.50 |
| 16-Jun-15 | 34.95 | 44.85 | 40.25 | 35.90 | 39.95 | 50.91 | 72.65 | 72.47 | 50.71 | 67.14 | 54.90 | 66.33 | 50.87 | 34.97 | 36.09 | 45.52 | 34.97 | 39.05 | 54.75 |
| 23-Jul-15 | 34.89 | 45.01 | 40.26 | 35.86 | 40.02 | 50.98 | 72.66 | 72.48 | 50.80 | 67.17 | 54.70 | 66.33 | 51.04 | 34.89 | 36.23 | 45.80 | 34.91 | 38.80 | 54.96 |
| 20-Aug-15 | 35.35 | 45.39 | 40.58 | 36.31 | 40.40 | 51.03 | 72.65 | 72.47 | 51.16 | 67.18 | 59.52 | 66.33 | 51.34 | 35.41 | 36.35 | 45.80 | 35.35 | 39.07 | 55.19 |
| 22-Sep-15 | 36.28 | 46.47 | 41.25 | 37.19 | 40.31 | 51.50 | 72.65 | 72.47 | 51.45 | 67.14 | 59.02 | 66.34 | 51.80 | 36.26 | 37.04 | 46.50 | 36.28 | 39.07 | 55.48 |
| 21-Oct-15 | 35.91 | 46.51 | 41.11 | 36.85 | 39.56 | 51.16 | 72.65 | 72.44 | 51.23 | 67.09 | 58.03 | 66.33 | 51.66 | 35.98 | 37.21 | 46.66 | 35.90 | 39.07 | 55.35 |
| 19-Nov-15 | 35.30 | 46.10 | 40.74 | 36.25 | 39.40 | 50.93 | 72.66 | 72.47 | 50.95 | 66.94 | 57.25 | 66.32 | 51.40 | 35.28 | 36.85 | 46.52 | 35.30 | 39.05 | 55.10 |
| 15-Dec-15 | 34.97 | 45.19 | 40.45 | 35.90 | 39.28 | 51.00 | 72.65 | 72.50 | 50.81 | 67.95 | 56.28 | 66.32 | 51.22 | 35.07 | 36.53 | 46.51 | 34.99 | 38.92 | 54.94 |
| 26-Jan-16 | 35.95 | 45.48 | 40.87 | 36.84 | 39.38 | 50.92 | 72.65 | 72.53 | 50.68 | 67.05 | 55.98 | 66.33 | 51.04 | 35.93 | 36.86 | 46.39 | 35.96 | 38.85 | 54.64 |
| 24-Feb-16 | 36.22 | 45.27 | 40.90 | 36.98 | 39.23 | 50.92 | 72.65 | 72.53 | 50.61 | 66.91 | 55.62 | 66.33 | 50.96 | 36.07 | 37.16 | 46.32 | 36.14 | 38.66 | 54.44 |
| 23-Mar-16 | 35.76 | 45.25 | 40.69 | 36.66 | 39.25 | 50.93 | 72.65 | 72.55 | 50.61 | 66.91 | 55.46 | 66.33 | 50.92 | 35.75 | 37.18 | 46.28 | 35.81 | 39.10 | 54.38 |

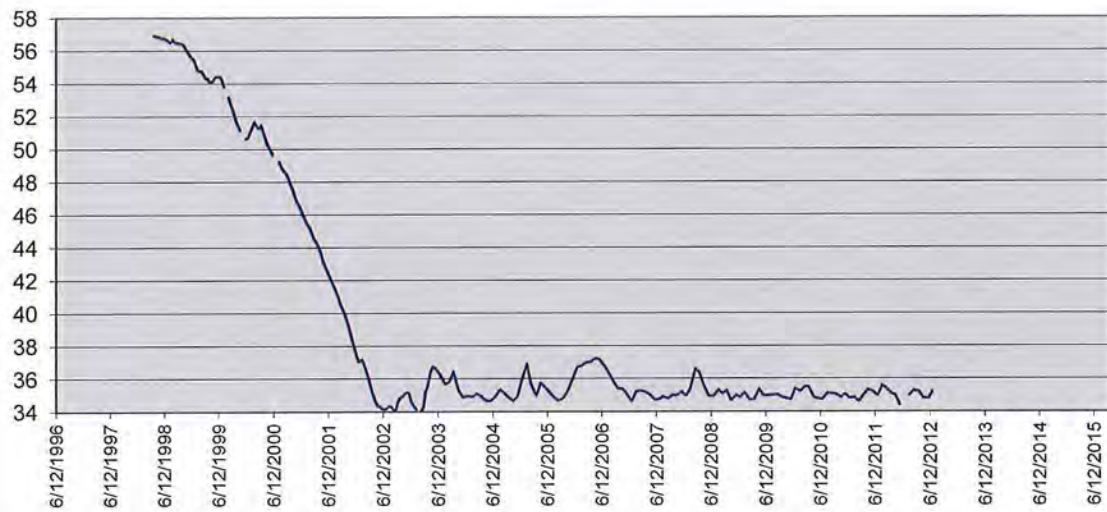
| Date | BH 20A | BH 21 | BH 22 | BH 22a | BH 23 | BH 23a | BH 24 | BH 24a | BH 25 | BH 25a | BH 26 | BH 26a | BH 27 | BH 28a | BH 29 | BH 30 | BH 33 | BH 34 | BH 35a |
|-----------|--------|-------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|-------|-------|-------|--------|
| 15-Apr-15 | 50.04 | 35.35 | 50.69 | 63.88 | 51.67 | 50.92 | 56.06 | 60.26 | 37.15 | 46.37 | 58.98 | 54.23 | 49.54 | 51.60 | 58.64 | 55.11 | 58.46 | 47.80 | 48.27 |
| 19-May-15 | 50.11 | 35.49 | 50.72 | 63.84 | 51.64 | 50.87 | 55.95 | 60.25 | 37.20 | 47.60 | 58.89 | 54.28 | 49.52 | 51.63 | 58.65 | 55.01 | 58.56 | 48.34 | 48.24 |
| 16-Jun-15 | 50.84 | 35.82 | 50.70 | 64.33 | 51.64 | 50.98 | 56.01 | 60.24 | 37.35 | 48.29 | 58.83 | 54.36 | 49.54 | 51.78 | 58.75 | 55.00 | 59.18 | 48.99 | 48.26 |
| 23-Jul-15 | 51.16 | 35.77 | 50.66 | 64.56 | 51.64 | 51.04 | 56.11 | 60.23 | 37.41 | 48.59 | 58.74 | 54.43 | 49.60 | 51.96 | 58.84 | 55.15 | 59.41 | 49.22 | 48.25 |
| 20-Aug-15 | 51.74 | 36.16 | 50.69 | 65.00 | 51.72 | 51.20 | 56.26 | 60.22 | 37.52 | 49.04 | 58.66 | 54.48 | 49.59 | 52.04 | 58.75 | 55.57 | 59.22 | 49.58 | 48.31 |
| 22-Sep-15 | 52.26 | 36.95 | 50.63 | 65.31 | 51.82 | 51.42 | 56.53 | 60.22 | 37.87 | 49.36 | 58.59 | 54.53 | 49.60 | 52.23 | 59.08 | 55.55 | 59.16 | 49.82 | 49.41 |
| 21-Oct-15 | 51.80 | 36.79 | 50.61 | 64.99 | 51.80 | 51.38 | 56.50 | 60.23 | 38.03 | 45.85 | 58.53 | 54.42 | 49.59 | 52.23 | 59.01 | 55.96 | 59.01 | 48.84 | 48.41 |
| 19-Nov-15 | 51.30 | 36.32 | 50.59 | 64.67 | 51.81 | 51.28 | 56.45 | 60.23 | 37.90 | 47.39 | 58.47 | 54.36 | 49.60 | 52.07 | 58.96 | 55.43 | 58.96 | 48.75 | 48.45 |
| 15-Dec-15 | 50.99 | 36.02 | 50.56 | 64.51 | 51.81 | 51.18 | 56.36 | 60.22 | 37.74 | 45.67 | 58.14 | 54.32 | 49.60 | 51.88 | 58.91 | 55.60 | 58.93 | 48.06 | 48.43 |
| 26-Jan-16 | 50.73 | 36.65 | 50.52 | 64.35 | 51.80 | 51.11 | 56.24 | 60.22 | 37.84 | 45.15 | 58.33 | 55.32 | 49.59 | 51.97 | 58.85 | 55.73 | 58.89 | 47.92 | 48.44 |
| 24-Feb-16 | 50.63 | 36.87 | 50.54 | 64.22 | 51.74 | 51.01 | 56.16 | 60.22 | 37.98 | 44.83 | 58.27 | 54.26 | 49.59 | 51.81 | 58.79 | 55.35 | 58.76 | 46.92 | 48.41 |
| 23-Mar-16 | 50.57 | 36.68 | 51.18 | 64.21 | 51.73 | 50.98 | 56.13 | 60.21 | 38.04 | 45.88 | 58.22 | 54.28 | 49.59 | 51.85 | 58.78 | 55.00 | 58.67 | 48.09 | 48.43 |

| Date | BH 35b | BH 36a | BH 36b | BH 37a | BH 37b | BH 38a | BH 38b | BH 39a | BH 39b | BH 40a | BH 40b |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 15-Apr-15 | 55.15 | 58.93 | 58.96 | 53.85 | 53.72 | 54.25 | 53.49 | 54.88 | 57.10 | 60.59 | 62.60 |
| 19-May-15 | 55.05 | 58.97 | 58.99 | 53.92 | 53.76 | 54.30 | 53.60 | 54.63 | 57.11 | 60.57 | 62.67 |
| 16-Jun-15 | 55.11 | 59.10 | 59.13 | 53.96 | 53.88 | 54.46 | 53.71 | 54.71 | 57.21 | 60.58 | 62.73 |
| 23-Jul-15 | 55.19 | 59.14 | 59.16 | 54.01 | 53.93 | 54.54 | 53.75 | 54.73 | 57.31 | 60.61 | 62.78 |
| 20-Aug-15 | 55.39 | 59.26 | 59.29 | 54.00 | 53.90 | 54.45 | 53.73 | 54.69 | 57.37 | 60.60 | 62.74 |
| 22-Sep-15 | 55.36 | 59.40 | 59.43 | 54.00 | 53.90 | 54.39 | 53.74 | 53.63 | 55.32 | 60.62 | 62.74 |
| 21-Oct-15 | 55.60 | 59.26 | 59.29 | 54.01 | 53.94 | 54.42 | 53.75 | 54.70 | 57.29 | 60.77 | 62.86 |
| 19-Nov-15 | 55.54 | 59.18 | 59.21 | 53.99 | 53.92 | 54.44 | 53.65 | 54.71 | 57.25 | 60.74 | 62.82 |
| 15-Dec-15 | 55.41 | 59.10 | 59.12 | 54.01 | 53.82 | 54.40 | 53.56 | 54.67 | 57.19 | 60.90 | 62.74 |
| 26-Jan-16 | 55.36 | 59.13 | 59.16 | 55.31 | 53.78 | 54.42 | 54.06 | 54.59 | 57.18 | 61.26 | 62.75 |
| 24-Feb-16 | 55.26 | 59.13 | 59.08 | 53.96 | 53.79 | 54.46 | 53.57 | 54.66 | 57.14 | 60.72 | 62.79 |
| 23-Mar-16 | 55.26 | 59.09 | 59.11 | 53.93 | 53.79 | 54.49 | 53.55 | 54.64 | 57.14 | 60.72 | 62.74 |

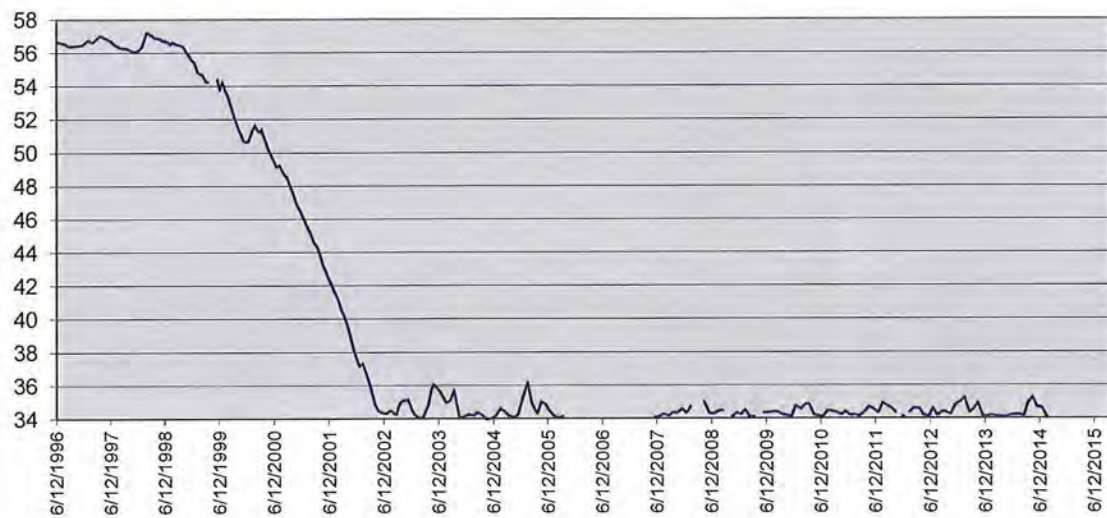
Groundwater Levels - Bores within or immediately adjacent to Three Kings Quarry



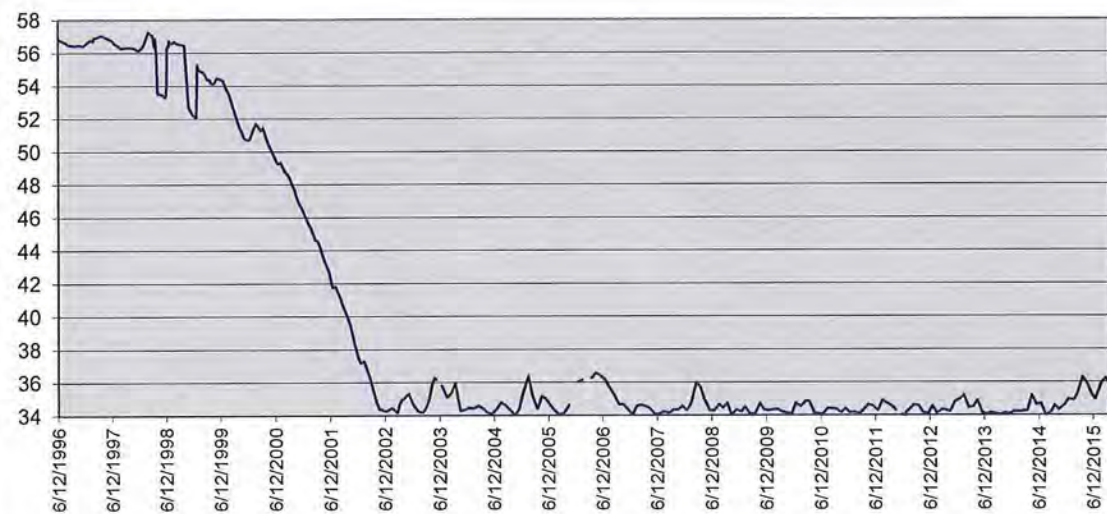
Borehole 1B

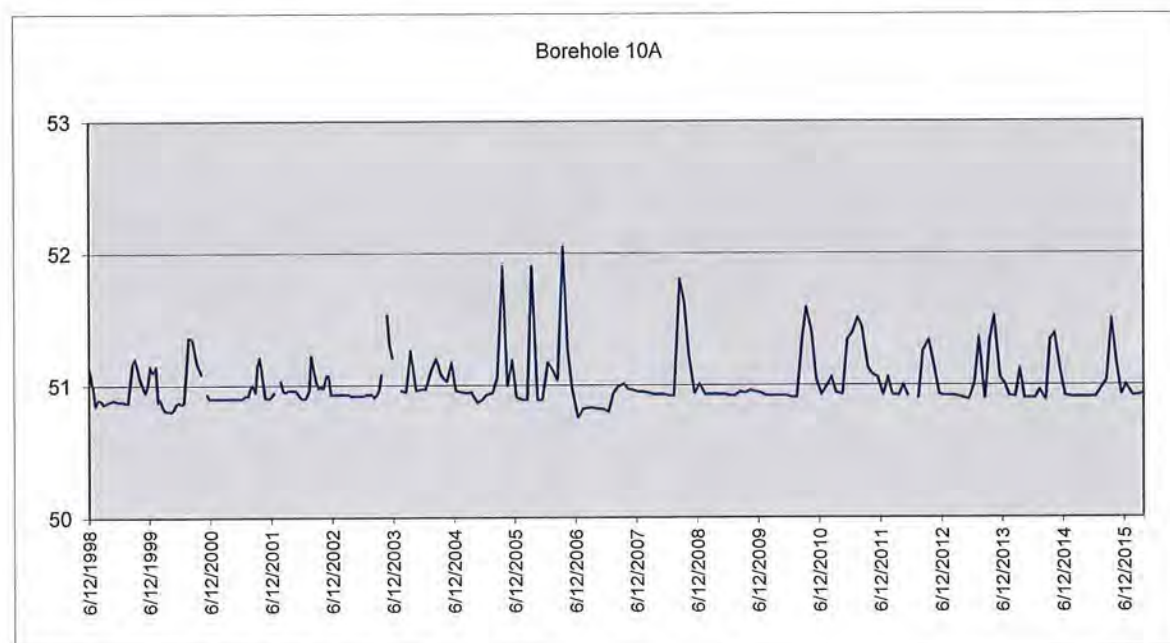
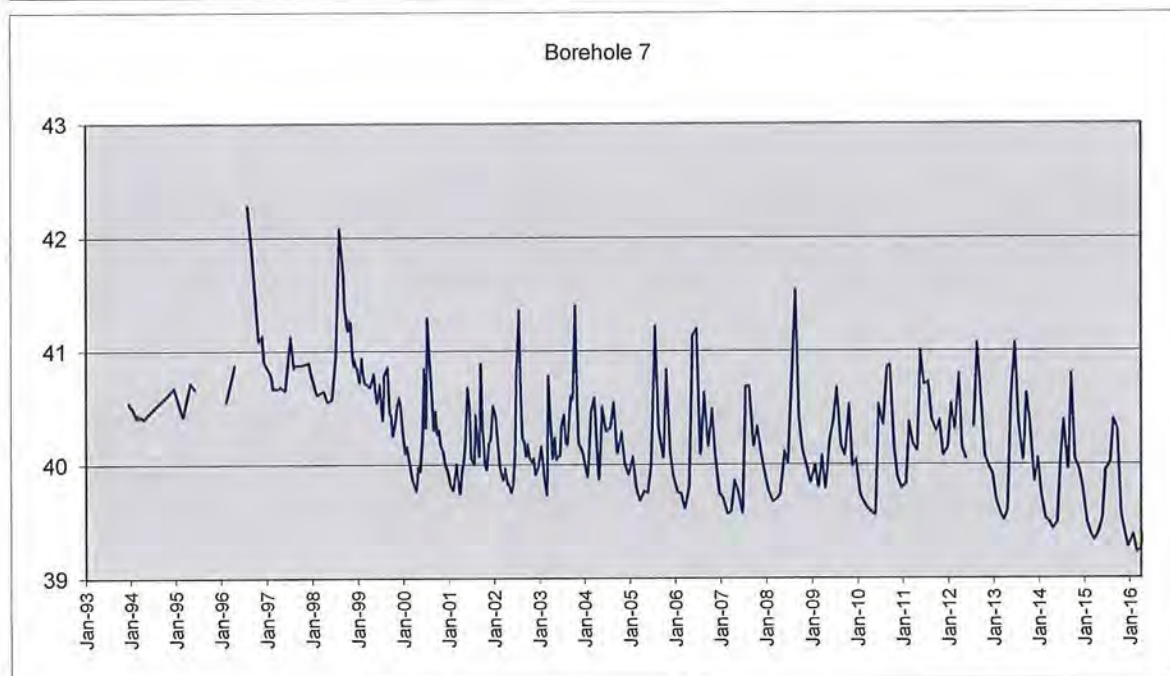
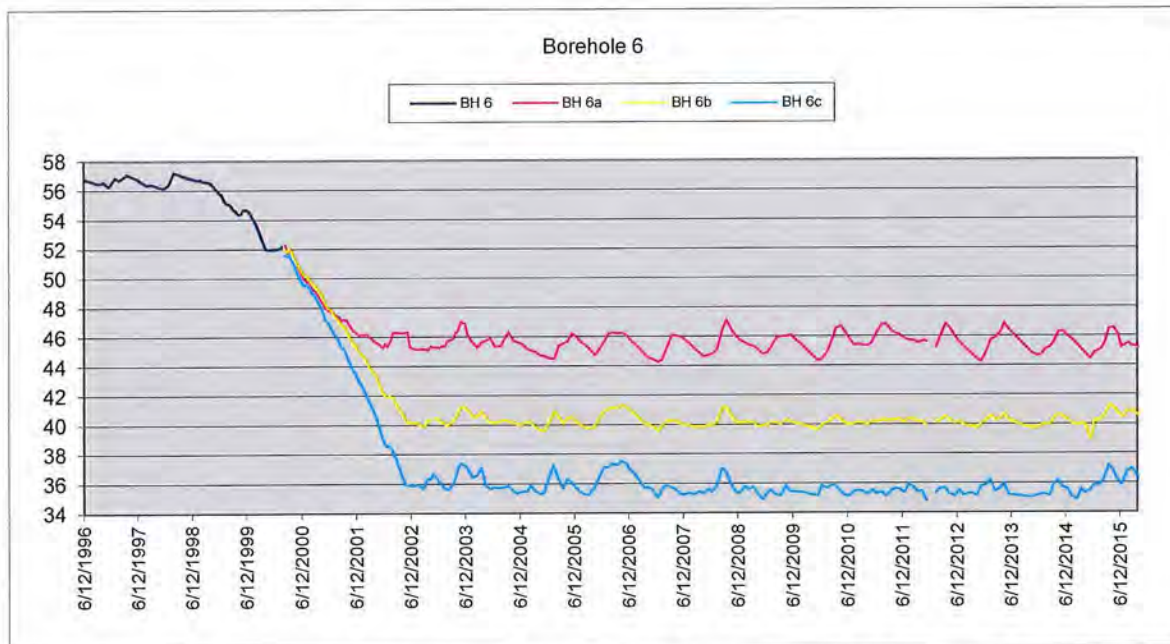


Borehole 2B

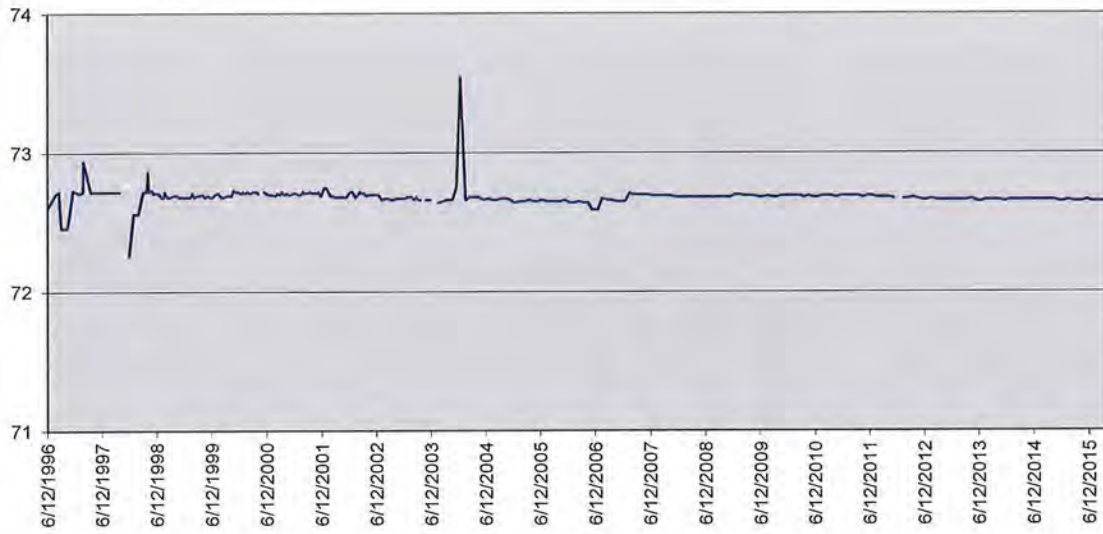


Borehole 5B

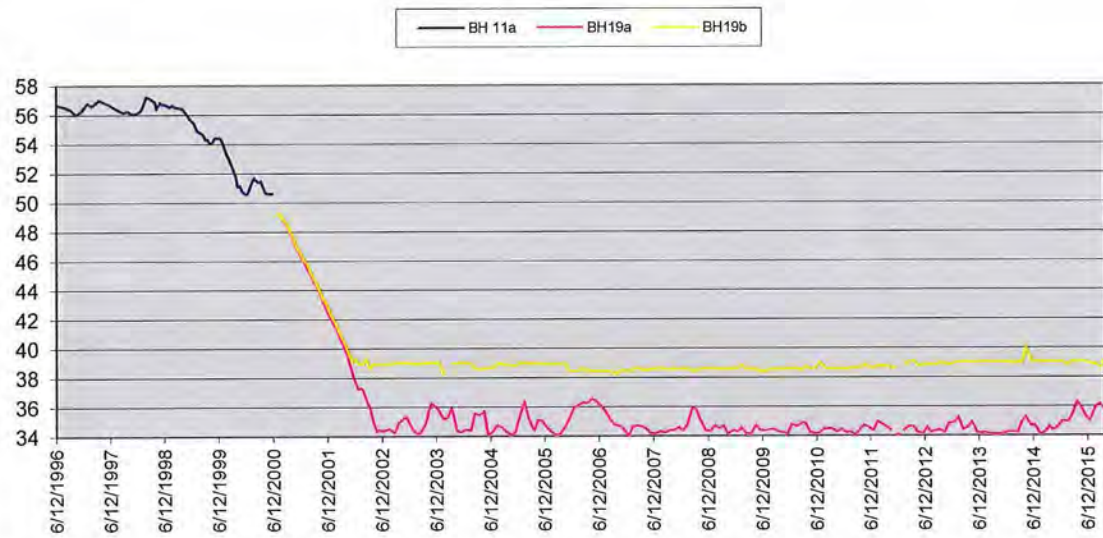




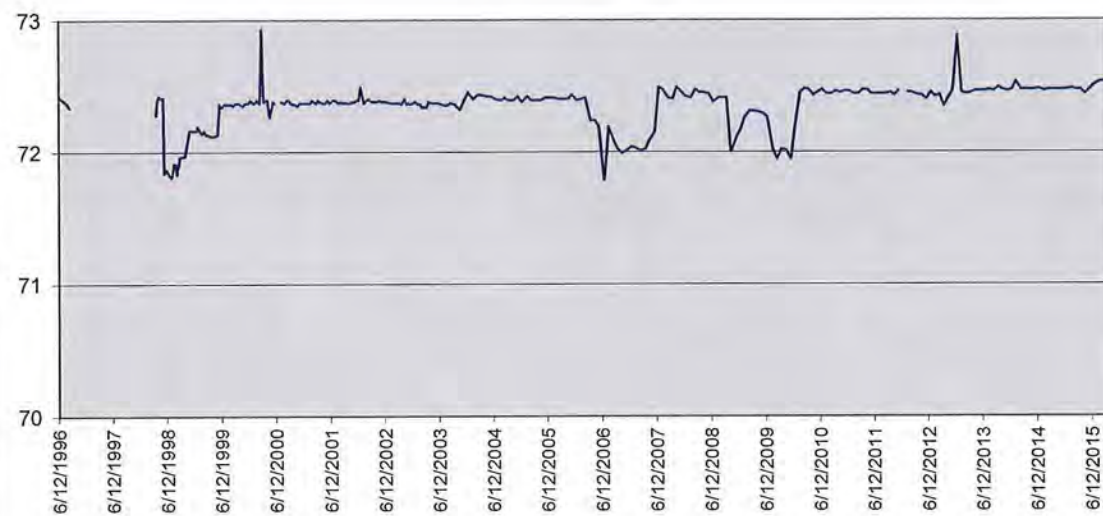
Borehole 10B



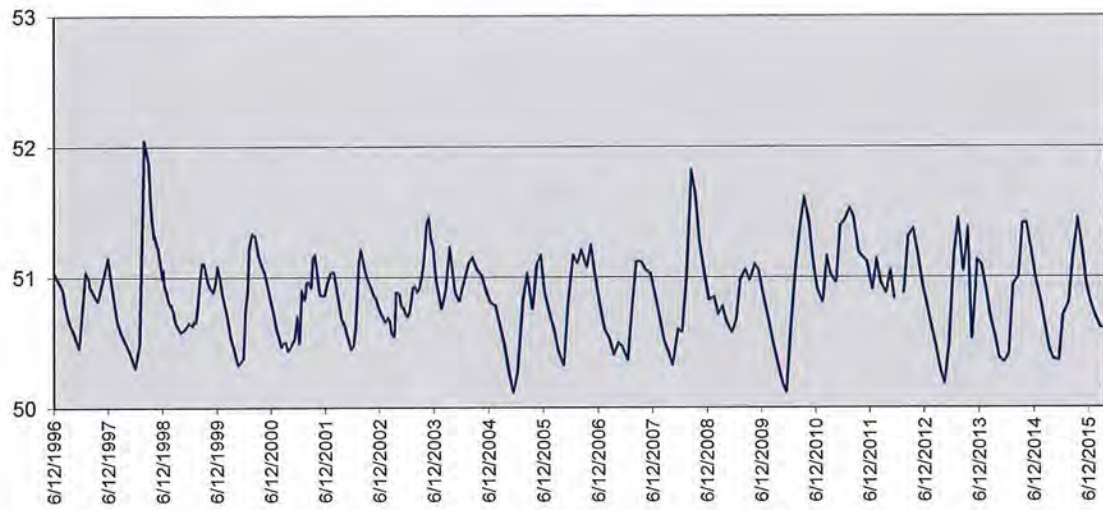
Borehole 11a, 19a and 19b



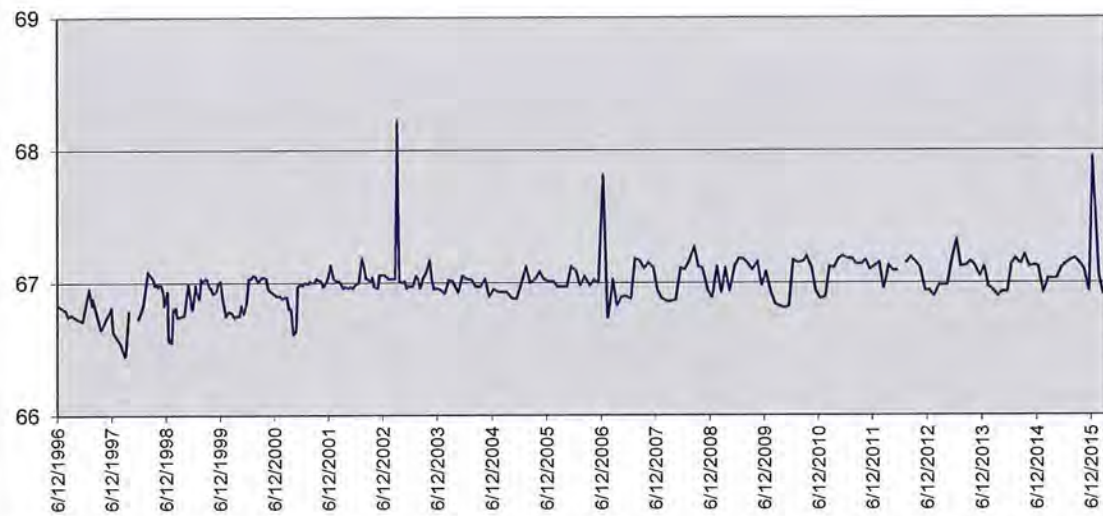
Borehole 11b



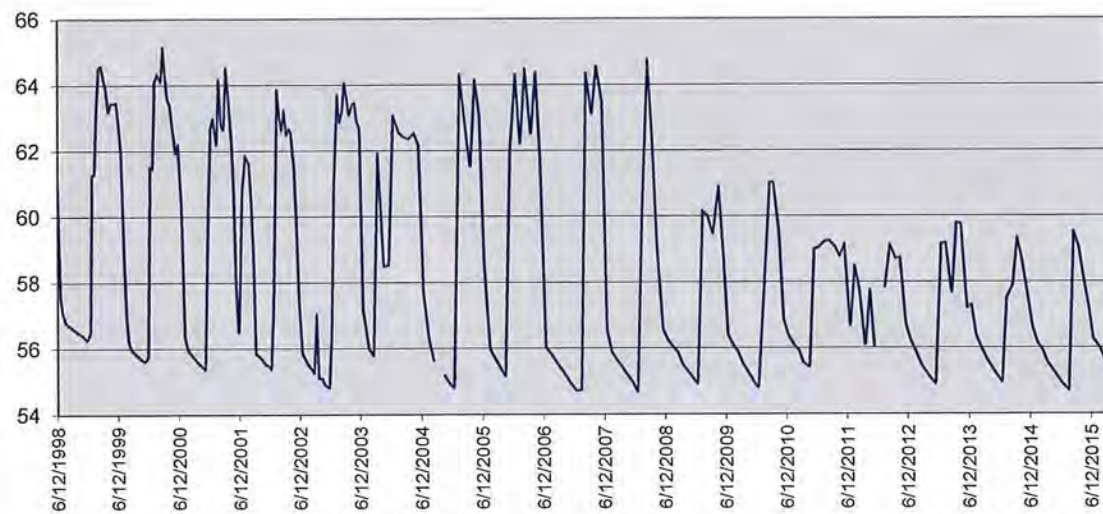
Borehole 12A



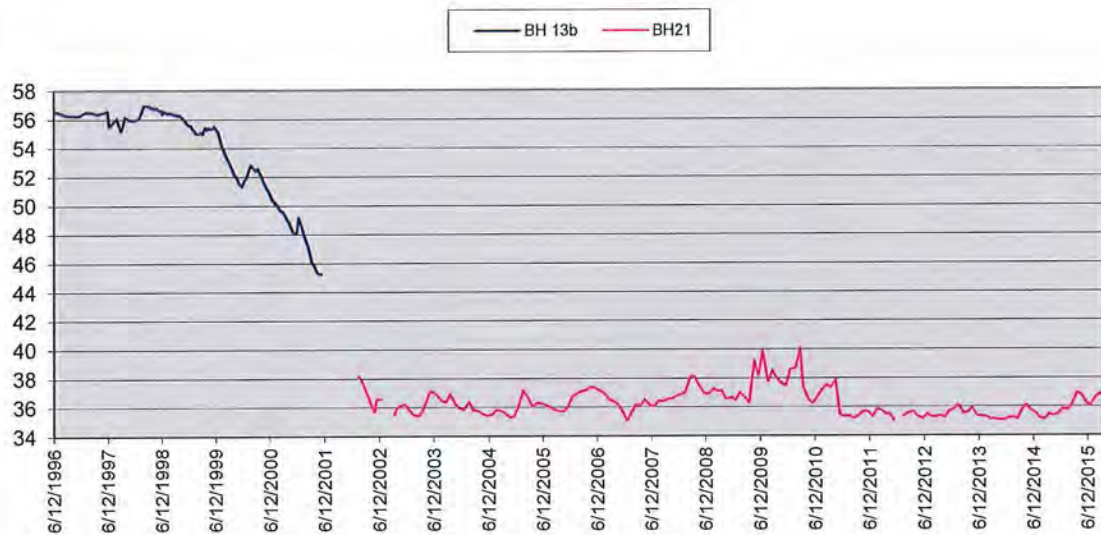
Borehole 12B



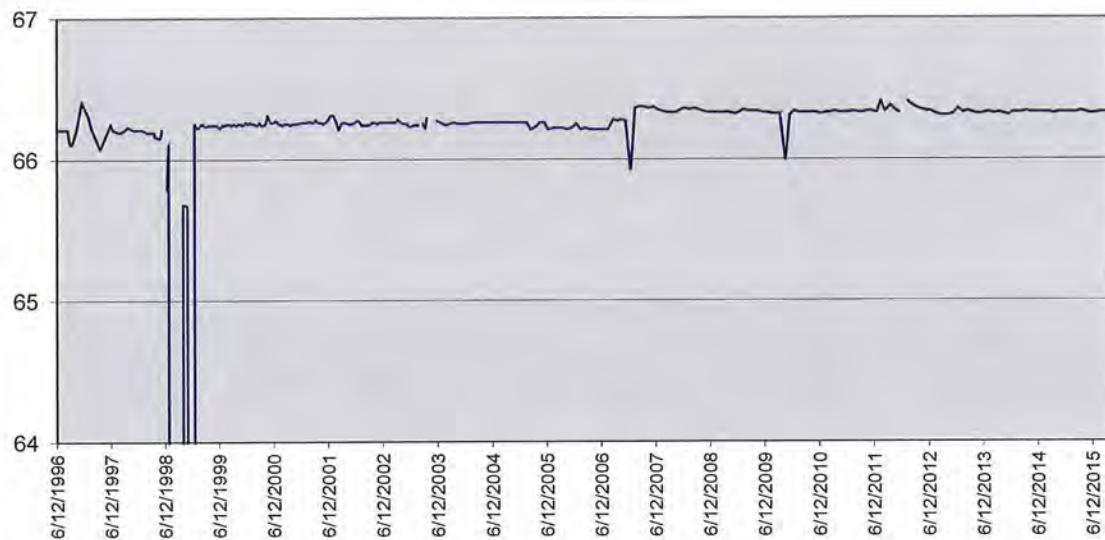
Borehole 13A



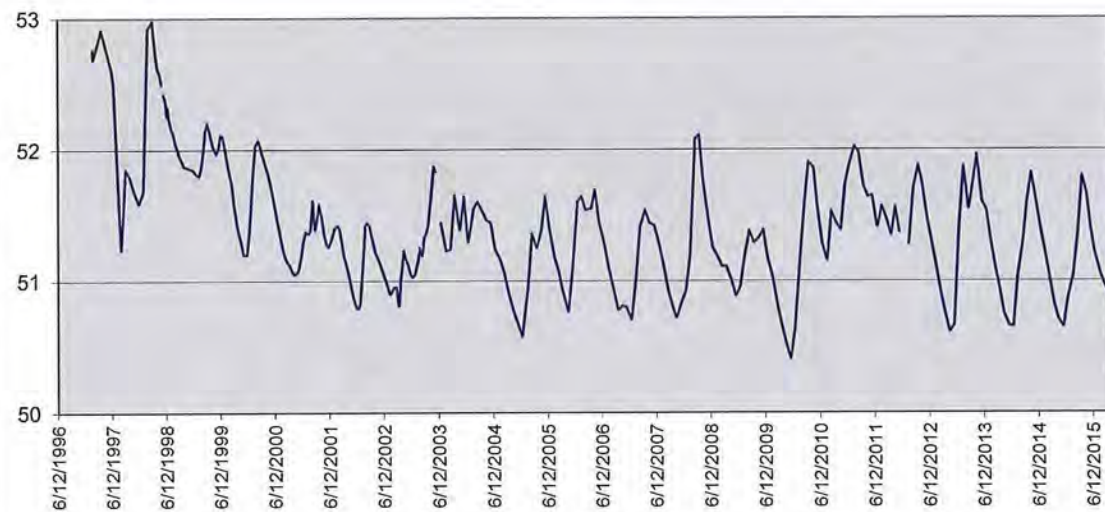
Borehole 13B and 21



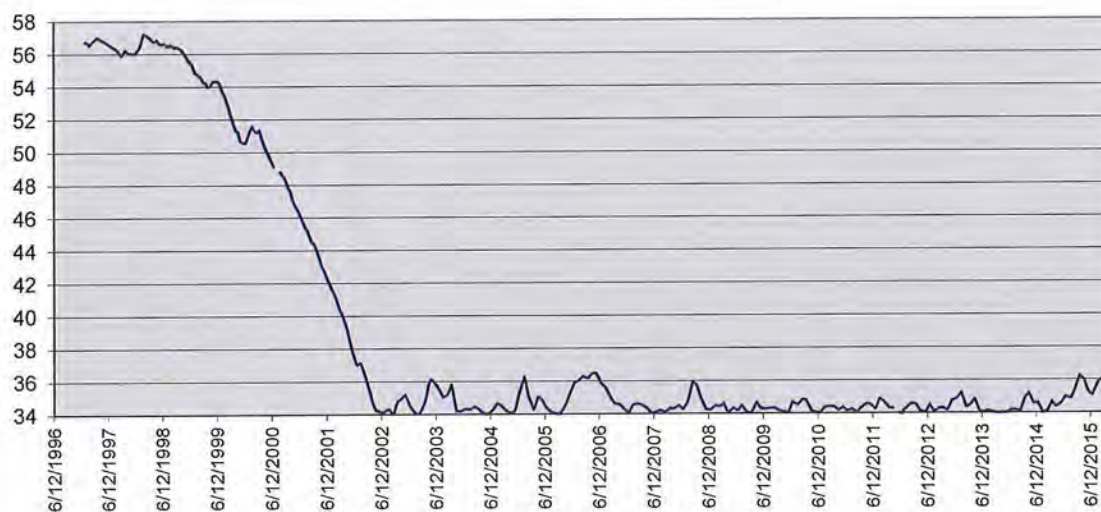
Borehole 13C



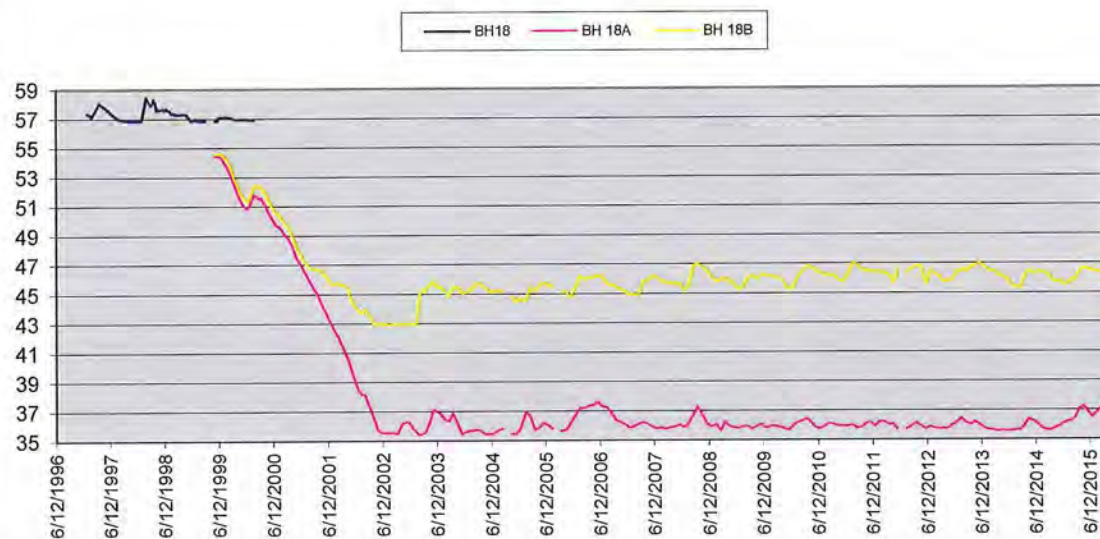
Borehole 16



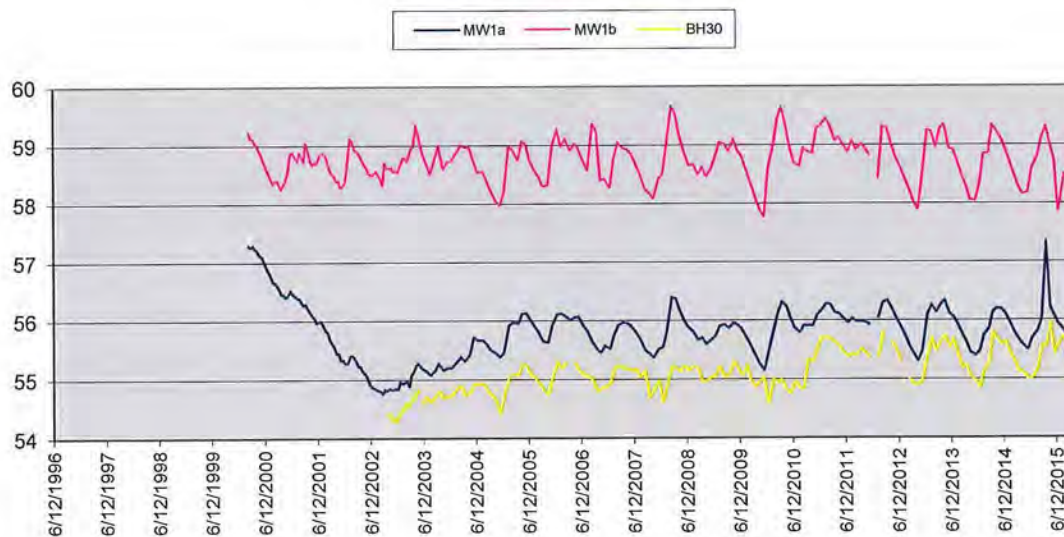
Borehole 17



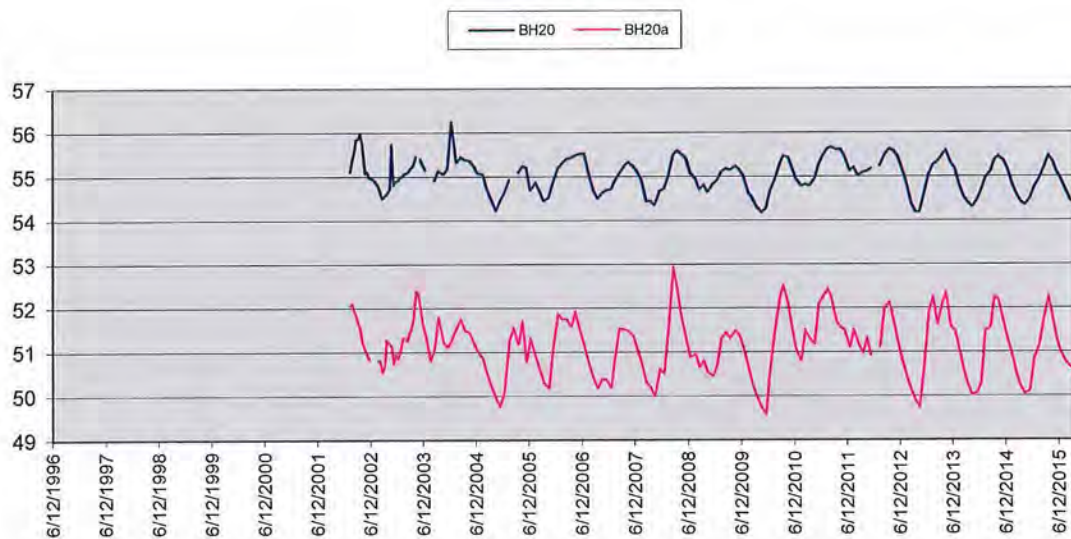
Borehole 18, 18A and 18B



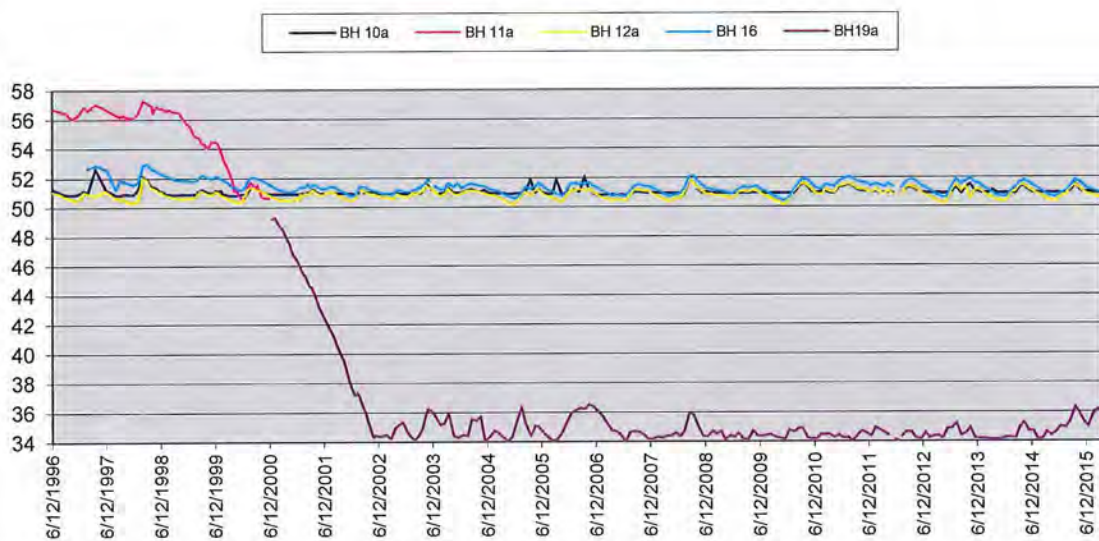
Borehole MW1a, MW1b and BH30



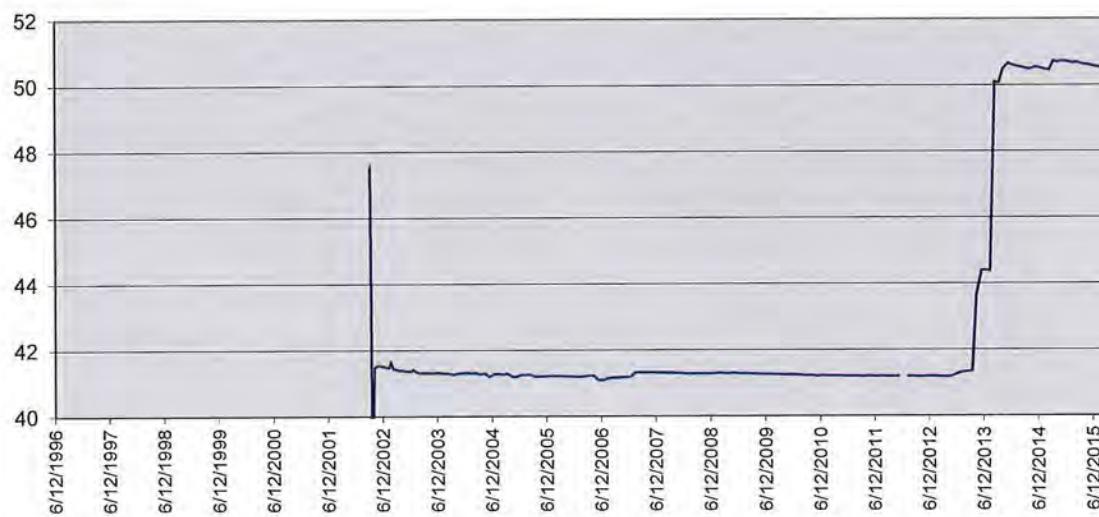
Borehole 20 and 20a

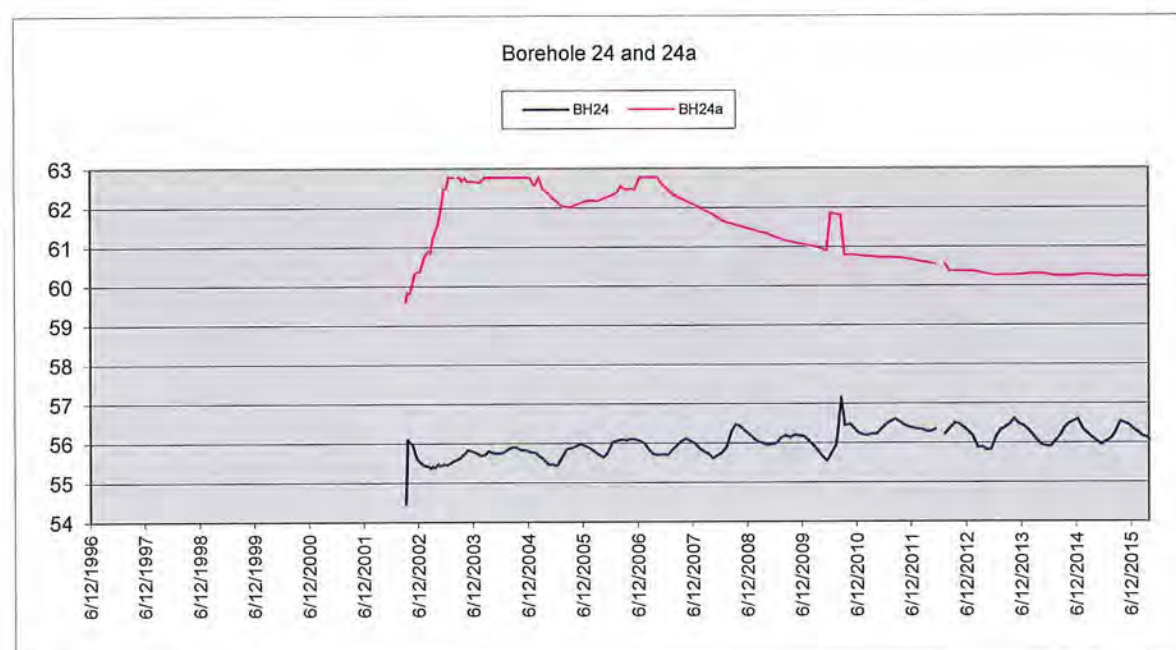
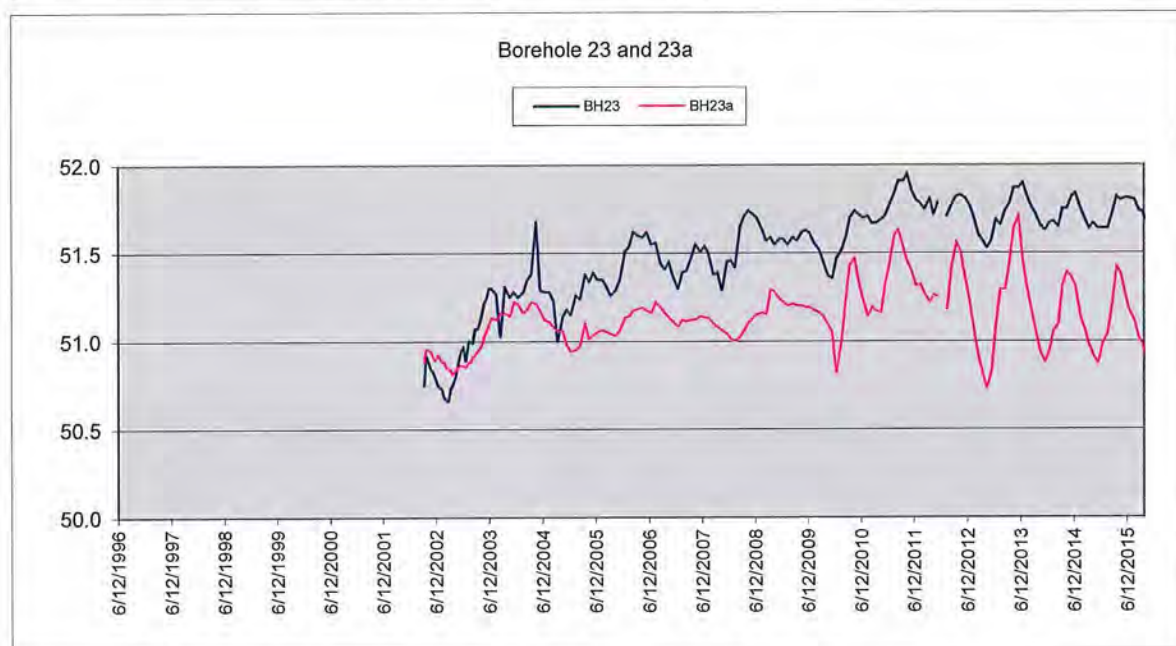
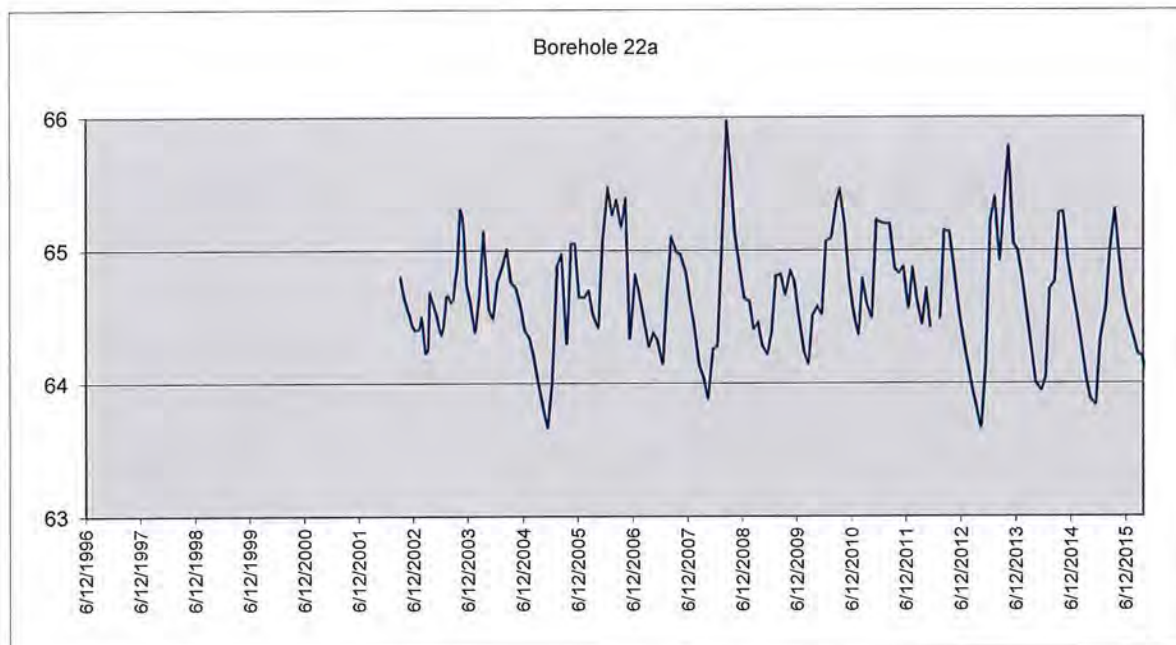


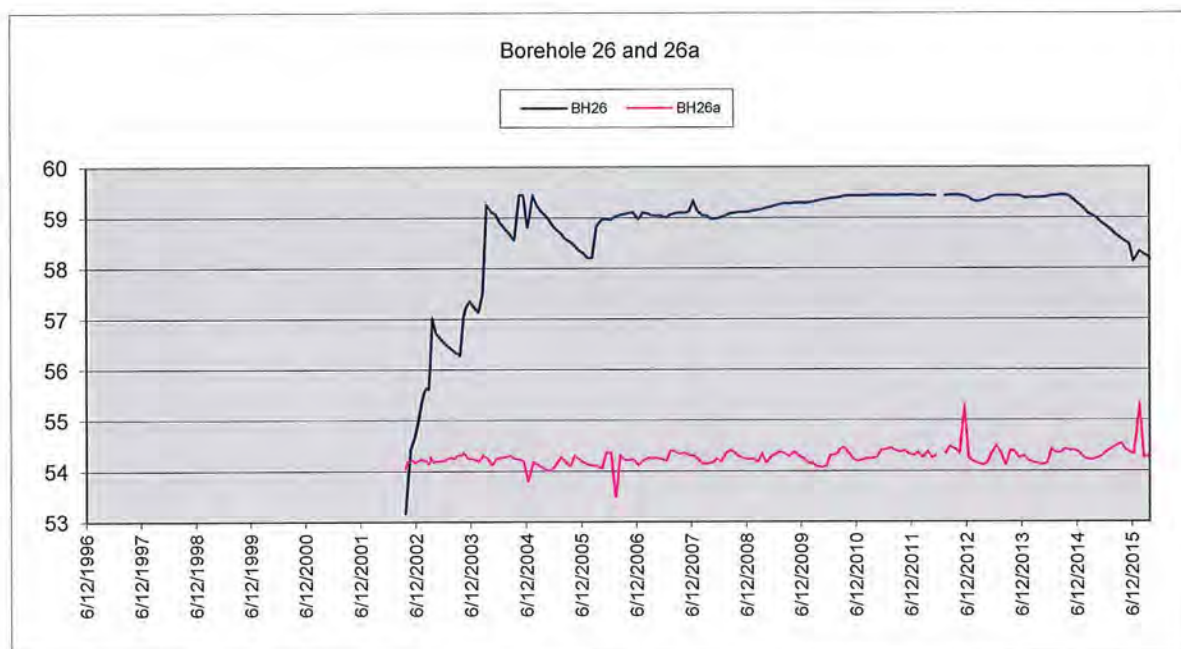
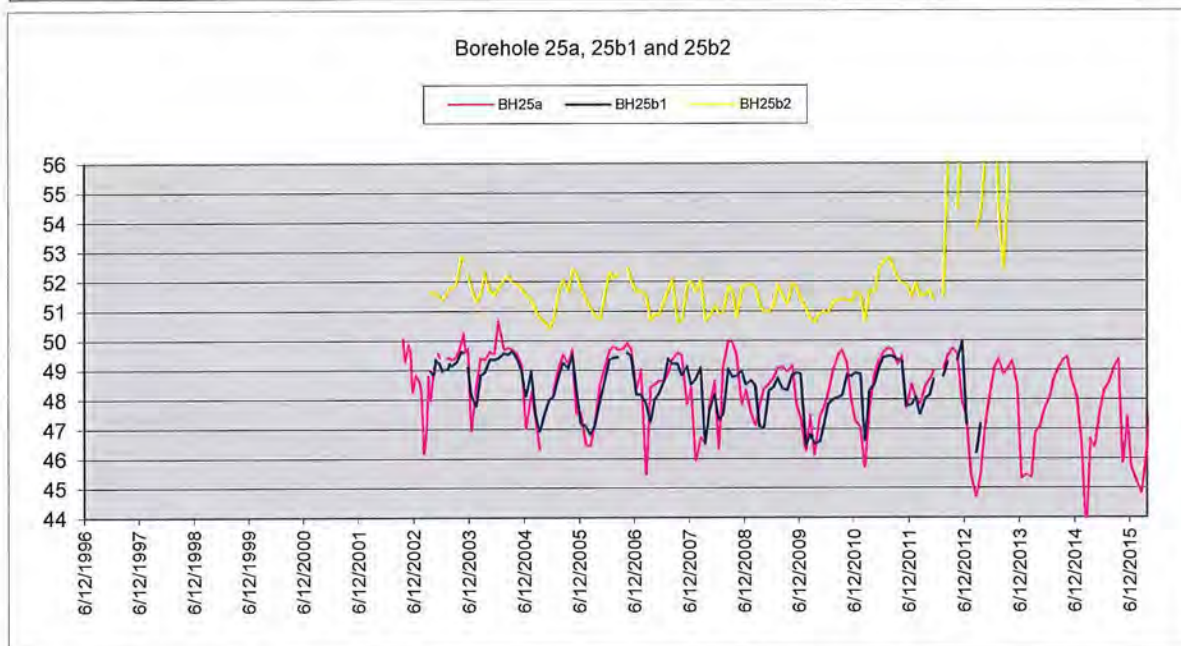
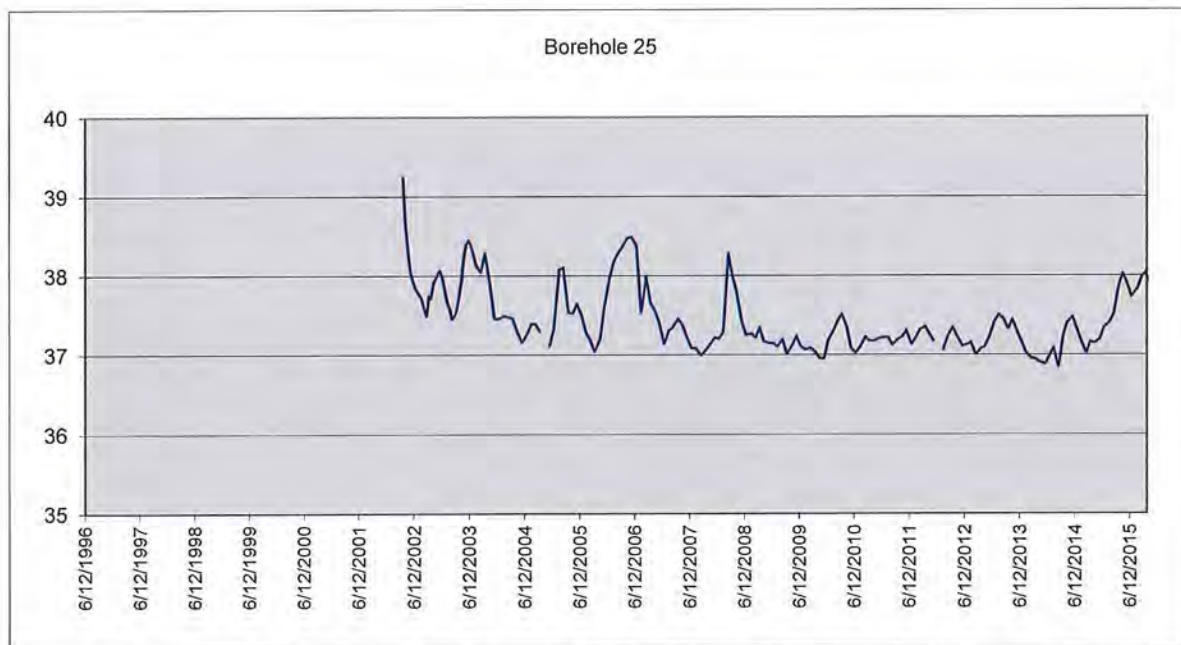
BH's 10a, 11a, 12a, 16 and 19a



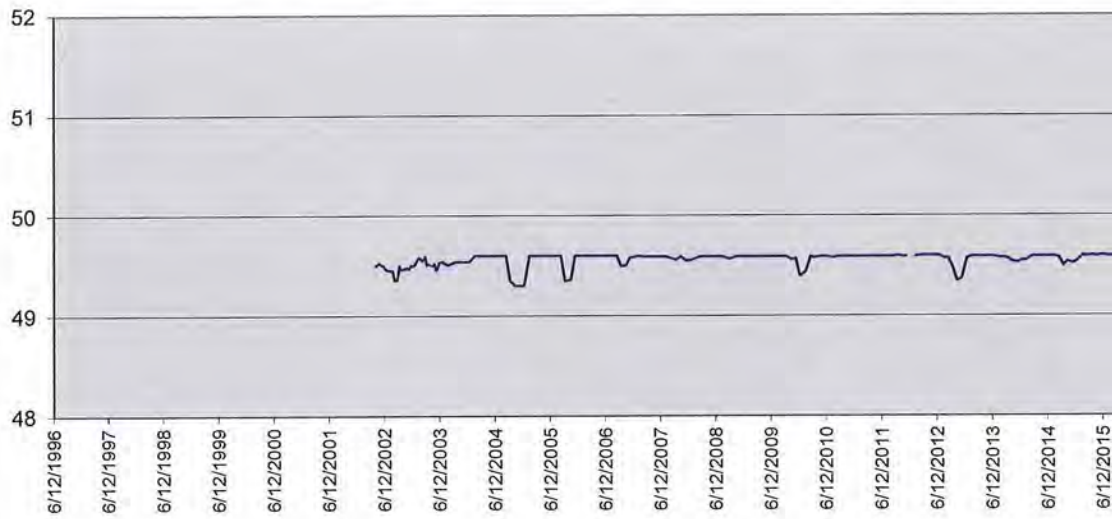
Borehole 22



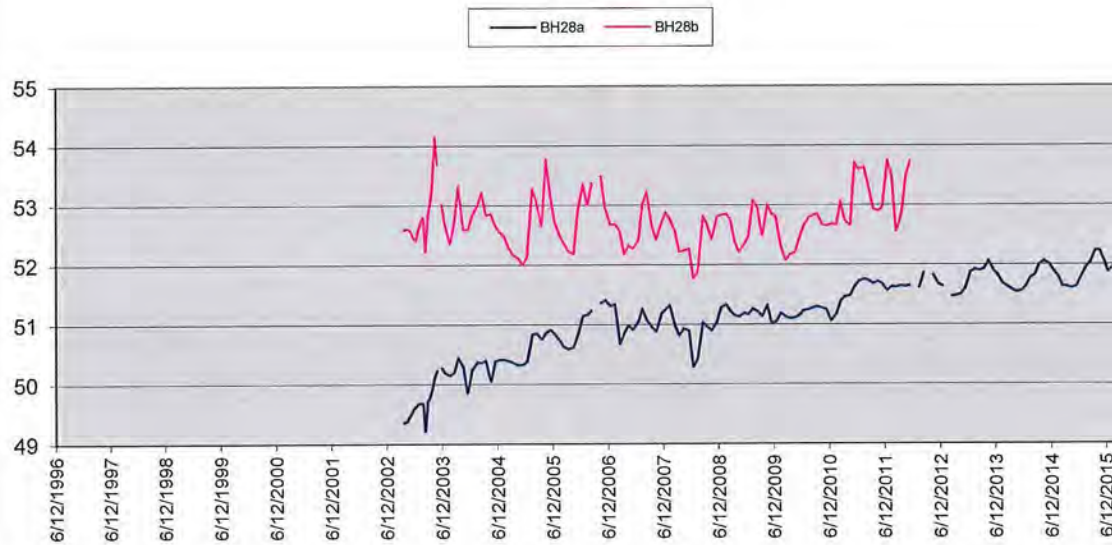




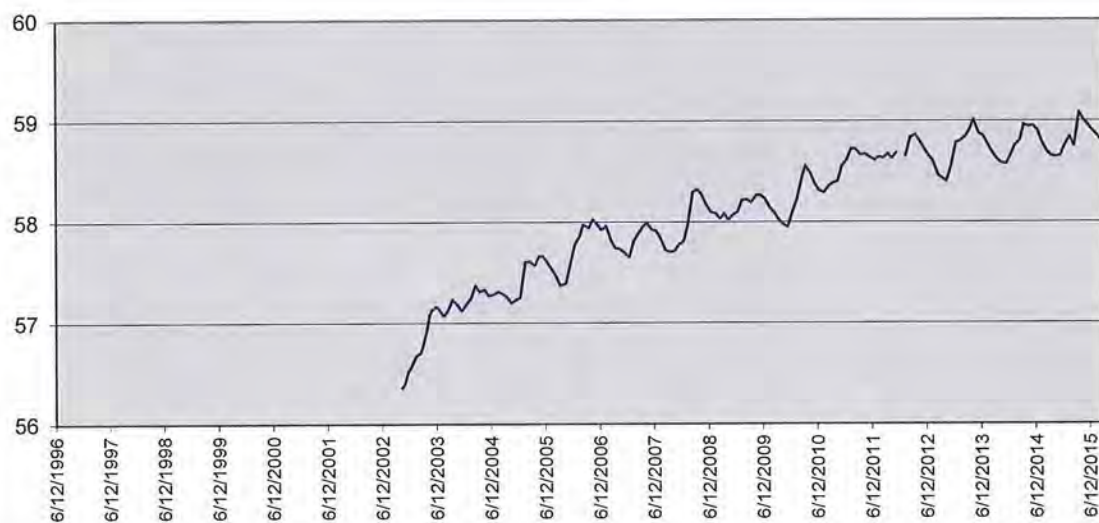
Borehole 27



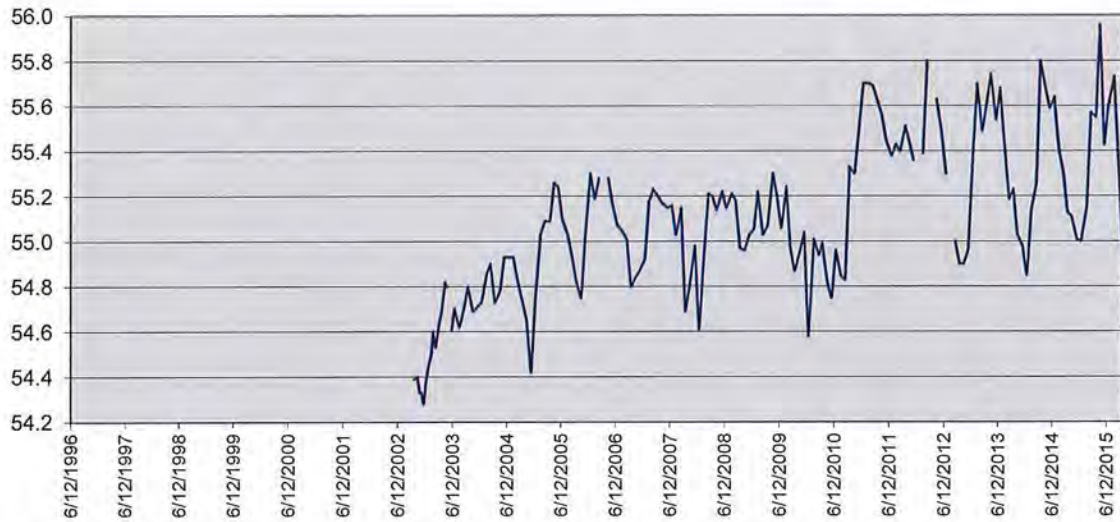
Borehole 28a and 28b



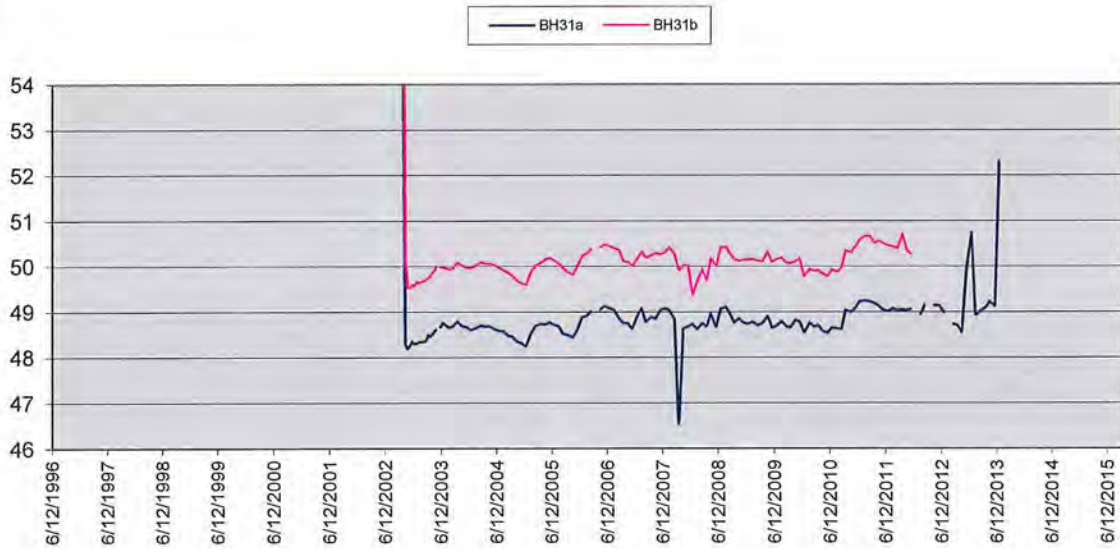
Borehole 29



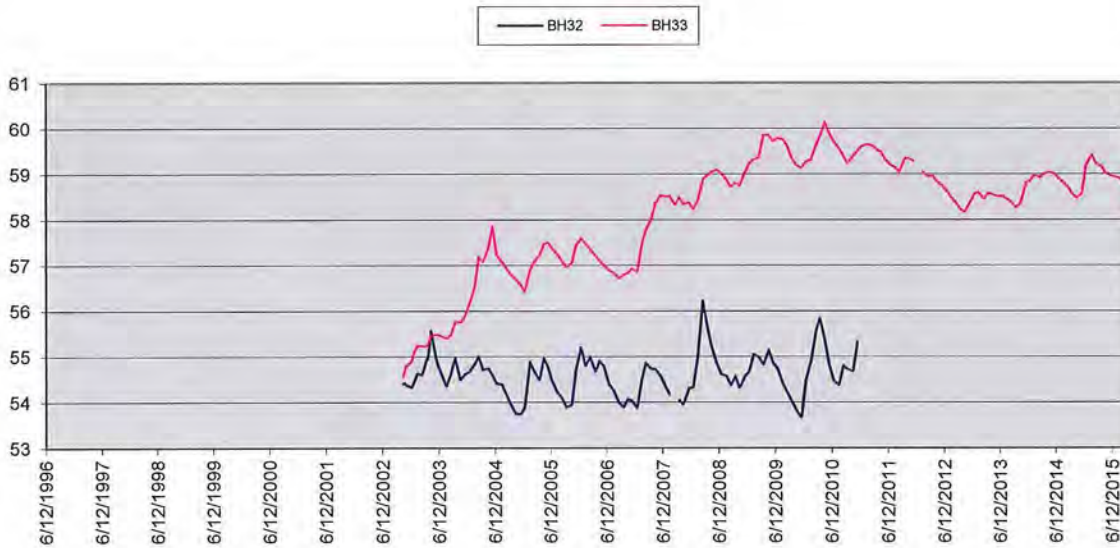
Borehole 30



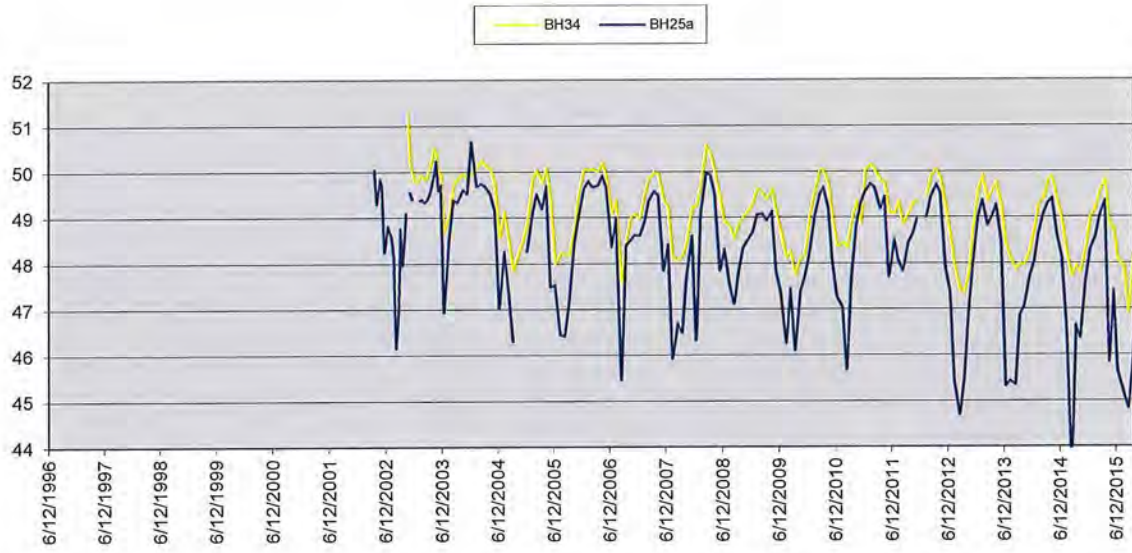
Borehole 31



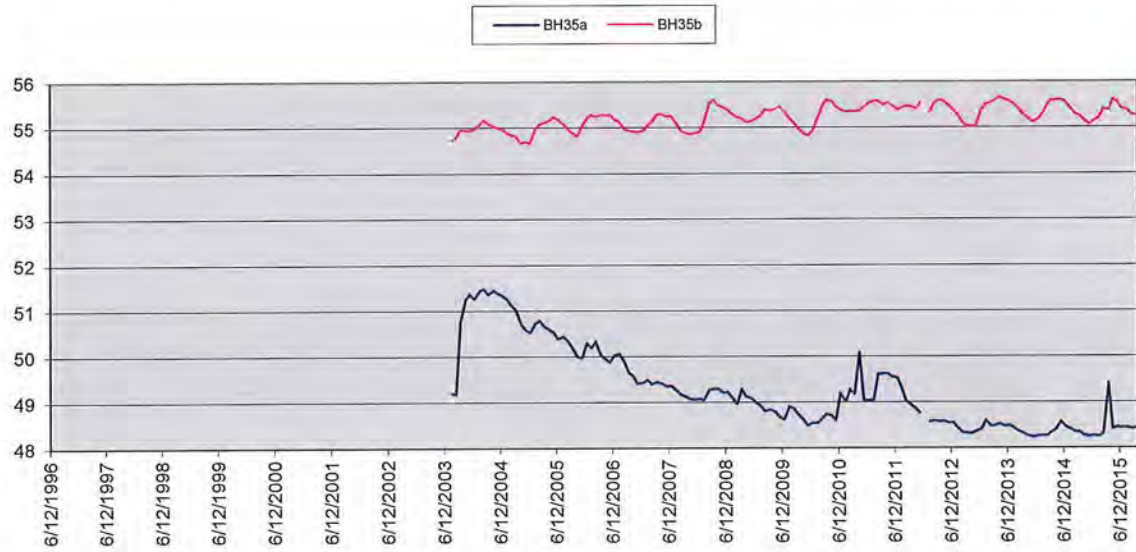
Borehole 32 and 33



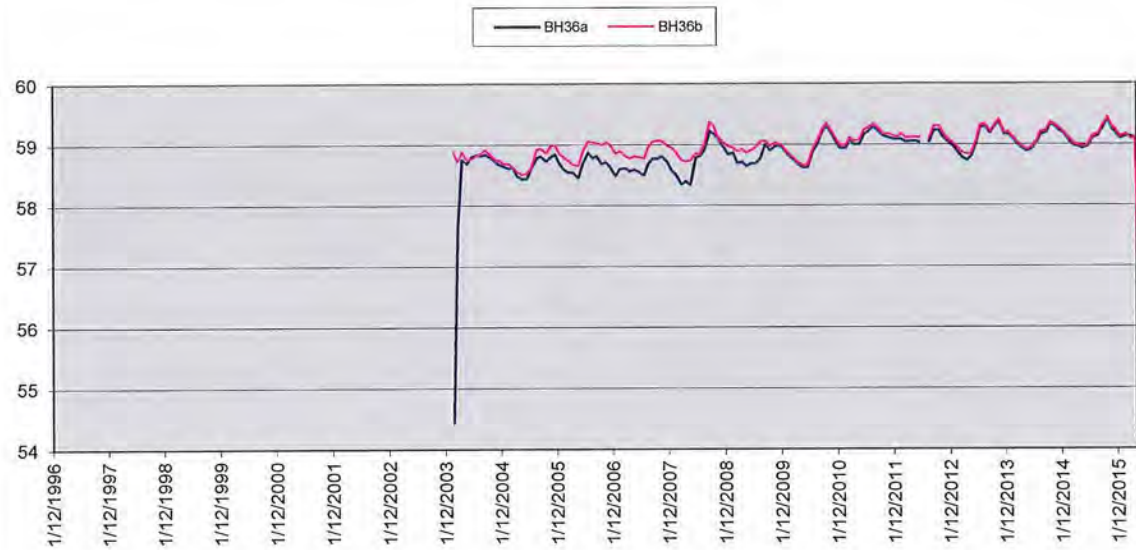
Boreholes 25a and 34



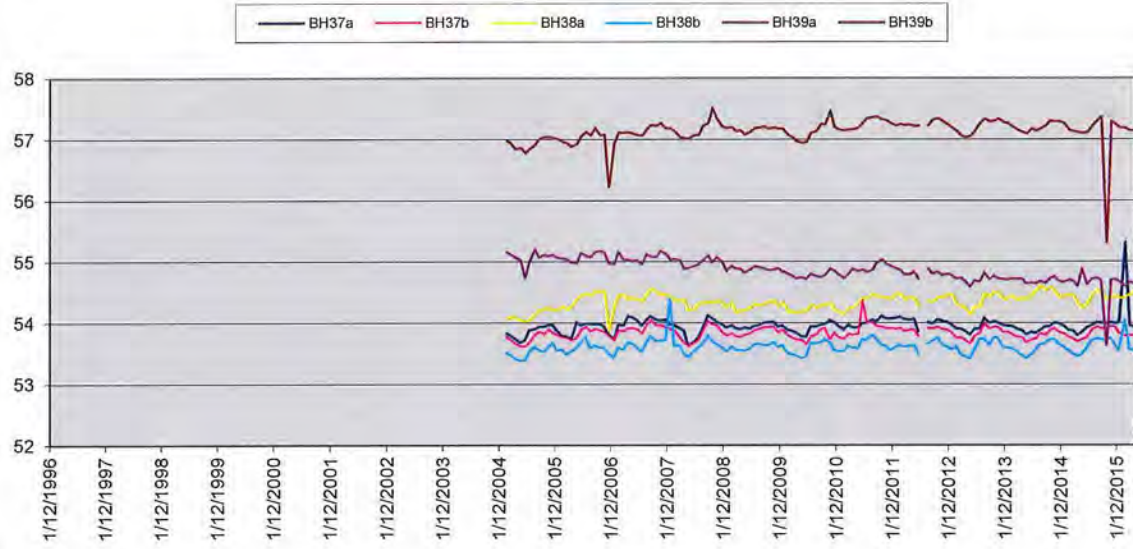
Borehole 35a and 35b



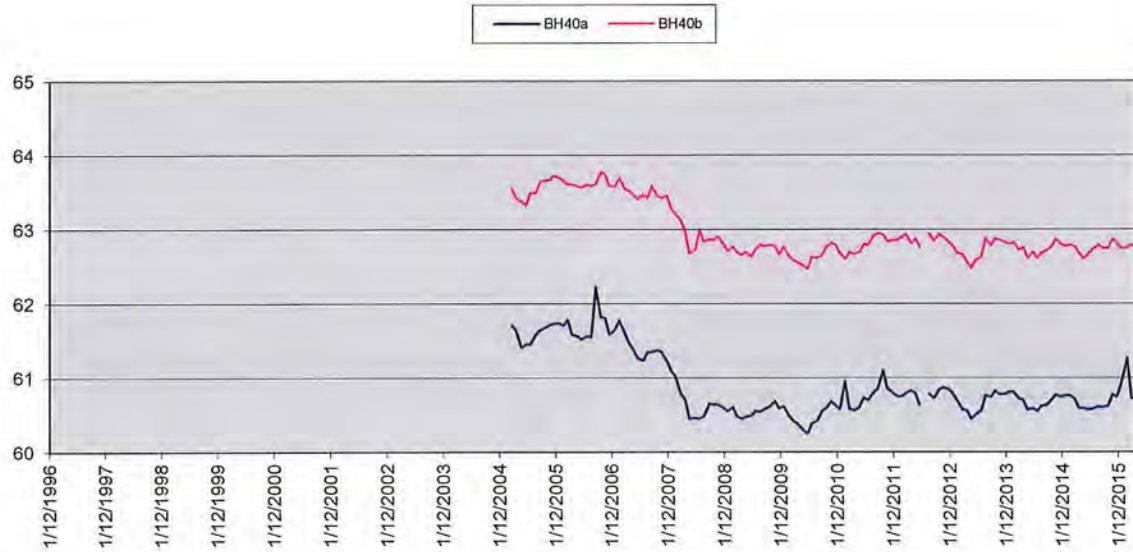
Borehole 36a and 36b



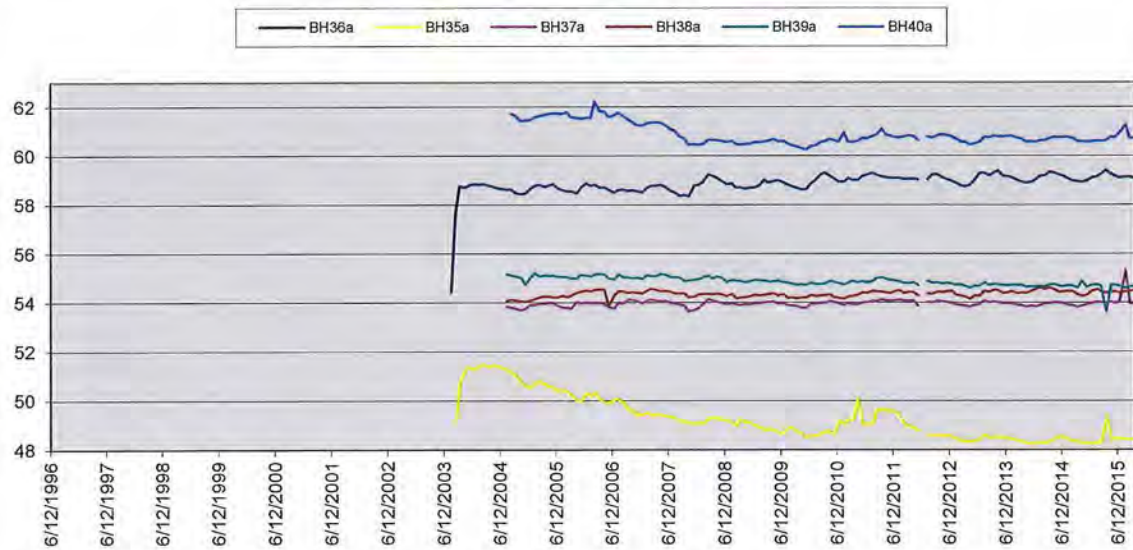
Boreholes 37, 38 and 39



Borehole 40



Borehole 35a, 36a, 37a, 38a, 39a, and 40a

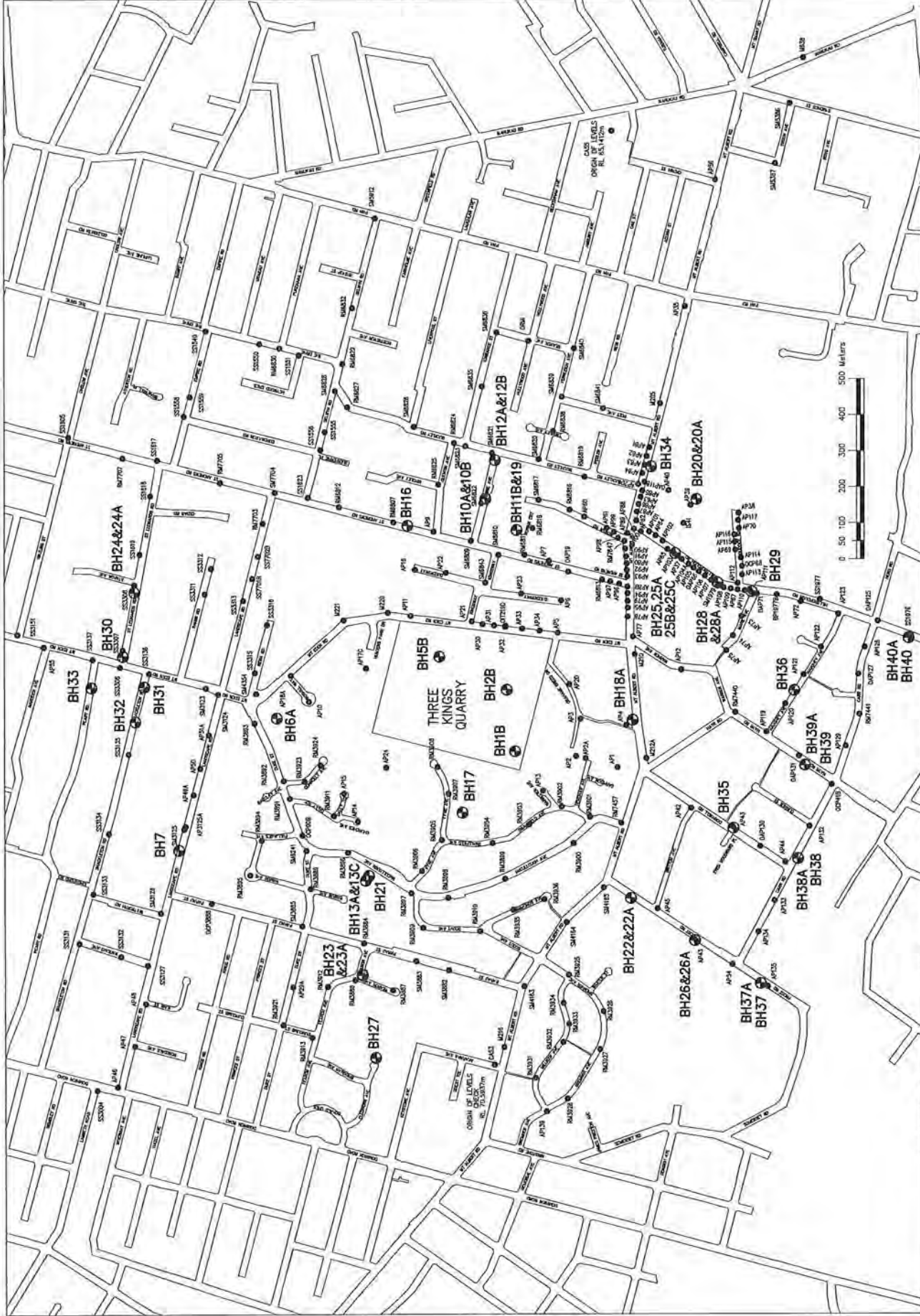




Note:
Origin of Levels
CAS5 S049830
RL65.1412m
in same terms as
M205 S054417
RL59.305m

• SS3316 = Precise
Level Survey
Benchmarks

• BH16 = Borehole
Location



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| REVISION | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | 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| | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | | | | | DATE | | | | | | | | | | BY | | | | | | | | | | CHECKED | | | | | | 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Precise Level Survey Results
(Precise Level Mark Location Plan)

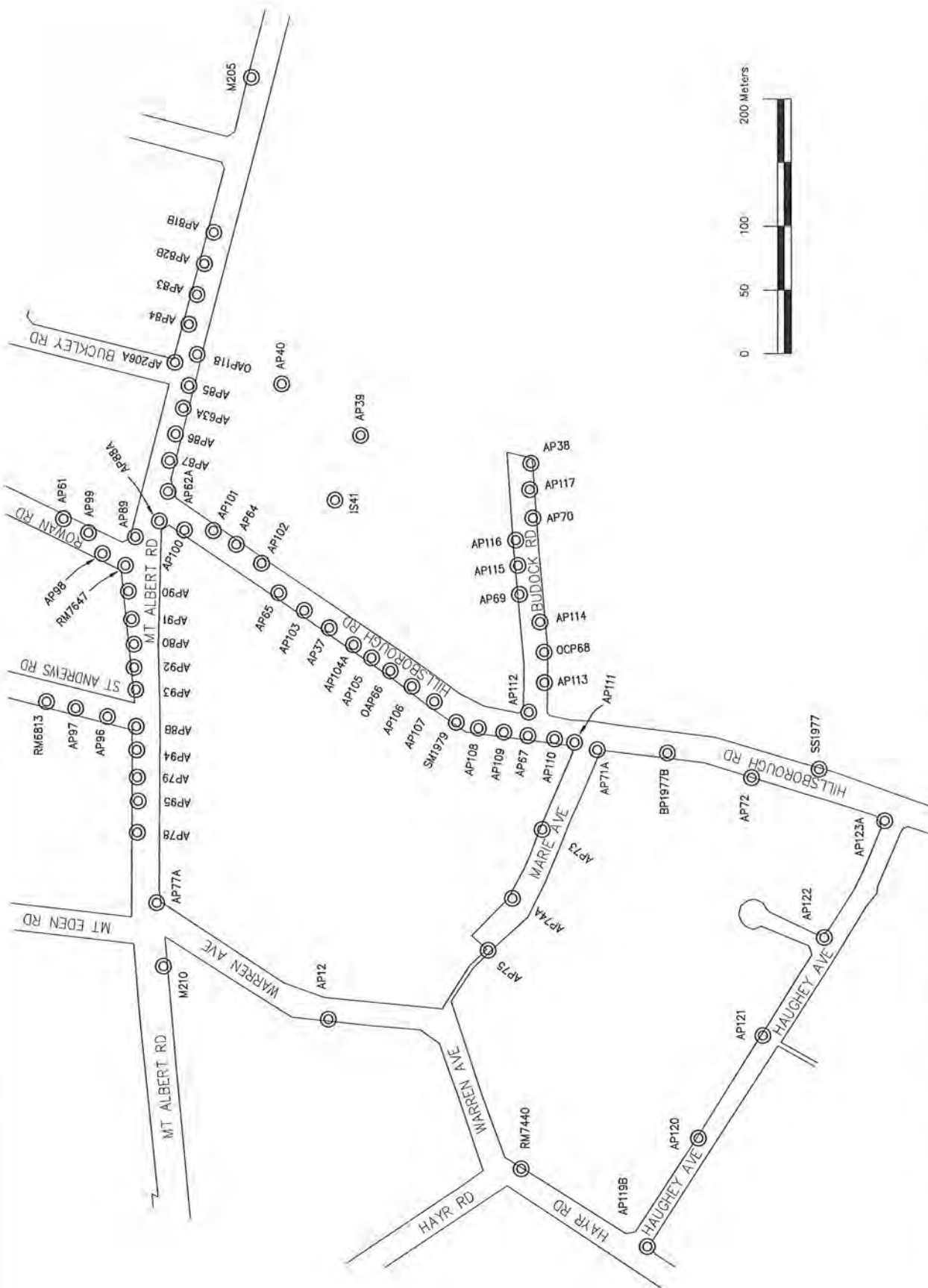
THREE KINGS PRECISE LEVEL SURVEY RECORD

| Station ID | Location | Coordinates | | Averaged Level | Surveyed Levels (metres) | | Change from Averaged Level (mm) | | April 16 cf April 15 (mm) |
|------------|---------------------|-------------|------------|----------------|--------------------------|--------|---------------------------------|--------|---------------------------|
| | | mN | mE | | Apr-15 | Apr-16 | Apr-15 | Apr-16 | |
| AP 3136A | Mt Eden Rd | 697911.30 | 299386.400 | 63.113 | 63.112 | 63.114 | -1 | 0 | 2 |
| CN 3137A | Mt Eden Rd | 698072.60 | 299427.100 | 63.327 | 63.326 | 63.327 | -1 | 0 | 1 |
| M 212A | Mt Albert Rd | 696504.40 | 299153.200 | 86.127 | 86.110 | 86.110 | -17 | -17 | 0 |
| SM 4163 | Mt Albert Rd | 696843.00 | 298513.000 | 74.142 | 74.141 | 74.142 | -1 | 0 | 1 |
| SM 4164 | Mt Albert Rd | 696728.60 | 298688.400 | 75.851 | 75.842 | 75.843 | -9 | -8 | 1 |
| SM 4165 | Mt Albert Rd | 696625.10 | 298783.300 | 83.632 | 83.622 | 83.622 | -10 | -10 | 0 |
| SM 3882 | Parau St | 697063.30 | 298555.500 | 63.302 | 63.300 | 63.301 | -2 | -1 | 1 |
| RM 3898 | McCullough Ave | 697067.10 | 298760.300 | 76.078 | 76.064 | 76.065 | -15 | -13 | 2 |
| RM 3899 | McCullough Ave | 696901.00 | 298813.200 | 77.811 | 77.801 | 77.802 | -11 | -10 | 1 |
| RM 3900 | McCullough Ave | 696713.60 | 298916.500 | 76.657 | 76.641 | 76.642 | -16 | -15 | 1 |
| RM 3901 | Smallfield Ave | 696669.60 | 298986.600 | 78.931 | 78.895 | 78.896 | -36 | -35 | 0 |
| RM 3902 | Smallfield Ave | 696747.40 | 299014.200 | 80.177 | 80.161 | 80.162 | -16 | -15 | 1 |
| RM 3903 | Smallfield Ave | 696834.70 | 298965.100 | 82.524 | 82.515 | 82.516 | -10 | -8 | 1 |
| RM 3904 | Smallfield Ave | 696940.00 | 298912.500 | 82.708 | 82.697 | 82.700 | -11 | -9 | 2 |
| RM 3907 | Fyvie Ave | 697063.30 | 299054.600 | 80.321 | 80.314 | 80.316 | -7 | -5 | 2 |
| RM 3910 | Scout Ave | 696974.90 | 298672.900 | 83.414 | 83.403 | 83.406 | -11 | -9 | 2 |
| RM 3925 | Bremner Ave | 696727.70 | 298541.500 | 65.423 | 65.424 | 65.424 | 1 | 1 | 0 |
| RM 3926 | Bremner Ave | 696630.50 | 298449.000 | 59.088 | 59.089 | 59.089 | 1 | 1 | 0 |
| RM 3933 | Milliken Rd | 696725.10 | 298412.700 | 71.049 | 71.054 | 71.054 | 5 | 5 | -1 |
| RM 3934 | Milliken Rd | 696742.70 | 298472.300 | 66.303 | 66.307 | 66.306 | 4 | 3 | 0 |
| RM 3935 | Simmonds Ave | 696877.00 | 298725.700 | 91.755 | 91.745 | 91.746 | -10 | -9 | 2 |
| RM 3936 | Simmonds Ave | 696788.80 | 298756.800 | 90.869 | 90.850 | 90.852 | -19 | -18 | 1 |
| RM 7440 | Hayr Rd | 696258.10 | 299279.700 | 84.033 | 84.023 | 84.024 | -11 | -9 | 2 |
| RM 7457 | Mt Albert Rd | 696575.40 | 298967.900 | 85.707 | 85.691 | 85.691 | -17 | -17 | 0 |
| AP 1 | Plaza, Mt Albert Rd | 696589.80 | 299127.200 | 81.269 | 81.247 | 81.247 | -22 | -22 | 0 |
| AP 2 | Plaza, Mt Albert Rd | 696706.40 | 299158.200 | 76.290 | 76.273 | 76.273 | -17 | -17 | 0 |
| AP 2A | Plaza, Mt Albert Rd | 696679.30 | 299152.500 | 77.582 | 77.567 | 77.567 | -15 | -15 | 0 |
| AP 3 | Plaza, Mt Albert Rd | 696693.00 | 299259.100 | 77.367 | 77.354 | 77.354 | -13 | -13 | 0 |
| AP 4 | Plaza, Mt Albert Rd | 696564.80 | 299244.900 | 83.366 | 83.344 | 83.346 | -21 | -20 | 1 |
| AP 13 | Barrister Ave | 696796.00 | 299064.300 | 79.867 | 79.860 | 79.861 | -7 | -6 | 2 |
| AP 20 | Grahame Breed Dr | 696723.10 | 299358.500 | 76.792 | 76.786 | 76.787 | -6 | -5 | 1 |
| AP 3123A | Mt Eden Rd | 697748.50 | 299344.000 | 75.903 | 75.903 | 75.904 | -1 | 1 | 2 |
| AP 3124A | Landscape Rd | 697715.20 | 299326.900 | 77.907 | 77.907 | 77.909 | 0 | 1 | 1 |
| SM 3125 | Landscape Rd | 697810.20 | 298959.400 | 69.440 | 69.426 | 69.427 | -14 | -13 | 1 |
| SM 3126 | Landscape Rd | 697873.00 | 298716.400 | 63.015 | 63.006 | 63.008 | -8 | -7 | 1 |
| SS 3127 | Landscape Rd | 697912.00 | 298565.700 | 59.724 | 59.718 | 59.720 | -6 | -4 | 2 |
| SS 3132 | Waltomo St | 697987.80 | 298590.900 | 61.689 | 61.684 | 61.686 | -4 | -3 | 2 |
| SM 3883 | Parau St | 697157.00 | 298581.000 | 64.371 | 64.366 | 64.368 | -5 | -3 | 2 |
| RM 3884 | Parau St | 697302.00 | 298629.200 | 62.539 | 62.534 | 62.535 | -5 | -4 | 1 |
| AP 3885A | Duke St | 697477.00 | 298682.300 | 62.051 | 62.051 | 62.051 | No previous | 0 | 0 |
| RM 3886 | Fearon Ave | 697329.60 | 298529.500 | 55.236 | 55.235 | 55.235 | -1 | -1 | 1 |
| RM 3887 | Fearon Ave | 697221.30 | 298498.200 | 51.548 | 51.535 | 51.535 | -13 | -13 | 0 |
| OCP 3888 | Parau St | 697732.60 | 298744.400 | 62.513 | 62.502 | 62.503 | -11 | -10 | 1 |
| RM 3889 | Duke St | 697452.30 | 298785.500 | 69.233 | 69.210 | 69.210 | -24 | -23 | 1 |
| RM 3891 | Duke St | 697515.90 | 299039.800 | 77.575 | 77.557 | 77.559 | -18 | -16 | 2 |
| RM 3892 | Duke St | 697529.20 | 299086.300 | 78.012 | 77.995 | 77.998 | -17 | -14 | 2 |
| RM 3893A | Duke St | 697610.70 | 299248.000 | 79.110 | 79.109 | 79.110 | -1 | 0 | 1 |
| RM 3894 | Fulljames Ave | 697589.80 | 298923.400 | 72.082 | 72.052 | 72.054 | -30 | -28 | 2 |
| RM 3895 | Hamon Ave | 697620.40 | 298829.500 | 65.188 | 65.154 | 65.154 | -34 | -35 | -1 |
| AP 3895A | Hamon Ave | 697632.00 | 298839.100 | 65.612 | 65.612 | 65.609 | 0 | -4 | -3 |
| RM 3896 | McCullough Ave | 697345.50 | 298887.000 | 69.820 | 69.798 | 69.798 | -22 | -21 | 0 |
| RM 3897 | McCullough Ave | 697170.60 | 298776.600 | 75.084 | 75.067 | 75.069 | -17 | -15 | 2 |
| RM 3905 | Fyvie Ave | 697080.60 | 298924.000 | 75.813 | 75.804 | 75.806 | -9 | -8 | 2 |
| RM 3906 | Fyvie Ave | 697134.60 | 298836.100 | 77.447 | 77.433 | 77.436 | -14 | -11 | 2 |
| RM 3908 | Fyvie Ave | 697093.60 | 299129.200 | 82.069 | 82.064 | 82.065 | -5 | -4 | 1 |
| RM 3909 | Scout Ave | 697136.40 | 298680.600 | 80.056 | 80.043 | 80.045 | -13 | -12 | 2 |
| RM 3911 | Dally Tce | 697387.50 | 298991.100 | 88.894 | 88.878 | 88.881 | -15 | -12 | 3 |
| RM 3912 | Fearon Ave | 697399.30 | 298512.800 | 51.652 | 51.652 | 51.653 | 0 | 1 | 1 |
| RM 3913 | Fearon Ave | 697445.80 | 298362.000 | 49.238 | 49.243 | 49.243 | 4 | 5 | 0 |
| RM 3921 | Duncumb St | 697530.80 | 298402.700 | 50.034 | 50.036 | 50.037 | 3 | 3 | 1 |
| RM 3923 | Connolly Ave | 697465.90 | 299086.300 | 74.293 | 74.275 | 74.278 | -18 | -16 | 2 |
| RM 3924 | Connolly Ave | 697424.60 | 299131.900 | 73.034 | 73.014 | 73.016 | -20 | -18 | 2 |
| SM 4354 | Mt Eden Rd | 697606.00 | 299322.200 | 80.155 | 80.129 | 80.130 | -26 | -25 | 1 |
| SM 6241 | Duke St | 697468.60 | 298893.400 | 70.012 | 69.981 | 69.985 | -30 | -27 | 3 |
| OCP 90B | Duke St | 697480.40 | 298934.300 | 71.805 | 71.785 | 71.787 | -20 | -18 | 2 |
| AP 10A | Roskill Way | 697458.70 | 299309.200 | 82.766 | 82.766 | 82.767 | 0 | 0 | 1 |
| AP 14 | Churches Ave | 697318.10 | 298969.200 | 91.334 | 91.320 | 91.323 | -14 | -11 | 3 |
| AP 15 | Dally Terrace | 697357.20 | 299055.900 | 90.821 | 90.806 | 90.808 | -16 | -13 | 2 |
| AP 17C | Hunters Park Dr | 697293.90 | 299402.900 | 74.602 | 74.593 | 74.593 | -9 | -8 | 1 |
| AP 29A | Duke St | 697501.60 | 298517.800 | 49.542 | 49.536 | 49.539 | -5 | -3 | 2 |
| M 220 | Mt Eden Rd | 697232.60 | 299557.200 | 81.700 | 81.663 | 81.665 | -37 | -35 | 2 |
| M 221 | Mt Eden Rd | 697359.10 | 299539.900 | 83.449 | 83.434 | 83.434 | -15 | -14 | 0 |
| SS 1555 | Selwyn Rd | 697413.60 | 300062.900 | 99.584 | 99.584 | 99.584 | 0 | 0 | 0 |

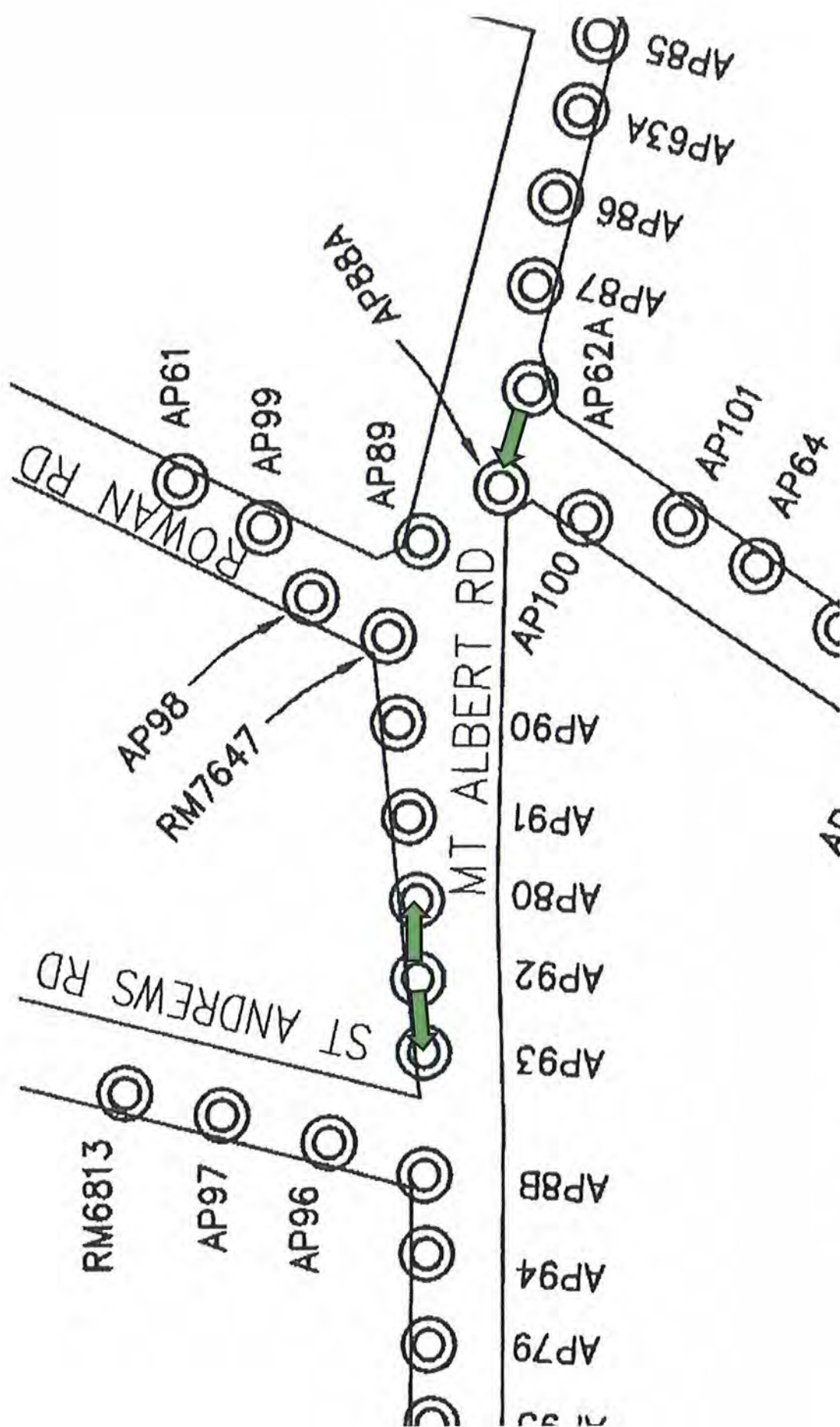
| Station ID | Location | Coordinates | | Averaged Level | Surveyed Levels (metres) | | Change from Averaged Level (mm) | | April 16 of April 15 (mm) |
|------------|-----------------|-------------|------------|----------------|--------------------------|---------|---------------------------------|--------|---------------------------|
| | | mN | mE | | Apr-15 | Apr-16 | Apr-15 | Apr-16 | |
| SS 1556 | Selwyn Rd | 697425.90 | 300012.800 | 102.373 | 102.372 | 102.372 | -1 | -1 | 0 |
| SS 1617 | St Andrews Rd | 697887.70 | 299983.300 | 81.442 | 81.443 | 81.444 | 0 | 2 | 1 |
| SS 1618 | St Leonards Rd | 697906.00 | 299884.500 | 78.478 | 78.473 | 78.475 | -5 | -3 | 2 |
| AP 1619A | St Leonards Rd | 697935.70 | 299724.600 | 66.609 | 66.604 | 66.606 | -4 | -3 | 2 |
| SS 1623 | St Andrews Rd | 697461.10 | 299875.000 | 107.522 | 107.516 | 107.517 | -6 | -6 | 1 |
| SS 3306 | Mt Eden Rd | 697993.20 | 299406.800 | 60.565 | 60.549 | 60.550 | -17 | -16 | 1 |
| SS 3307 | St Leonards Rd | 697985.80 | 299454.700 | 59.661 | 59.649 | 59.650 | -13 | -11 | 2 |
| SS 3308 | St Leonards Rd | 697952.20 | 299636.000 | 63.275 | 63.268 | 63.269 | -7 | -6 | 1 |
| SS 3311 | Rahiri Rd | 697752.00 | 299610.900 | 95.306 | 95.290 | 95.293 | -16 | -13 | 2 |
| SS 3312 | Rahiri Rd | 697733.60 | 299683.000 | 95.929 | 95.915 | 95.918 | -14 | -12 | 3 |
| SS 3313 | Landscape Rd | 697648.30 | 299592.500 | 112.633 | 112.618 | 112.619 | -15 | -15 | 0 |
| SS 3315 | Rewa Rd | 697613.40 | 299396.600 | 80.938 | 80.914 | 80.915 | -24 | -23 | 1 |
| SS 3316 | Rewa Rd | 697579.50 | 299529.800 | 98.902 | 98.884 | 98.885 | -18 | -16 | 1 |
| RM 6807 | St Andrews Rd | 697216.70 | 299808.100 | 102.487 | 102.474 | 102.475 | -13 | -12 | 1 |
| RM 6812 | St Andrews Rd | 697370.60 | 299846.600 | 108.907 | 108.899 | 108.903 | -7 | -4 | 3 |
| SM 6826 | Buckley Rd | 697157.90 | 300077.500 | 74.710 | 74.707 | 74.707 | -3 | -3 | 0 |
| RM 6827 | Buckley Rd | 697346.00 | 300128.000 | 83.332 | 83.336 | 83.335 | 3 | 2 | -1 |
| SM 6828 | Buckley Rd | 697383.80 | 300177.400 | 87.952 | 87.956 | 87.955 | 4 | 3 | -1 |
| SS 7701B | Landscape Rd | 697619.70 | 299657.100 | 115.509 | 115.509 | 115.509 | 0 | 0 | 0 |
| SS 7702B | Landscape Rd | 697602.30 | 299725.800 | 110.538 | 110.537 | 110.537 | -1 | -2 | 0 |
| RM 7703 | Landscape Rd | 697589.20 | 299808.400 | 100.149 | 100.131 | 100.131 | -18 | -18 | 0 |
| SM 7704 | St Andrews Rd | 697556.90 | 299894.500 | 97.816 | 97.810 | 97.810 | -6 | -6 | 1 |
| AP 7705A | St Andrews Rd | 697700.10 | 299930.600 | 88.195 | 88.196 | 88.197 | 1 | 2 | 1 |
| AP 9 | St Andrews Rd | 697103.90 | 299782.200 | 92.802 | 92.783 | 92.783 | -18 | -18 | 0 |
| AP 11 | Mt Eden Rd | 697168.40 | 299548.700 | 80.191 | 80.182 | 80.183 | -9 | -8 | 1 |
| AP 16 | Queens Way | 697156.20 | 299676.200 | 83.646 | 83.643 | 83.644 | -2 | -2 | 1 |
| AP 18C | Mt Eden Rd | 697509.70 | 299383.900 | 81.666 | 81.666 | 81.666 | -1 | 0 | 1 |
| M 205 | Mt Albert Rd | 696471.20 | 300138.500 | 59.305 | 59.303 | 59.303 | -2 | -2 | 0 |
| AP 206A | Mt Albert Rd | 696527.30 | 299919.400 | 59.997 | 59.993 | 59.993 | -4 | -4 | 0 |
| M 210 | Mt Albert Rd | 696536.10 | 299441.600 | 83.050 | 83.029 | 83.030 | -21 | -20 | 1 |
| SM 1979 | Hillsborough Rd | 696308.00 | 299637.300 | 61.241 | 61.212 | 61.213 | -29 | -28 | 1 |
| BP 1977B | Hillsborough Rd | 696141.80 | 299609.900 | 71.993 | 71.986 | 71.988 | -7 | -5 | 2 |
| SM 6809 | St Andrews Rd | 697001.30 | 299757.400 | 81.800 | 81.778 | 81.778 | -22 | -22 | 0 |
| SM 6810 | St Andrews Rd | 696925.60 | 299720.900 | 76.956 | 76.936 | 76.936 | -20 | -20 | 0 |
| RM 6811 | St Andrews Rd | 696849.00 | 299715.400 | 76.526 | 76.501 | 76.501 | -24 | -24 | 0 |
| RM 6813 | St Andrews Rd | 696632.00 | 299653.000 | 80.905 | 80.879 | 80.879 | -26 | -27 | 0 |
| RM 6816 | Rowan Rd | 696721.90 | 299845.700 | 78.908 | 78.885 | 78.886 | -23 | -23 | 1 |
| SM 6817 | Rowan Rd | 696808.80 | 299876.800 | 80.995 | 80.976 | 80.977 | -20 | -19 | 1 |
| RM 6818 | Rowan Rd | 696826.70 | 299791.300 | 81.966 | 81.946 | 81.947 | -19 | -19 | 0 |
| RM 6819 | Buckley Rd | 696678.00 | 299942.300 | 65.620 | 65.604 | 65.604 | -16 | -16 | 0 |
| SM 6820 | Buckley Rd | 696808.10 | 299988.800 | 71.955 | 71.946 | 71.945 | -9 | -10 | -1 |
| SM 6821 | Buckley Rd | 696938.50 | 300004.300 | 71.114 | 71.107 | 71.107 | -7 | -7 | 0 |
| SM 6822 | Gorrie Ave | 696973.90 | 299863.200 | 81.874 | 81.857 | 81.857 | -17 | -17 | 0 |
| SM 6823 | Buckley Rd | 697012.40 | 300021.700 | 70.593 | 70.583 | 70.584 | -10 | -10 | 0 |
| RM 6824 | Buckley Rd | 697044.40 | 300030.400 | 71.084 | 71.079 | 71.080 | -5 | -5 | 1 |
| RM 6825 | Quentin Ave | 697092.90 | 299916.800 | 81.386 | 81.375 | 81.374 | -11 | -12 | -1 |
| SM 6835 | Torrance St | 696970.00 | 300185.700 | 70.784 | 70.784 | 70.786 | 0 | 1 | 1 |
| SM 6836 | Torrance St | 696930.30 | 300343.300 | 65.955 | 65.956 | 65.957 | 1 | 2 | 1 |
| RM 6838 | Fernleigh Ave | 696773.30 | 300065.800 | 70.304 | 70.297 | 70.297 | -7 | -7 | 0 |
| SM 6839 | Fernleigh Ave | 696748.10 | 300163.500 | 67.487 | 67.485 | 67.486 | -1 | 0 | 1 |
| SM 6840 | Fernleigh Ave | 696714.70 | 300296.000 | 63.278 | 63.277 | 63.279 | -1 | 1 | 2 |
| SM 6841 | Peet Ave | 696626.70 | 300131.600 | 65.698 | 65.694 | 65.695 | -4 | -3 | 1 |
| AP 6843A | Kings Way | 696958.50 | 299642.100 | 75.221 | 75.218 | 75.219 | -3 | -3 | 1 |
| RM 7647 | Mt Albert Rd | 696565.00 | 299755.100 | 67.601 | 67.573 | 67.574 | -28 | -27 | 1 |
| ORM.I | Weaver Street | 696836.50 | 300316.200 | 63.578 | 63.579 | 63.580 | 1 | 2 | 2 |
| AP 5 | Mt Eden Rd | 696757.00 | 299500.900 | 75.746 | 75.734 | 75.735 | -12 | -11 | 1 |
| AP 6 | Queens Way | 696746.90 | 299590.600 | 75.306 | 75.285 | 75.286 | -21 | -20 | 1 |
| AP 7A | St Andrews Rd | 696778.90 | 299702.100 | 76.820 | 76.817 | 76.817 | -3 | -4 | 0 |
| AP 8B | Mt Albert Rd | 696559.10 | 299633.500 | 75.740 | 75.723 | 75.724 | -17 | -16 | 1 |
| AP 12 | Warren Ave | 696409.10 | 299402.200 | 94.357 | 94.339 | 94.341 | -17 | -16 | 1 |
| OAP 19 | St Andrews Rd | 696725.00 | 299676.400 | 77.508 | 77.482 | 77.482 | -26 | -26 | 0 |
| AP 21B | Mt Eden Rd | 696995.00 | 299530.400 | 77.649 | 77.647 | 77.647 | -2 | -2 | 0 |
| AP 22 | Queens Way | 697069.30 | 299667.600 | 78.352 | 78.348 | 78.348 | -5 | -4 | 0 |
| AP 23 | Queens Way | 696858.60 | 299609.600 | 74.402 | 74.393 | 74.394 | -9 | -8 | 1 |
| AP 30 | Mt Eden Rd | 696966.20 | 299525.100 | 77.329 | 77.318 | 77.318 | -12 | -12 | 0 |
| AP 31 | Mt Eden Rd | 696934.20 | 299521.400 | 76.857 | 76.852 | 76.852 | -6 | -6 | 0 |
| AP 32 | Mt Eden Rd | 696902.60 | 299517.800 | 76.203 | 76.193 | 76.193 | -10 | -10 | 0 |
| AP 33 | Mt Eden Rd | 696855.10 | 299512.300 | 75.121 | 75.110 | 75.110 | -11 | -11 | 0 |
| AP 34 | Mt Eden Rd | 696807.30 | 299506.800 | 74.937 | 74.923 | 74.923 | -14 | -14 | 0 |
| SM 5387 | Erson Ave | 696146.20 | 300815.900 | 56.747 | 56.748 | 56.747 | 1 | 0 | 0 |
| SM 5386 | Symonds St | 696104.10 | 300983.300 | 55.184 | 55.184 | 55.185 | 0 | 1 | 1 |
| M 638 | Manukau Rd | 696081.50 | 301109.300 | 54.690 | 54.688 | 54.689 | -2 | -2 | 0 |
| CA 55 | Manukau Rd | 696605.90 | 300894.300 | 65.141 | 65.141 | | 0 | 0 | 0 |
| CA 53 | Akarana Ave | 696935.90 | 298292.100 | 70.594 | 70.594 | | 0 | 0 | 0 |
| M 216 | Mt Albert Rd | 696903.50 | 298347.900 | 72.658 | 72.658 | 72.659 | 1 | 1 | 1 |

| Station ID | Location | Coordinates | | Averaged Level | Surveyed Levels (metres) | | Change from Averaged Level (mm) | | April 16 cf April 15 (mm) |
|------------|----------------------|-------------|------------|----------------|--------------------------|--------|---------------------------------|--------|---------------------------|
| | | mN | mE | | Apr-15 | Apr-16 | Apr-15 | Apr-16 | |
| SS 1977 | Hillsborough Rd | 696020.20 | 299595.800 | 74.453 | 74.448 | 74.450 | -5 | -3 | 2 |
| RM 3927 | Bremner Ave | 696633.30 | 298338.800 | 62.651 | 62.650 | 62.650 | -1 | -2 | -1 |
| RM 3928 | Bremner Ave | 696727.80 | 298195.800 | 56.144 | 56.143 | 56.142 | -1 | -2 | -1 |
| AP 139 | Bremner Ave | 696788.00 | 298157.400 | 56.225 | 56.223 | 56.221 | -3 | -4 | -1 |
| RM 3931 | Milliken Ave | 696817.50 | 298257.500 | 62.500 | 62.501 | 62.500 | 1 | 0 | -1 |
| RM 3932 | Milliken Ave | 696734.00 | 298363.200 | 71.719 | 71.719 | 71.718 | 0 | -1 | 0 |
| SS 3004 | Dominion Rd | 698058.80 | 298223.500 | 51.812 | 51.806 | 51.808 | -6 | -4 | 2 |
| SS 3131 | Shackleton Rd | 698110.50 | 298631.800 | 59.419 | 59.414 | 59.416 | -5 | -3 | 2 |
| SS 3133 | Shackleton Rd | 698071.30 | 298770.700 | 59.554 | 59.547 | 59.549 | -7 | -5 | 2 |
| SS 3134 | Shackleton Rd | 698021.70 | 298946.500 | 61.479 | 61.468 | 61.471 | -10 | -8 | 3 |
| SS 3135 | Shackleton Rd | 697966.30 | 299165.800 | 61.684 | 61.677 | 61.680 | -8 | -5 | 3 |
| SS 3151 | Mt Eden Rd | 698285.90 | 299497.700 | 67.987 | 67.985 | 67.986 | -3 | -1 | 2 |
| SS 1905 | St Andrews Rd | 698147.70 | 300049.400 | 88.810 | 88.808 | 88.810 | -2 | 0 | 2 |
| AP 7707A | St Andrews Rd | 697977.70 | 300005.000 | 81.535 | 81.537 | 81.538 | 1 | 3 | 2 |
| RM 1558A | Empire Rd | 697816.20 | 300105.600 | 91.682 | 91.684 | 91.685 | 2 | 3 | 1 |
| SS 1559 | Empire Rd | 697800.00 | 300165.500 | 96.024 | 96.023 | 96.025 | -2 | 0 | 2 |
| SS 1549 | The Drive | 697753.30 | 300348.700 | 85.871 | 85.871 | 85.872 | -1 | 1 | 1 |
| SS 1550 | The Drive | 697589.90 | 300306.700 | 84.432 | 84.434 | 84.437 | 2 | 4 | 2 |
| AP 6830A | The Drive | 697538.40 | 300293.800 | 81.767 | 81.769 | 81.769 | 2 | 3 | 0 |
| SS 1551 | The Drive | 697492.50 | 300281.700 | 77.481 | 77.478 | 77.477 | -3 | -4 | -1 |
| RM 6829 | Selwyn Rd | 697363.10 | 300258.100 | 79.864 | 79.857 | 79.857 | -6 | -7 | -1 |
| RM 6832 | Selwyn Rd | 697337.40 | 300403.600 | 80.190 | 80.192 | 80.191 | 1 | 1 | -1 |
| SM 5912 | Pah Rd | 697278.10 | 300666.200 | 74.285 | 74.286 | 74.287 | 0 | 1 | 1 |
| AP 35 | Mt Albert Rd | 696402.10 | 300407.200 | 54.190 | 54.193 | 54.193 | 2 | 3 | 1 |
| AP 37 | Hillsborough Rd | 696407.40 | 299705.900 | 59.335 | 59.318 | 59.318 | -17 | -17 | 0 |
| AP 38 | Budock Rd | 696246.80 | 299834.700 | 69.274 | 69.267 | 69.267 | -6 | -6 | 0 |
| AP 39 | Hillsborough Bowling | 696383.10 | 299856.300 | 56.297 | 56.288 | 56.288 | -9 | -9 | 1 |
| AP 40 | Hillsborough Bowling | 696445.90 | 299895.600 | 55.757 | 55.750 | 55.750 | -8 | -7 | 0 |
| IS 41 | Hillsborough Bowling | 696403.80 | 299804.800 | 56.336 | 56.327 | 56.327 | -10 | -10 | 0 |
| AP 42 | Dornwell Rd | 696378.40 | 299015.900 | 76.373 | 76.359 | 76.360 | -14 | -13 | 1 |
| AP 43 | Dornwell Rd | 696260.60 | 298956.800 | 66.002 | 65.991 | 65.992 | -11 | -10 | 1 |
| AP 44 | Dornwell Rd | 696110.00 | 298858.900 | 58.493 | 58.479 | 58.480 | -13 | -13 | 1 |
| AP 45 | Frost Rd | 696471.90 | 298726.900 | 64.920 | 64.910 | 64.912 | -10 | -8 | 2 |
| AP 54 | Frost Rd | 696264.70 | 298577.800 | 57.855 | 57.838 | 57.841 | -17 | -14 | 3 |
| AP 46 | Dominion Rd | 697995.60 | 298226.600 | 50.443 | 50.436 | 50.437 | -6 | -5 | 1 |
| AP 47A | Landscape Rd | 697951.80 | 298343.100 | 52.565 | 52.562 | 52.564 | -3 | -1 | 2 |
| AP 48A | Landscape Rd | 697937.90 | 298463.600 | 57.065 | 57.061 | 57.062 | -4 | -2 | 2 |
| AP 49B | Landscape Rd | 697788.50 | 299044.900 | 70.340 | 70.334 | 70.335 | -6 | -5 | 1 |
| AP 50B | Landscape Rd | 697766.30 | 299132.200 | 71.659 | 71.656 | 71.657 | -3 | -2 | 1 |
| AP 51B | Landscape Rd | 697745.00 | 299214.600 | 74.120 | 74.116 | 74.117 | -4 | -3 | 1 |
| AP 55A | Mt Eden Rd | 698208.60 | 299461.700 | 68.301 | 68.300 | 68.302 | -1 | 0 | 1 |
| AP 56 | Mt Albert Rd | 696314.40 | 300774.800 | 58.409 | 58.409 | 58.408 | 0 | 0 | -1 |
| AP 60 | Rowan Rd | 696681.10 | 299826.300 | 76.276 | 76.262 | 76.263 | -14 | -13 | 1 |
| AP 61 | Rowan Rd | 696616.50 | 299797.100 | 71.310 | 71.294 | 71.295 | -16 | -15 | 1 |
| AP 62A | Mt Albert Rd | 696527.20 | 299808.400 | 62.894 | 62.893 | 62.893 | -1 | -1 | 0 |
| AP 63A | Mt Albert Rd | 696520.10 | 299875.200 | 61.370 | 61.367 | 61.367 | -3 | -3 | 0 |
| AP 64 | Hillsborough Rd | 696478.50 | 299774.300 | 60.579 | 60.569 | 60.568 | -11 | -11 | 0 |
| AP 65 | Hillsborough Rd | 696446.60 | 299735.800 | 59.546 | 59.532 | 59.531 | -15 | -15 | -1 |
| OAP 66 | Hillsborough Rd | 696359.40 | 299672.800 | 59.987 | 59.977 | 59.978 | -10 | -9 | 1 |
| AP 67 | Hillsborough Rd | 696248.40 | 299622.200 | 63.871 | 63.861 | 63.863 | -10 | -8 | 2 |
| OCP 68 | Budock Rd | 696236.00 | 299684.400 | 66.304 | 66.299 | 66.300 | -5 | -4 | 1 |
| AP 69 | Budock Rd | 696249.60 | 299731.200 | 65.977 | 65.971 | 65.972 | -6 | -6 | 1 |
| AP 70 | Budock Rd | 696244.10 | 299790.400 | 71.208 | 71.203 | 71.204 | -4 | -4 | 1 |
| AP 71A | Hillsborough Rd | 696194.40 | 299616.400 | 67.651 | 67.813 | 67.815 | -2 | 0 | 2 |
| AP 72 | Hillsborough Rd | 696072.40 | 299594.000 | 74.077 | 74.072 | 74.074 | -5 | -3 | 2 |
| AP 73 | Marie Ave | 696238.30 | 299544.500 | 70.874 | 70.864 | 70.867 | -10 | -7 | 2 |
| AP 74A | Marie Ave | 696253.80 | 299498.700 | 78.301 | 78.300 | 78.303 | -1 | 2 | 2 |
| AP 75 | Marie Ave | 696280.10 | 299452.900 | 86.876 | 86.876 | 86.879 | 1 | 3 | 2 |
| AP 77A | Mt Albert Rd | 696539.70 | 299480.000 | 83.034 | 83.033 | 83.034 | -1 | 0 | 1 |
| AP 78 | Mt Albert Rd | 696559.40 | 299551.500 | 81.022 | 81.011 | 81.013 | -11 | -10 | 1 |
| AP 79 | Mt Albert Rd | 696558.50 | 299588.500 | 78.663 | 78.653 | 78.654 | -10 | -9 | 1 |
| AP 80 | Mt Albert Rd | 696561.90 | 299691.500 | 71.414 | 71.399 | 71.400 | -15 | -14 | 1 |
| AP 81B | Mt Albert Rd | 696502.00 | 300015.300 | 58.566 | 58.566 | 58.566 | No previous | 0 | 0 |
| AP 82B | Mt Albert Rd | 696508.10 | 299991.500 | 58.630 | 58.630 | 58.630 | No previous | 0 | 0 |
| AP 83 | Mt Albert Rd | 696514.40 | 299967.000 | 58.863 | 58.857 | 58.857 | -7 | -6 | 1 |
| AP 84 | Mt Albert Rd | 696520.40 | 299943.300 | 59.350 | 59.344 | 59.344 | -5 | -5 | 0 |
| AP 85 | Mt Albert Rd | 696516.20 | 299894.400 | 60.619 | 60.611 | 60.611 | -8 | -7 | 0 |
| AP 86 | Mt Albert Rd | 696524.80 | 299855.800 | 62.051 | 62.045 | 62.046 | -6 | -6 | 0 |
| AP 87 | Mt Albert Rd | 696530.60 | 299833.500 | 62.733 | 62.726 | 62.726 | -7 | -7 | 0 |
| AP 88A | Mt Albert Rd | 696541.40 | 299789.000 | 64.678 | 64.676 | 64.675 | -2 | -3 | -1 |
| AP 89 | Mt Albert Rd | 696560.90 | 299777.800 | 65.939 | 65.927 | 65.927 | -12 | -12 | 0 |
| AP 90 | Mt Albert Rd | 696562.90 | 299734.300 | 68.687 | 68.676 | 68.677 | -11 | -10 | 1 |
| AP 91 | Mt Albert Rd | 696562.40 | 299712.500 | 70.075 | 70.065 | 70.065 | -11 | -10 | 1 |
| AP 92 | Mt Albert Rd | 696560.50 | 299673.800 | 72.613 | 72.625 | 72.630 | 11 | 17 | 5 |
| AP 93 | Mt Albert Rd | 696559.90 | 299657.200 | 73.864 | 73.855 | 73.856 | -9 | -8 | 1 |

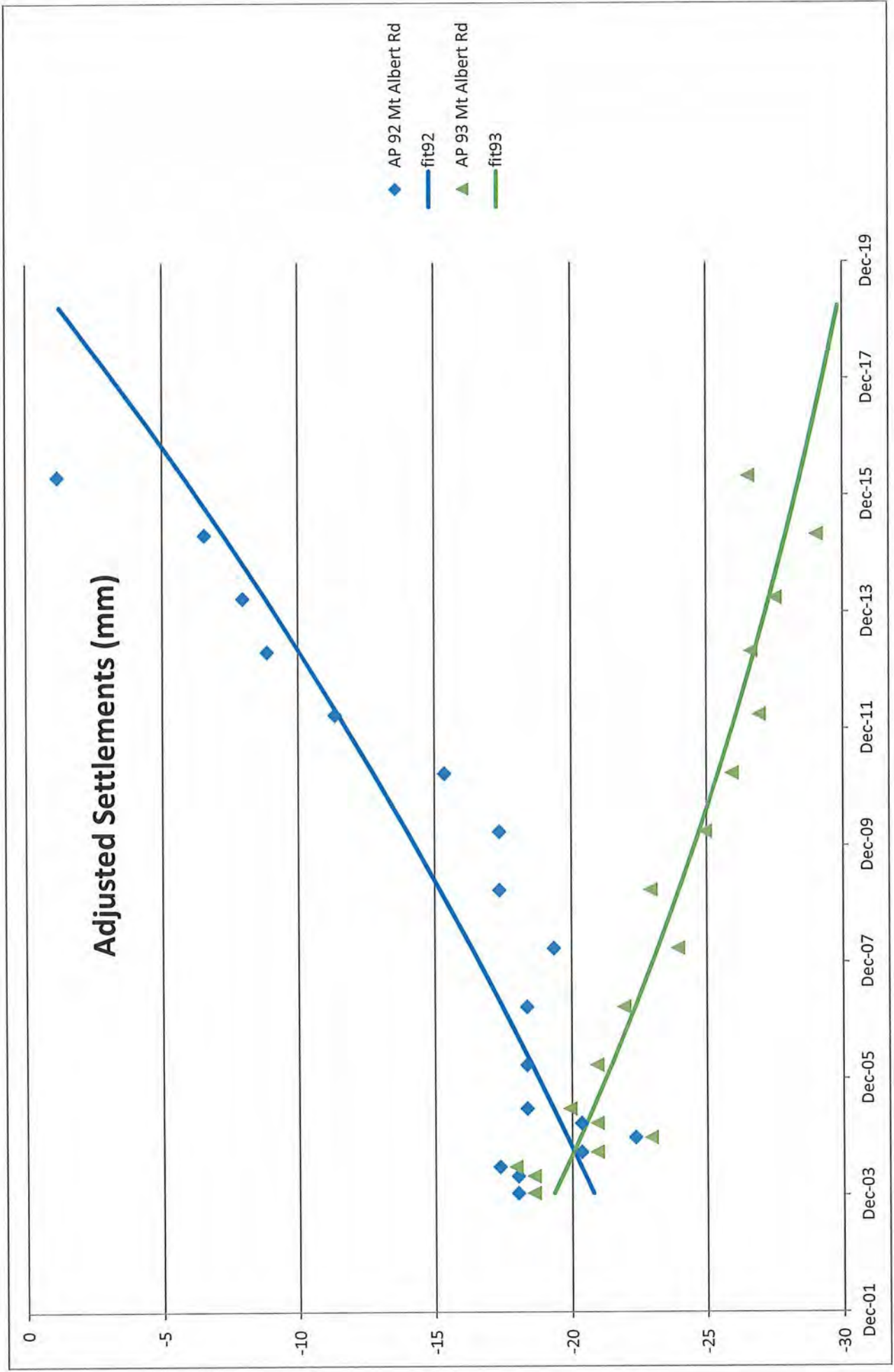
| Station ID | Location | Coordinates | | Averaged Level | Surveyed Levels (metres) | | Change from Averaged Level (mm) | | April 16 of April 15 (mm) |
|------------|-----------------|-------------|------------|----------------|--------------------------|--------|---------------------------------|-------------------|---------------------------|
| | | mN | mE | | Apr-15 | Apr-16 | Apr-15 | Apr-16 | |
| AP 94 | Mt Albert Rd | 696558.60 | 299610.300 | 77.101 | 77.093 | 77.094 | -8 | -7 | 1 |
| AP 95 | Mt Albert Rd | 696559.20 | 299570.000 | 79.957 | 79.948 | 79.949 | -9 | -8 | 1 |
| AP 96 | St Andrews Rd | 696582.90 | 299641.100 | 77.897 | 77.889 | 77.890 | -8 | -7 | 1 |
| AP 97 | St Andrews Rd | 696607.70 | 299646.900 | 80.321 | 80.314 | 80.314 | -7 | -7 | 0 |
| AP 98 | Rowan Rd | 696588.10 | 299763.700 | 68.501 | 68.494 | 68.495 | -7 | -6 | 1 |
| AP 99 | Rowan Rd | 696594.20 | 299786.100 | 69.478 | 69.469 | 69.470 | -9 | -9 | 0 |
| AP 100 | Hillsborough Rd | 696522.00 | 299784.900 | 62.966 | 62.955 | 62.954 | -11 | -12 | -1 |
| AP 101 | Hillsborough Rd | 696494.70 | 299787.000 | 61.359 | 61.350 | 61.349 | -9 | -10 | -1 |
| AP 102 | Hillsborough Rd | 696457.20 | 299761.100 | 60.006 | 59.997 | 59.996 | -9 | -10 | -1 |
| AP 103 | Hillsborough Rd | 696427.80 | 299719.800 | 59.404 | 59.390 | 59.390 | -14 | -14 | 0 |
| AP 104A | Hillsborough Rd | 696385.10 | 299690.200 | 59.554 | 59.545 | 59.545 | -9 | -9 | 0 |
| AP 105 | Hillsborough Rd | 696373.80 | 299682.700 | 59.711 | 59.701 | 59.702 | -10 | -9 | 1 |
| AP 106 | Hillsborough Rd | 696341.90 | 299660.500 | 60.458 | 60.451 | 60.452 | -7 | -6 | 1 |
| AP 107 | Hillsborough Rd | 696324.60 | 299648.600 | 60.881 | 60.874 | 60.875 | -7 | -6 | 1 |
| AP 108 | Hillsborough Rd | 696290.80 | 299628.800 | 62.060 | 62.054 | 62.055 | -6 | -5 | 1 |
| AP 109 | Hillsborough Rd | 696270.00 | 299627.800 | 62.806 | 62.799 | 62.801 | -8 | -6 | 2 |
| AP 110 | Hillsborough Rd | 696230.60 | 299619.600 | 64.997 | 64.987 | 64.989 | -10 | -8 | 2 |
| AP 111 | Hillsborough Rd | 696213.10 | 299617.100 | 66.322 | 66.316 | 66.318 | -5 | -3 | 2 |
| AP 112 | Budock Rd | 696247.80 | 299639.800 | 63.699 | 63.693 | 63.695 | -6 | -4 | 2 |
| AP 113 | Budock Rd | 696235.60 | 299662.400 | 65.546 | 65.545 | 65.546 | -2 | 0 | 2 |
| AP 114 | Budock Rd | 696238.50 | 299707.300 | 65.879 | 65.890 | 65.892 | 11 | 12 | 1 |
| AP 115 | Budock Rd | 696251.20 | 299753.100 | 67.579 | 67.573 | 67.574 | -6 | -6 | 1 |
| AP 116 | Budock Rd | 696251.90 | 299773.300 | 69.485 | 69.483 | 69.484 | -2 | -1 | 1 |
| AP 117 | Budock Rd | 696245.20 | 299811.800 | 70.833 | 70.844 | 70.845 | 11 | 12 | 1 |
| OAP 118 | Mt Albert Rd | 696509.20 | 299918.400 | 59.895 | 59.886 | 59.886 | -9 | -9 | 0 |
| AP 119B | Haughey Ave | 696153.10 | 299217.900 | 71.931 | 71.931 | 71.931 | 0 | 0 | 1 |
| AP 120 | Haughey Ave | 696109.90 | 299304.300 | 67.450 | 67.444 | 67.446 | -6 | -4 | 2 |
| AP 121 | Haughey Ave | 696056.80 | 299385.100 | 66.666 | 66.660 | 66.662 | -5 | -3 | 2 |
| AP 122 | Haughey Ave | 696006.90 | 299462.700 | 66.032 | 66.026 | 66.029 | -6 | -4 | 3 |
| AP 123A | Haughey Ave | 695959.40 | 299557.700 | 73.518 | 73.518 | 73.520 | 0 | 2 | 2 |
| AP 125A | Hillsborough Rd | 695847.30 | 299535.600 | 69.946 | 69.945 | 69.947 | -1 | 1 | 2 |
| SS 1976 | Hillsborough Rd | 695759.40 | 299503.900 | 71.137 | 71.128 | 71.130 | -10 | -7 | 3 |
| AP 126A | Carr Rd | 695885.10 | 299465.200 | 65.244 | 65.241 | 65.243 | -3 | -1 | 2 |
| AP 127A | Carr Rd | 695905.30 | 299374.800 | 61.514 | 61.511 | 61.514 | -2 | 0 | 3 |
| RM 7441 | Carr Rd | 695901.90 | 299261.400 | 58.499 | 58.492 | 58.493 | -7 | -6 | 1 |
| AP 129A | Carr Rd | 695938.30 | 299190.900 | 58.156 | 58.152 | 58.154 | -4 | -2 | 2 |
| OAP 130 | Dornwell Rd | 696185.80 | 298907.600 | 60.670 | 60.663 | 60.665 | -7 | -5 | 1 |
| OAP 131 | Hayr Rd | 696067.40 | 299157.700 | 63.120 | 63.117 | 63.117 | -4 | -3 | 1 |
| AP 142 | Carr/Hayr Rds | 695981.20 | 299082.900 | 58.437 | 58.434 | | -3 | Refer to AP 142A | |
| AP142A | Carr/Hayr Rds | 695981.10 | 299081.200 | 58.379 | | 58.379 | | No previous level | |
| AP 132B | Carr Rd | 696036.50 | 298977.100 | 58.356 | 58.354 | 58.355 | -2 | -1 | 0 |
| AP 133 | Carr Rd | 696128.80 | 298776.800 | 58.156 | 58.150 | 58.152 | -6 | -5 | 2 |
| AP 134 | Carr Rd | 696177.90 | 298685.500 | 58.033 | 58.029 | 58.030 | -3 | -3 | 1 |
| AP 135 | Frost Rd | 696157.90 | 298506.100 | 57.399 | 57.397 | 57.399 | -2 | 0 | 2 |
| AP 136 | Frost Rd | 696363.40 | 298640.300 | 59.265 | 59.261 | 59.264 | -4 | -1 | 3 |

[illegible]

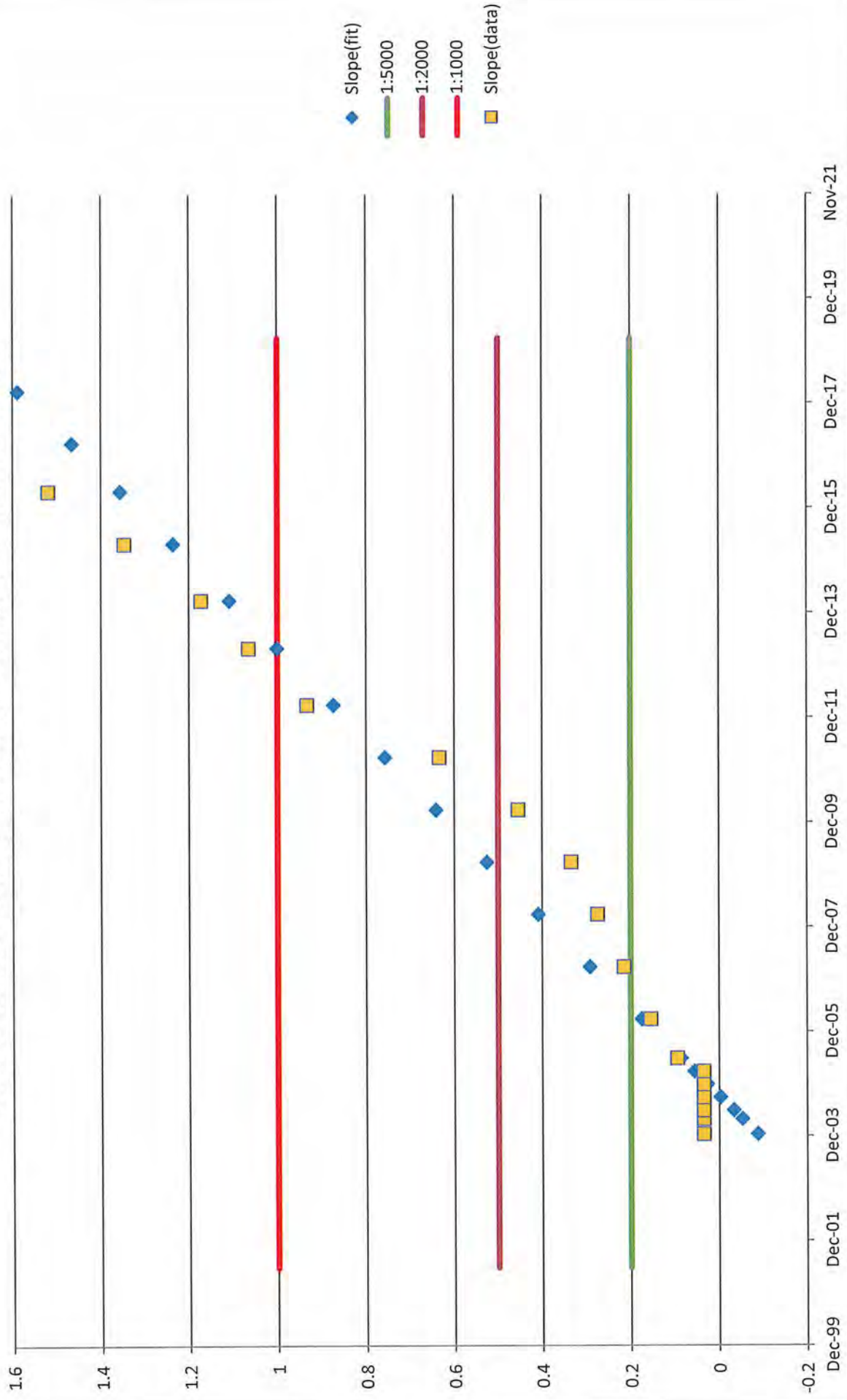
Differential Settlement Alarm Trend Analysis

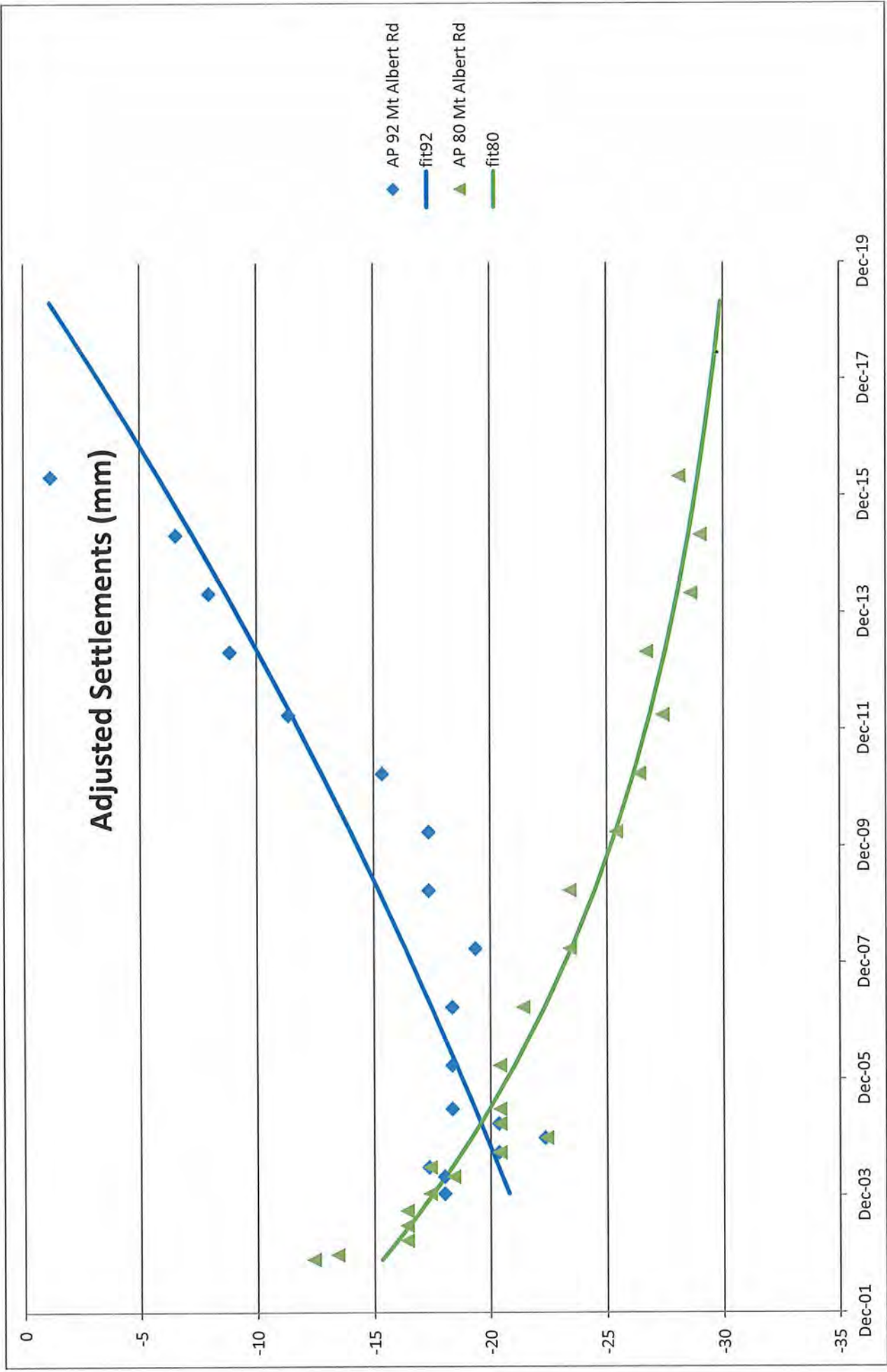


Differential Settlement Alarm Trends – Mt Albert Road

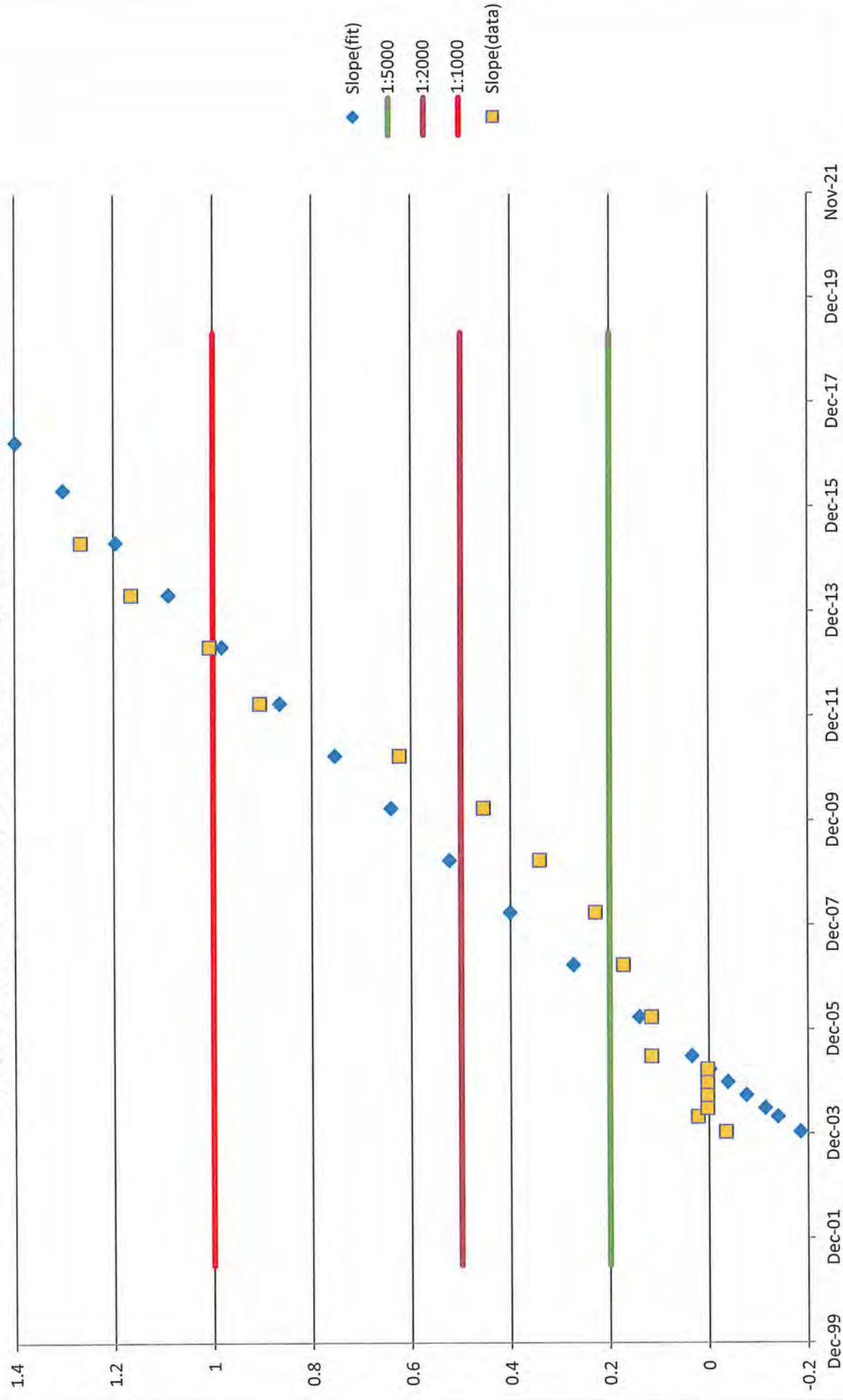


Differential Settlement Trend Analysis - AP92 vs AP93

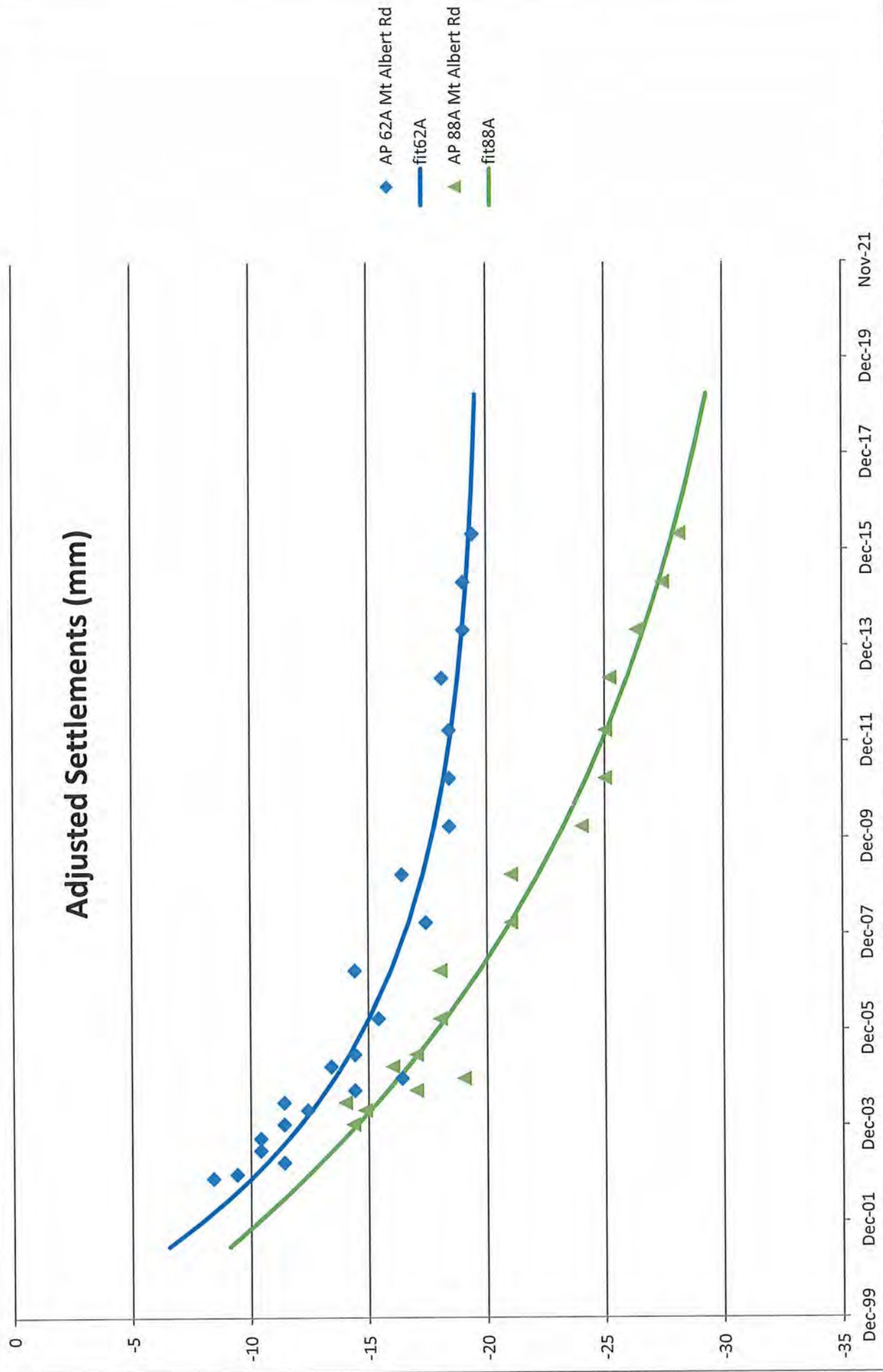




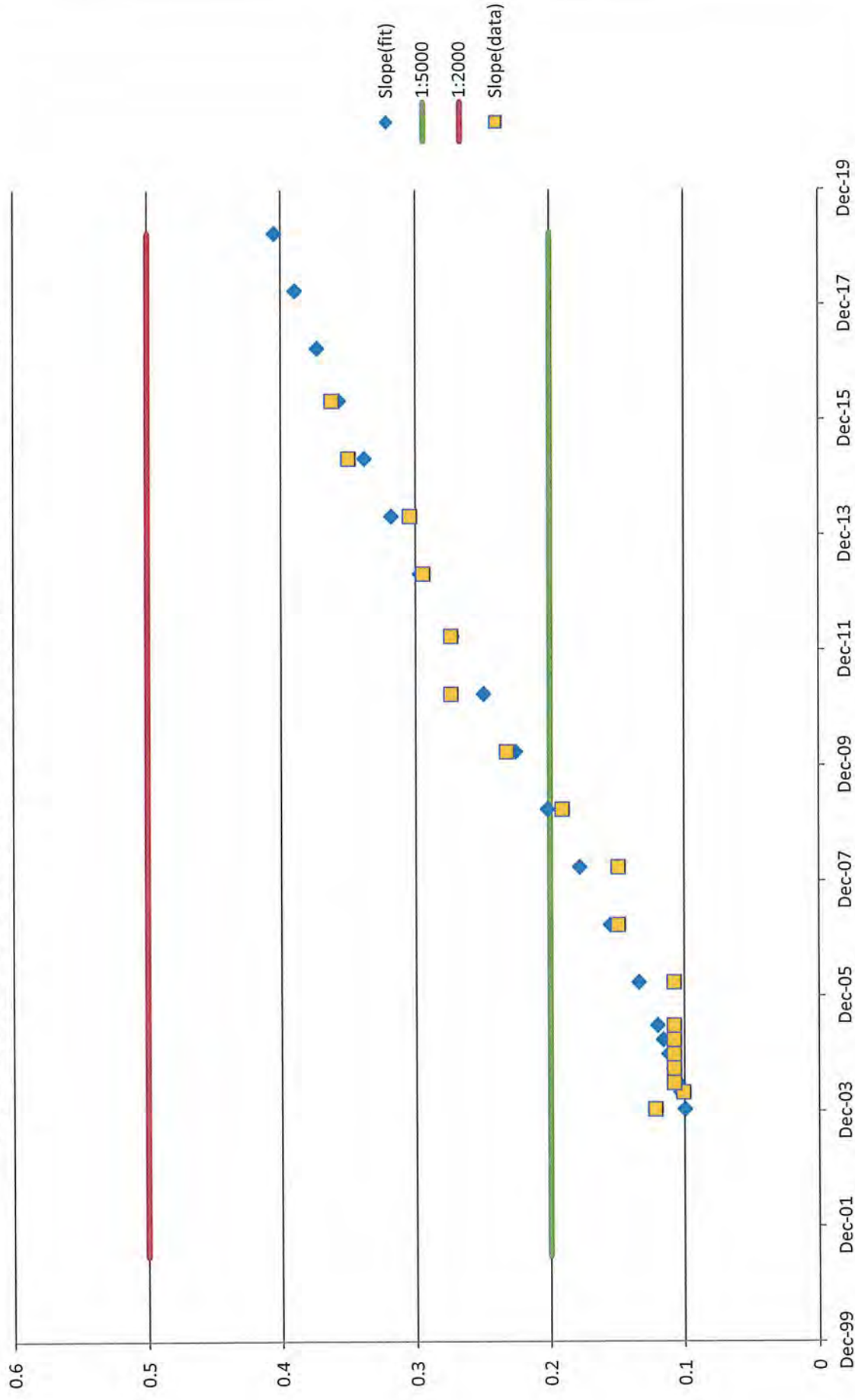
Differential Settlement Trend Analysis - AP80 vs AP92

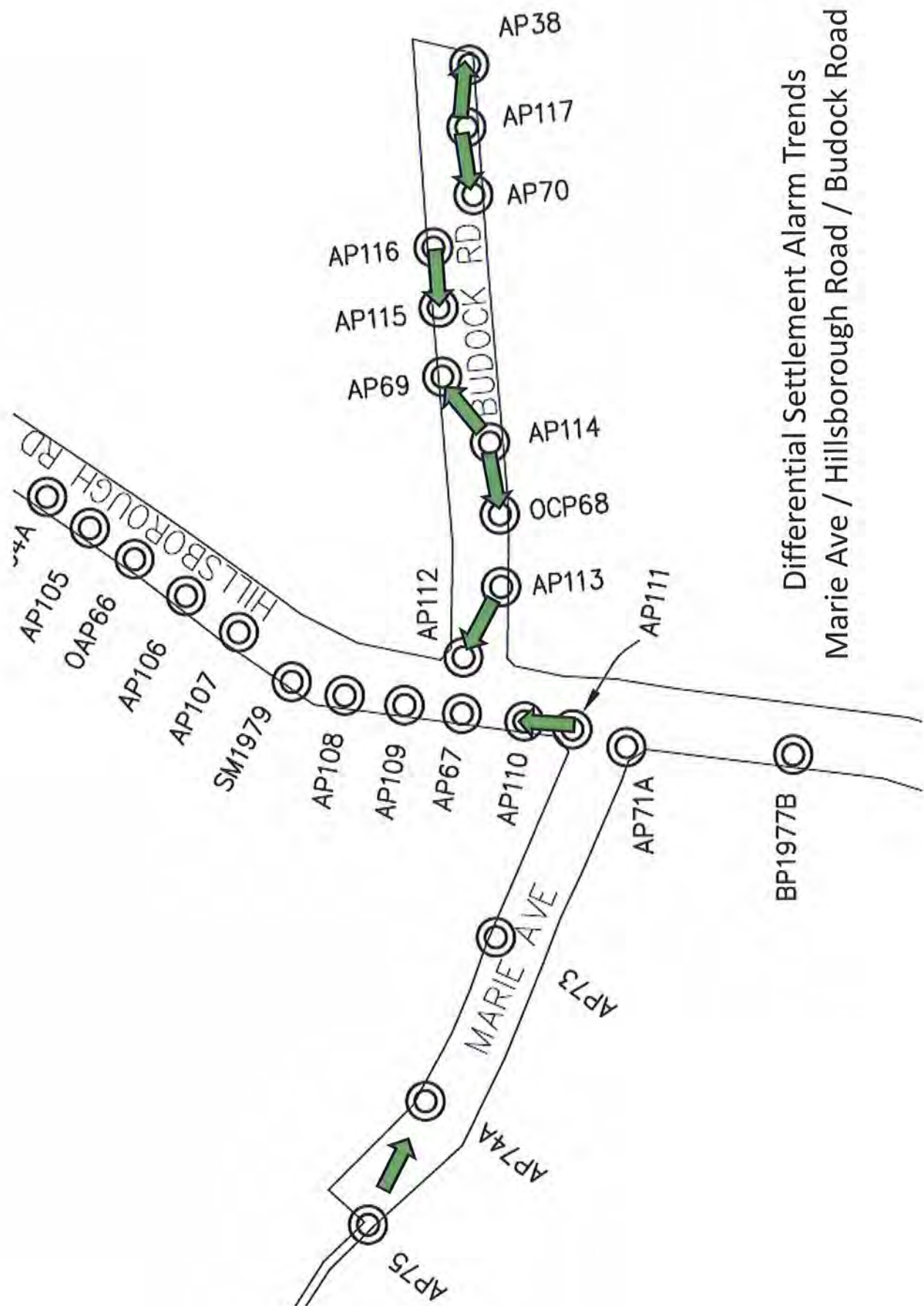


Adjusted Settlements (mm)



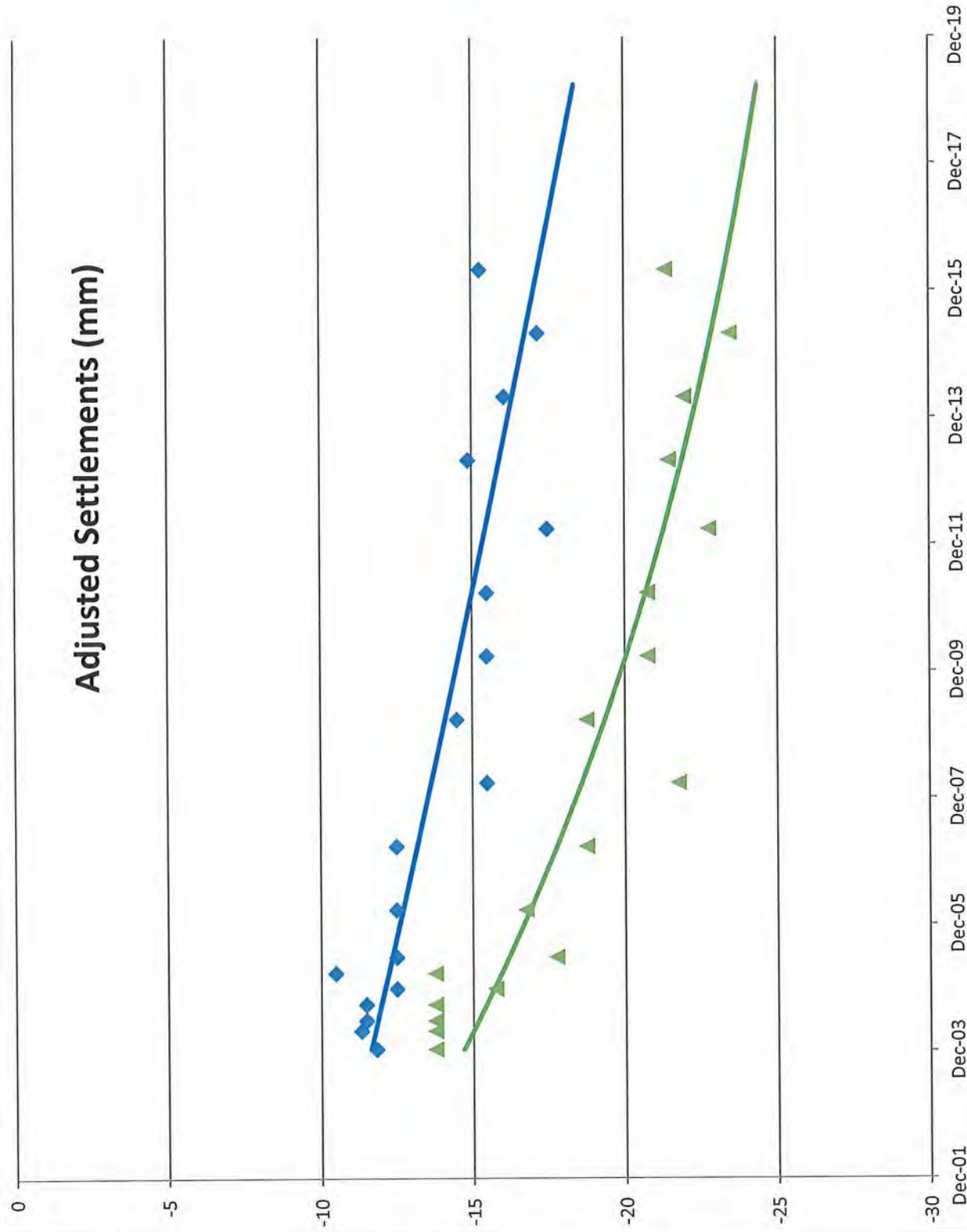
Differential Settlement Trend Analysis - AP62A vs AP88A



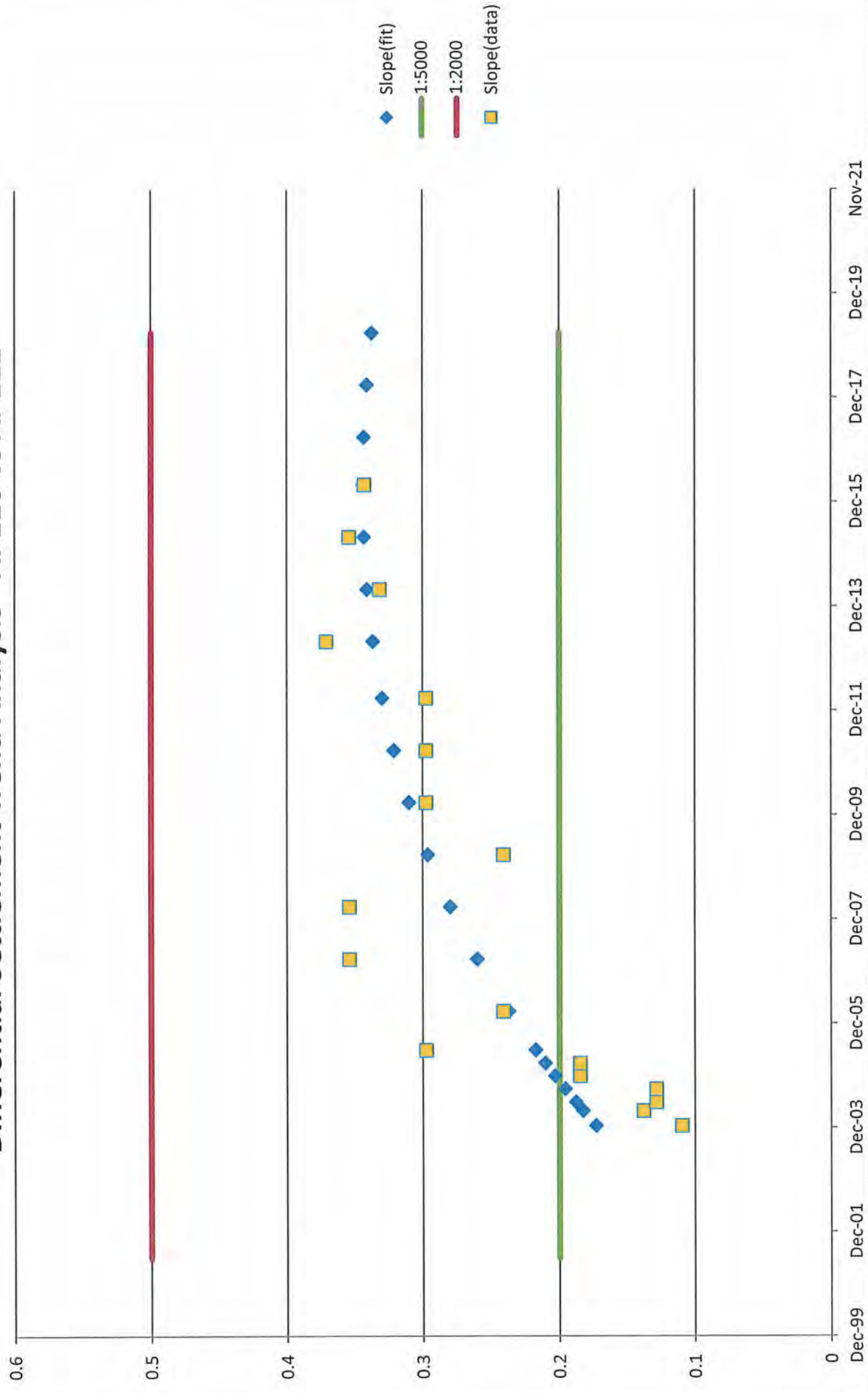


Differential Settlement Alarm Trends
Marie Ave / Hillsborough Road / Budock Road

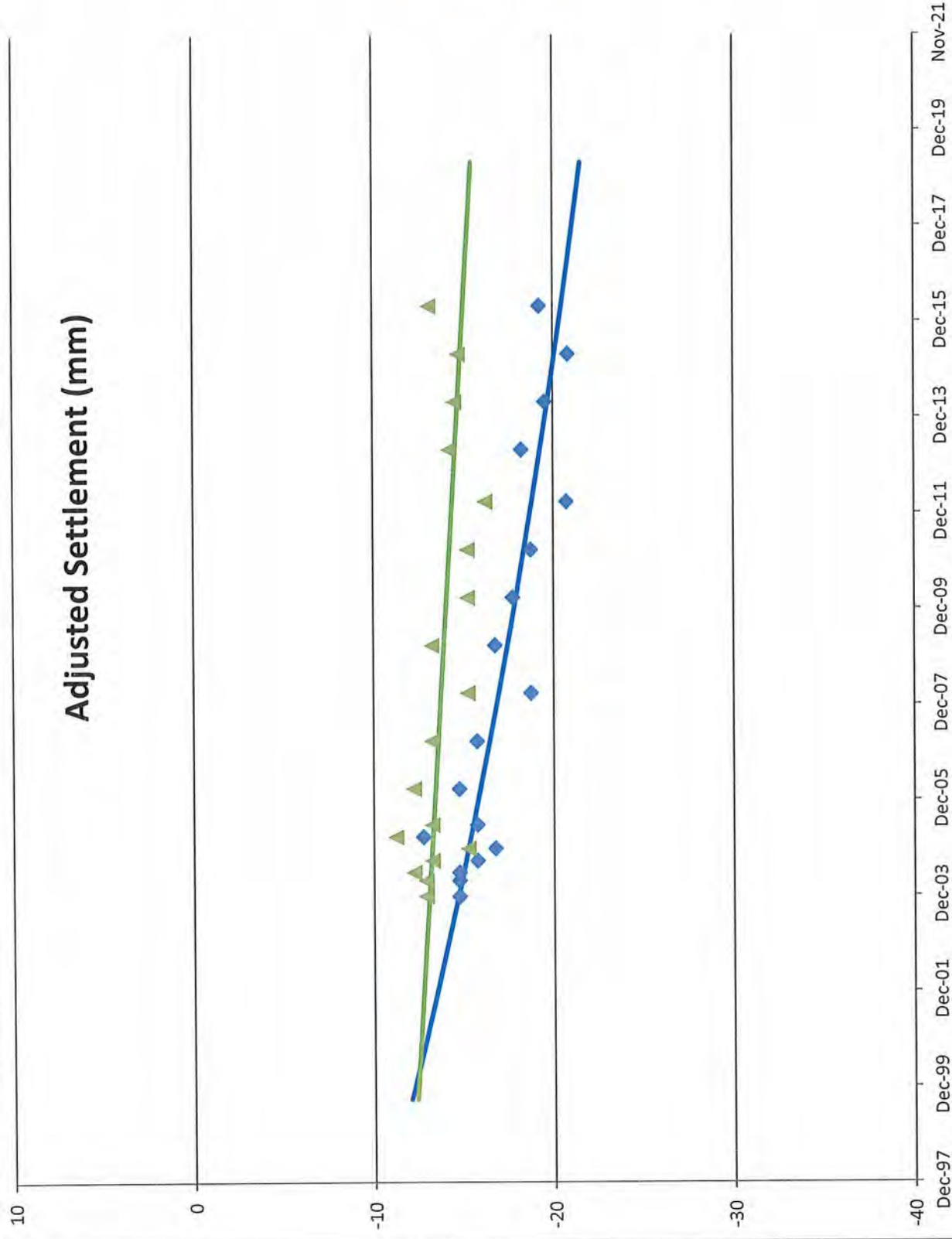
Adjusted Settlements (mm)



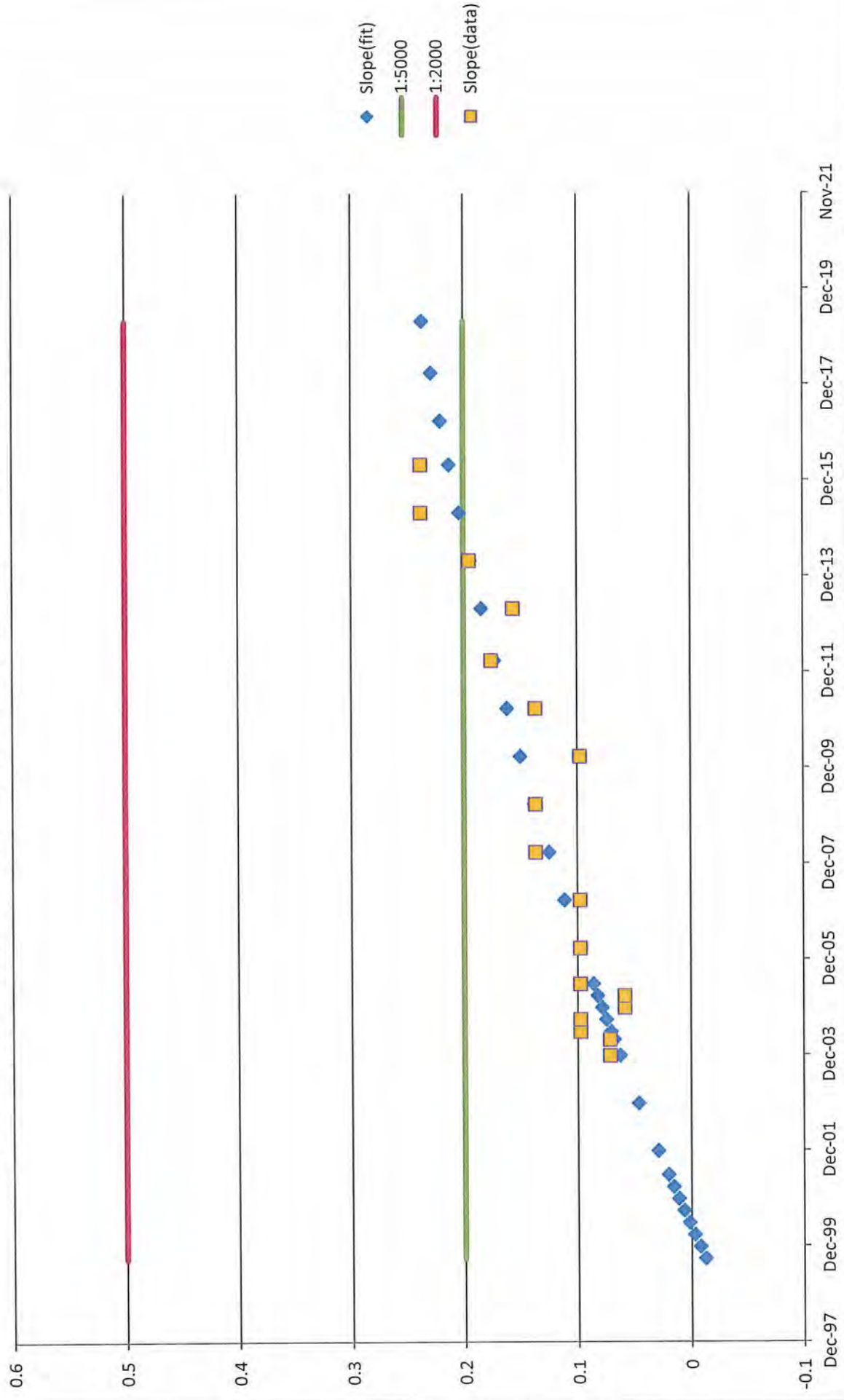
Differential Settlement Trend Analysis - AP110 vs AP111

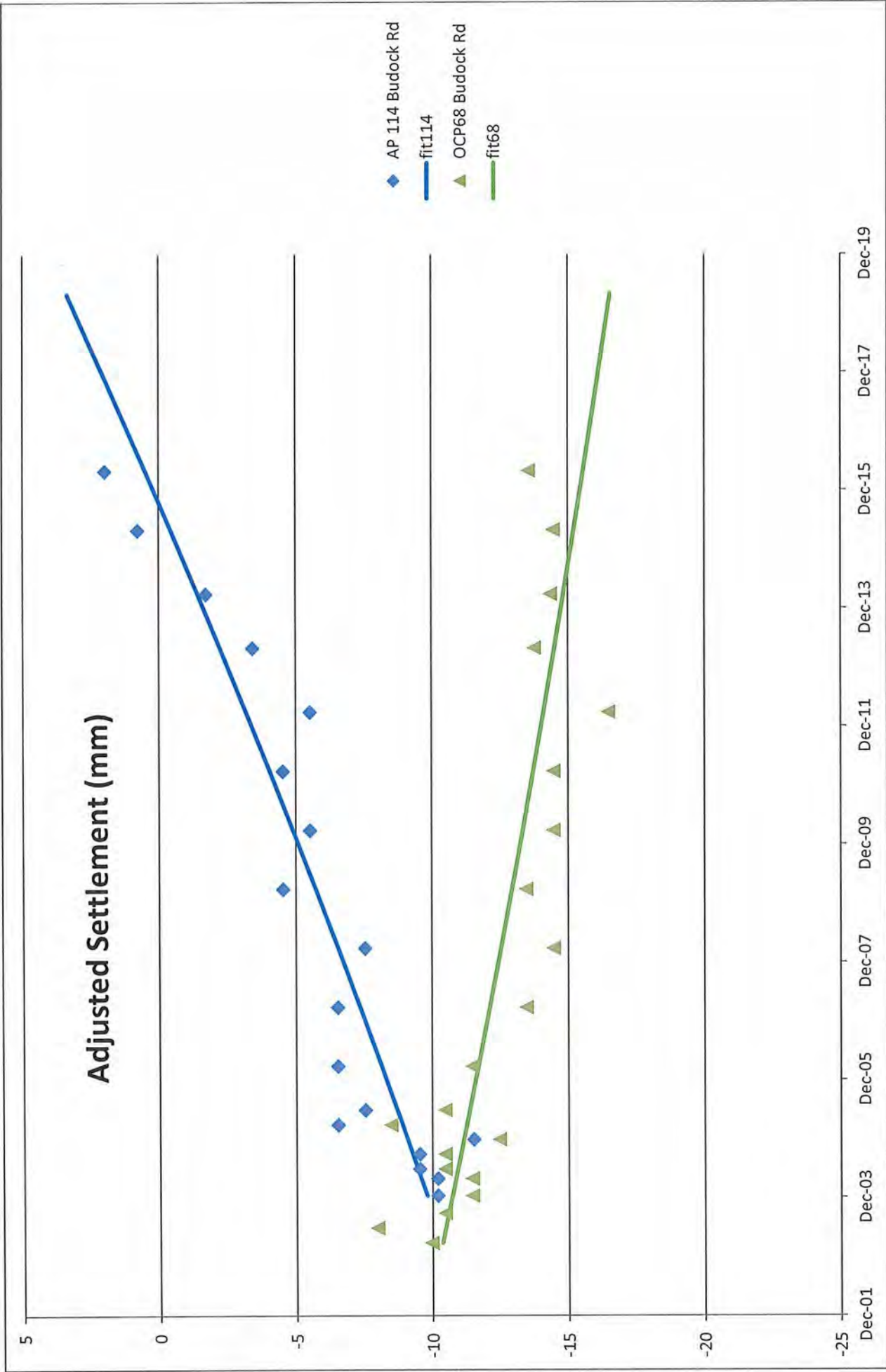


Adjusted Settlement (mm)

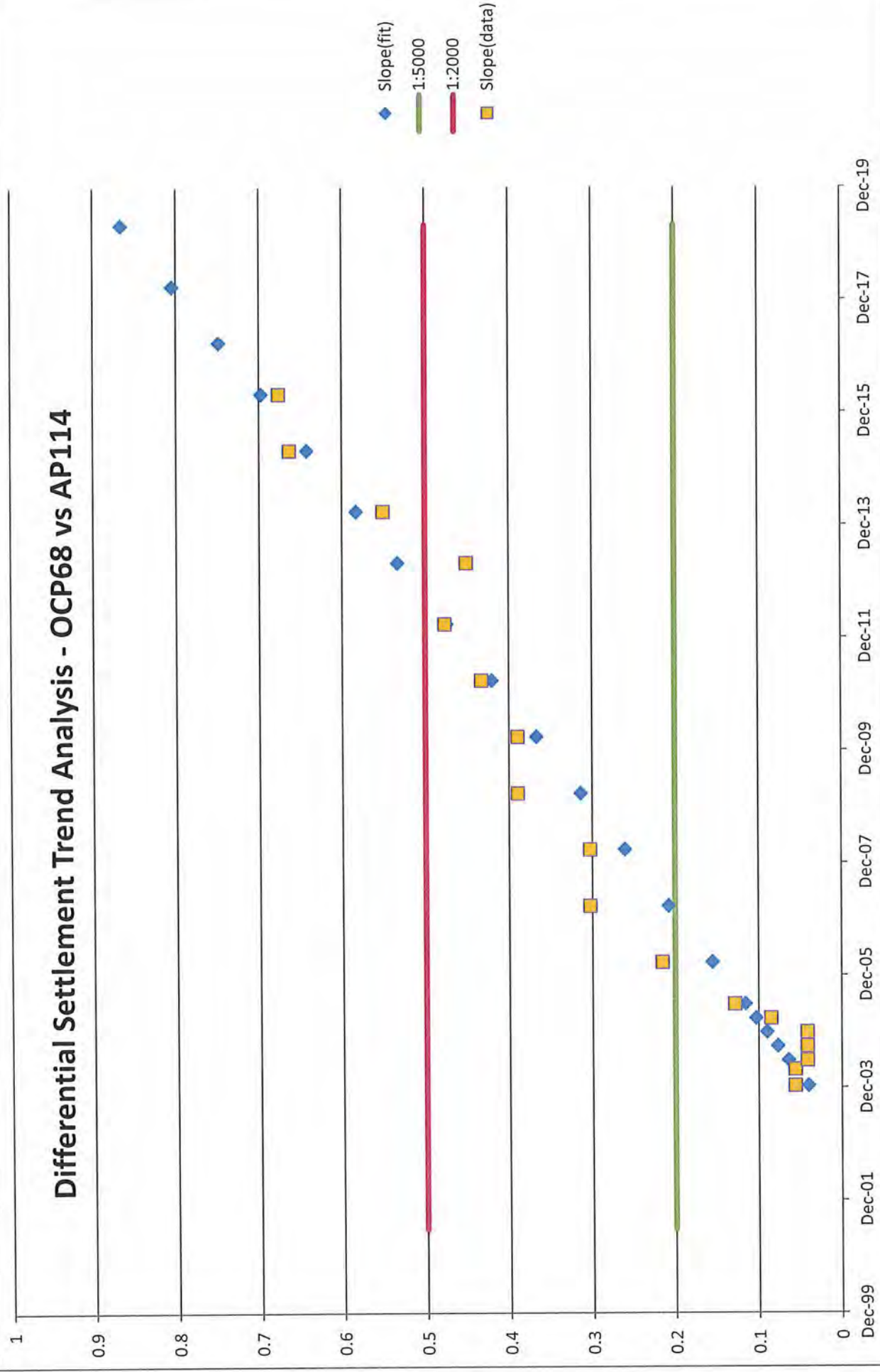


Differential Settlement Trend Analysis - AP112 vs AP113

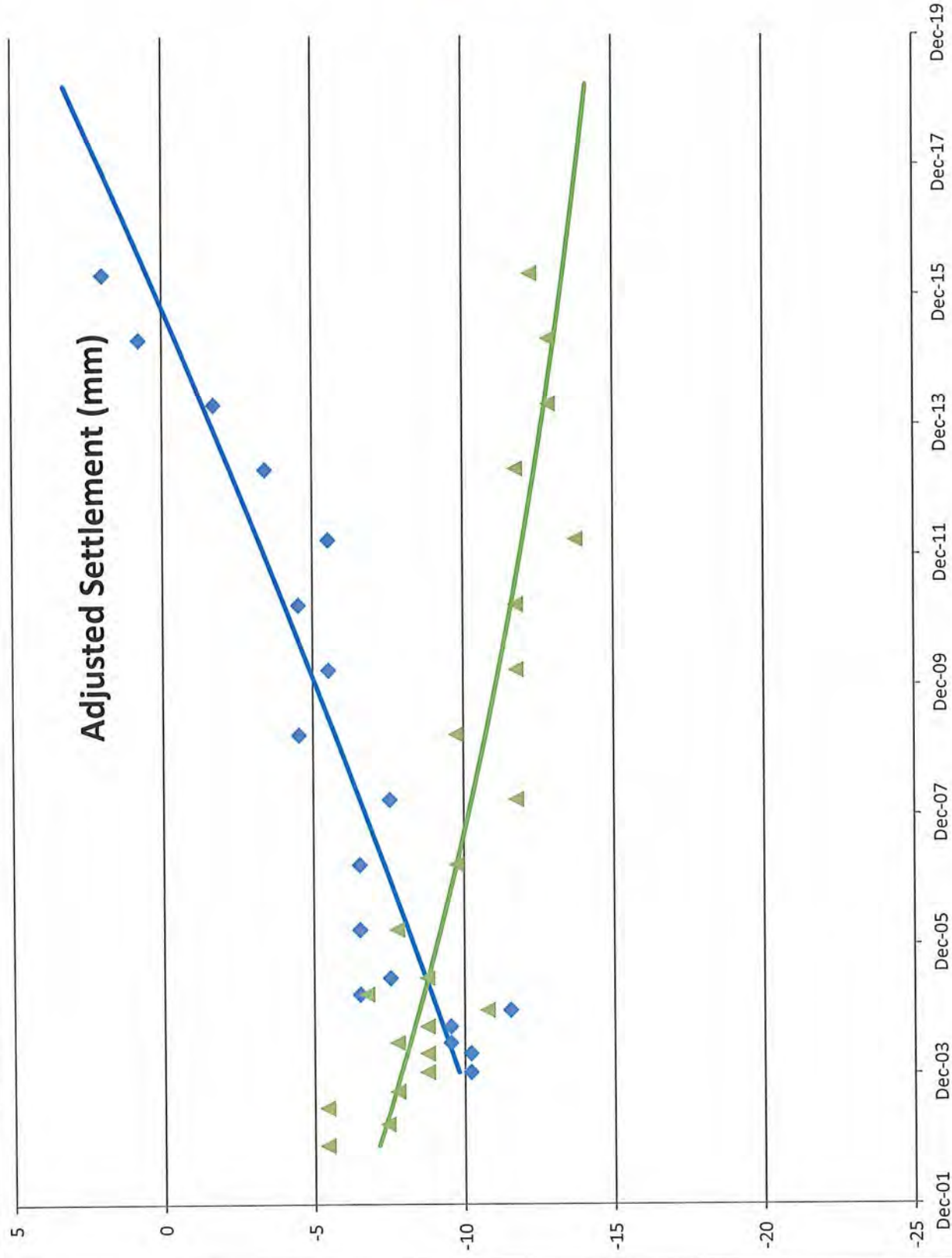




Differential Settlement Trend Analysis - OCP68 vs AP1114

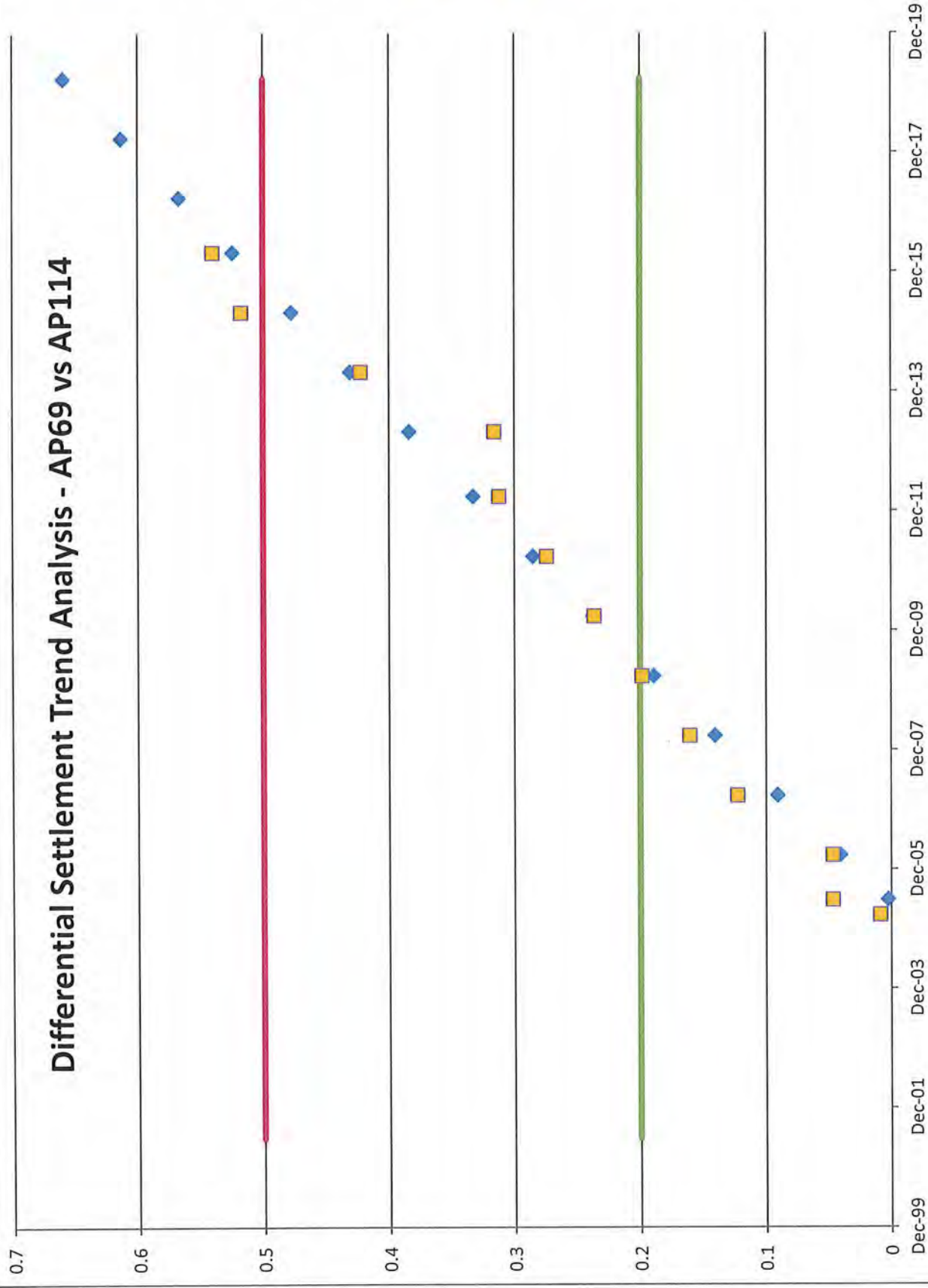


Adjusted Settlement (mm)

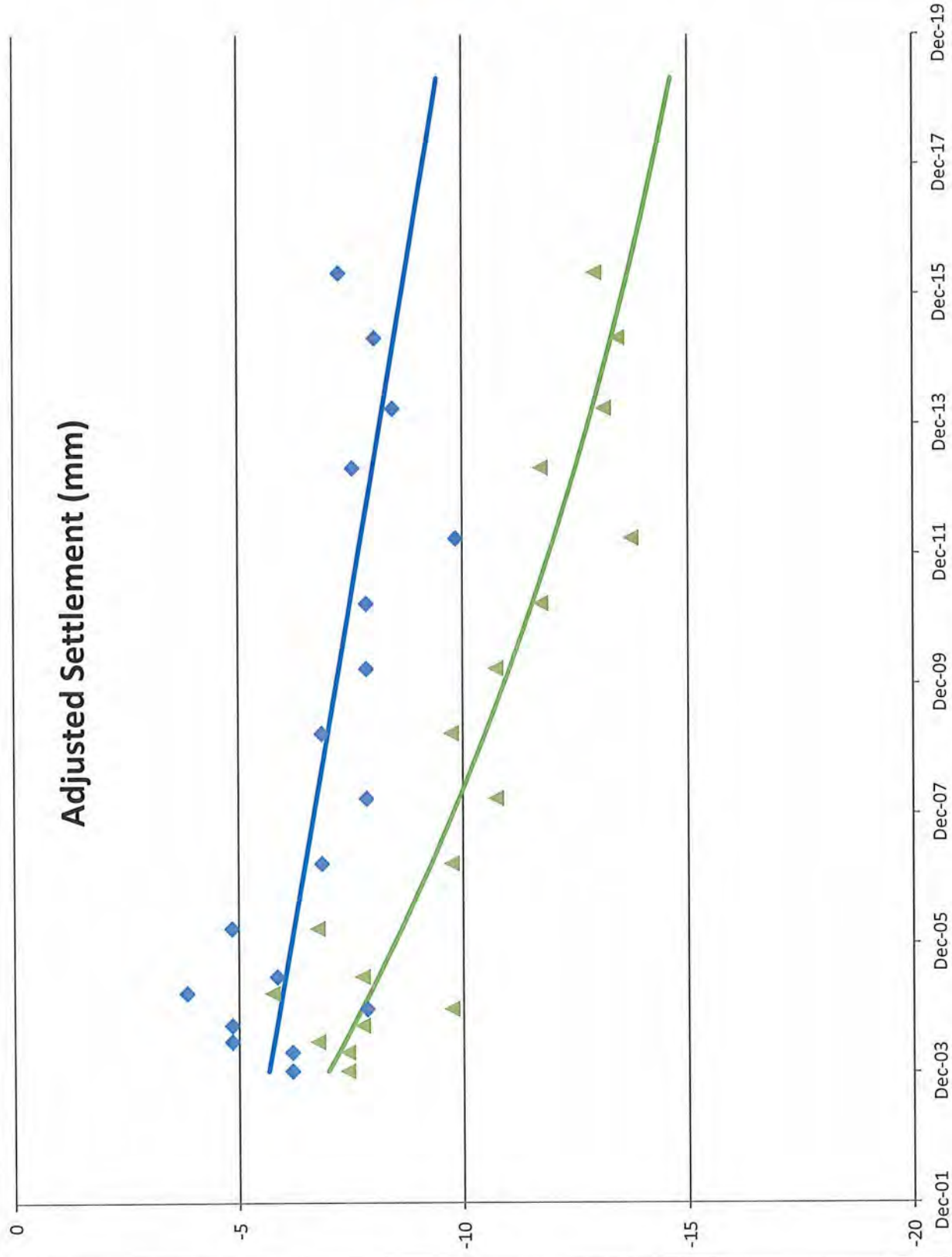


- AP 114 Budock Rd
- fit114
- AP 69 Budock Rd
- fit69

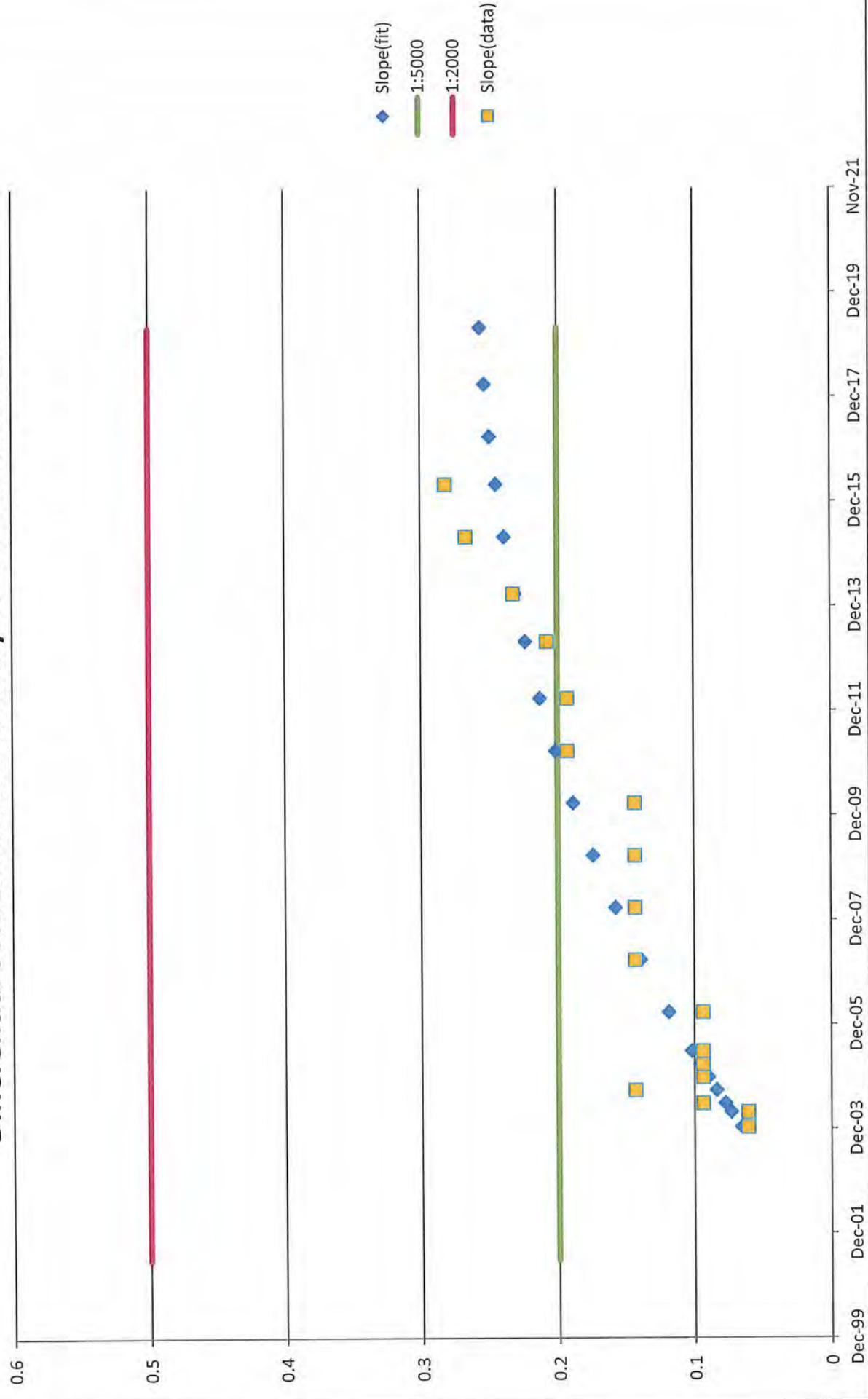
Differential Settlement Trend Analysis - AP69 vs AP114



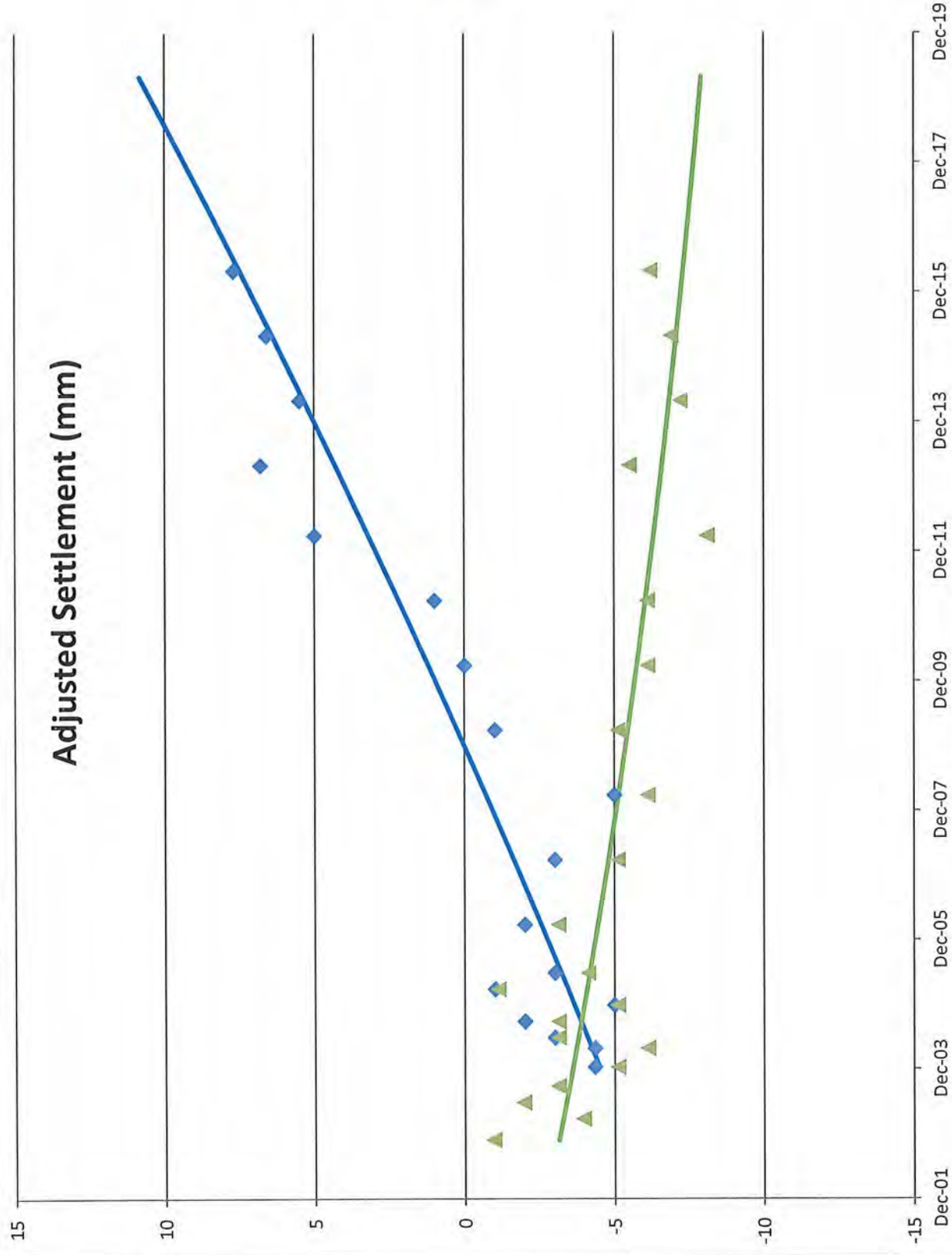
Adjusted Settlement (mm)



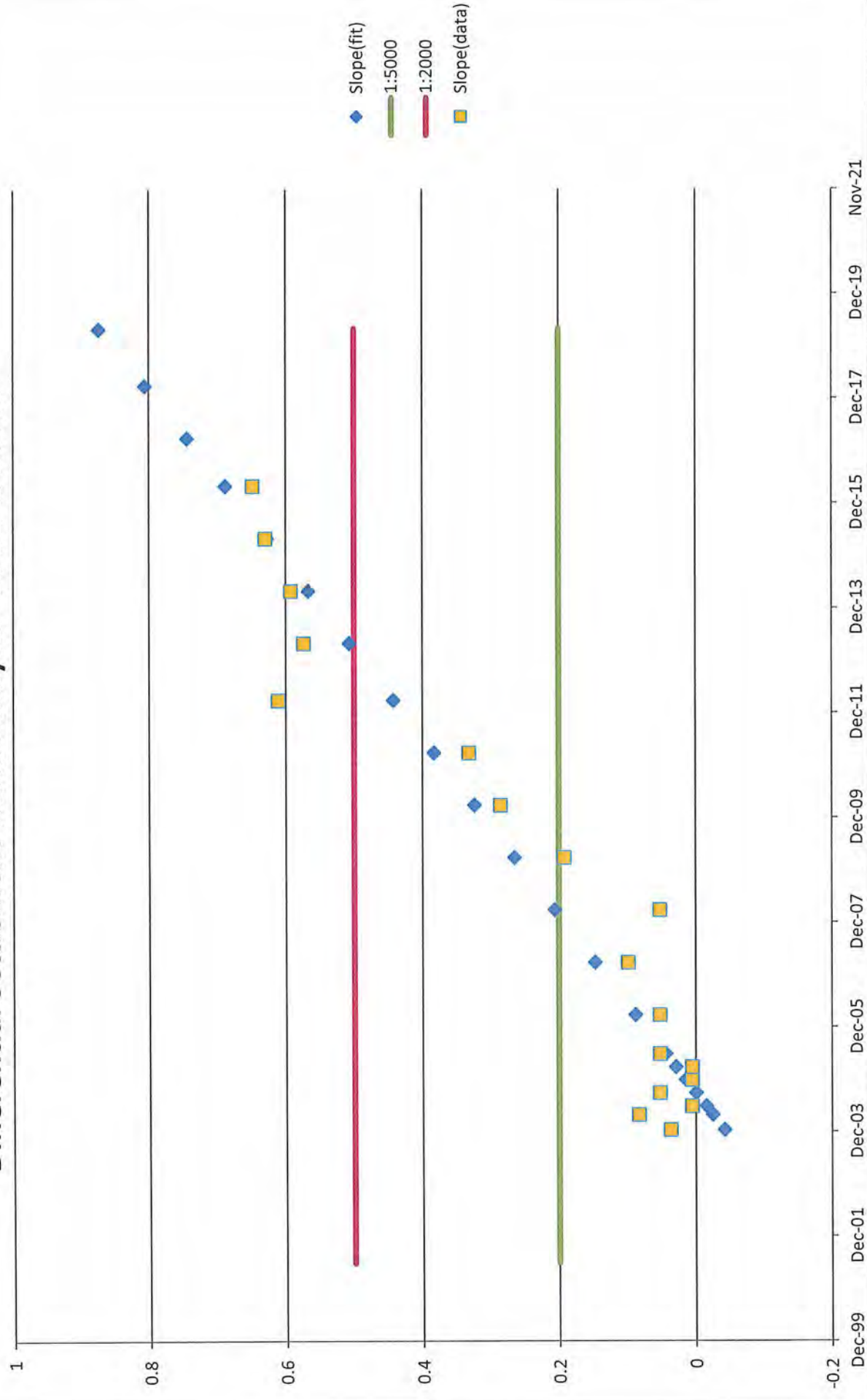
Differential Settlement Trend Analysis - AP115 vs AP116



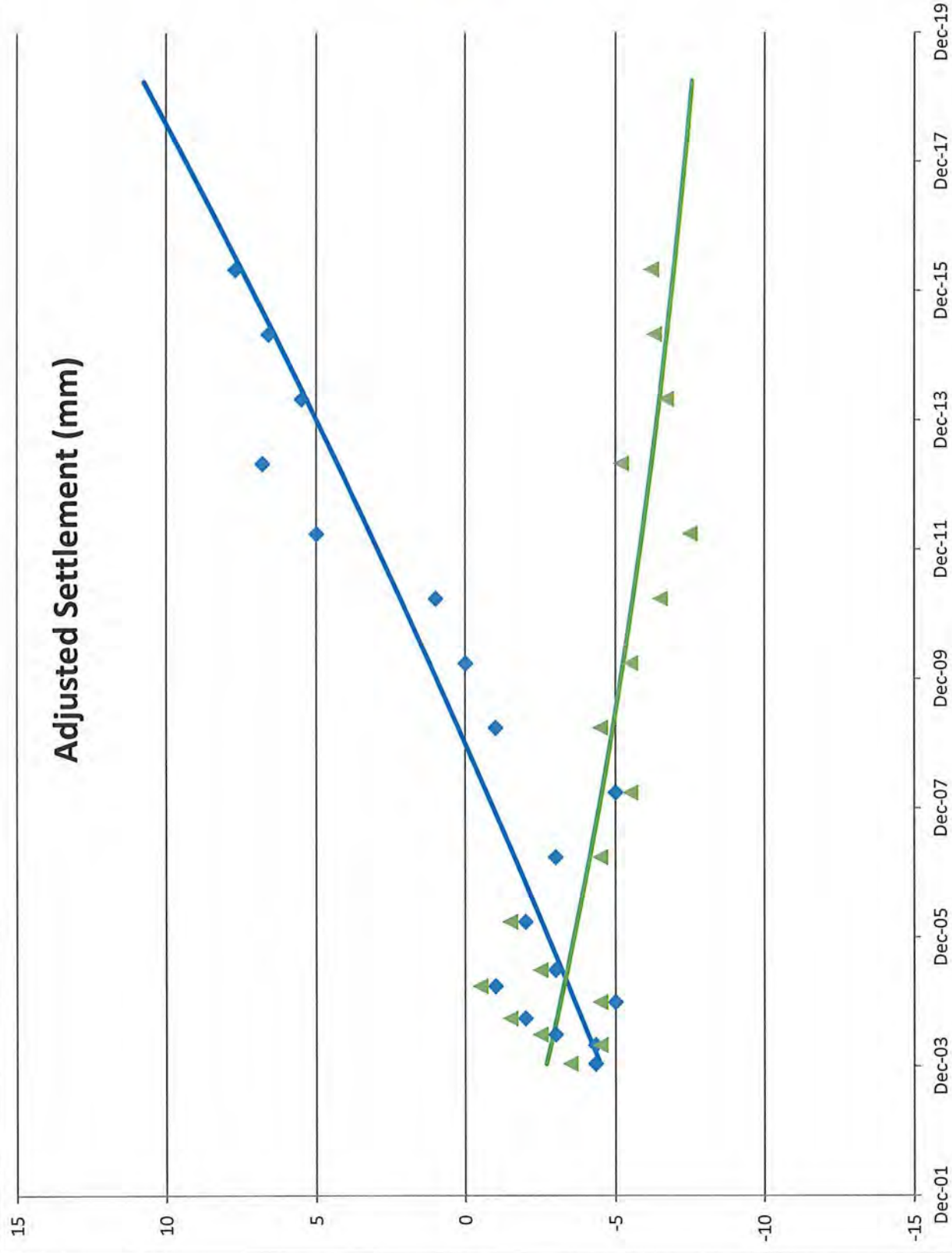
Adjusted Settlement (mm)



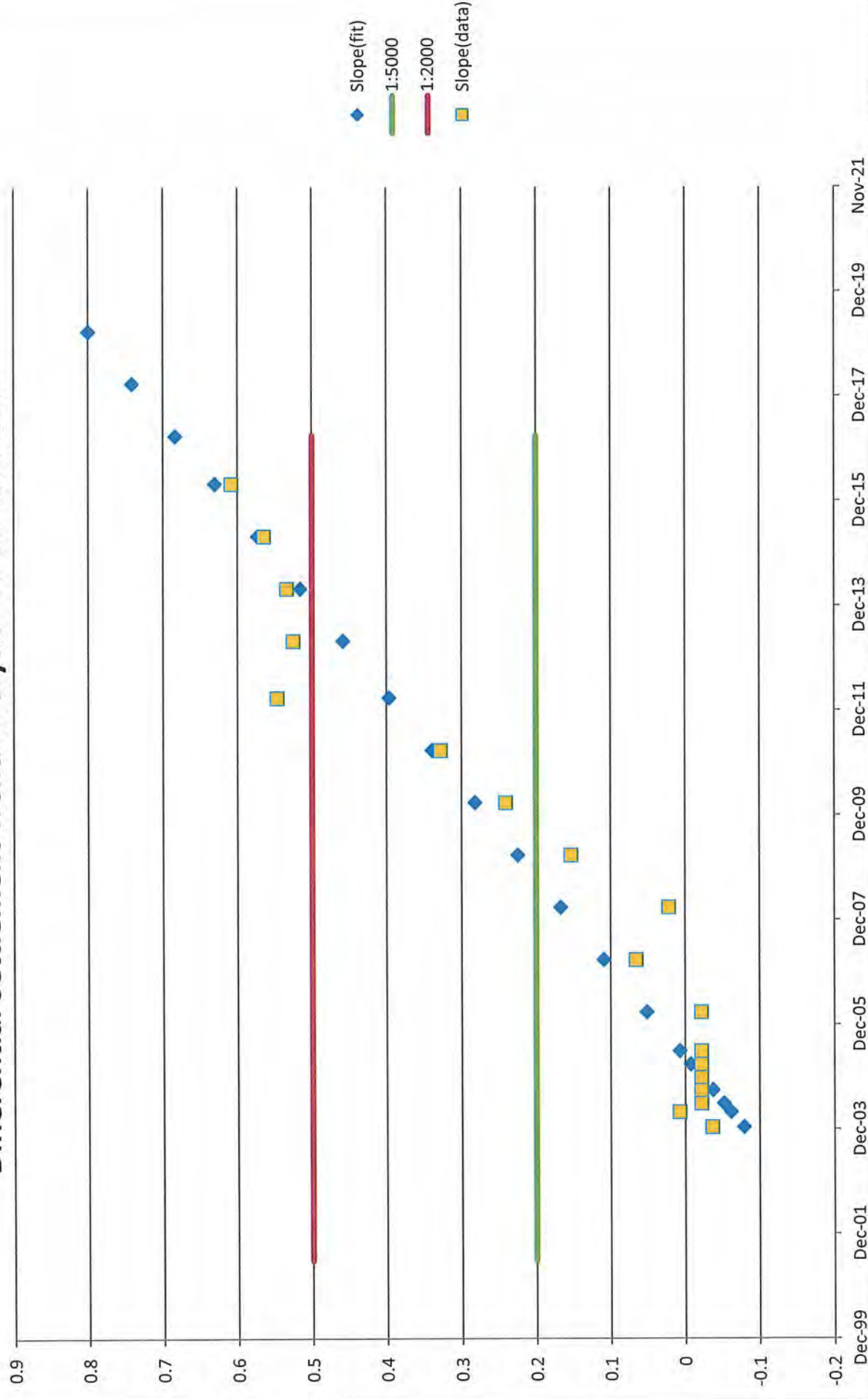
Differential Settlement Trend Analysis - AP70 vs AP117



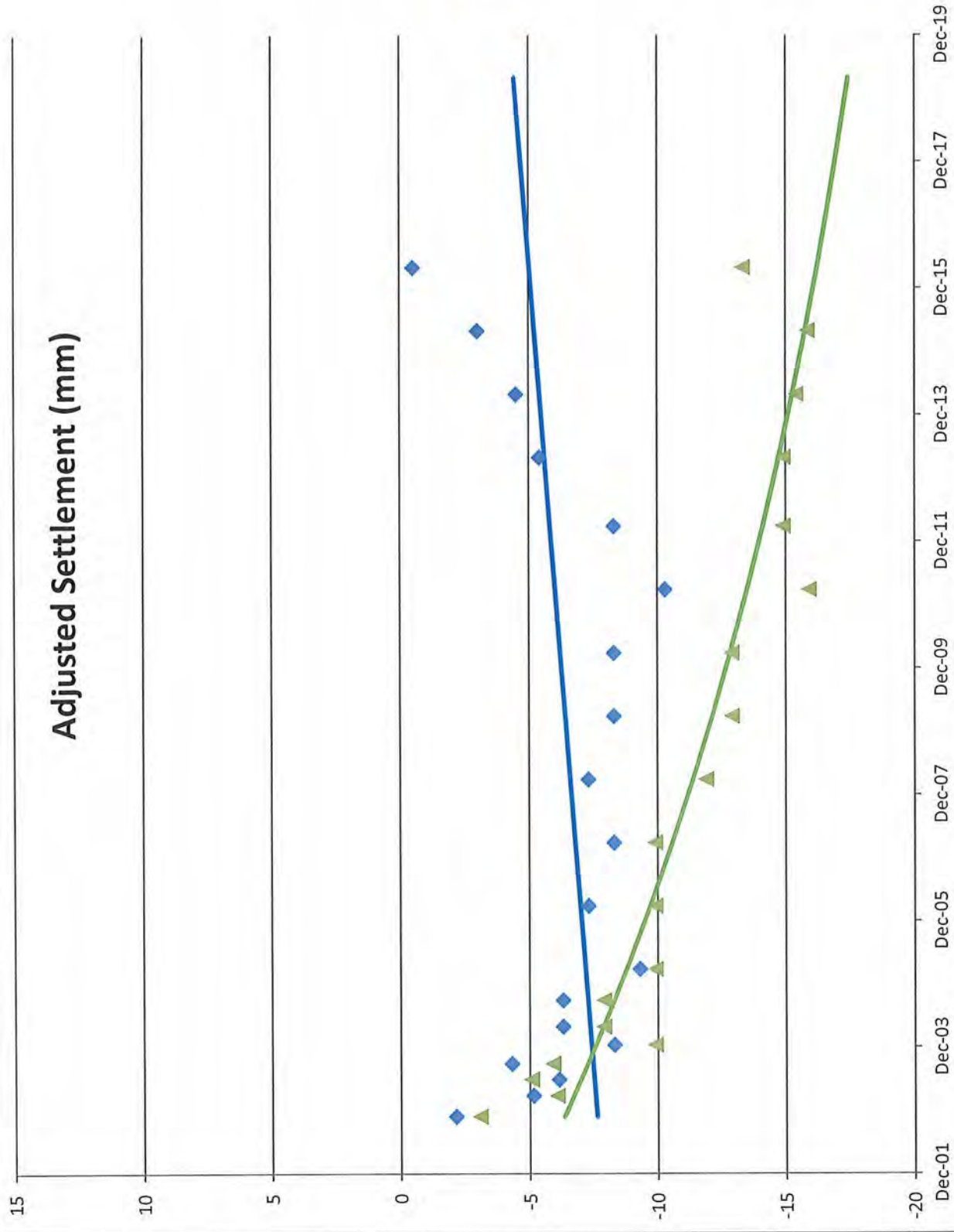
Adjusted Settlement (mm)



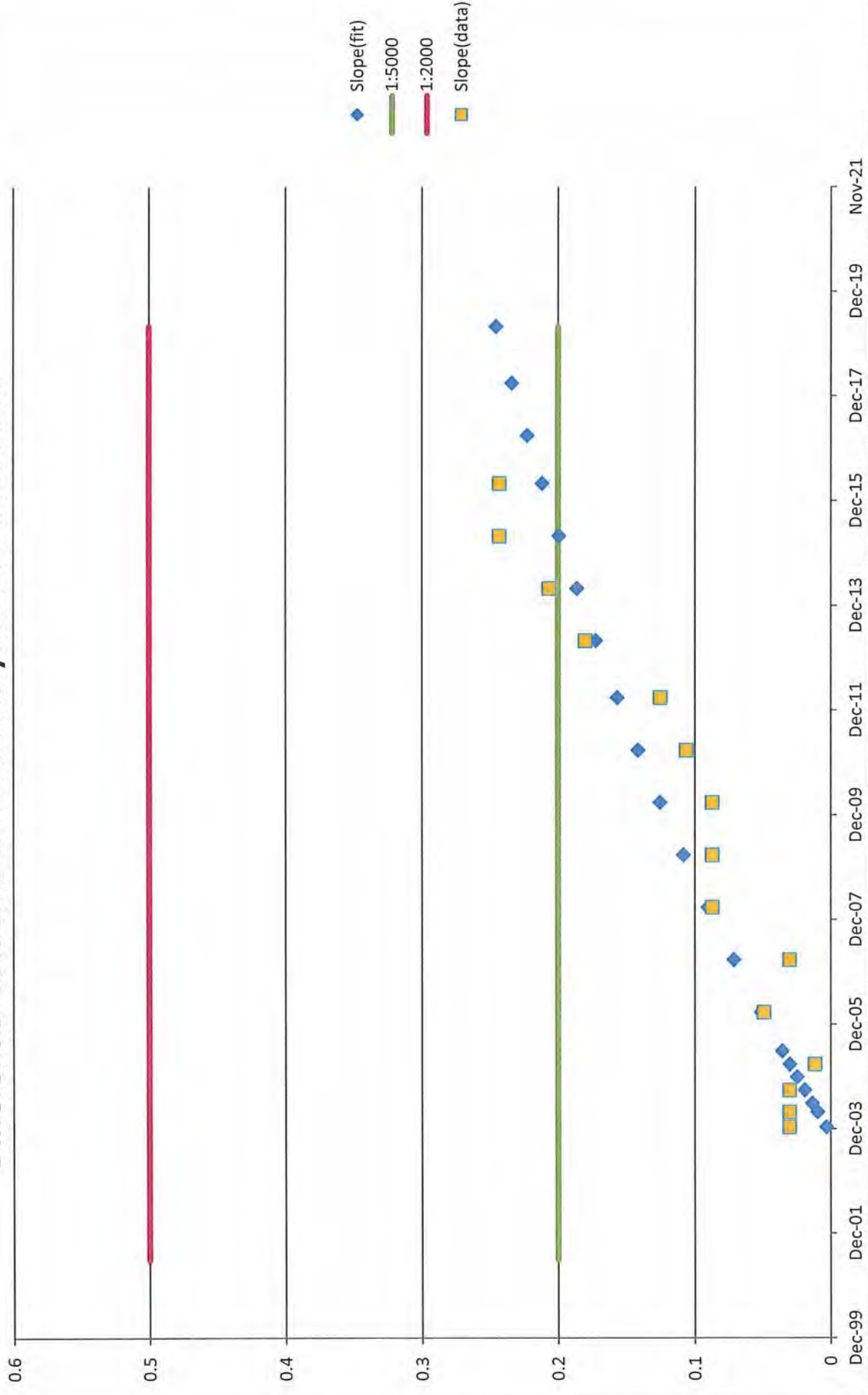
Differential Settlement Trend Analysis - AP38 vs AP117

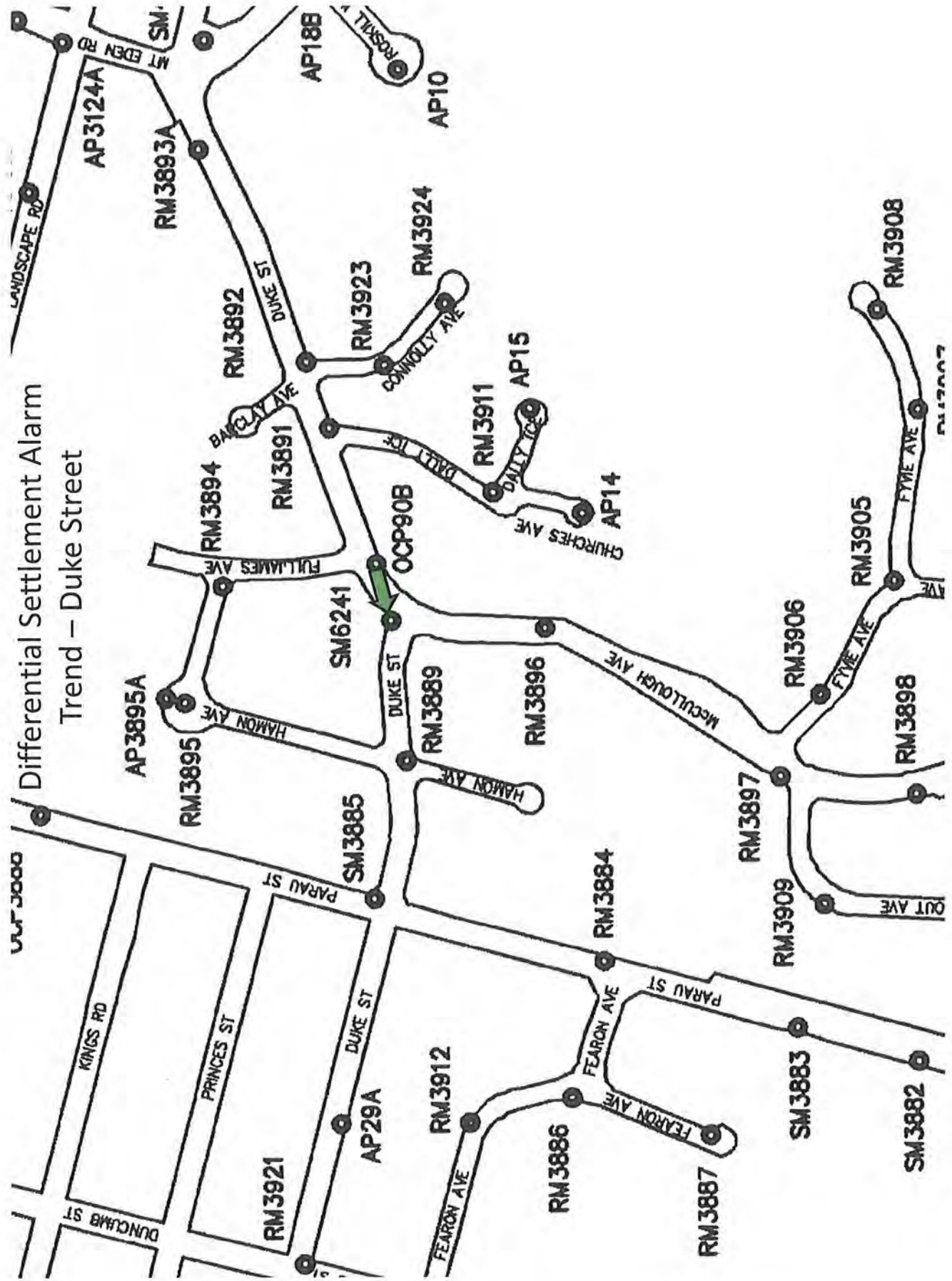


Adjusted Settlement (mm)



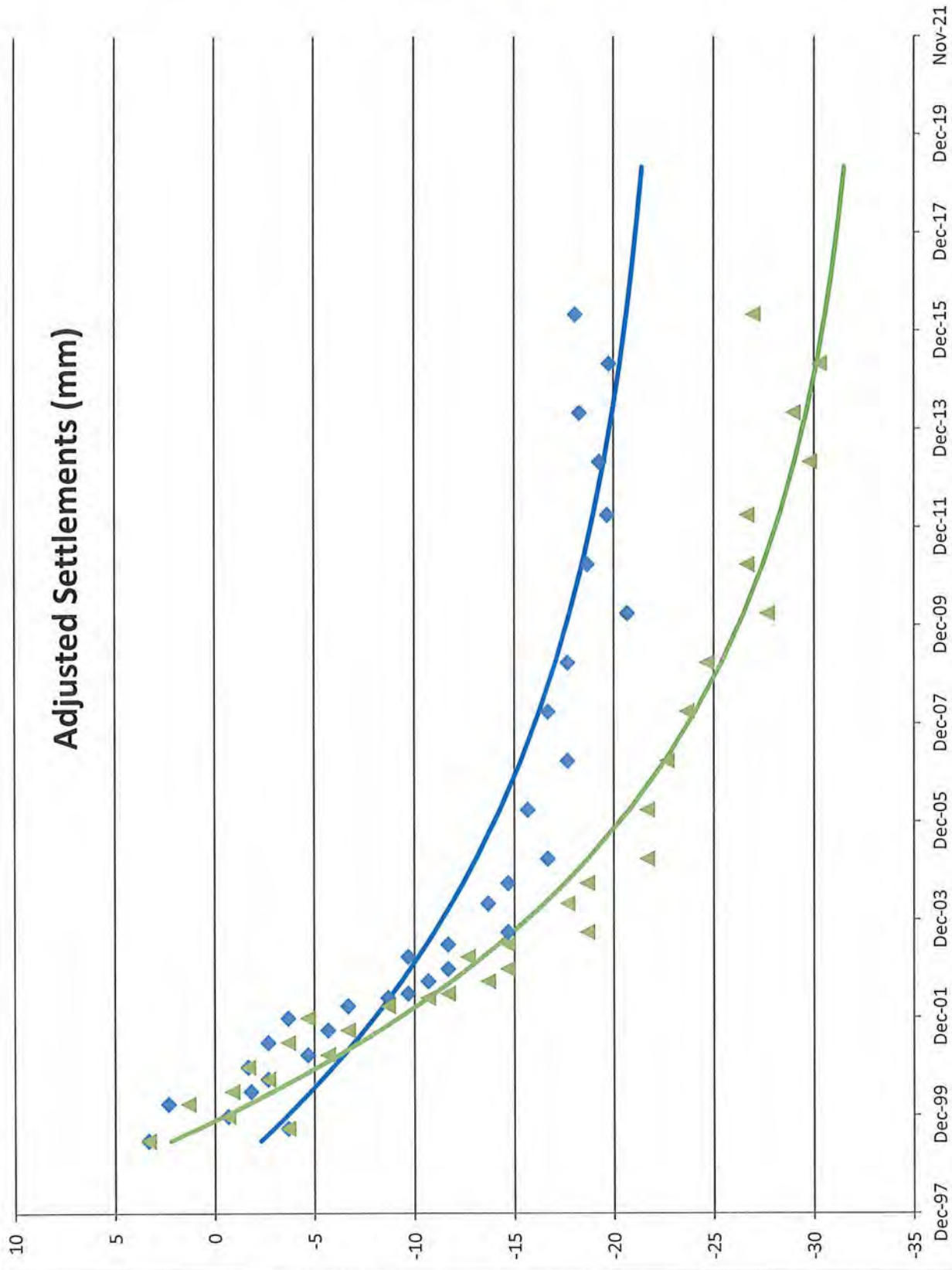
Differential Settlement Trend Analysis - AP74A vs AP75



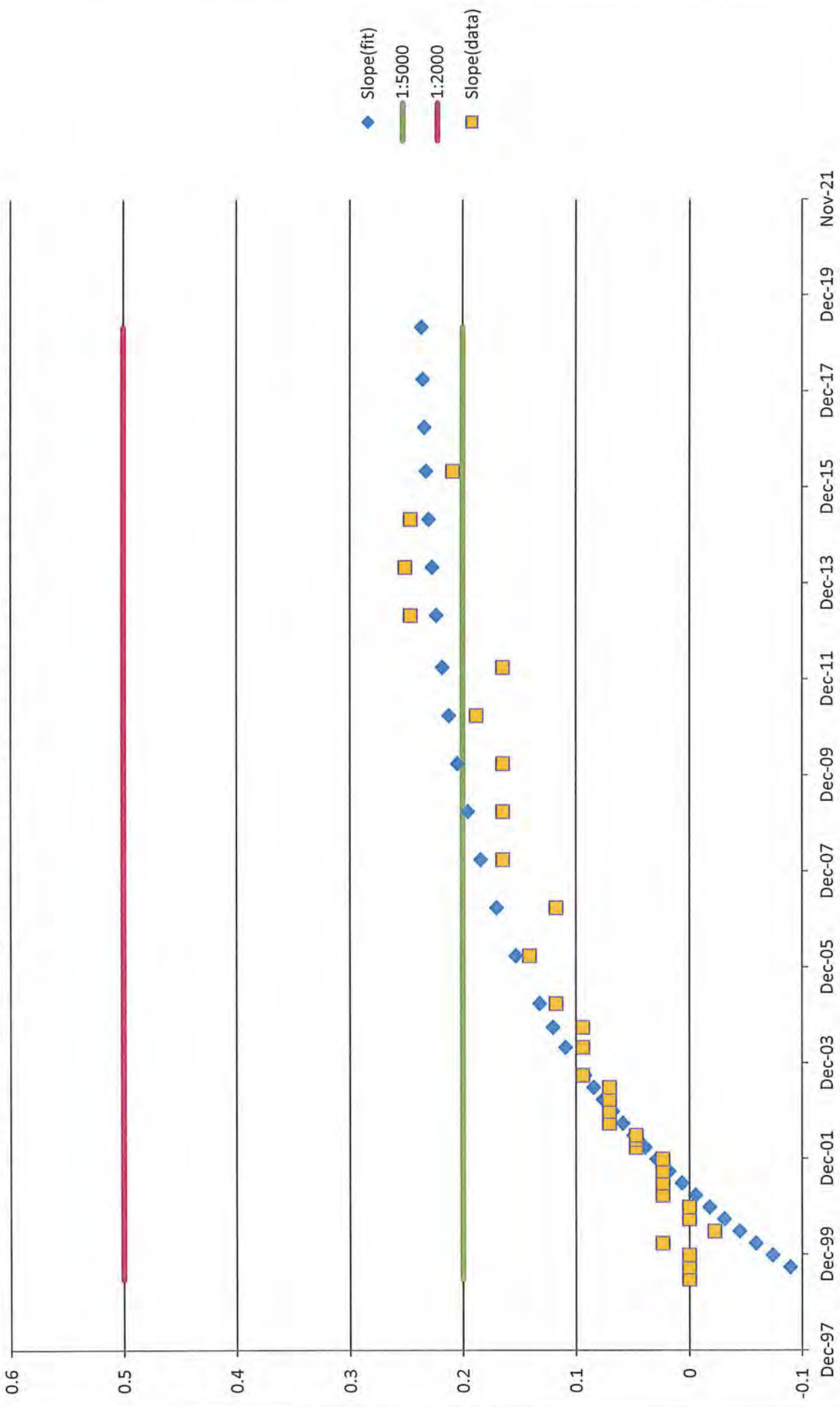


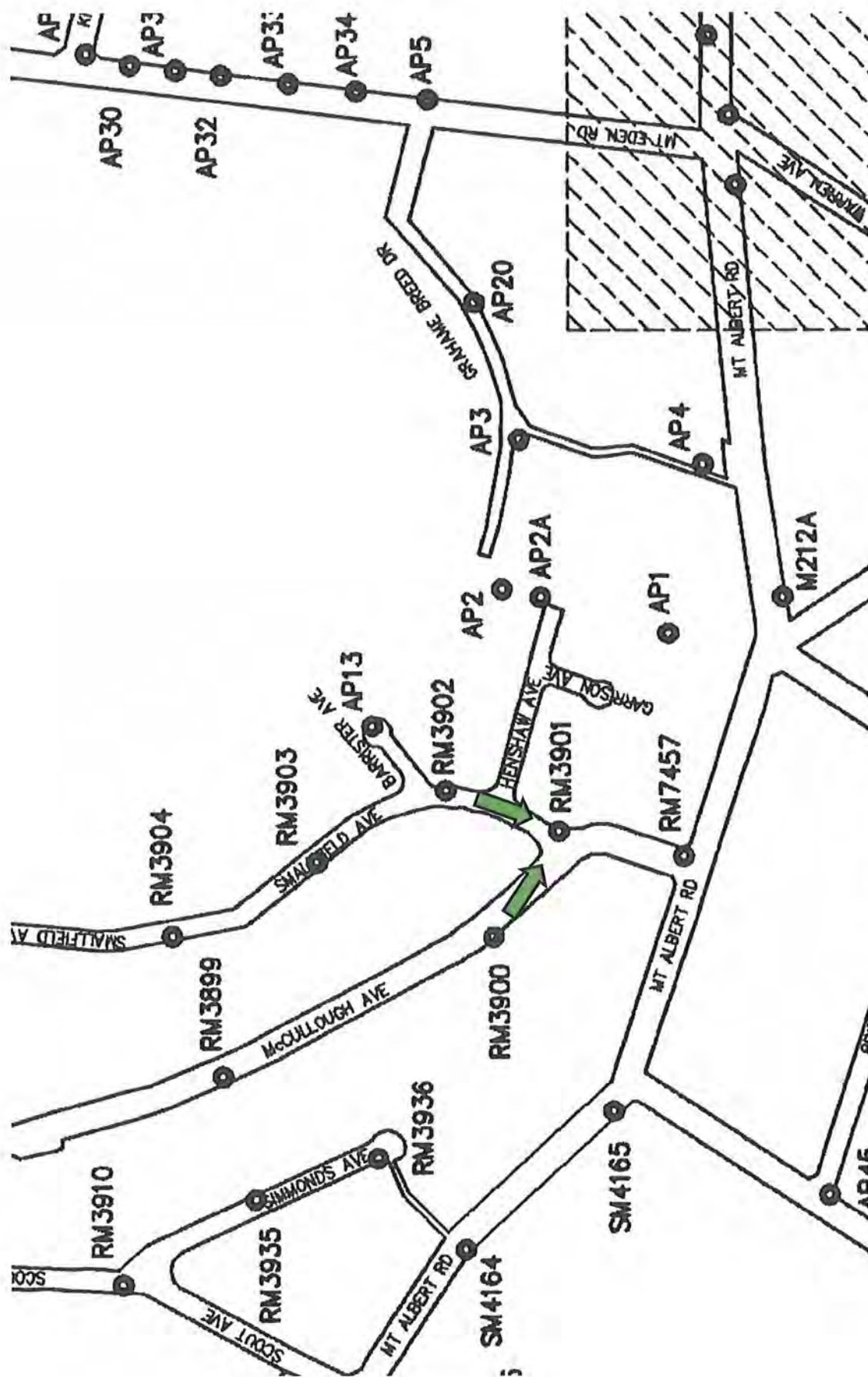
Differential Settlement Alarm
Trend - Duke Street

Adjusted Settlements (mm)



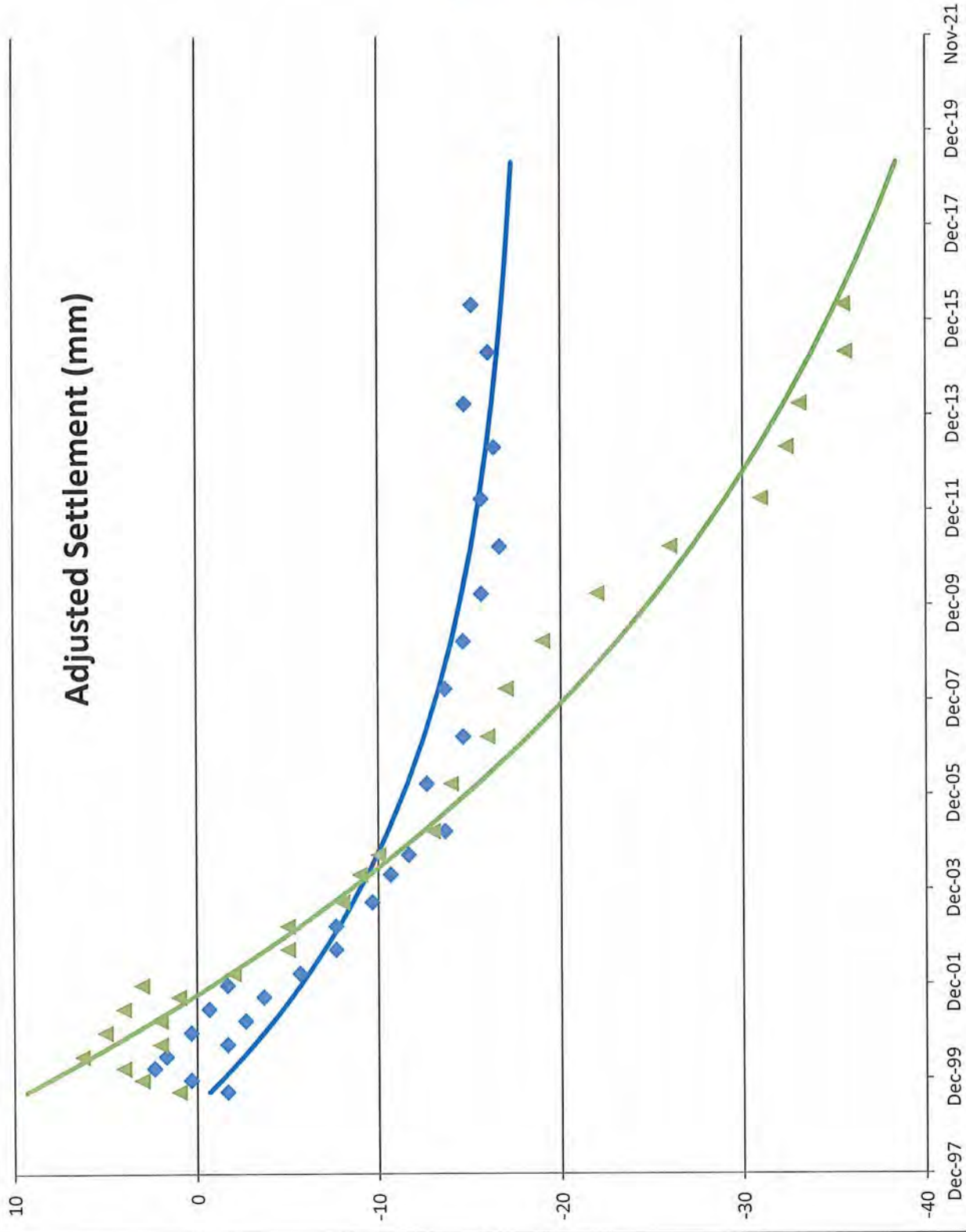
Differential Settlement Trend Analysis - OCP90B vs SM6241



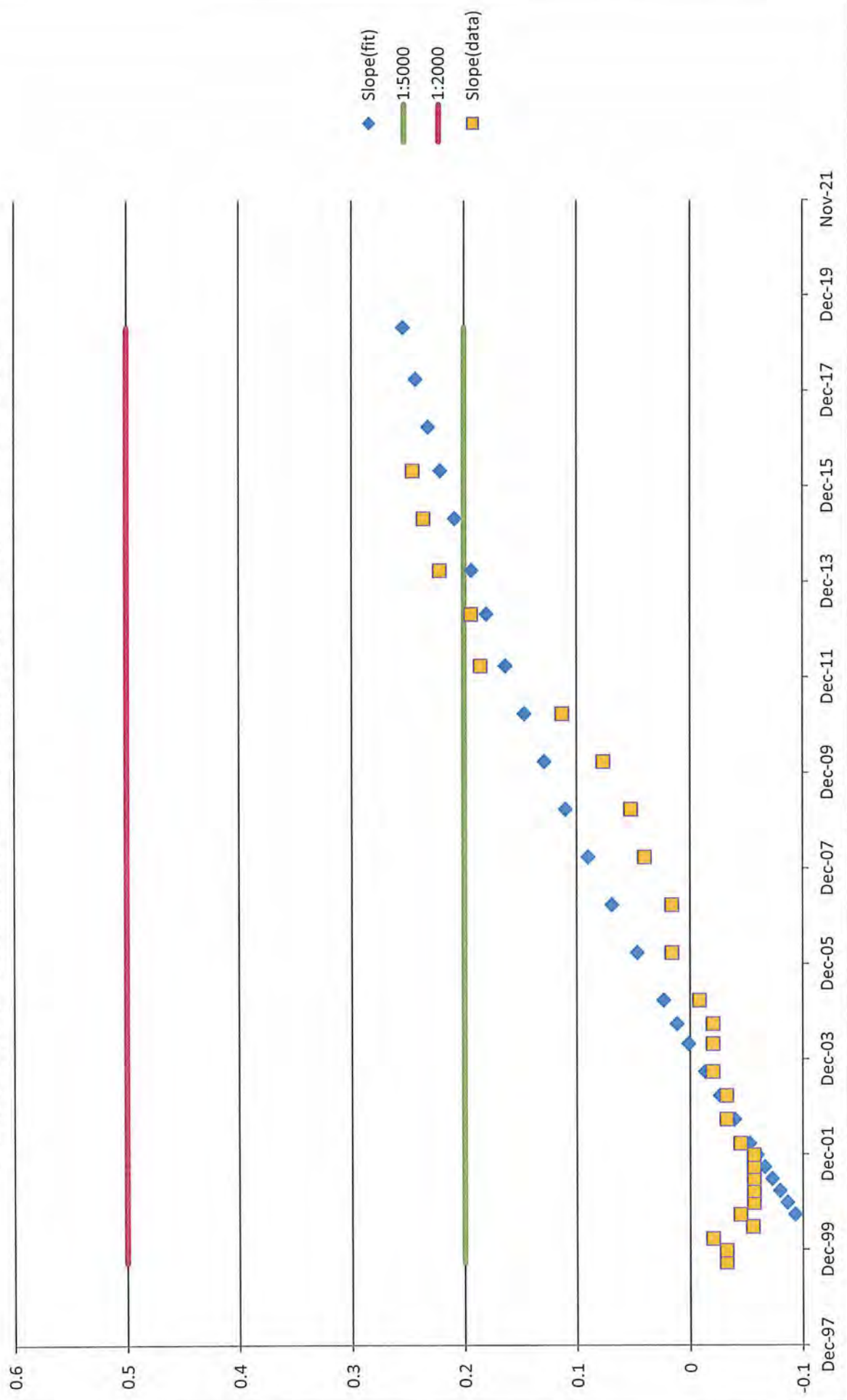


Differential Settlement Alarm Trend - Smallfield Avenue

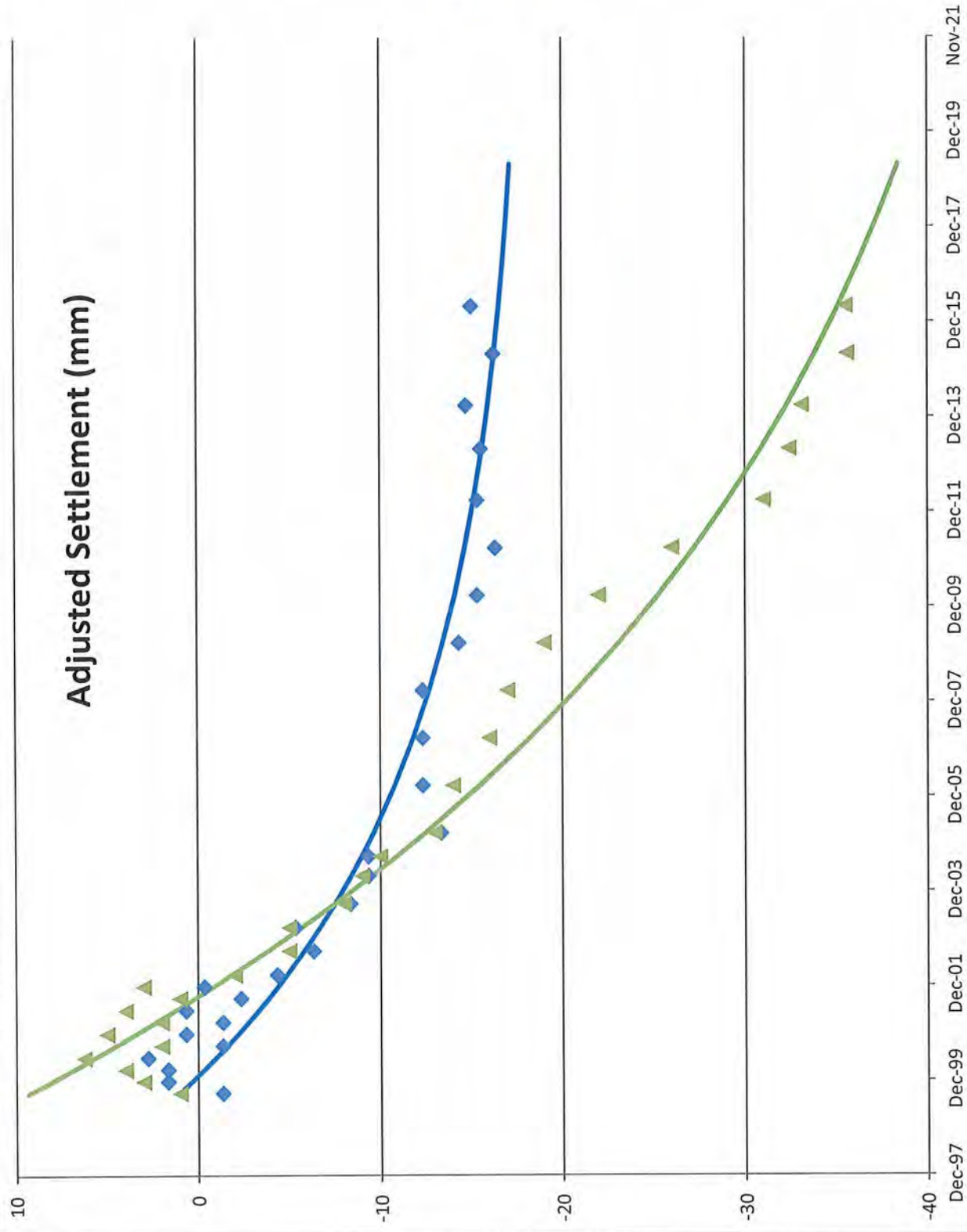
Adjusted Settlement (mm)



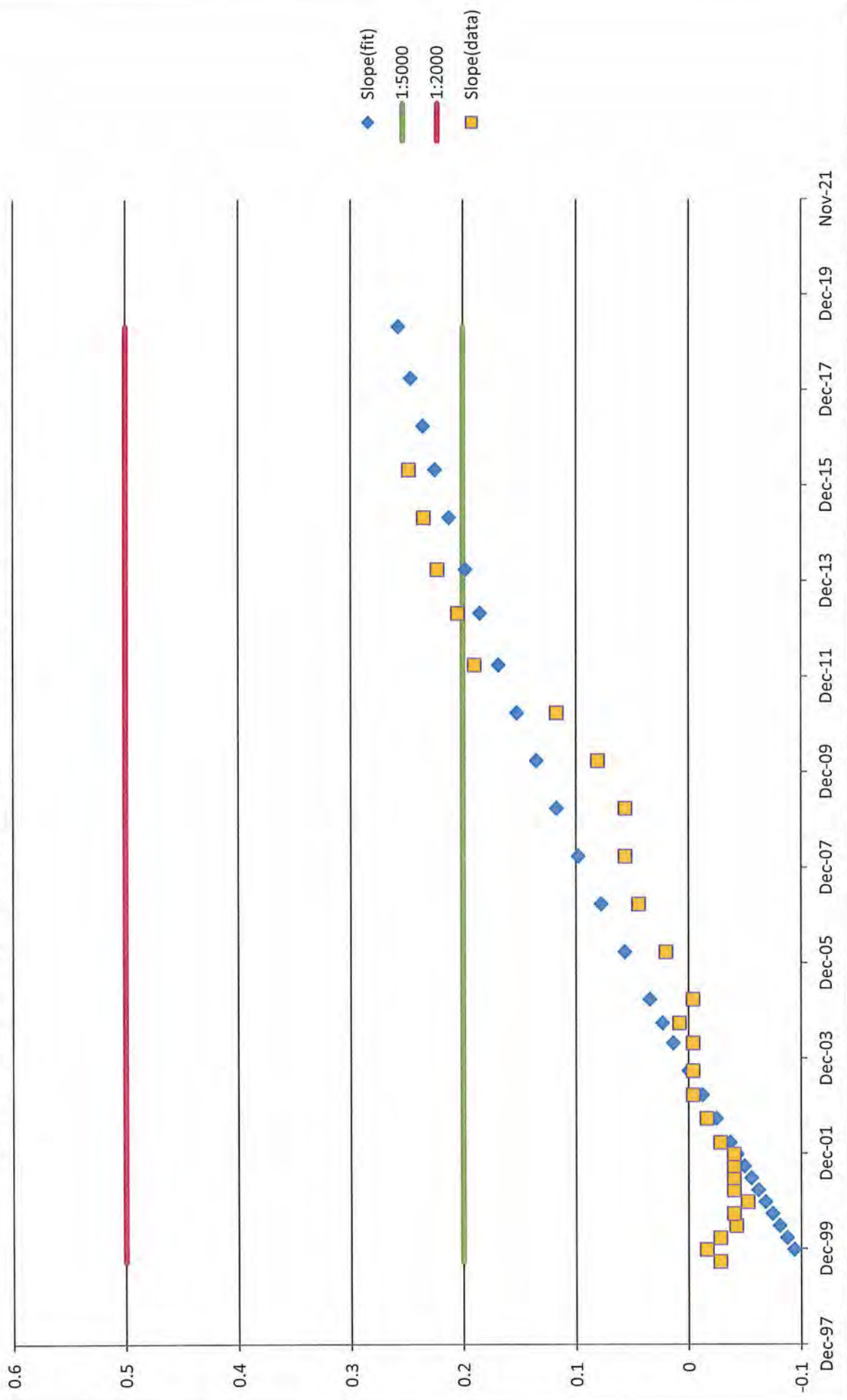
Differential Settlement Trend Analysis - RM3900 vs RM3901



Adjusted Settlement (mm)



Differential Settlement Trend Analysis - RM3901 vs RM3902



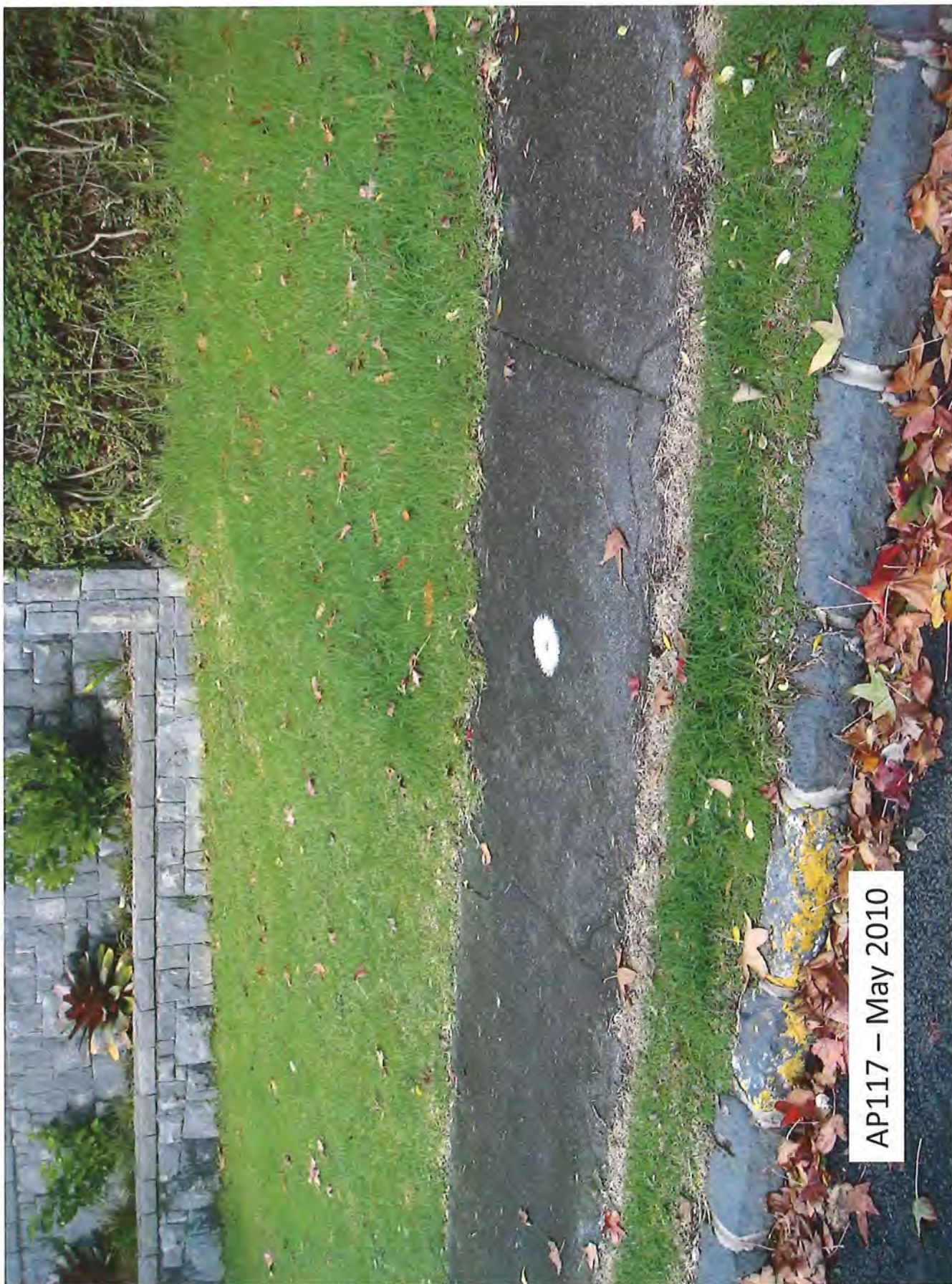
Photographs of Precise Level Marks AP92 and AP117



AP92 – May 2010



AP92 – July 2016



AP117 – May 2010



AP117 – July 2016

Graphs of Stage Control Intermediate Triggers
(Settlement Zone Plan and Stage Control Trigger Plan)

NOTES
1. All dimensions are in metres unless noted otherwise.

LEGEND

Quarry

| | | | |
|---|----------------------|-----|--------|
| 0 | First Issue | BY | DATE |
| | REVISION DESCRIPTION | | |
| | DESIGNED : | | |
| | DRAWN : | AMM | OCT 02 |
| | DESIGN CHECKED : | | |
| | DRAWING CHECKED : | | |
| | REFERENCE : | | |

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WINSTONE AGGREGATES LTD

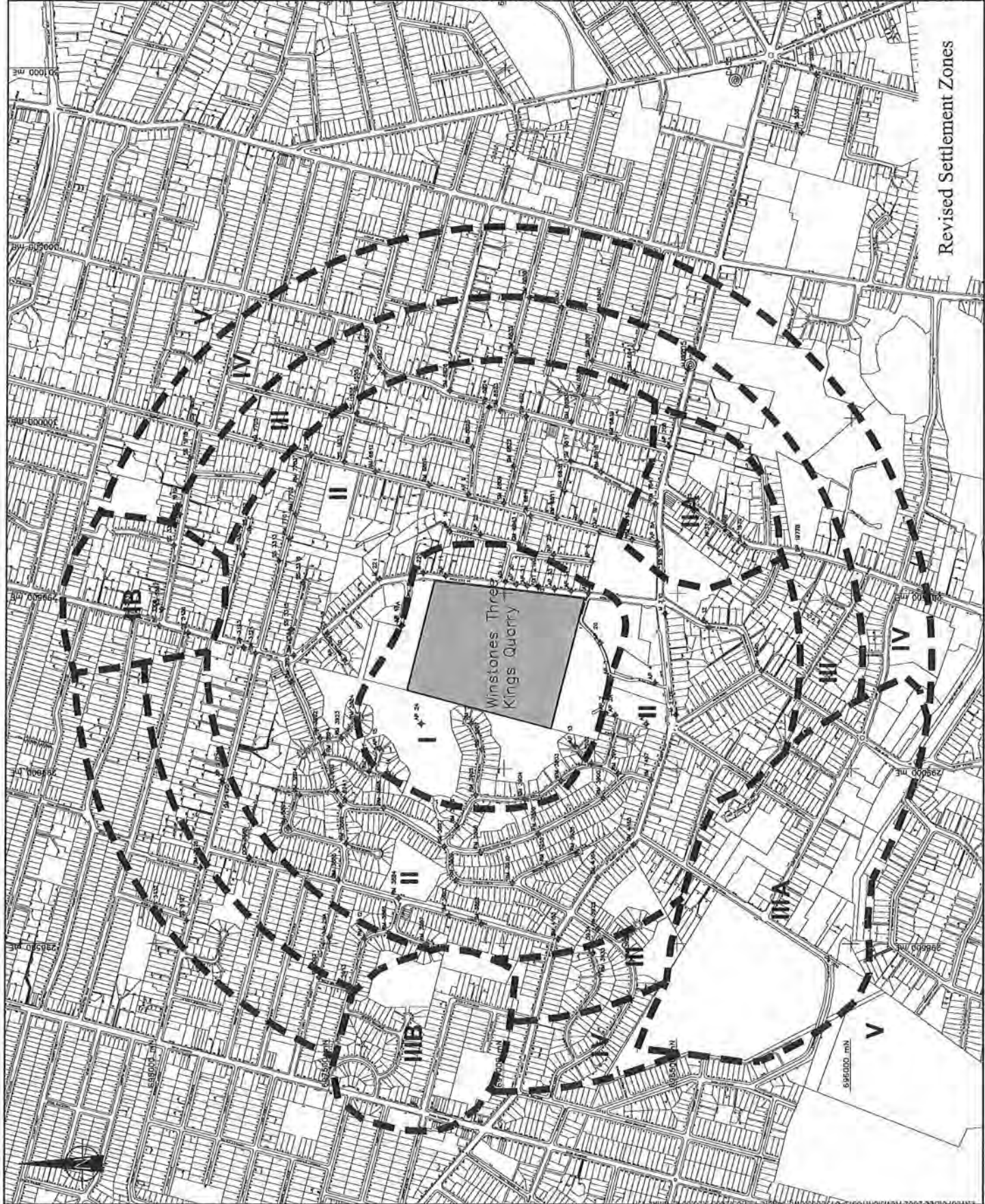
THREE KINGS QUARRY DEWATERING

REVIEW OF SETTLEMENT PREDICTIONS

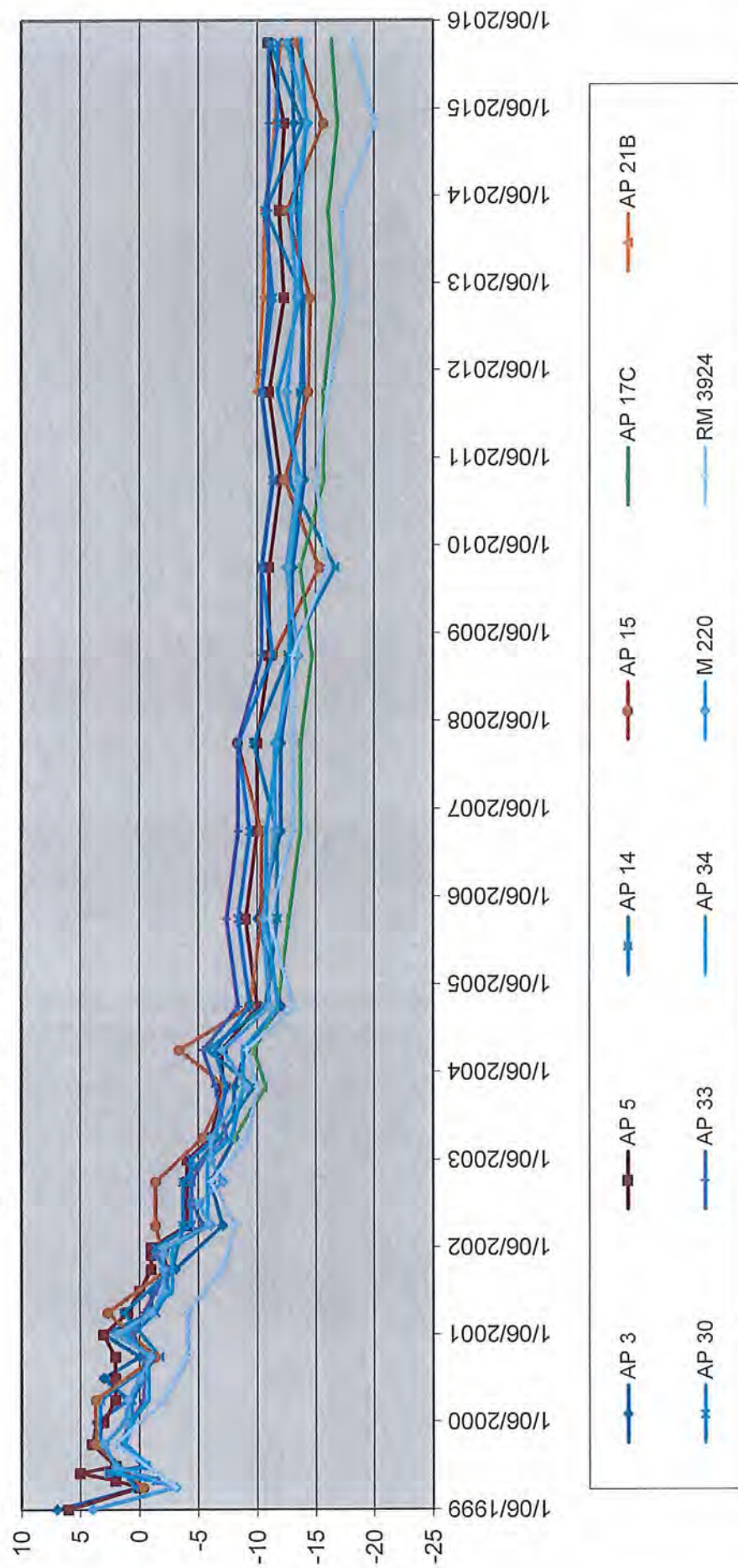
Figure 7

Scale: 1:10000
Date: 18670-04

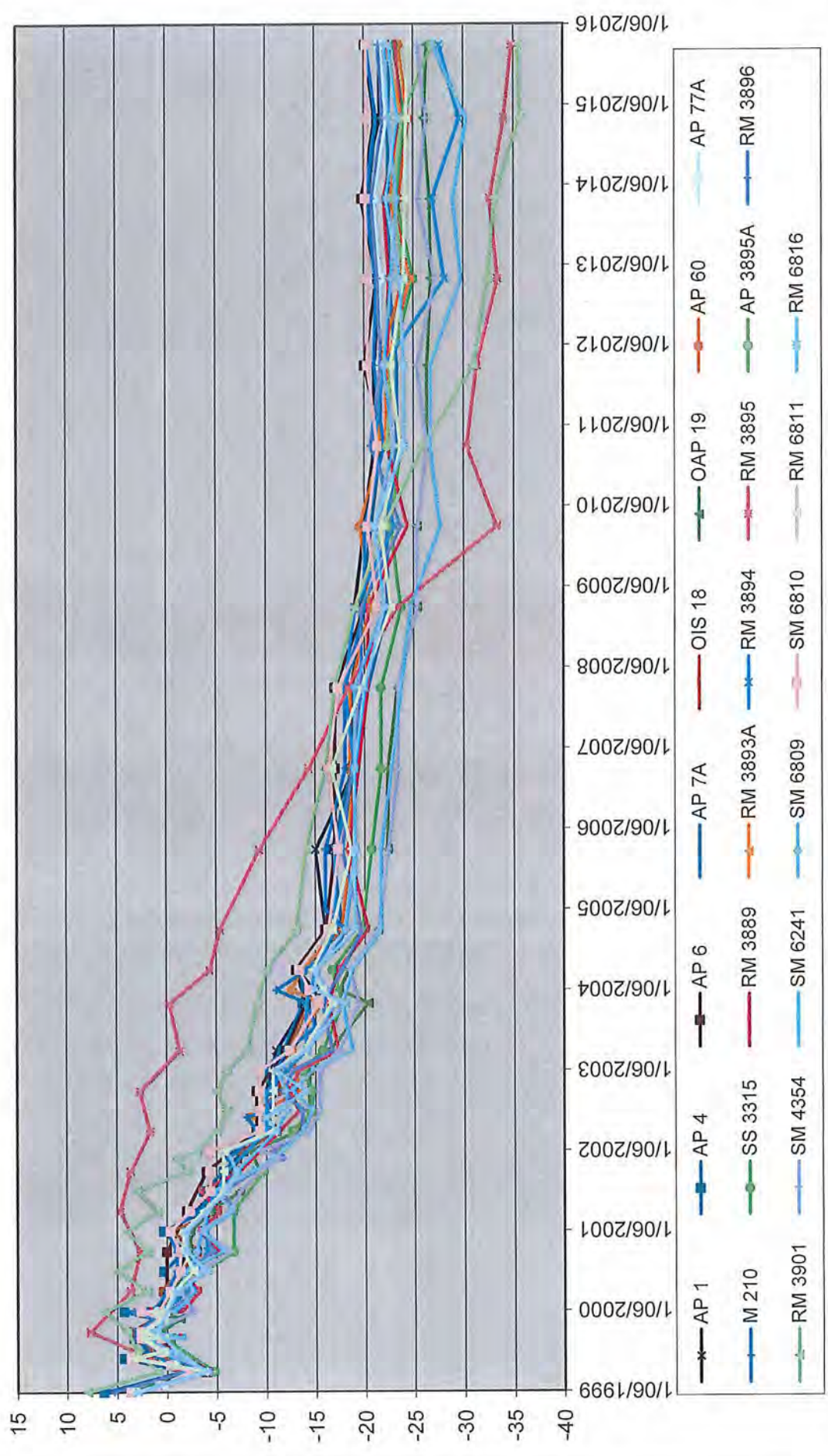
Revised Settlement Zones



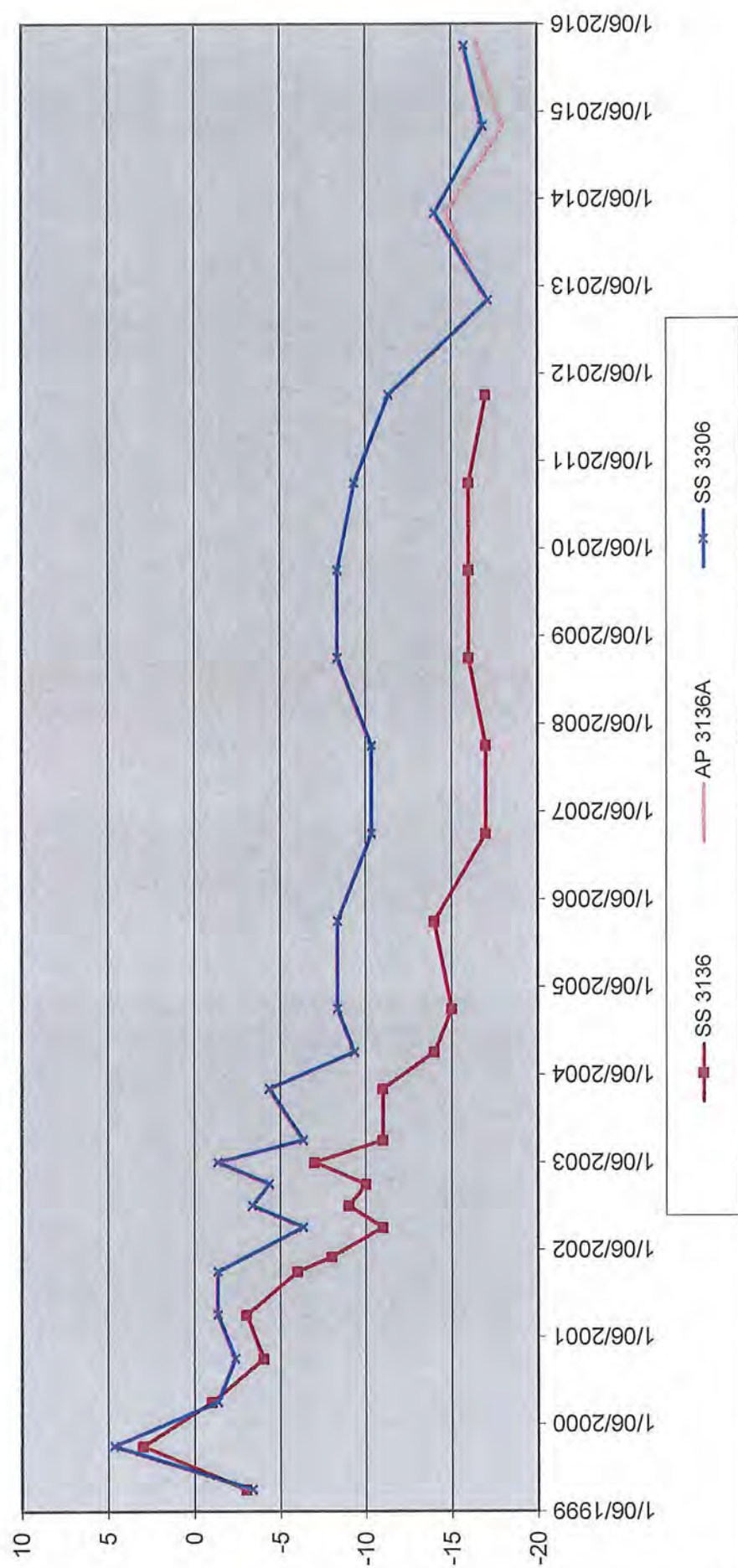
Area I - Marks with Adjusted Settlement Greater than 10mm



Area II - Marks with Adjusted Settlement Greater than 20mm



Area IIB - Marks with Adjusted Settlement Greater than 15mm



Area V - Marks with Adjusted Settlement Greater than 5mm

