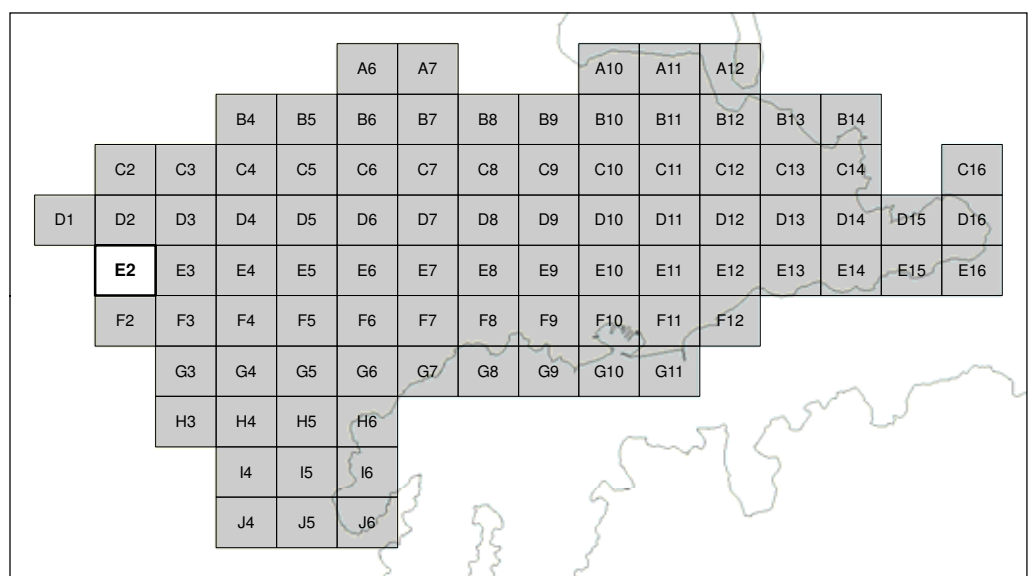


Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



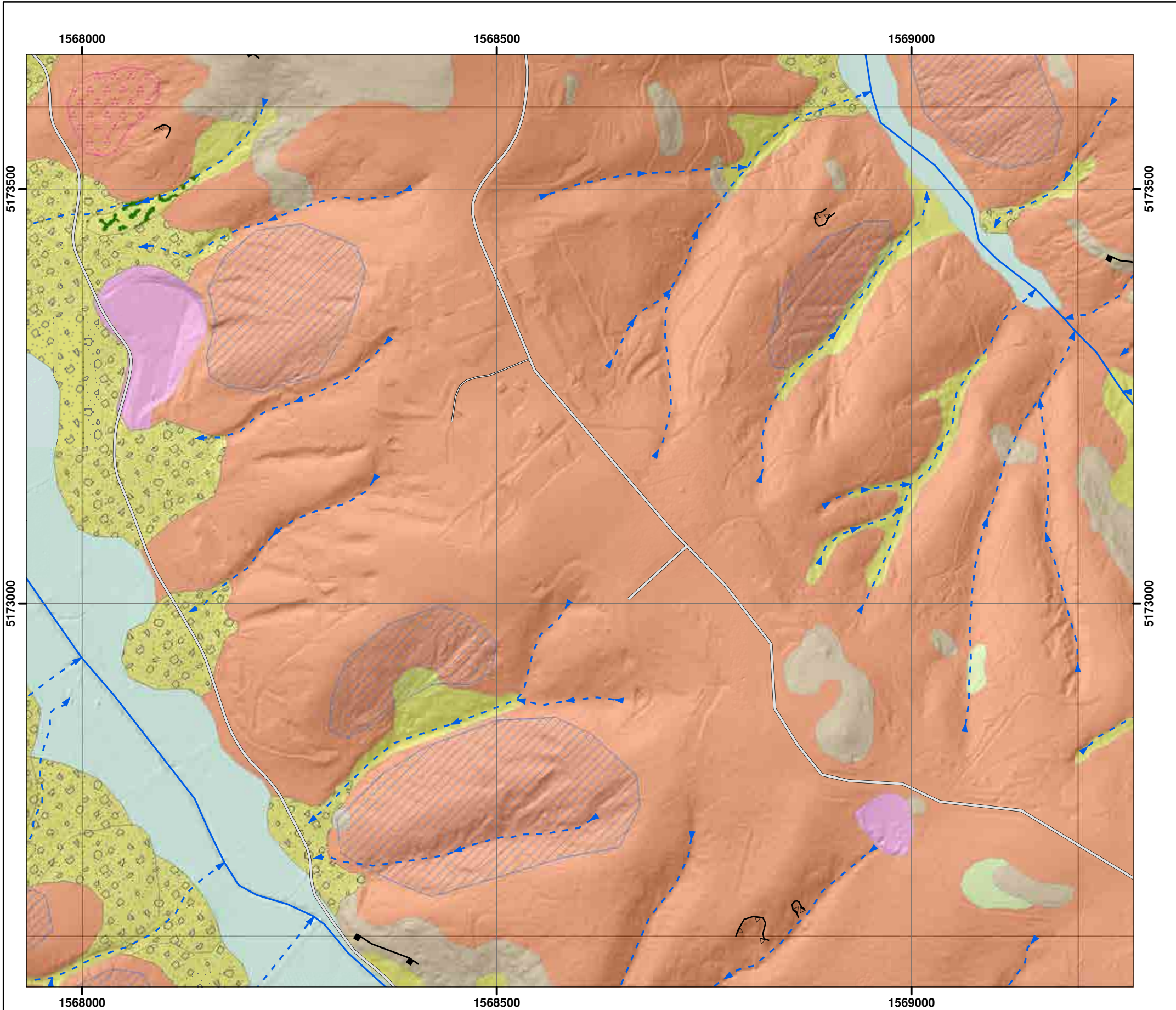
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

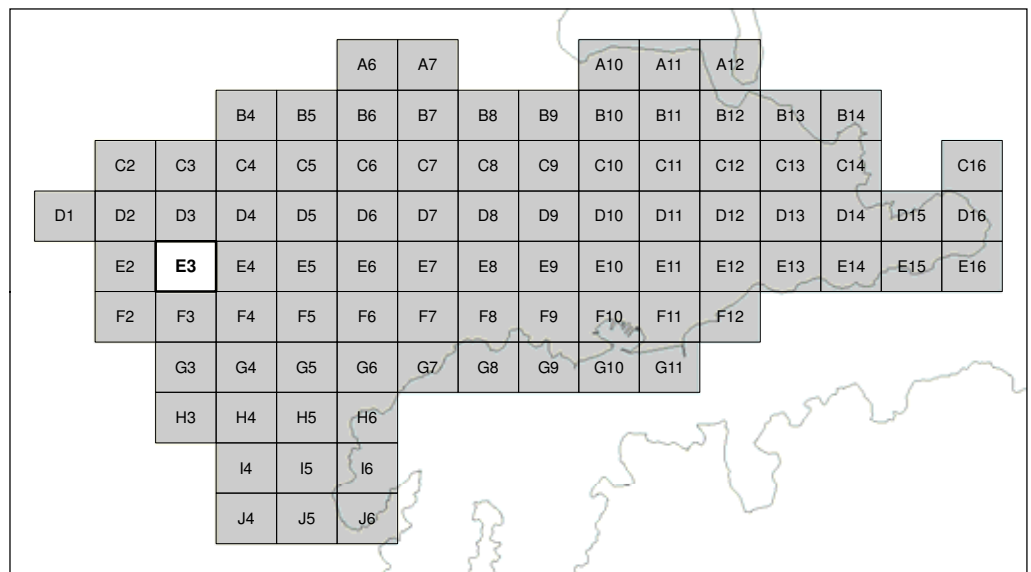
APPENDIX 4  
Map E2

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



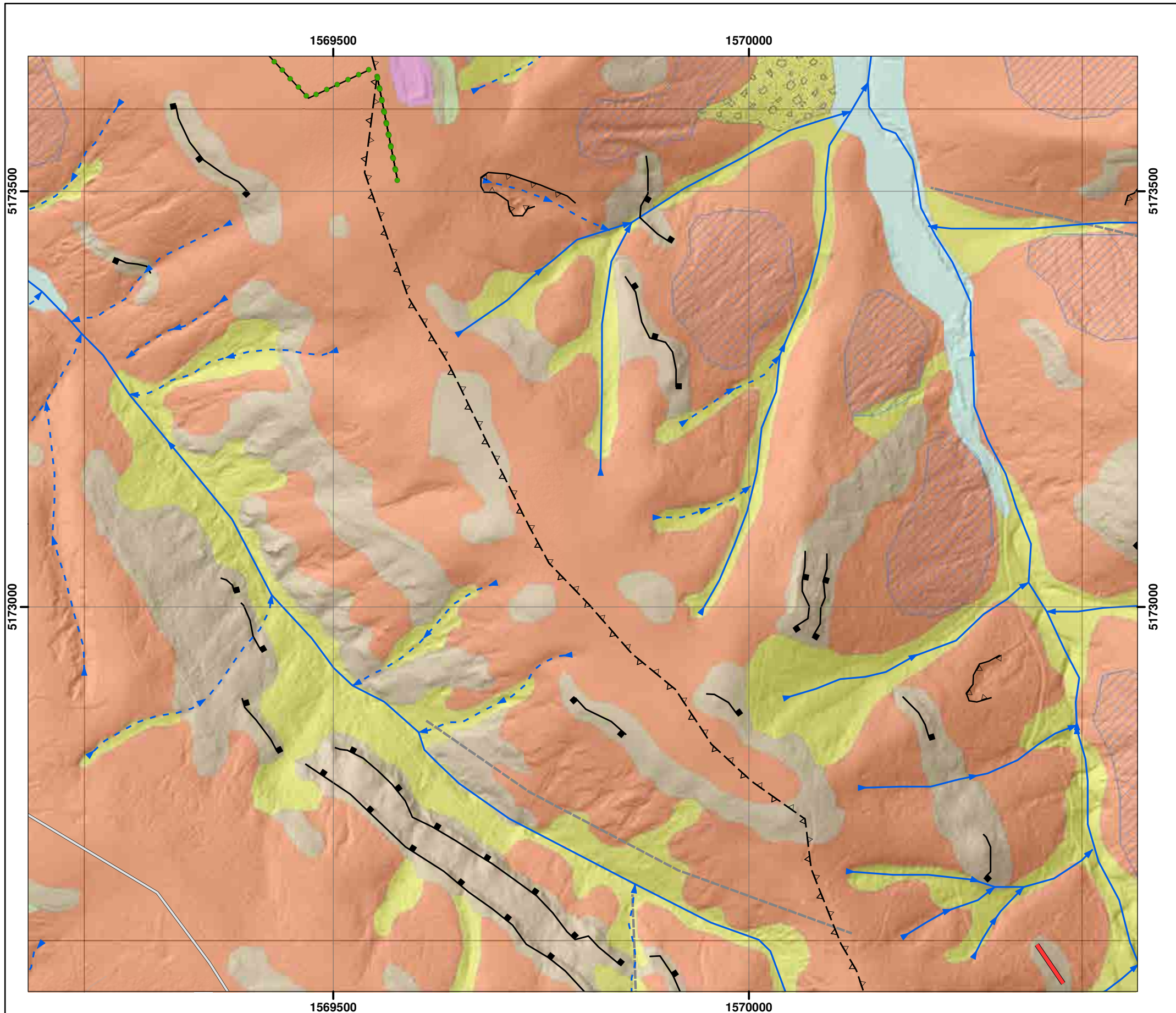
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

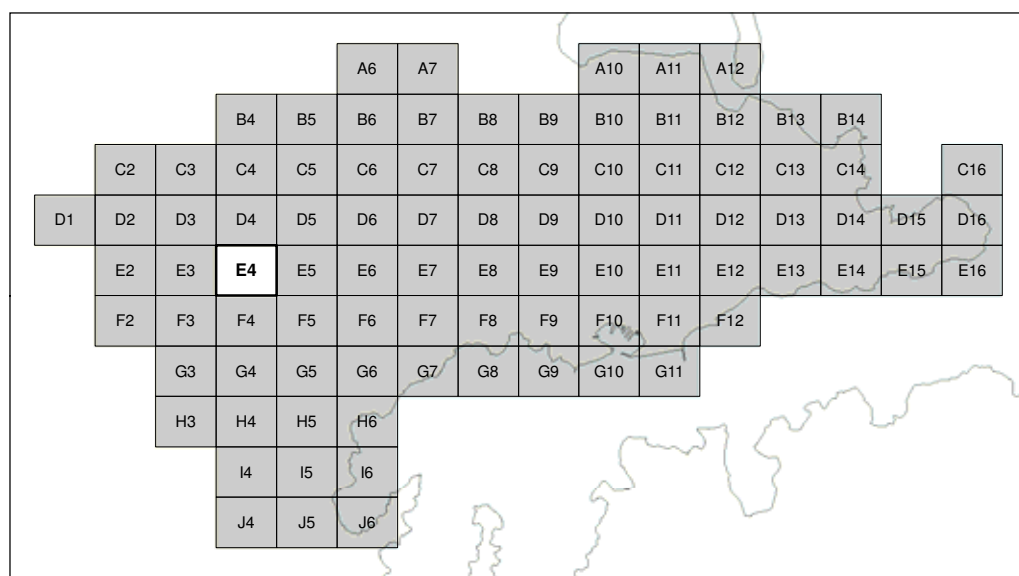
APPENDIX 4  
Map E3

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



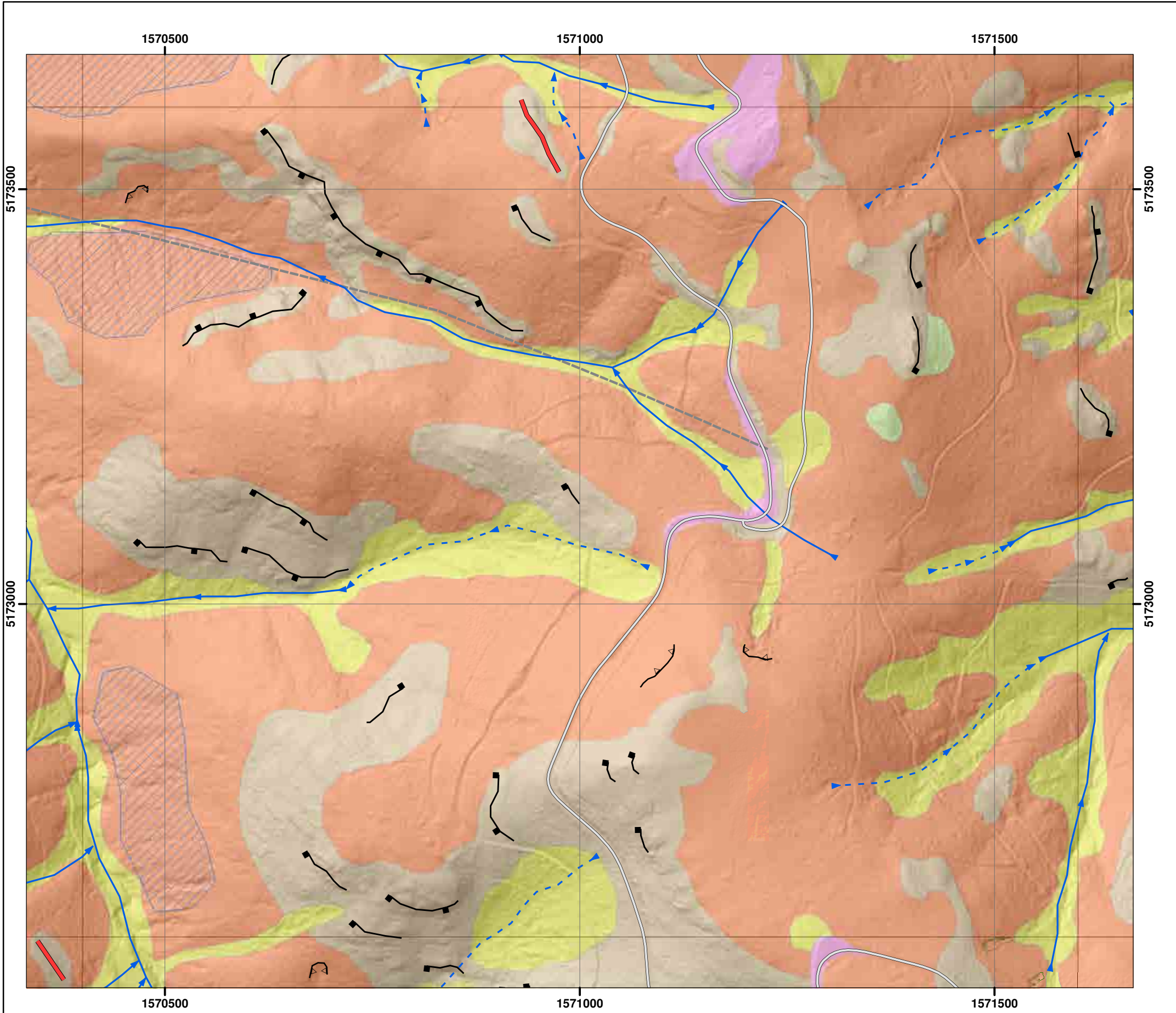
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

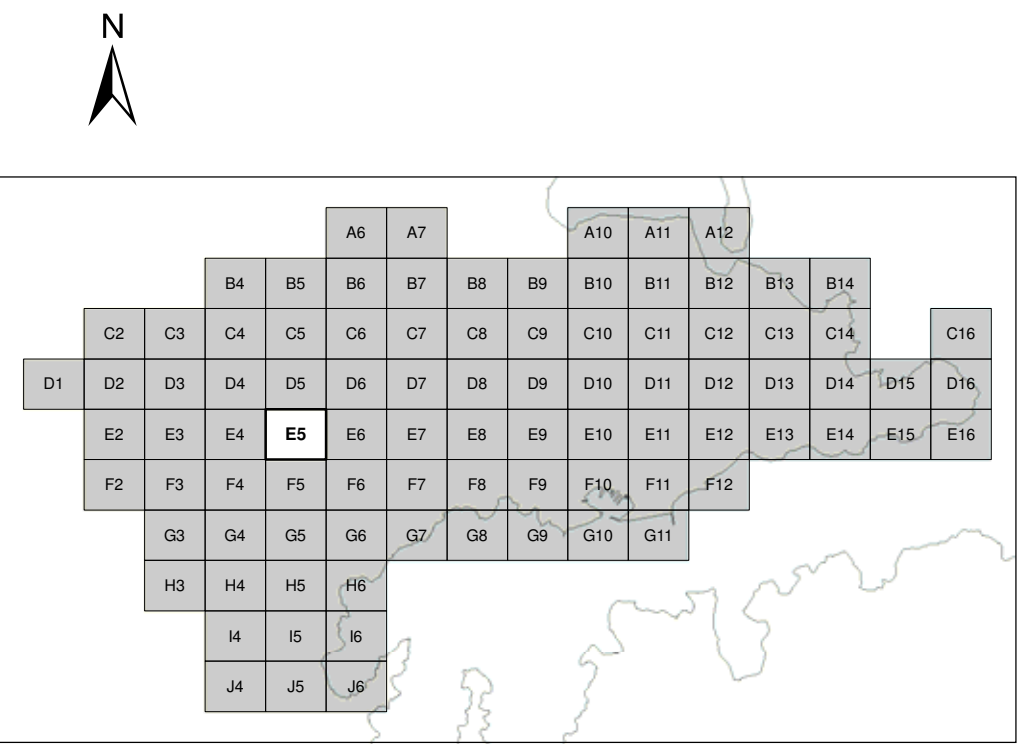
APPENDIX 4  
Map E4

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
 DBT  
 CHK:  
 CM

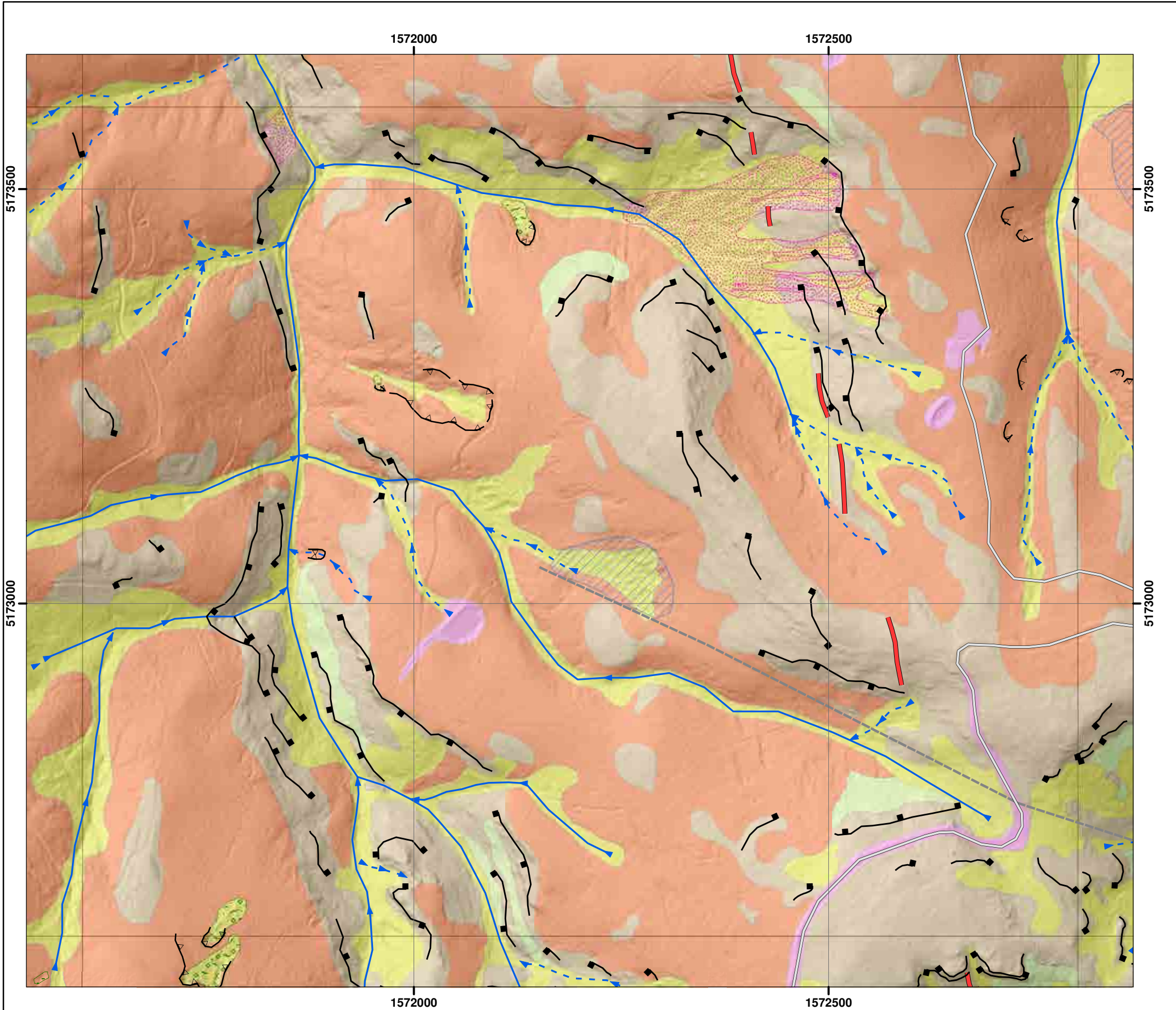


**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

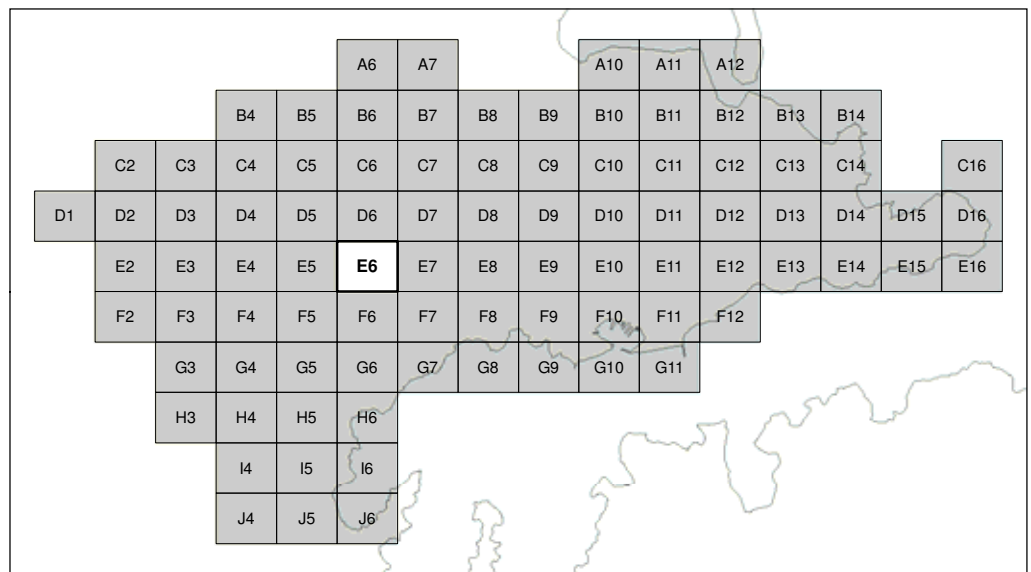
**Port Hills Christchurch**

APPENDIX 4  
 Map E5

**FINAL**  
 REPORT: CR2012/15    DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



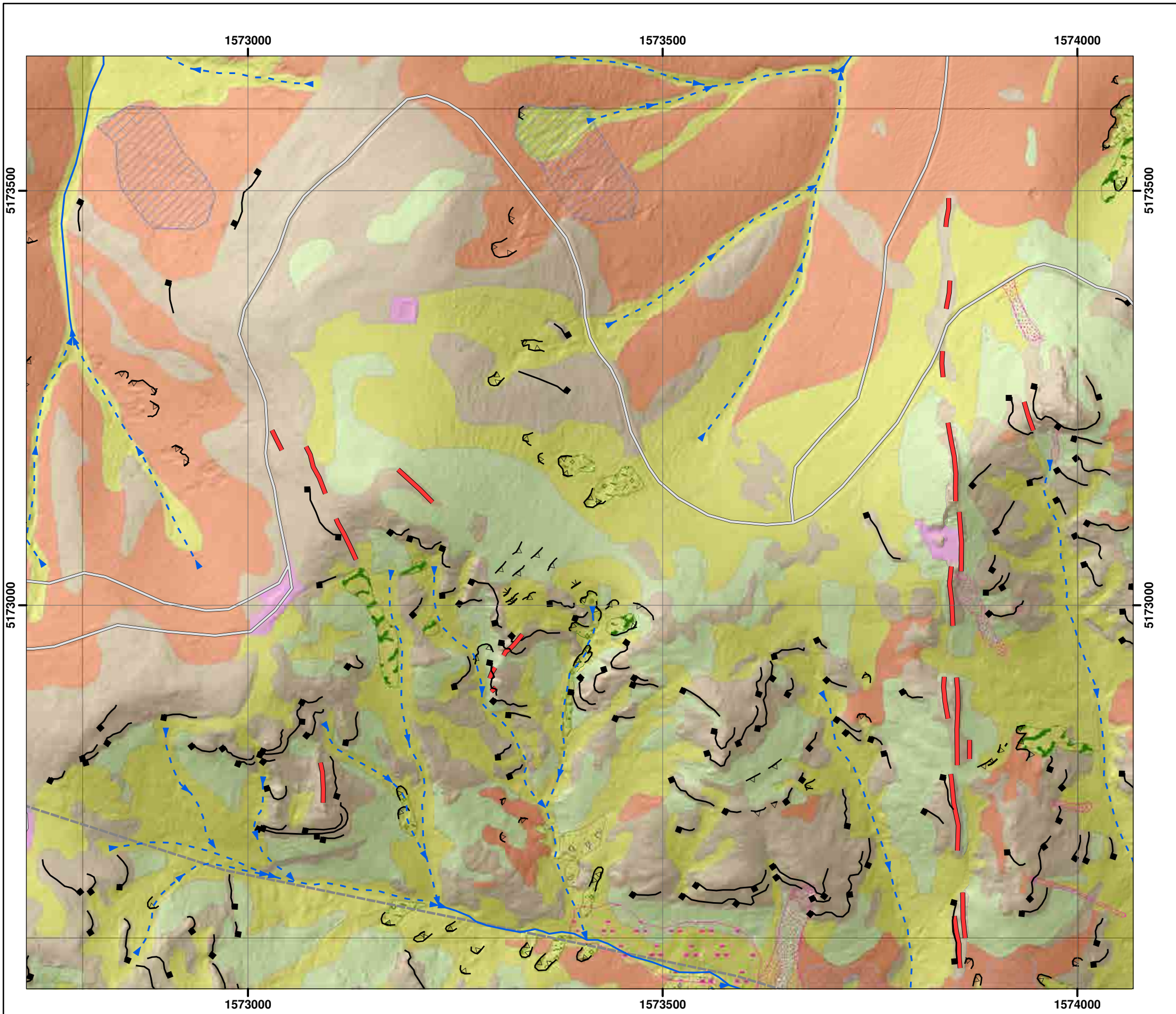
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

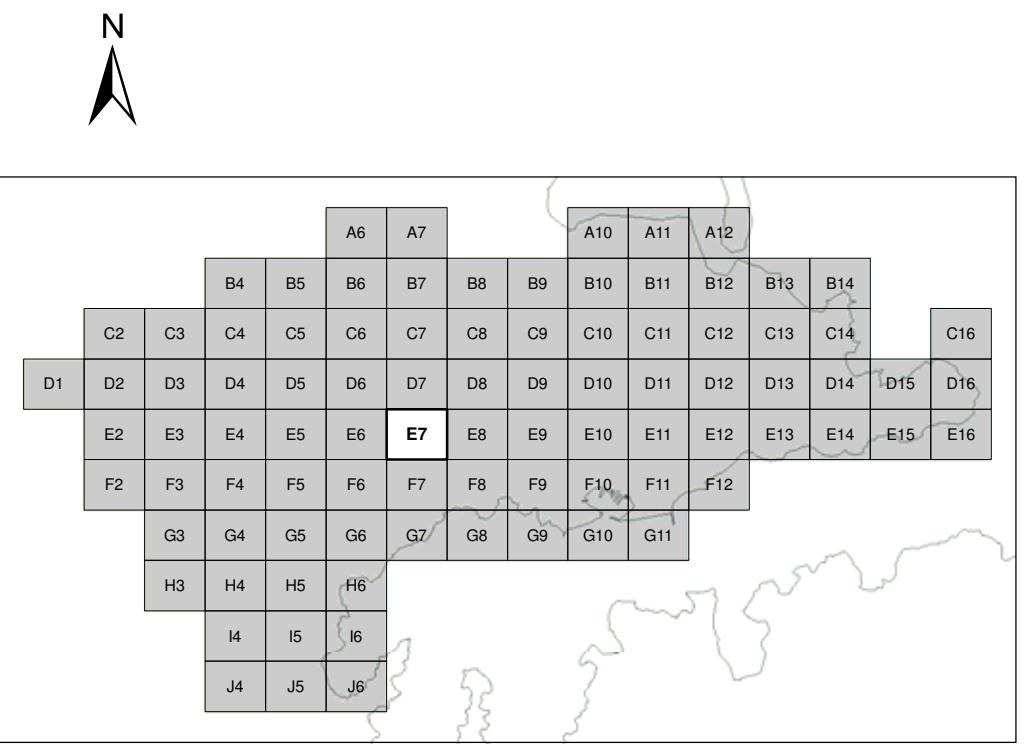
APPENDIX 4  
Map E6

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



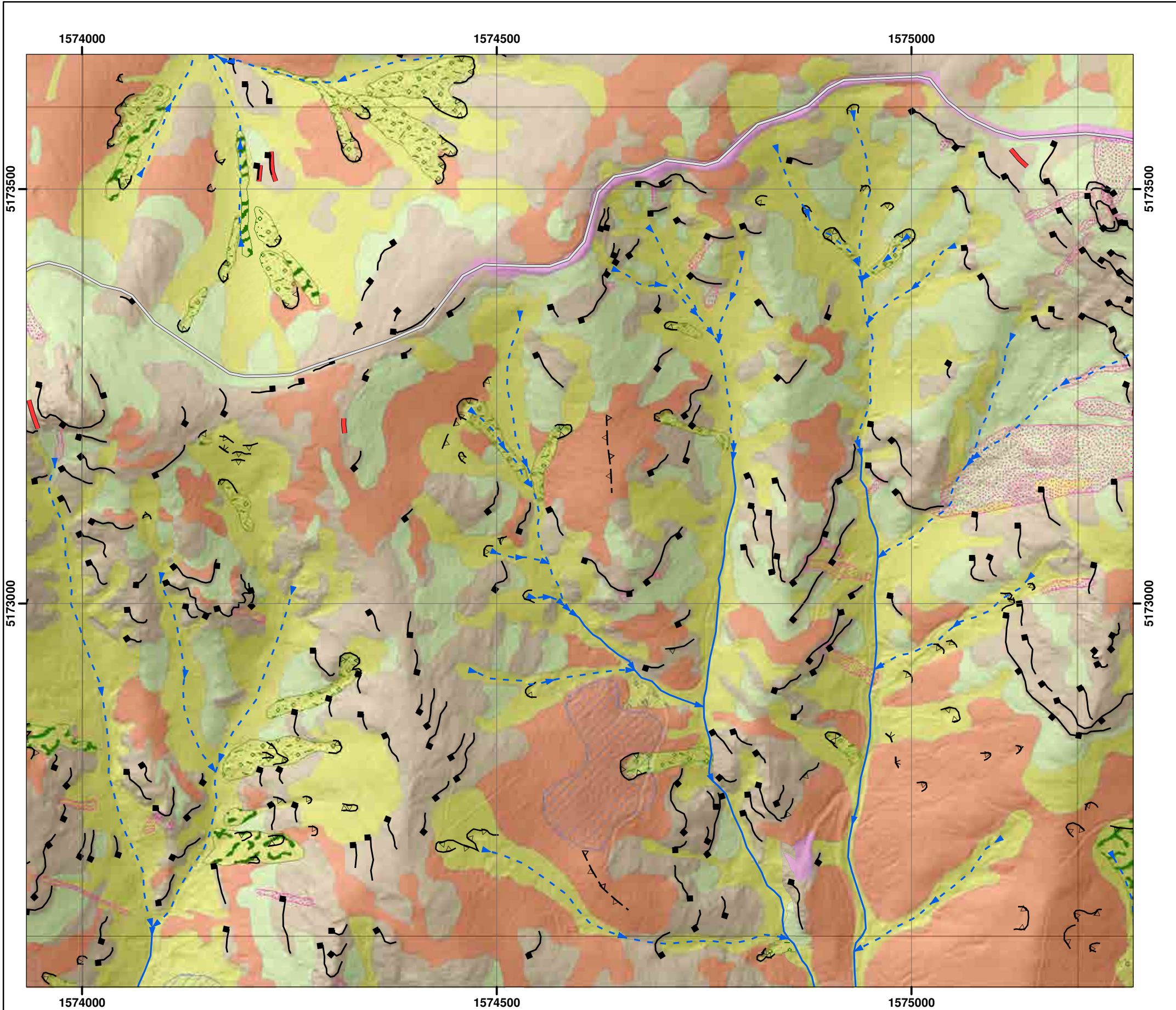
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

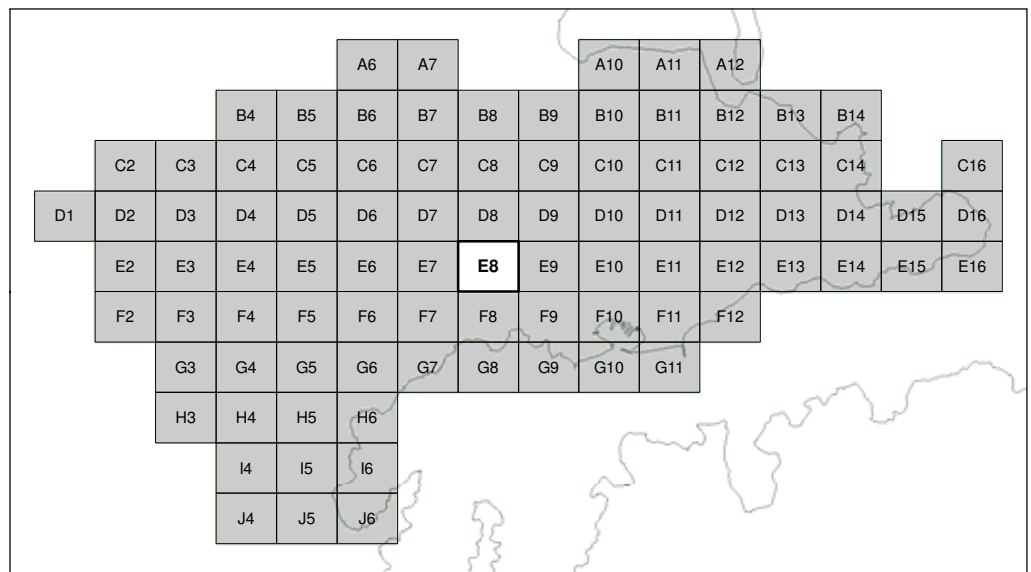
APPENDIX 4  
Map E7

**FINAL**

REPORT: CR2012/15	DATE: Sept 2012
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Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



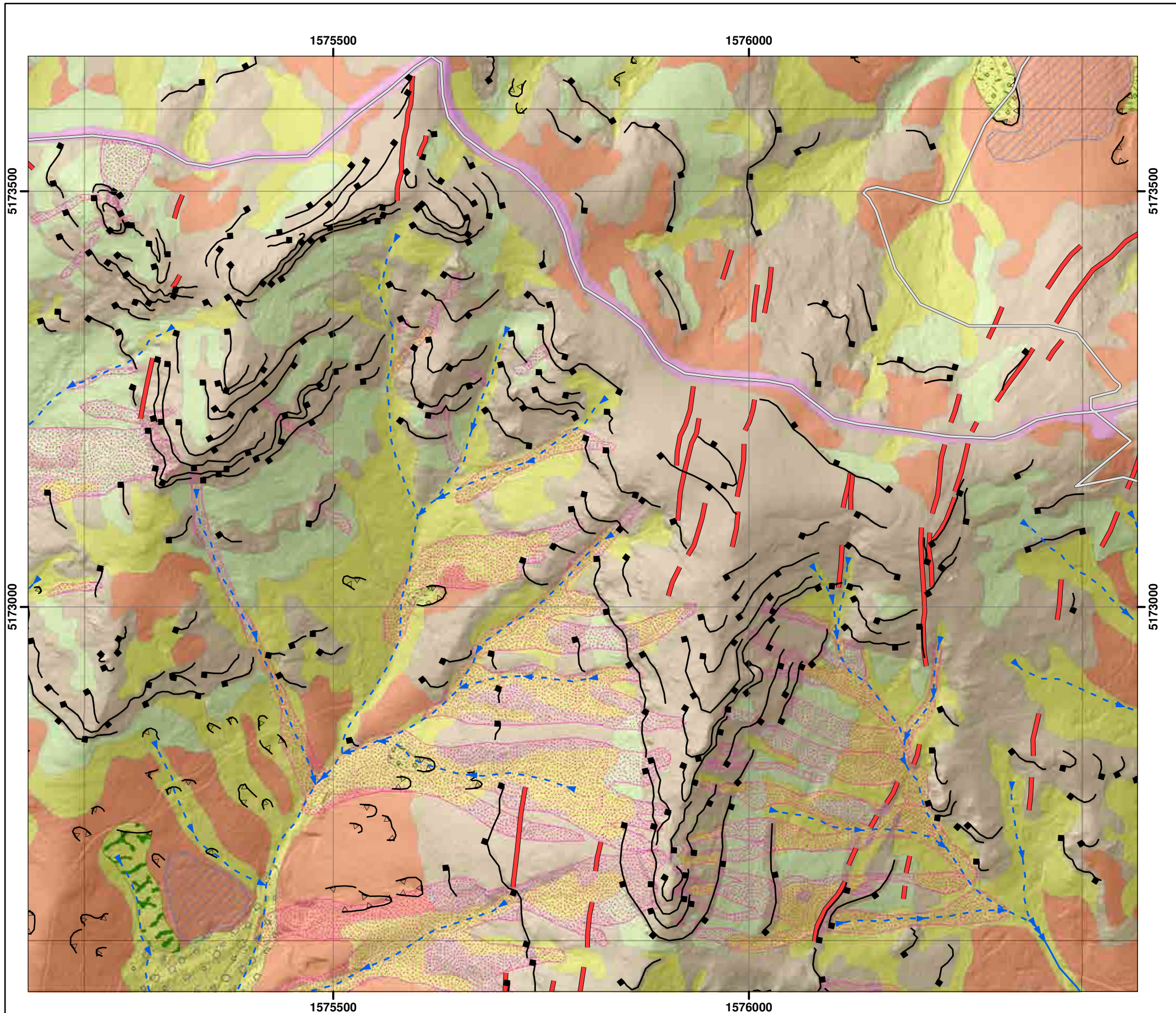
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

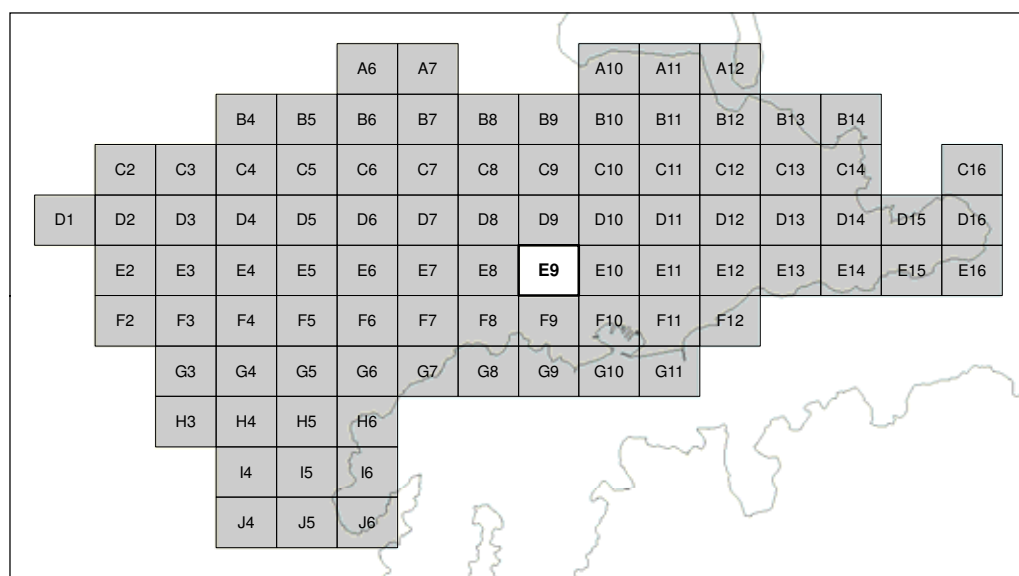
APPENDIX 4  
Map E8

**FINAL**

REPORT: CR2012/15      DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

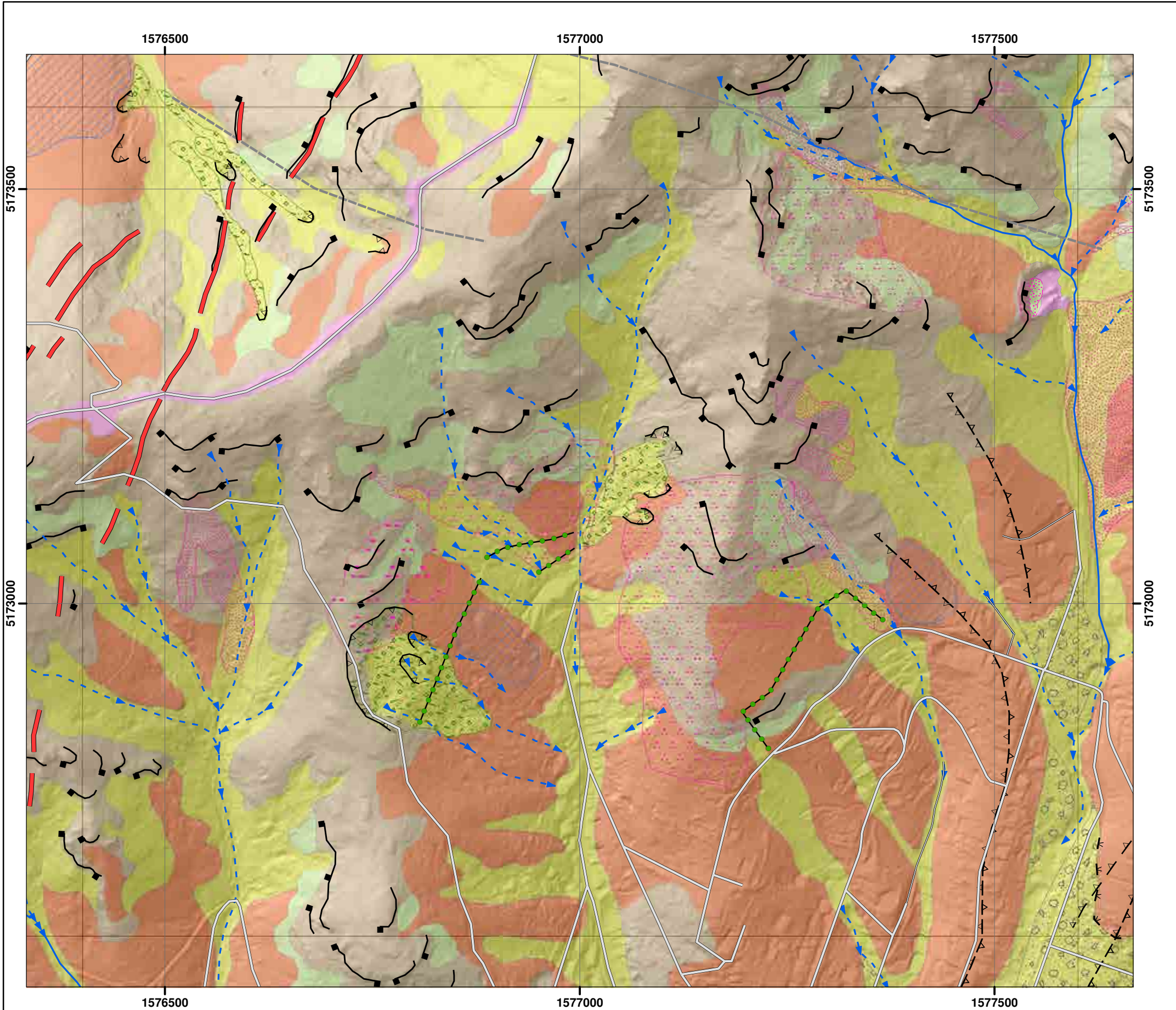
**Port Hills Christchurch**

APPENDIX 4  
Map E9

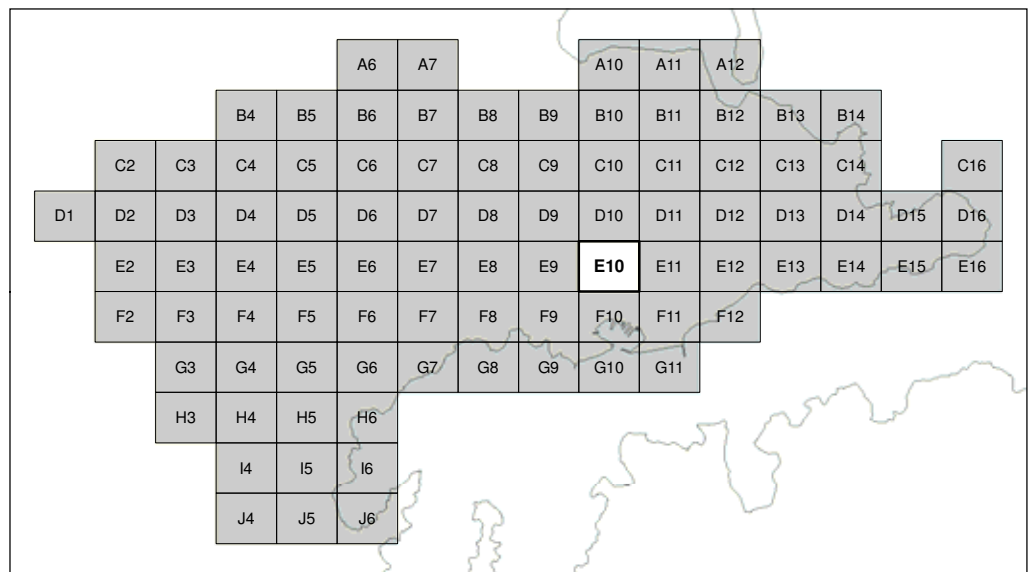
**FINAL**

REPORT: CR2012/15 DATE: Sept 2012





Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lination	Sand and gravel	Rills
Sharp lination (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



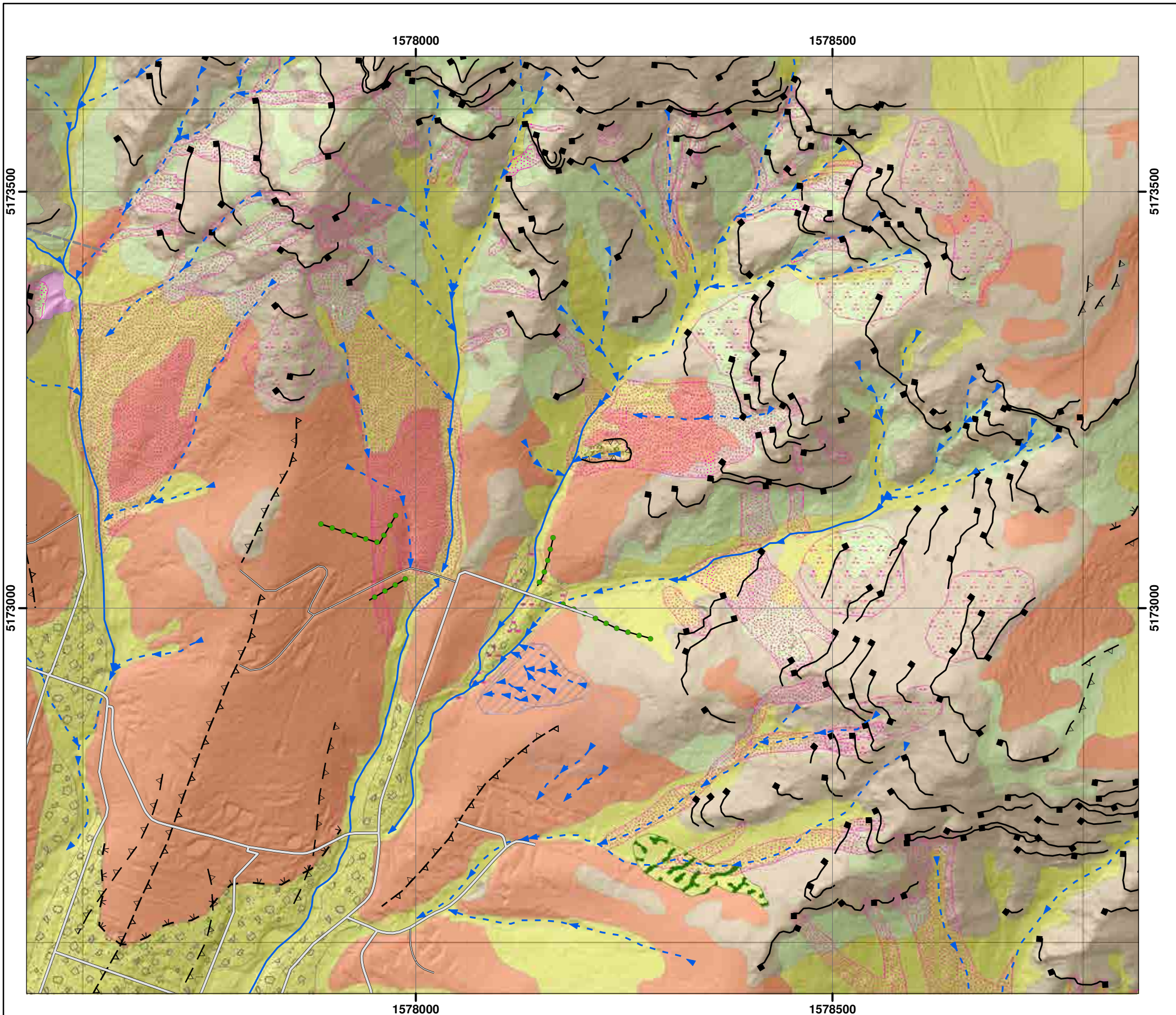
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

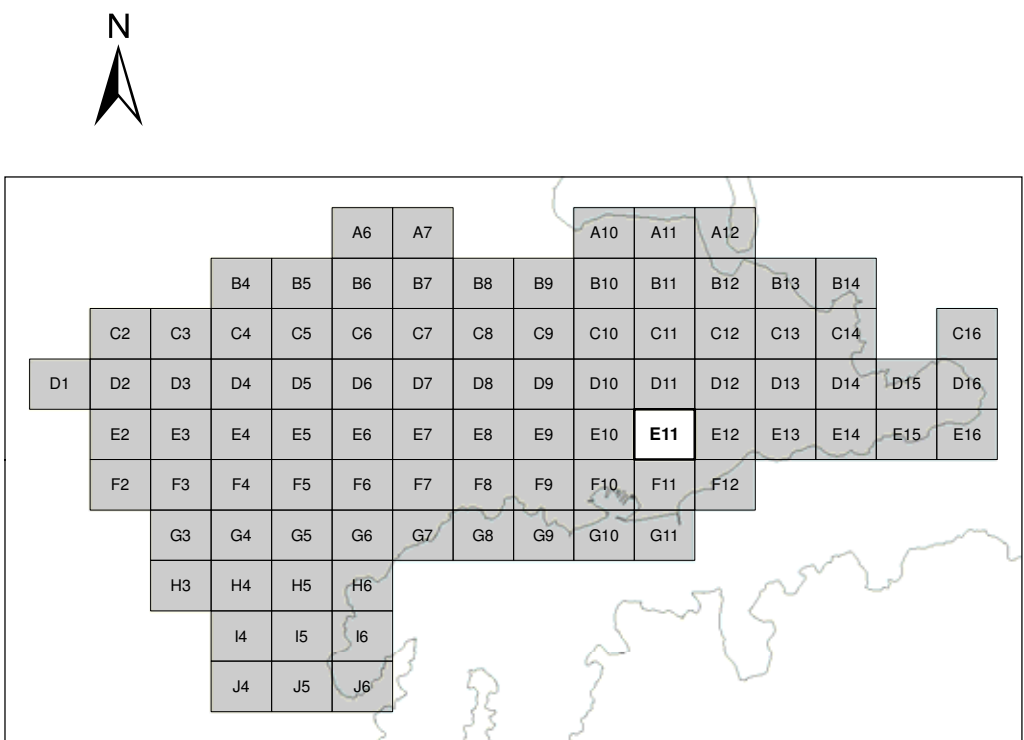
APPENDIX 4  
Map E10

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



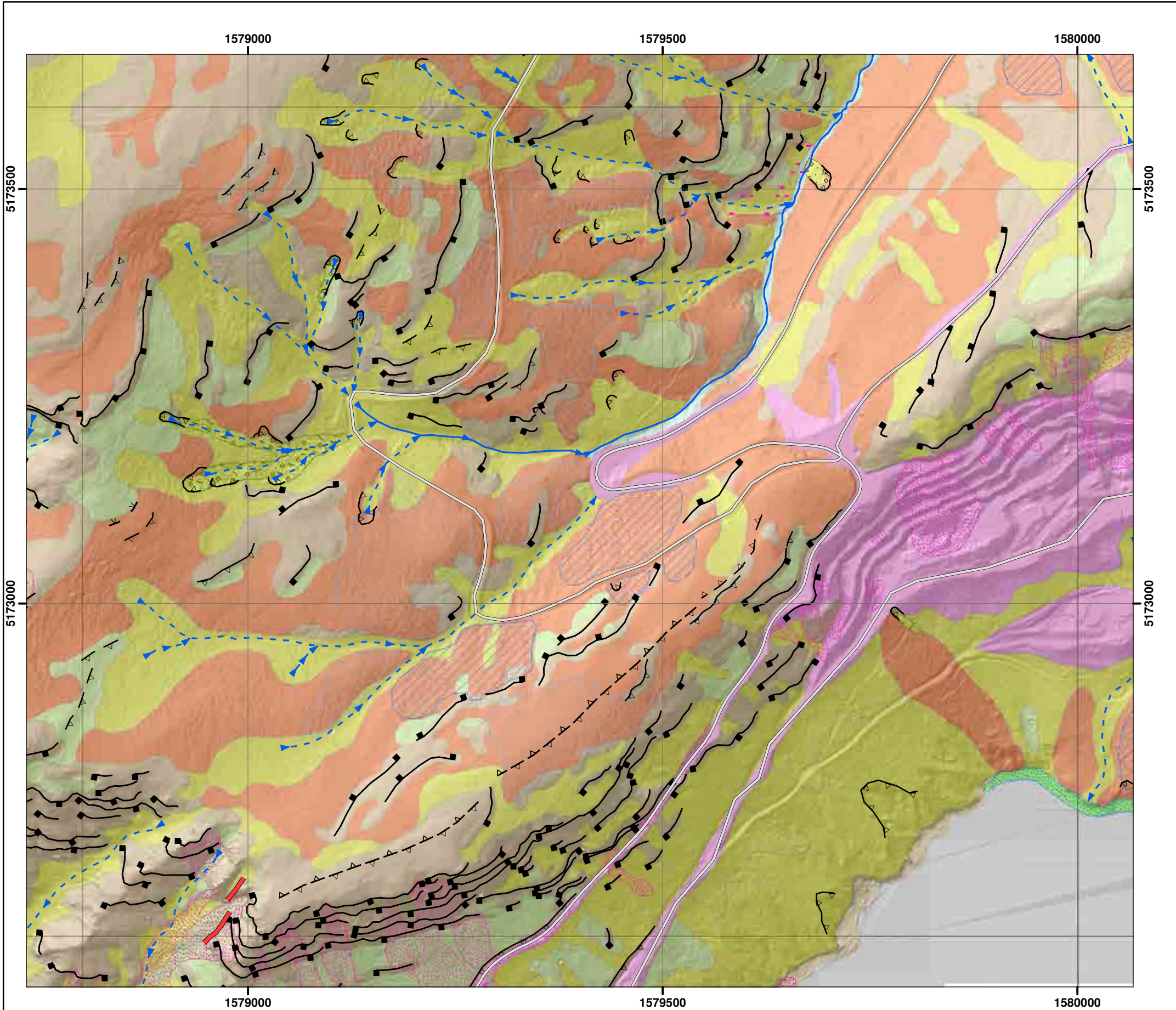
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

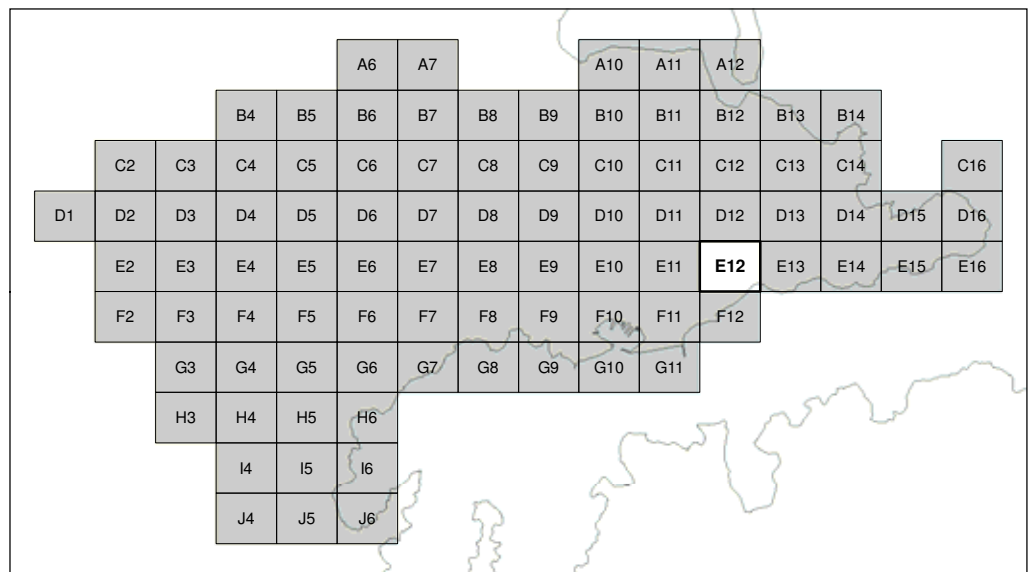
APPENDIX 4  
Map E11

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



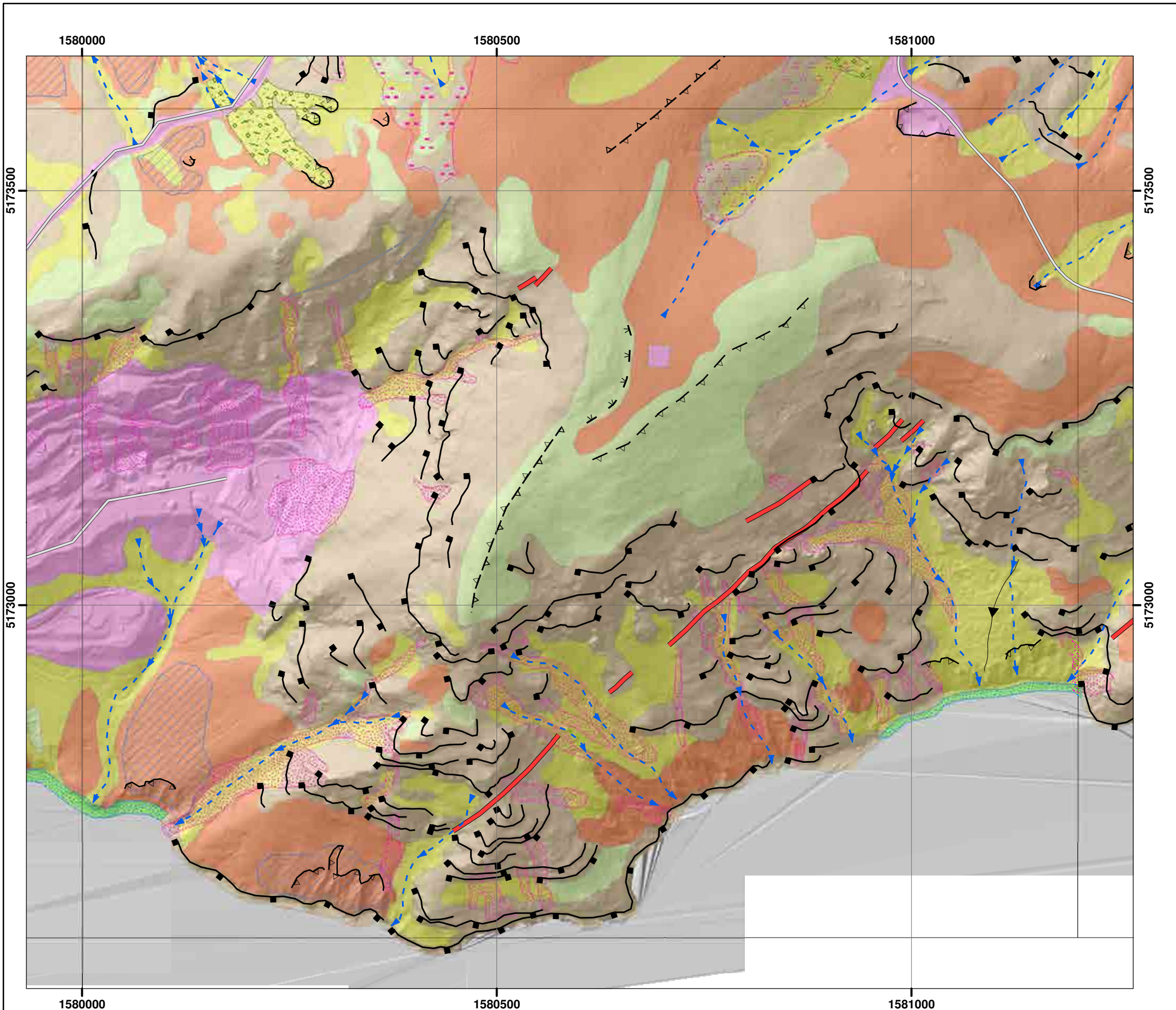
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

APPENDIX 4  
Map E12

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



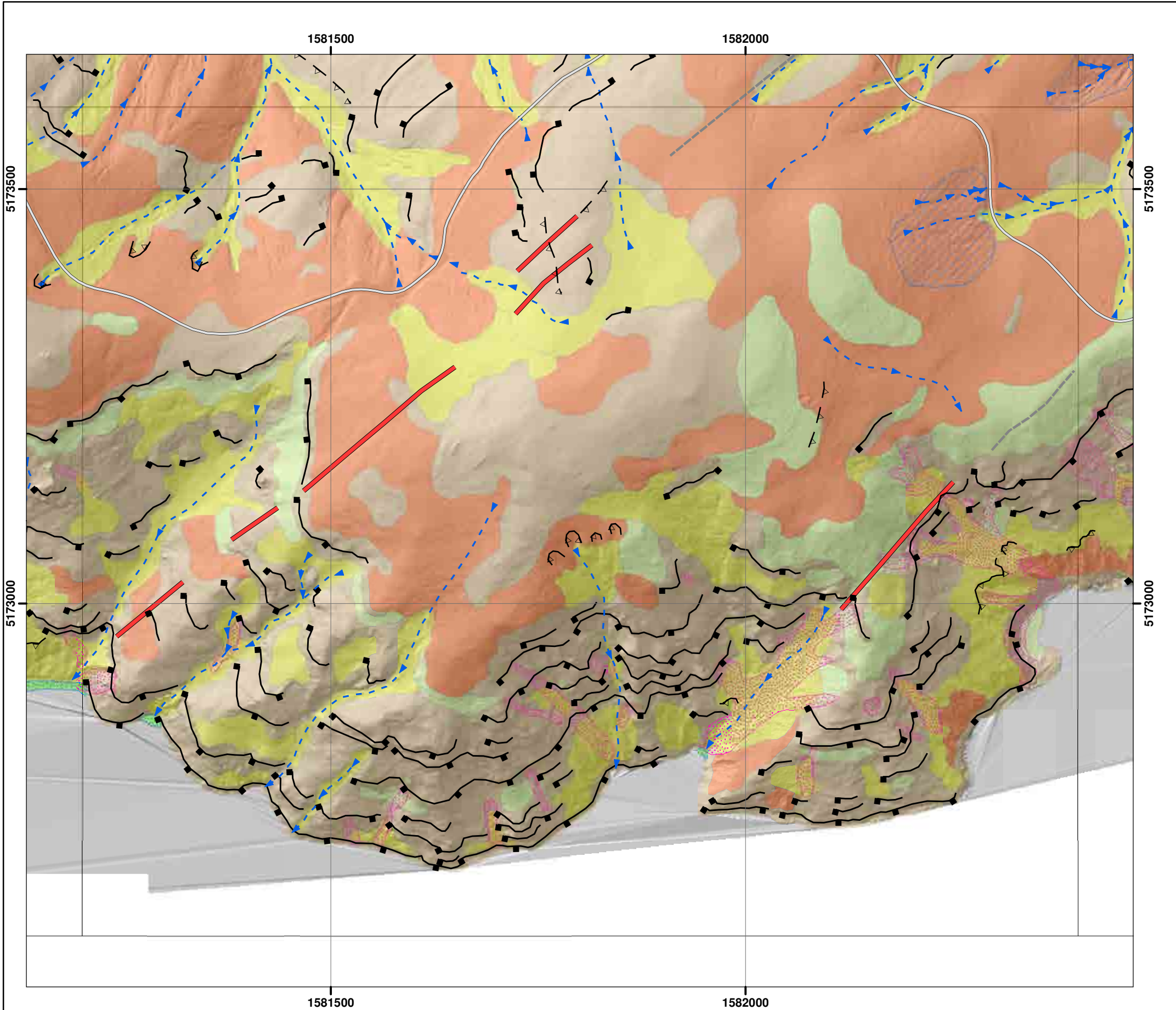
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

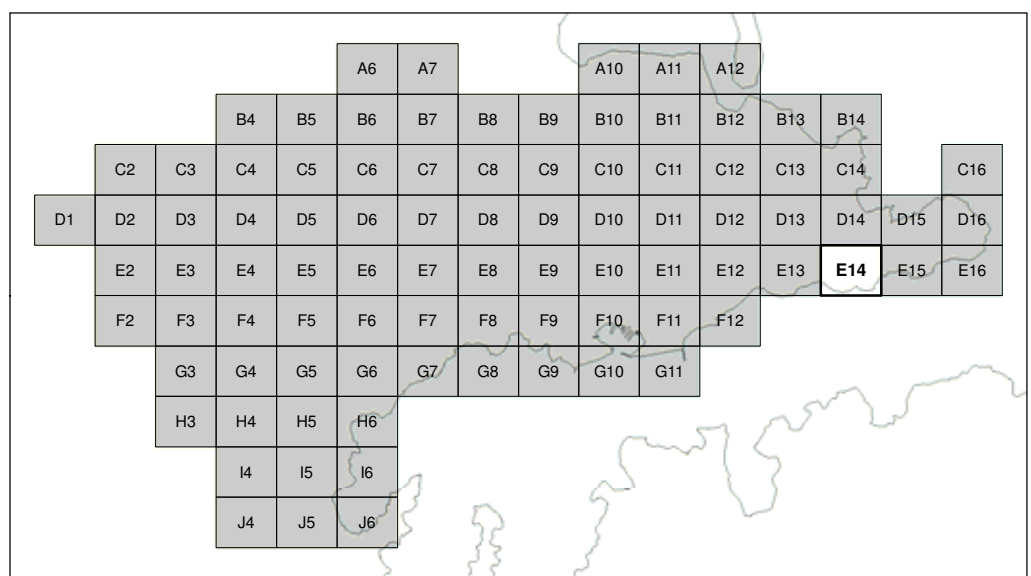
APPENDIX 4  
Map E13

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lination	Sand and gravel	Rills
Sharp lination (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:

Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



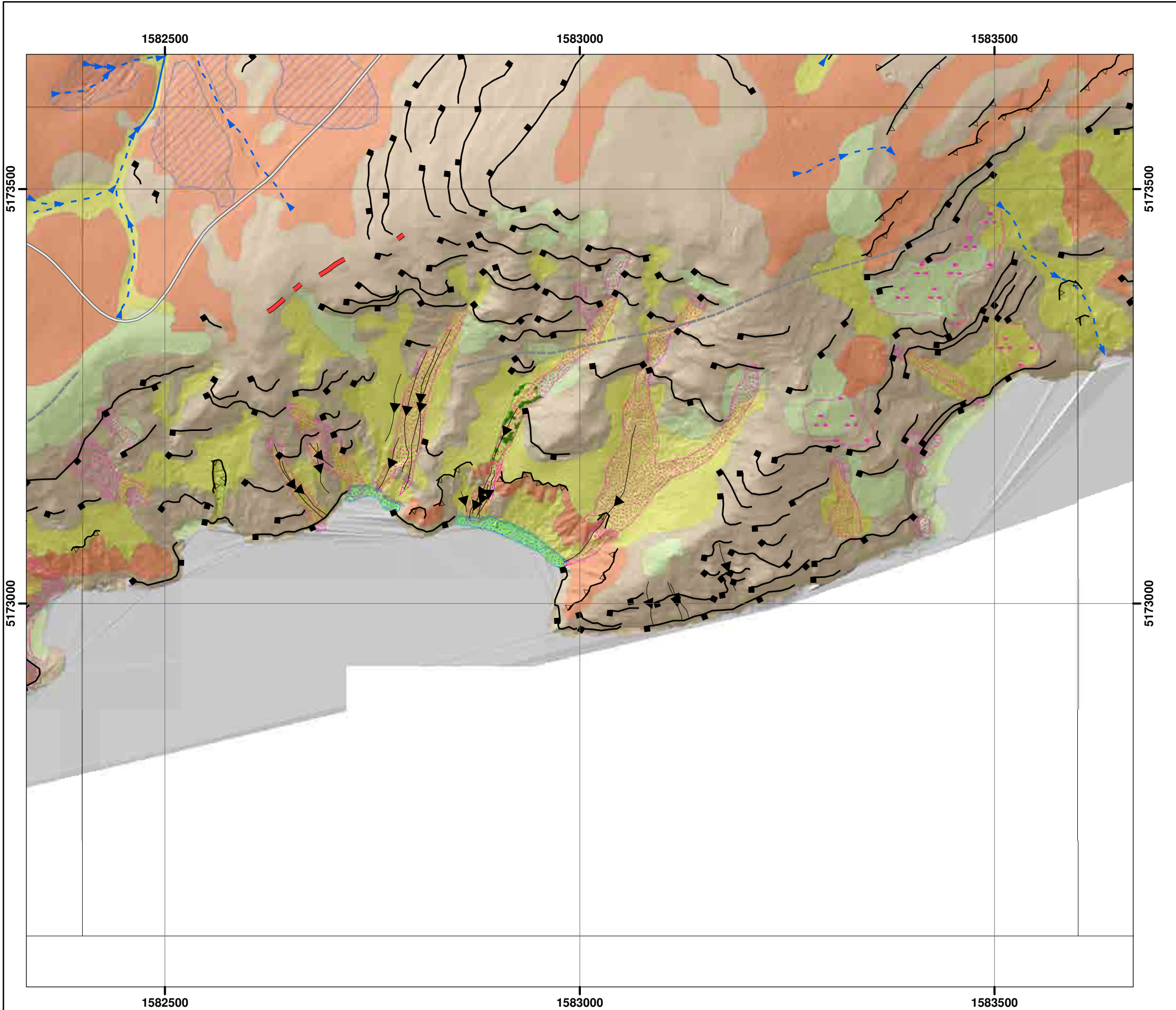
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

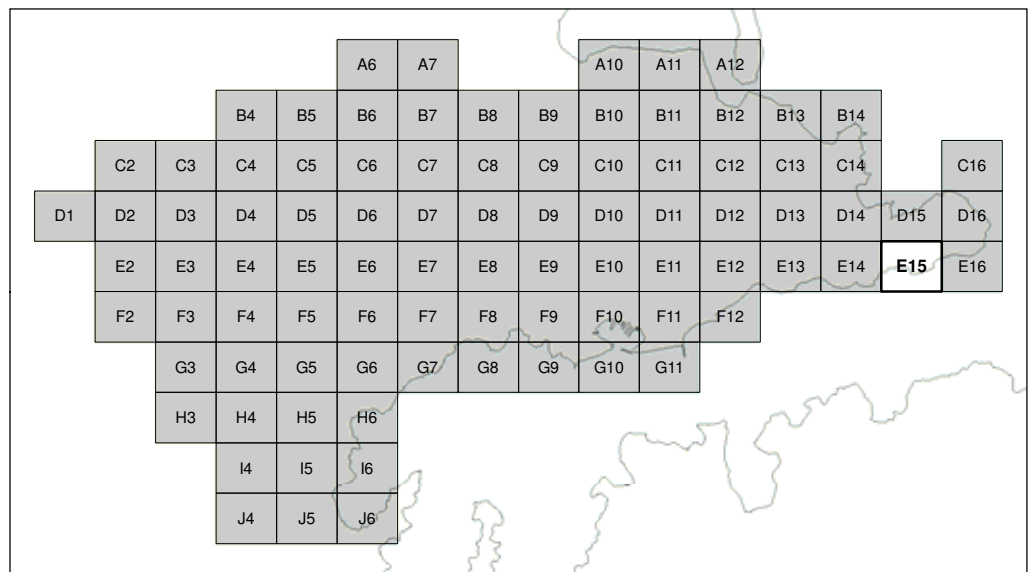
APPENDIX 4  
Map E14

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



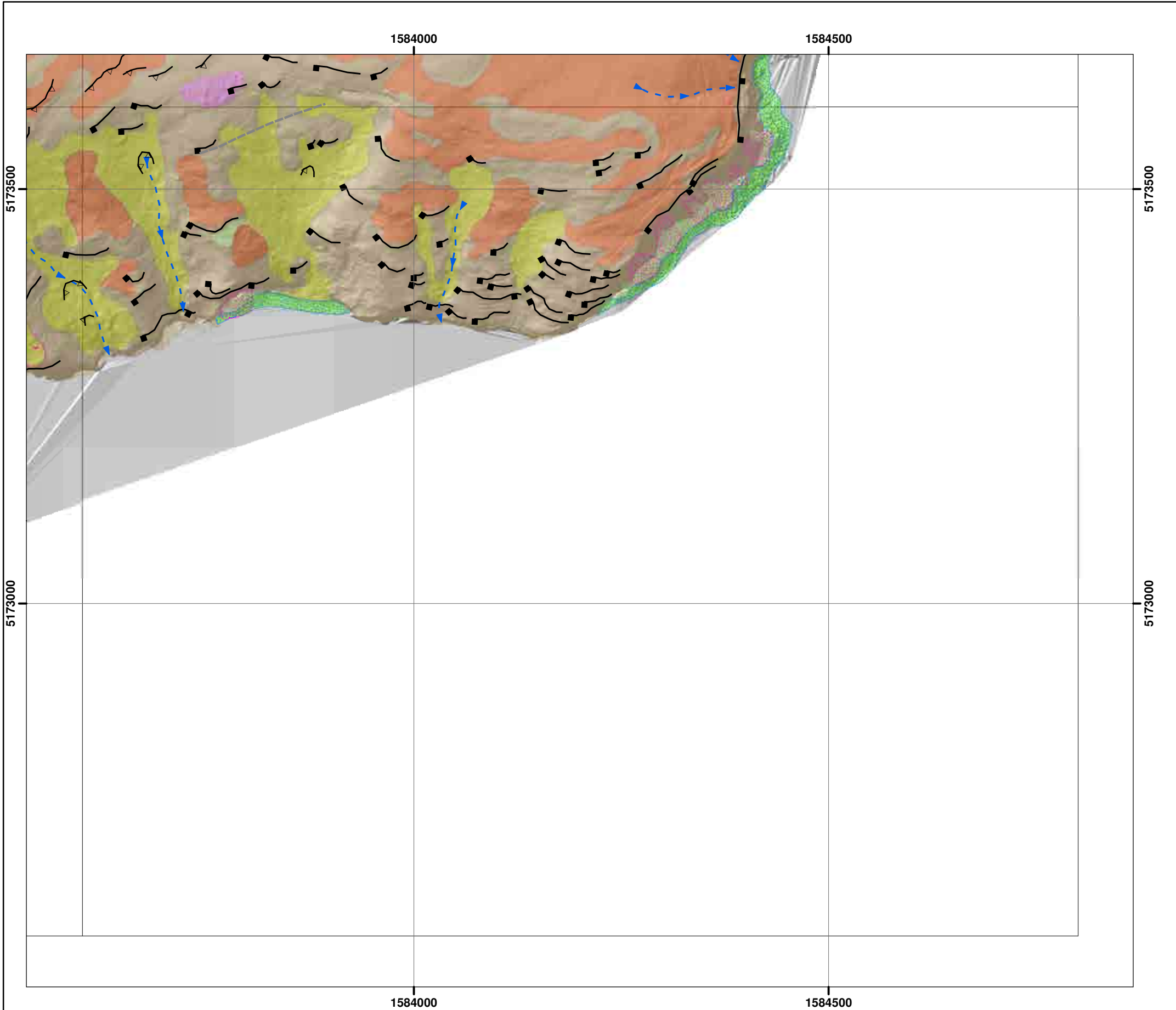
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

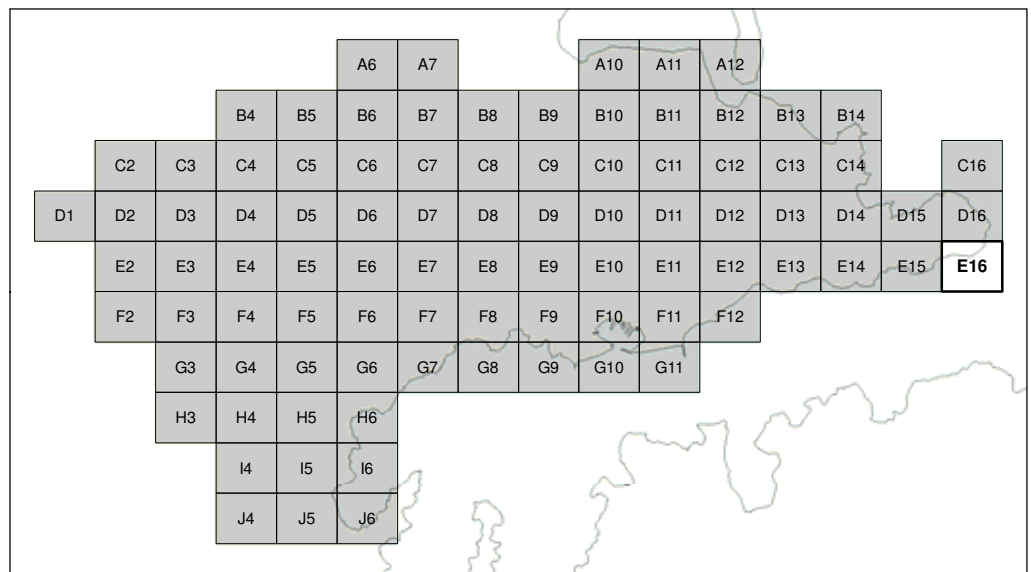
APPENDIX 4  
Map E15

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



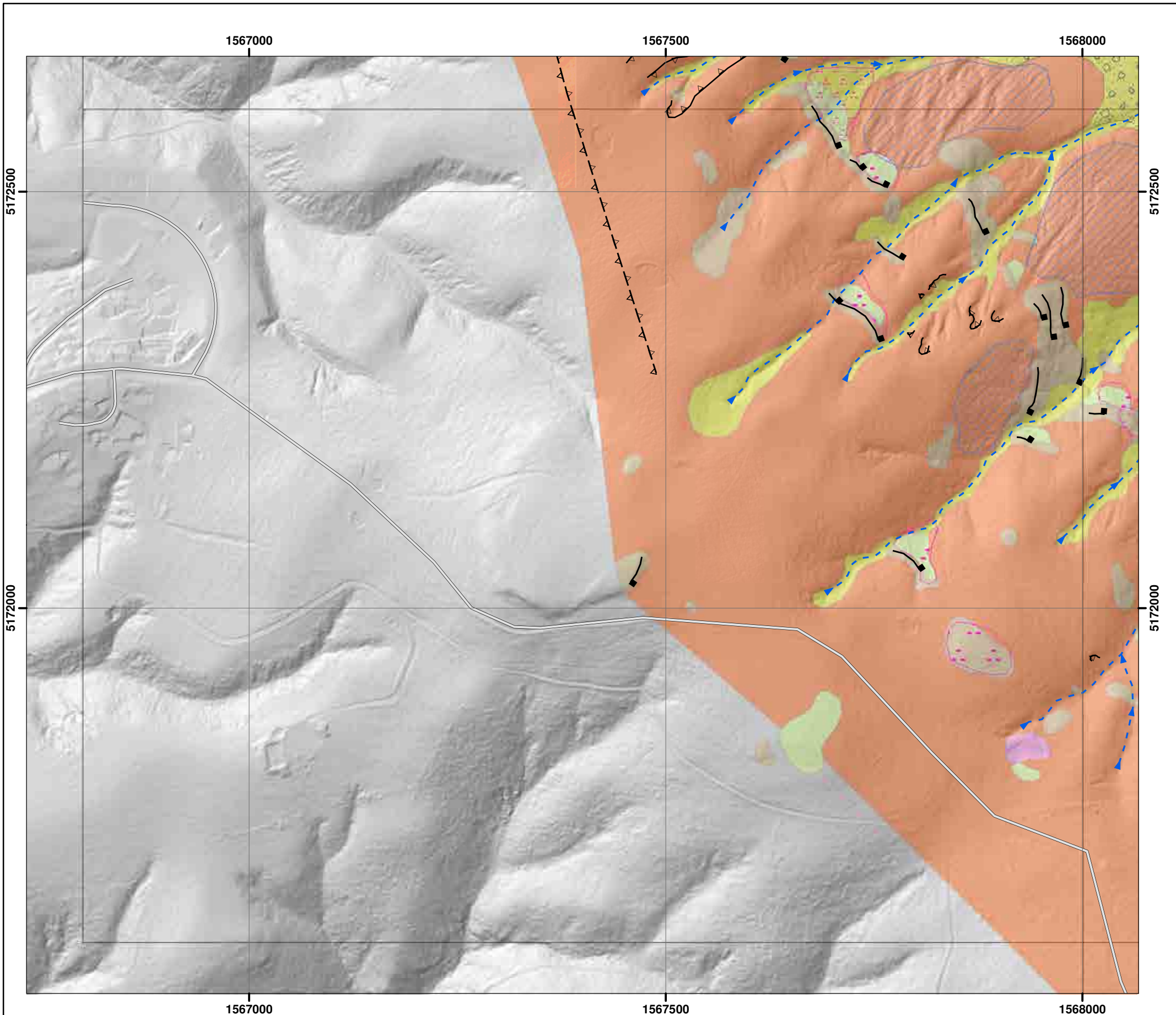
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

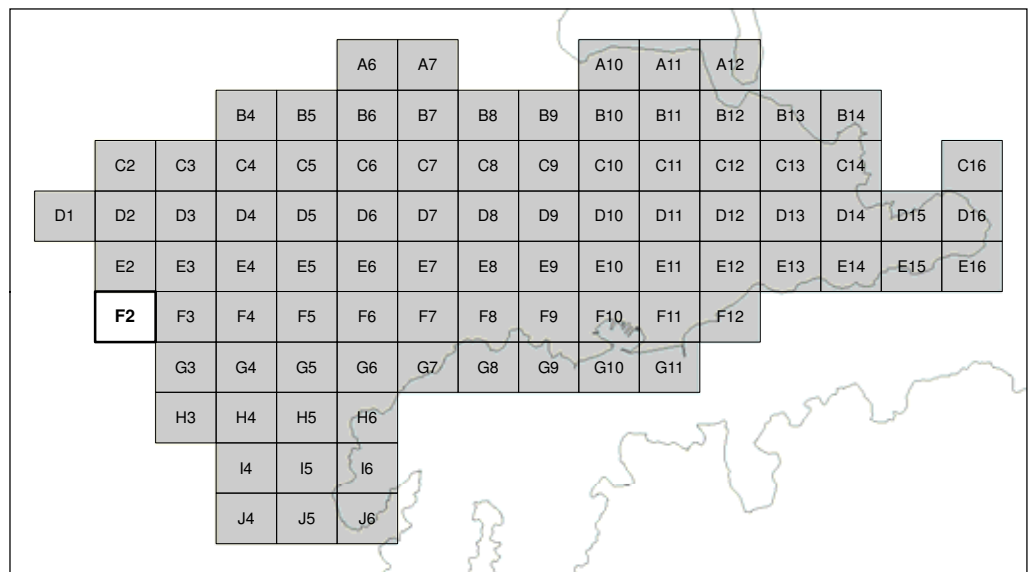
APPENDIX 4  
Map E16

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
 DBT  
 CHK:  
 CM



**GEOMORPHOLOGY MAPPING FOR  
 ROCKFALL RISK ASSESSMENT**

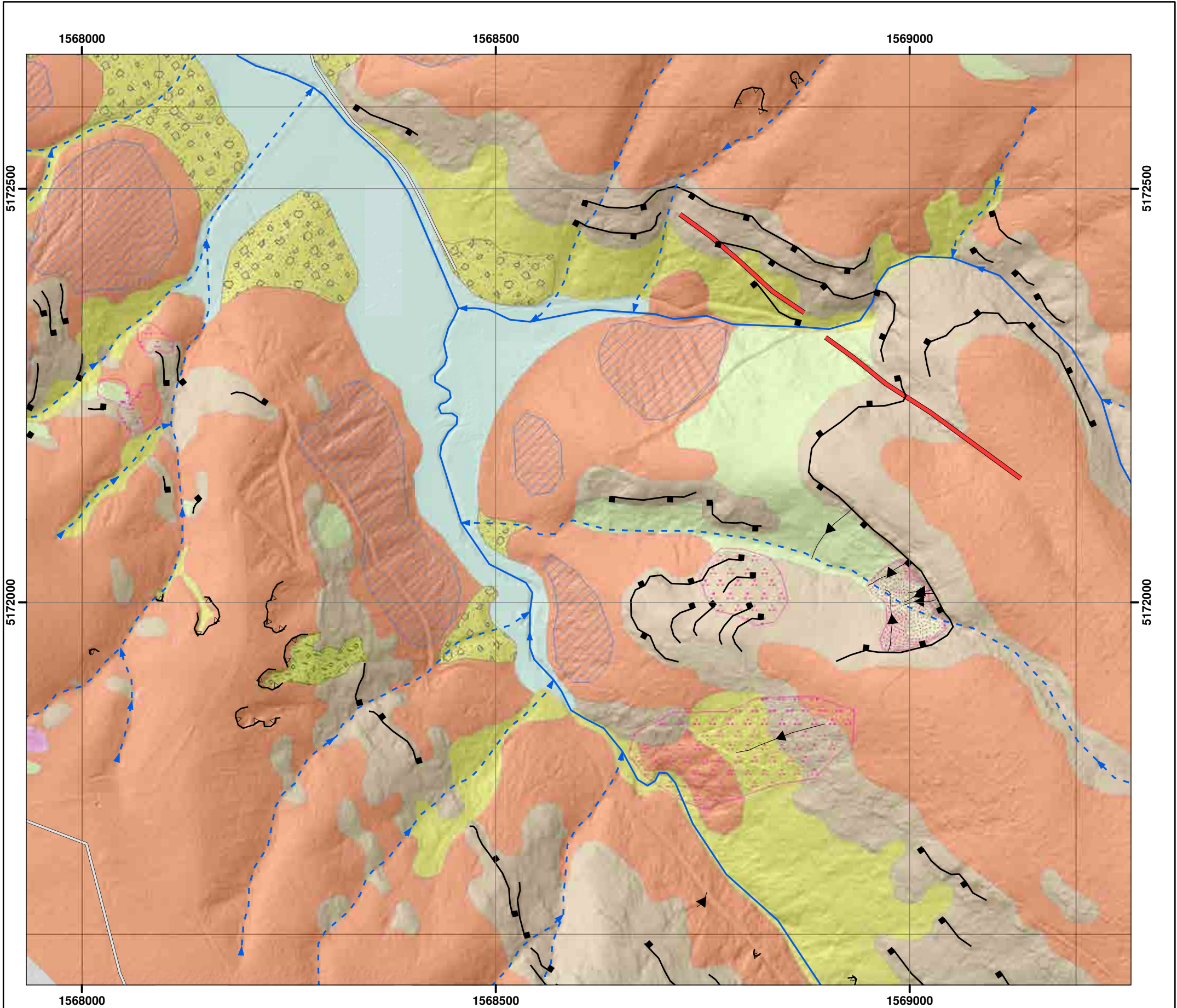
**Port Hills  
 Christchurch**

APPENDIX 4  
 Map F2

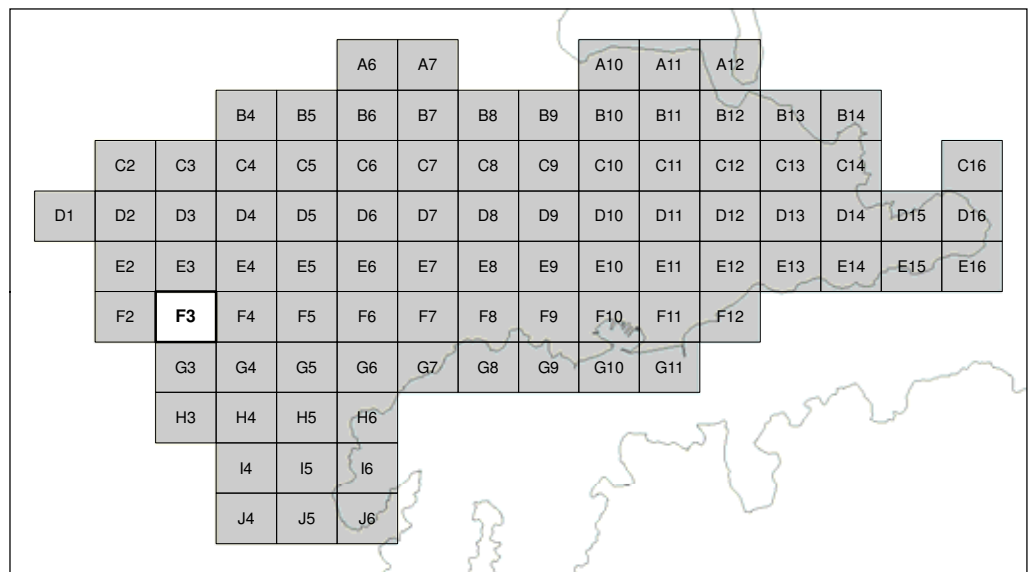
**FINAL**

REPORT: CR2012/15      DATE: Sept 2012





Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1: 5000  
m

EXPLANATION:  
Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
Roads provided by Christchurch City Council (20/02/2012).  
PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



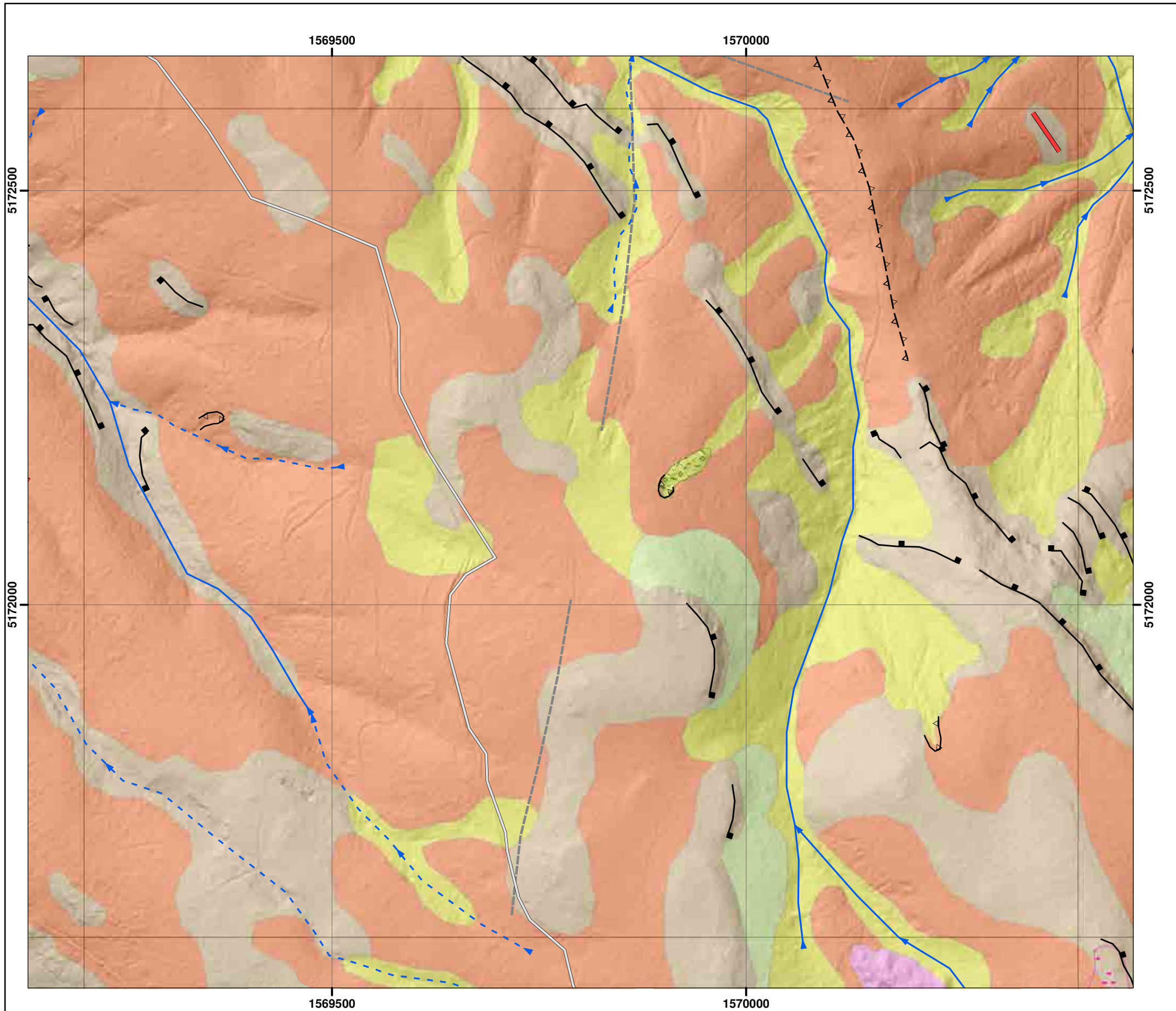
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

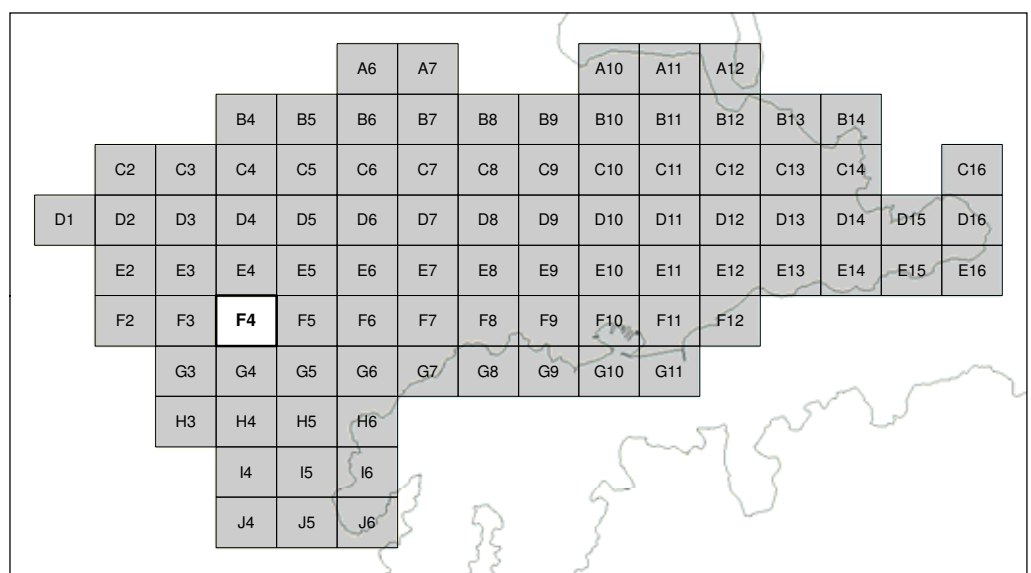
APPENDIX 4  
Map F3

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



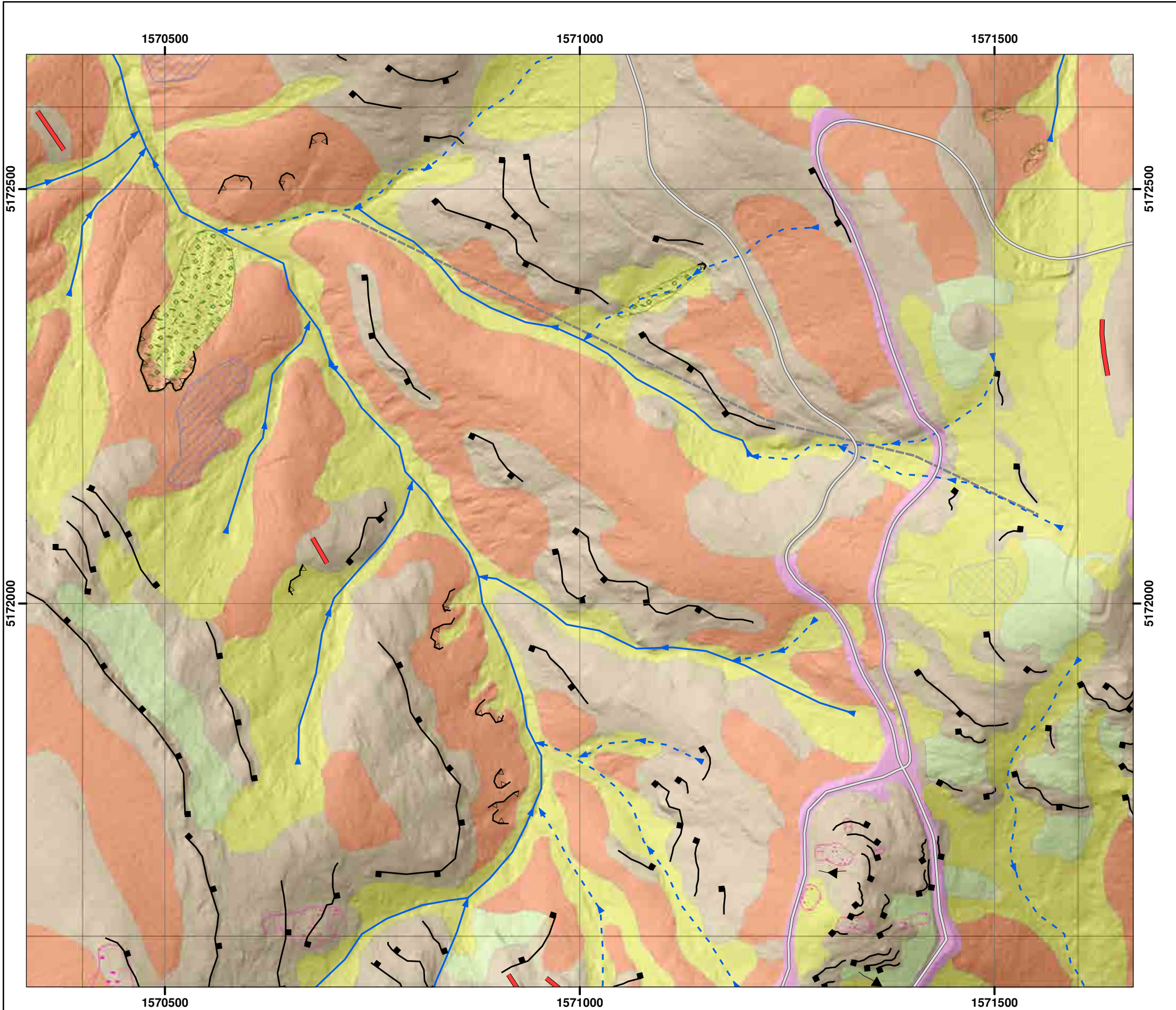
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

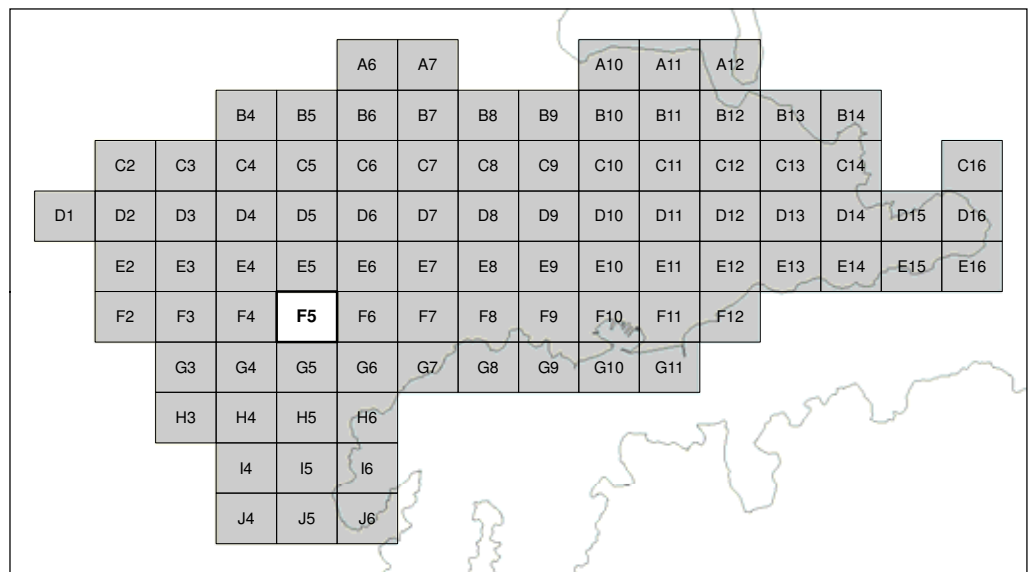
APPENDIX 4  
Map F4

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



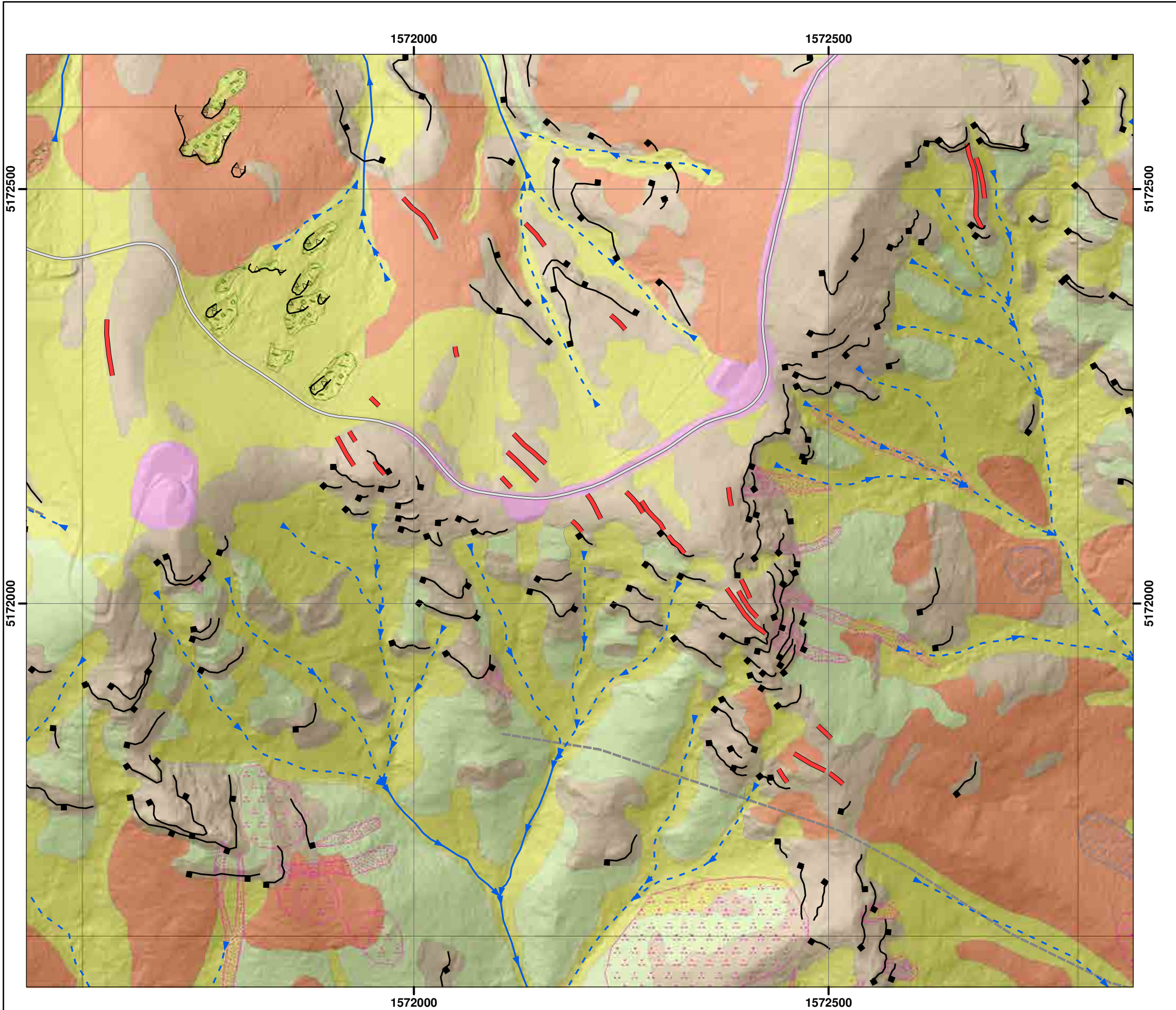
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

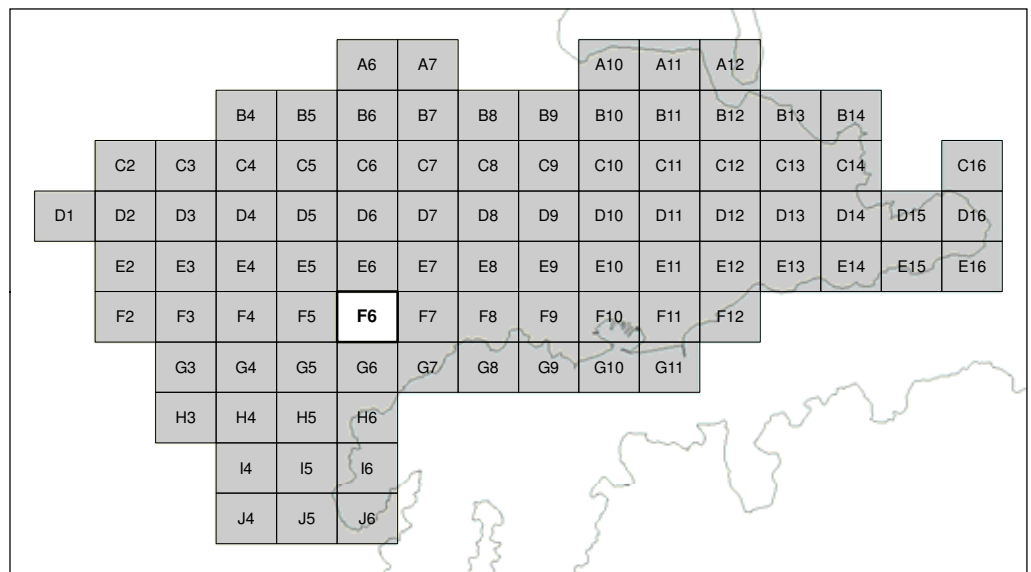
APPENDIX 4  
Map F5

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1: 5000  
m

EXPLANATION:  
Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
Roads provided by Christchurch City Council (20/02/2012).  
PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



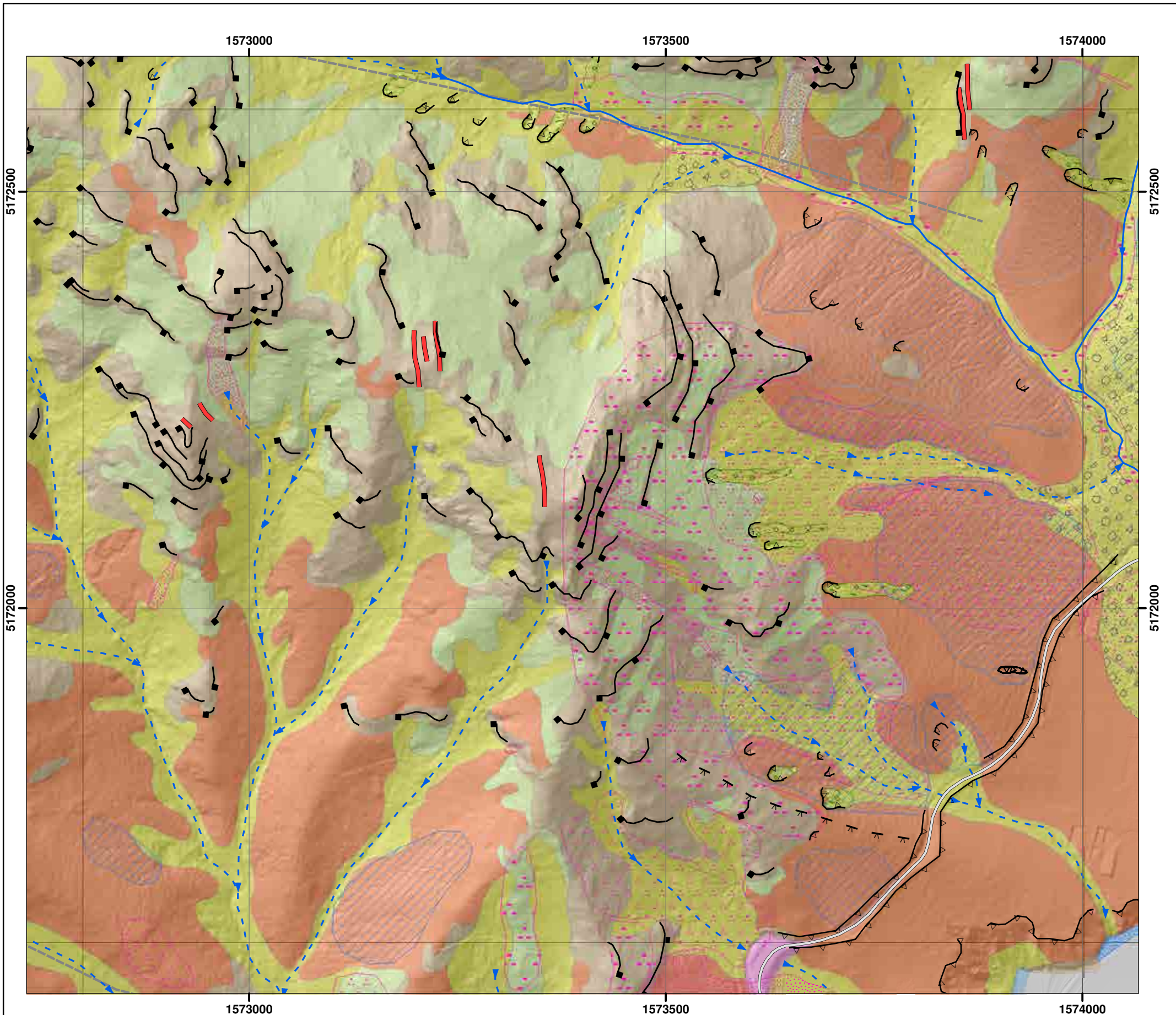
### GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT

Port Hills  
Christchurch

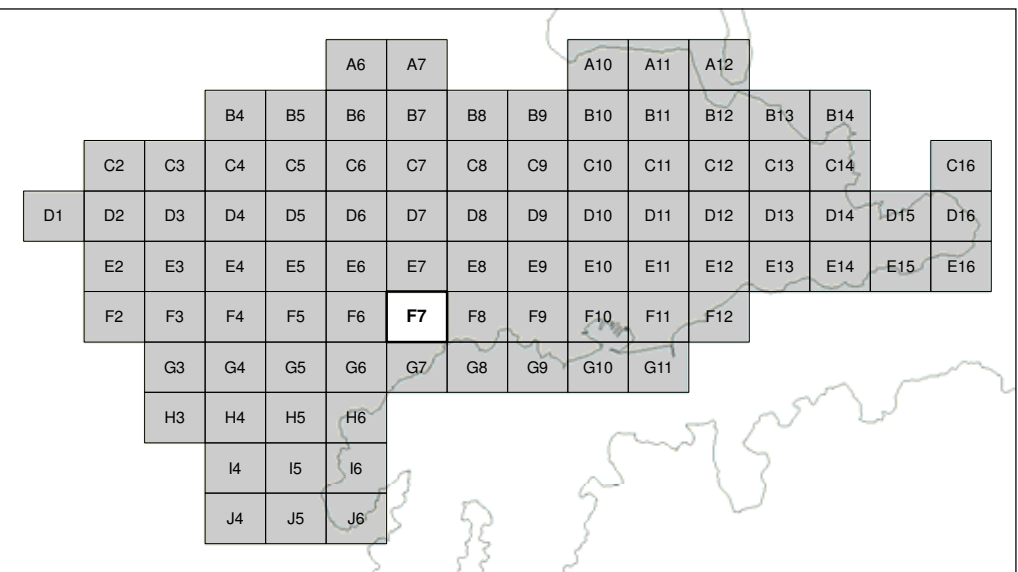
APPENDIX 4  
Map F6

**FINAL**

REPORT: CR2012/15  
DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



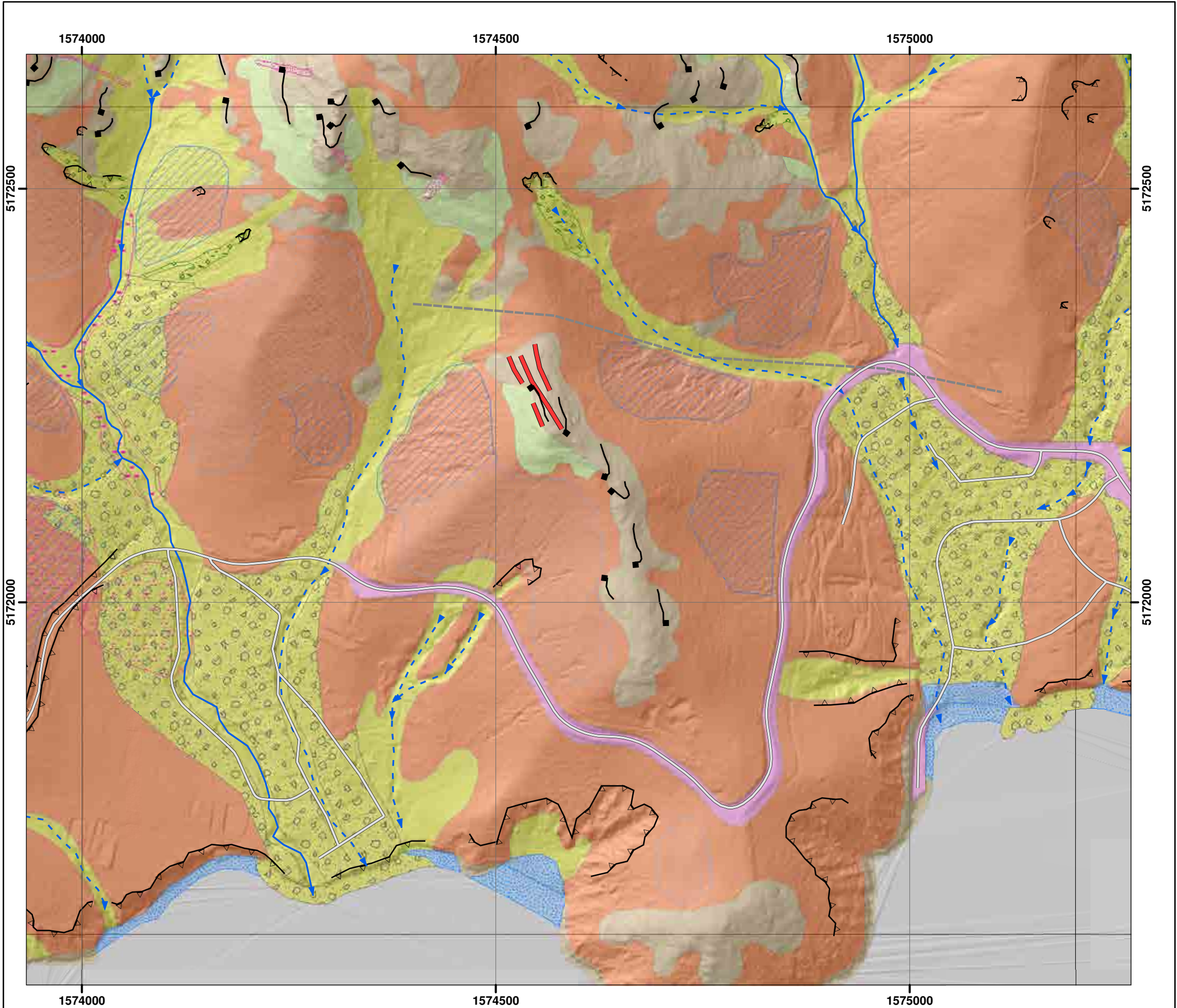
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

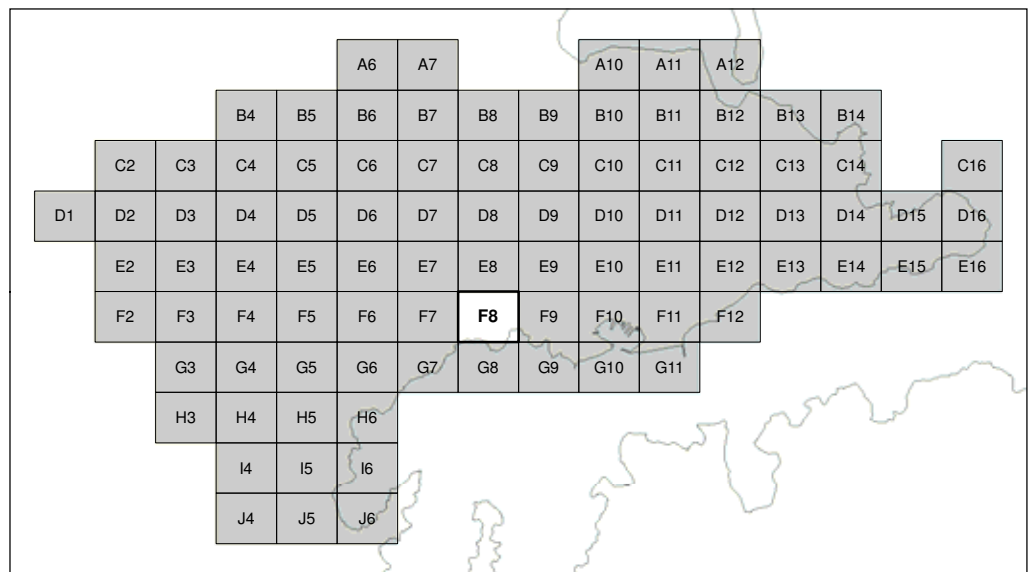
APPENDIX 4  
Map F7

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



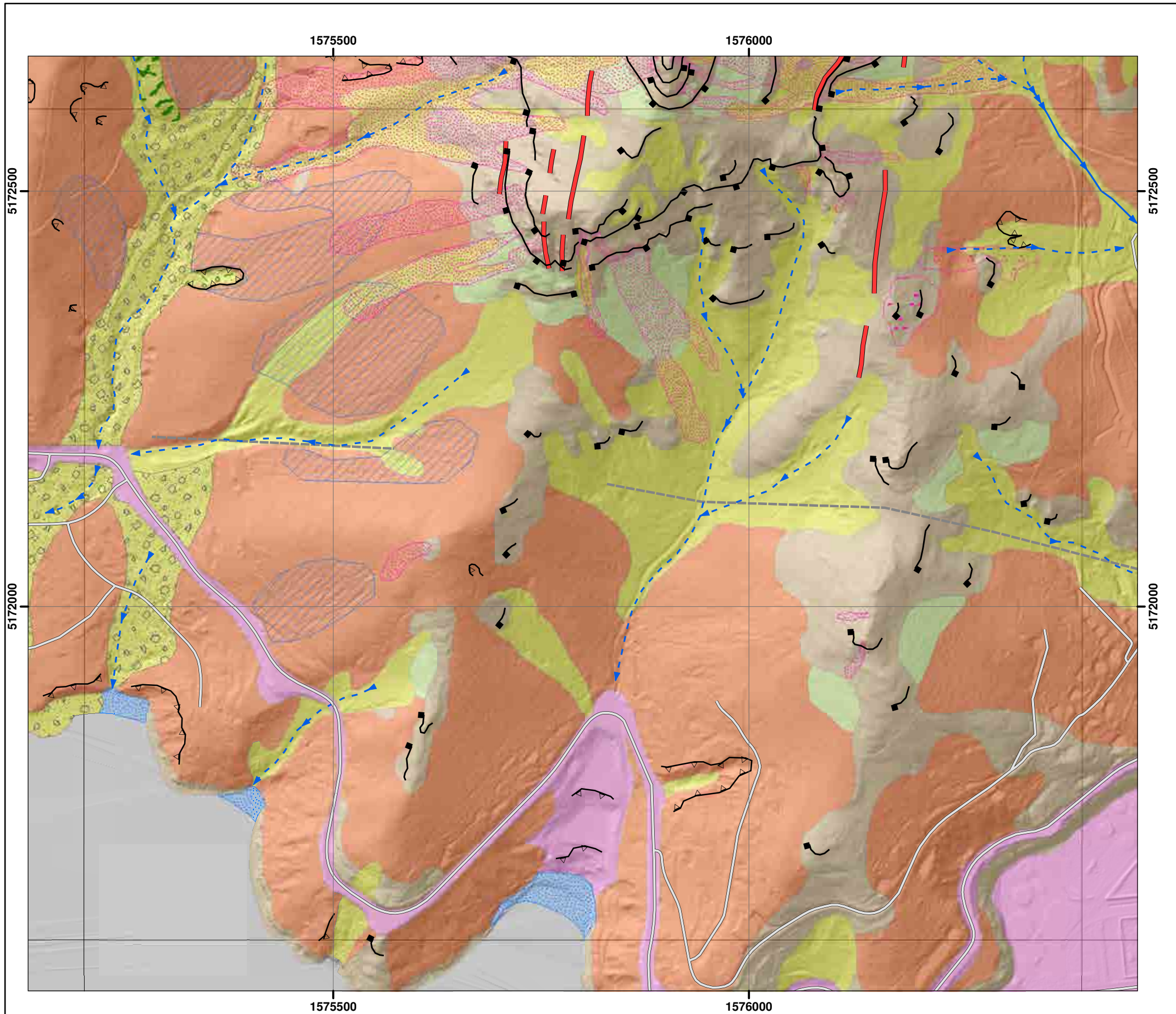
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

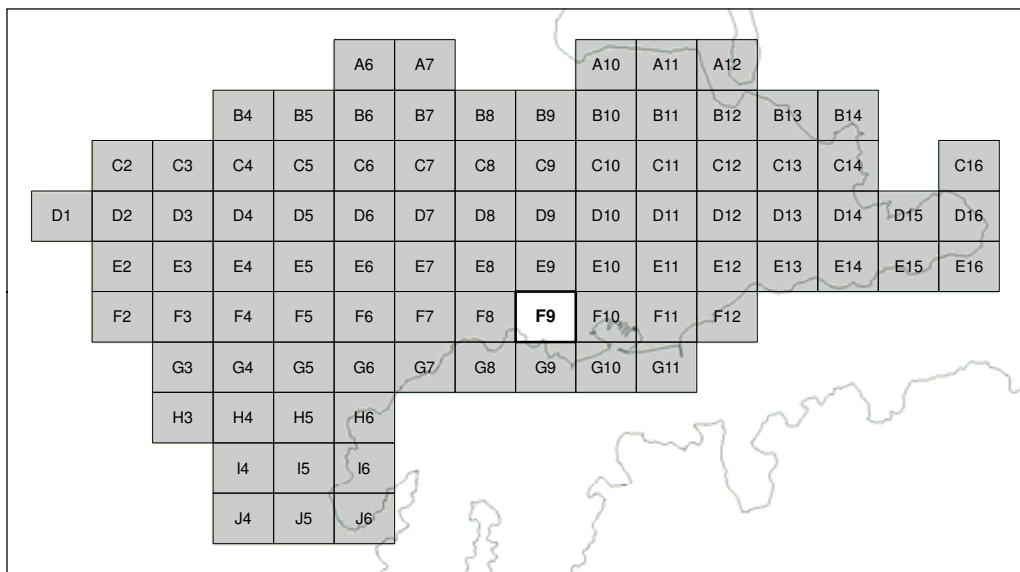
APPENDIX 4  
Map F8

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



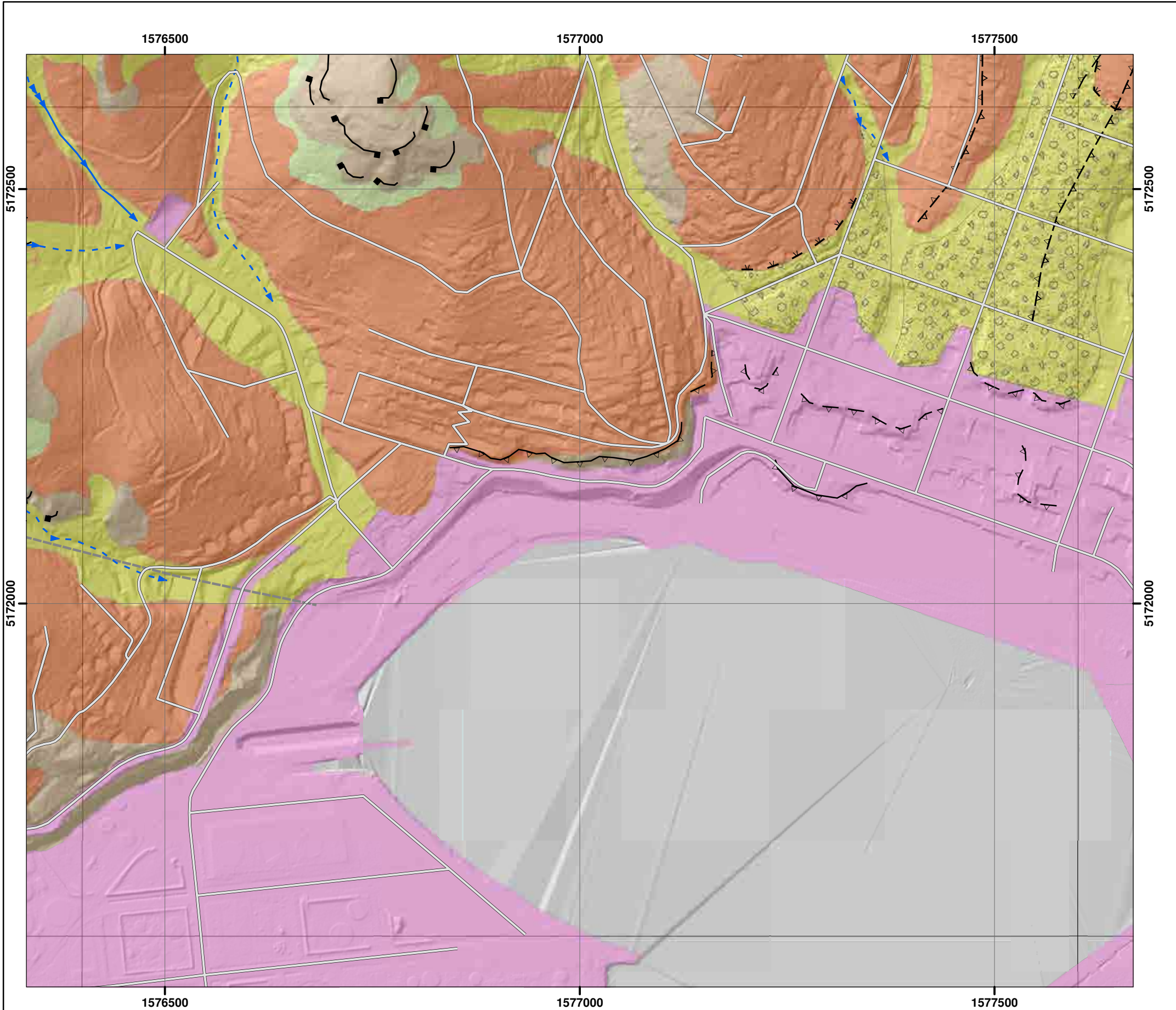
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

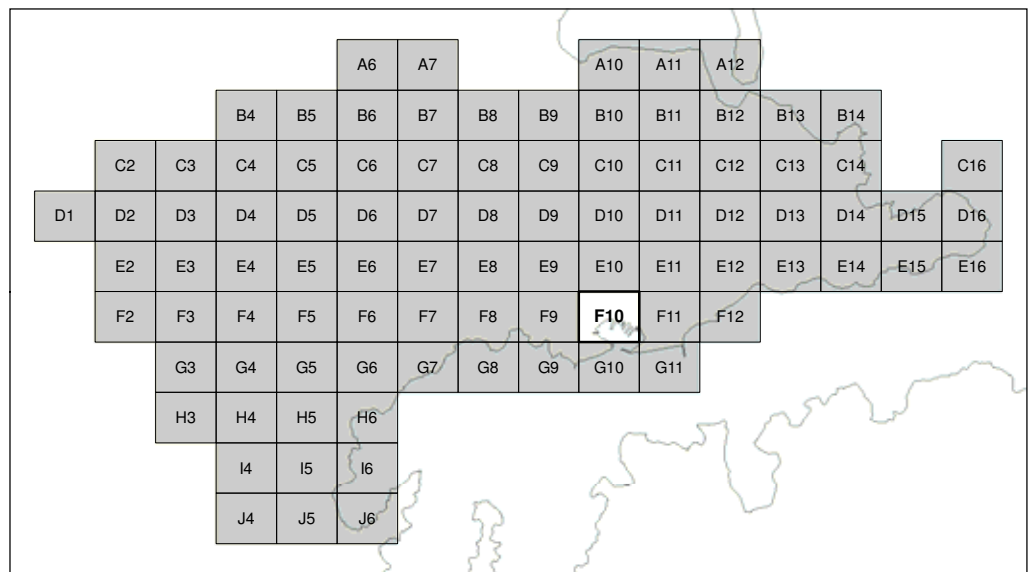
APPENDIX 4  
Map F9

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lination	Sand and gravel	Rills
Sharp lination (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



## GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT

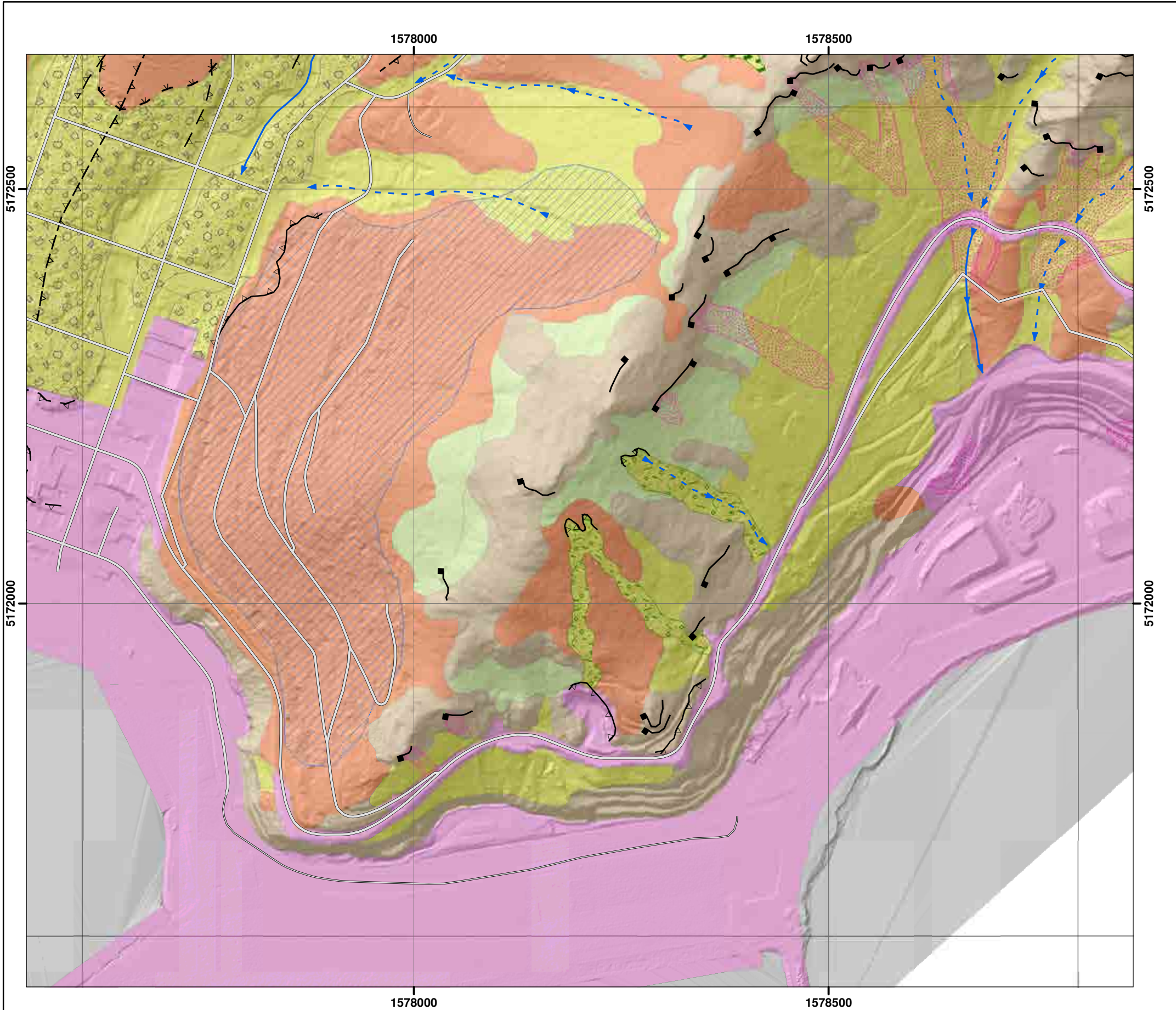
Port Hills  
Christchurch

APPENDIX 4  
Map F10

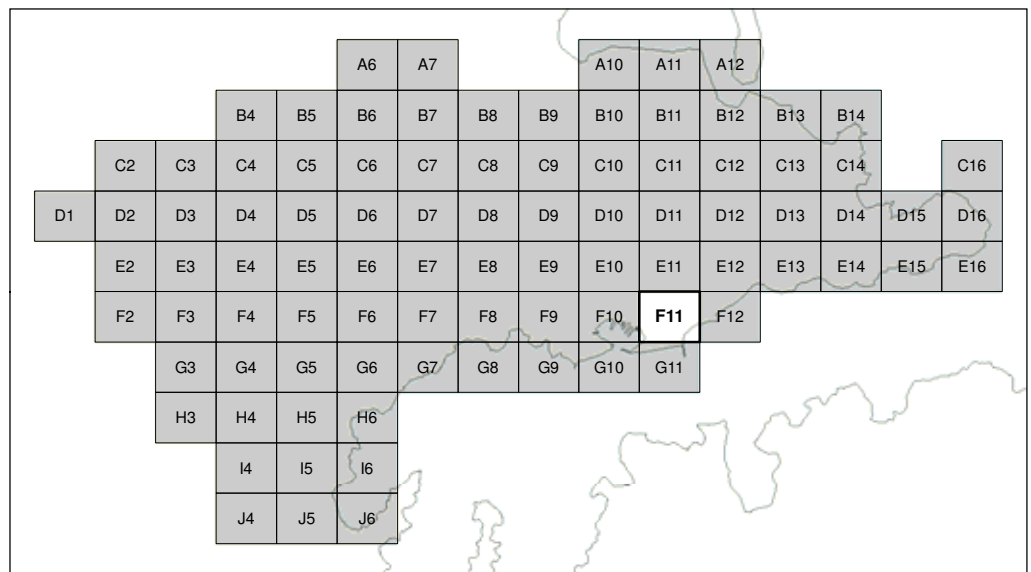
**FINAL**

REPORT: CR2012/15 DATE: Sept 2012





Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

**EXPLANATION:**

Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



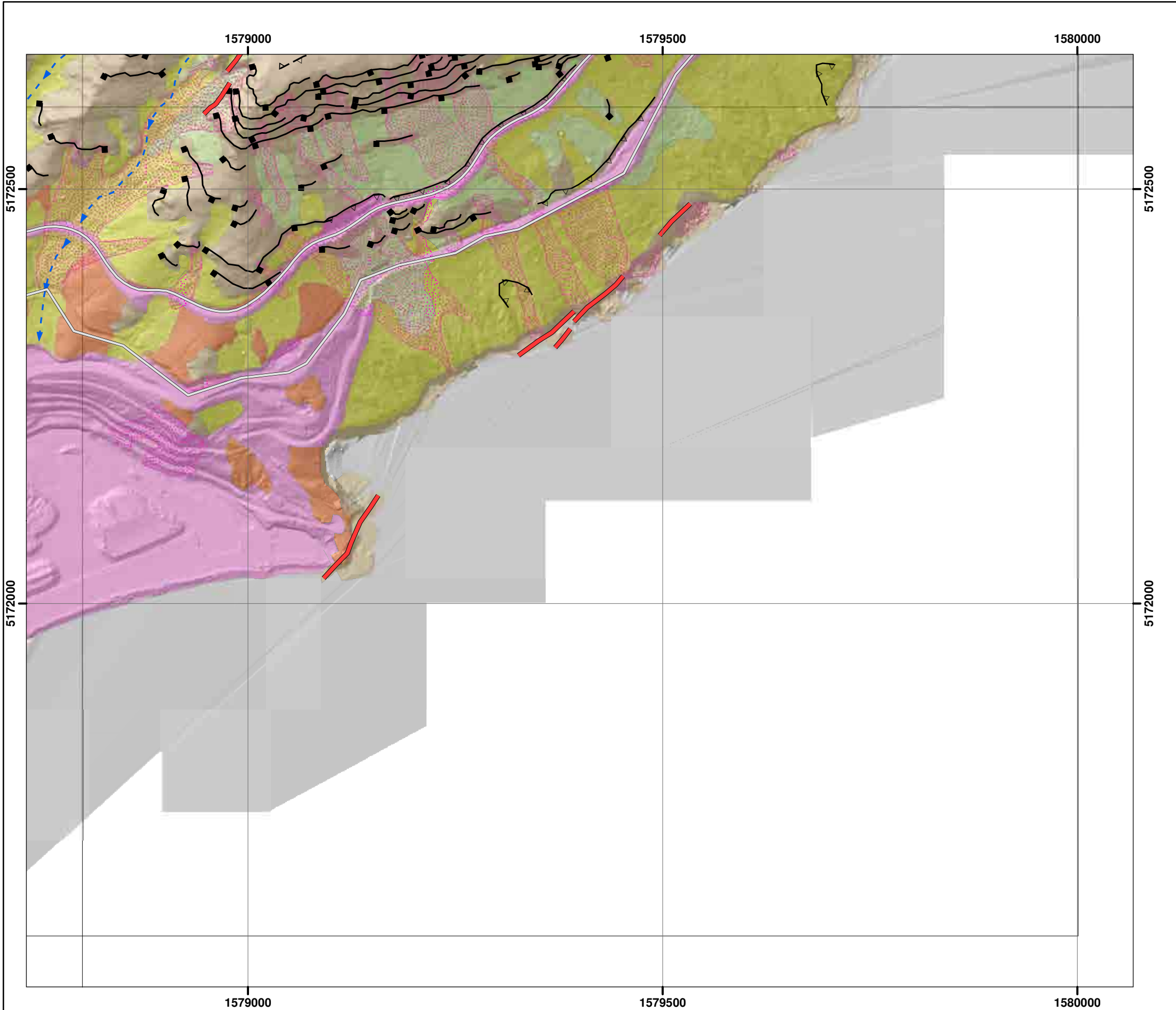
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

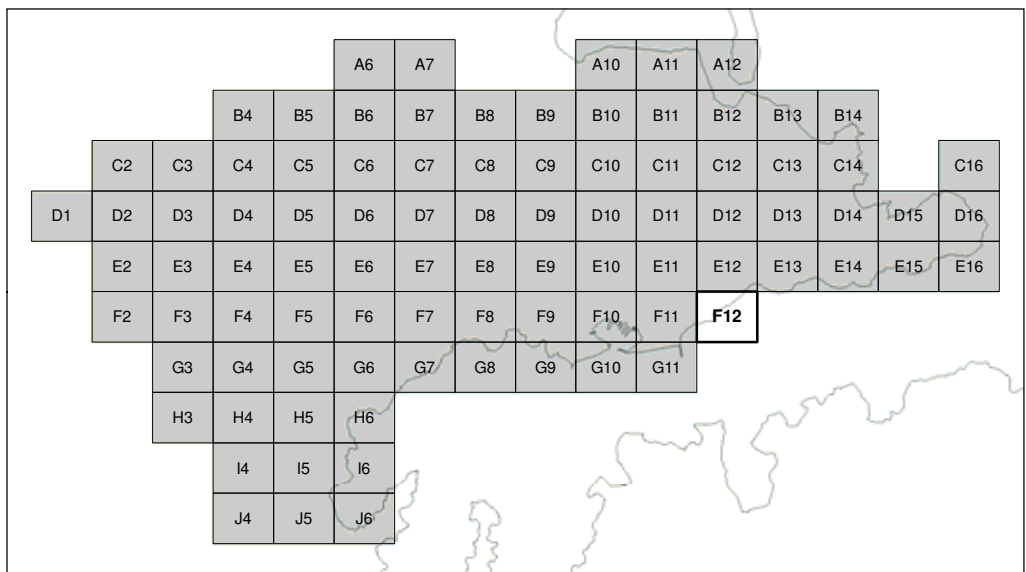
APPENDIX 4  
Map F11

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



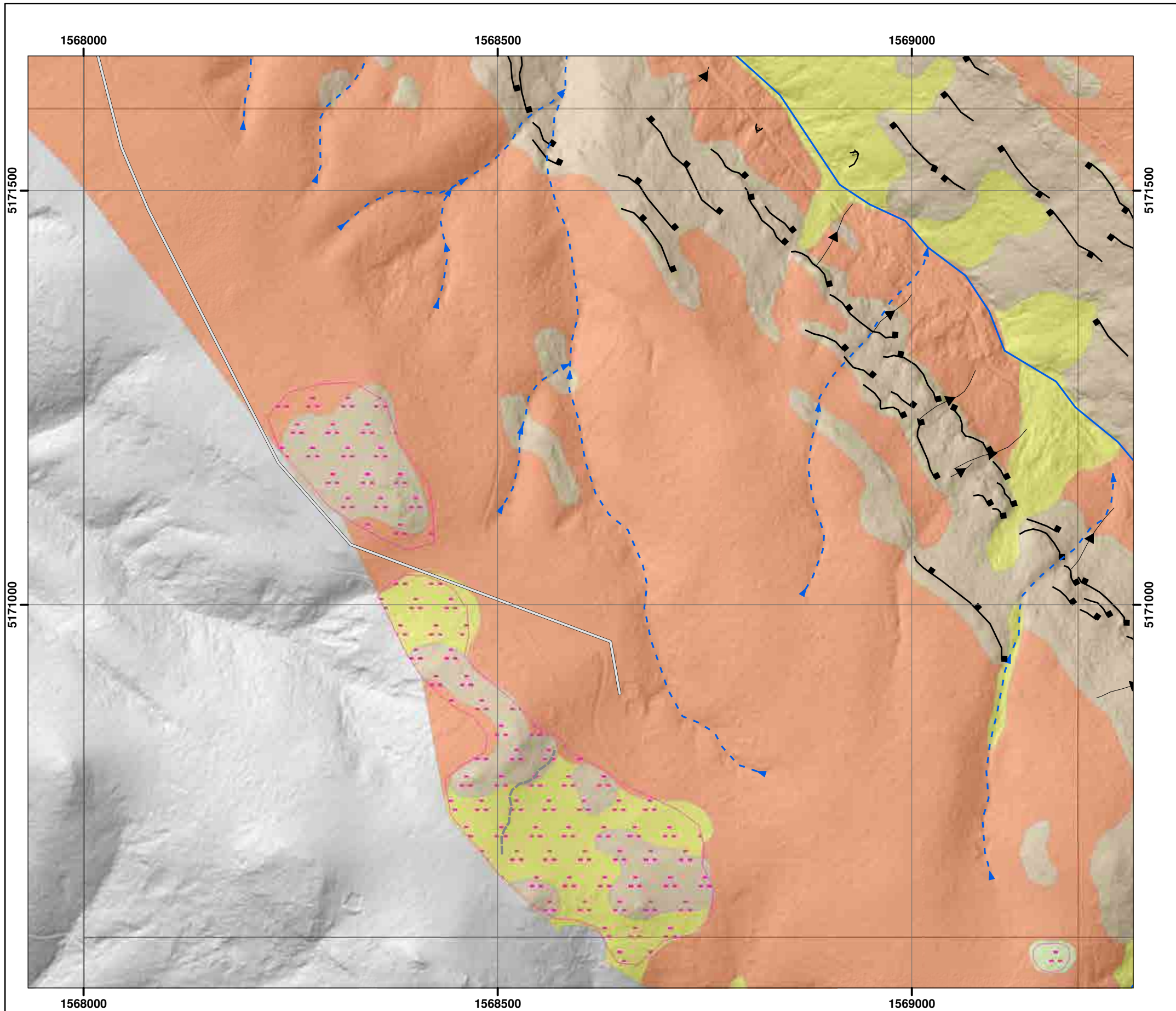
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

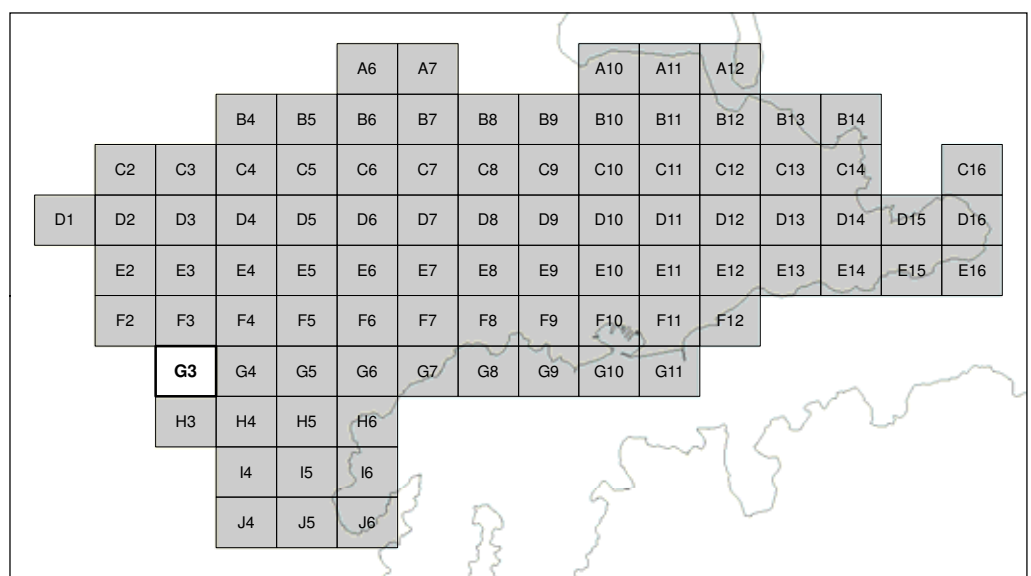
APPENDIX 4  
Map F12

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

**EXPLANATION:**

Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
Roads provided by Christchurch City Council (20/02/2012).  
PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



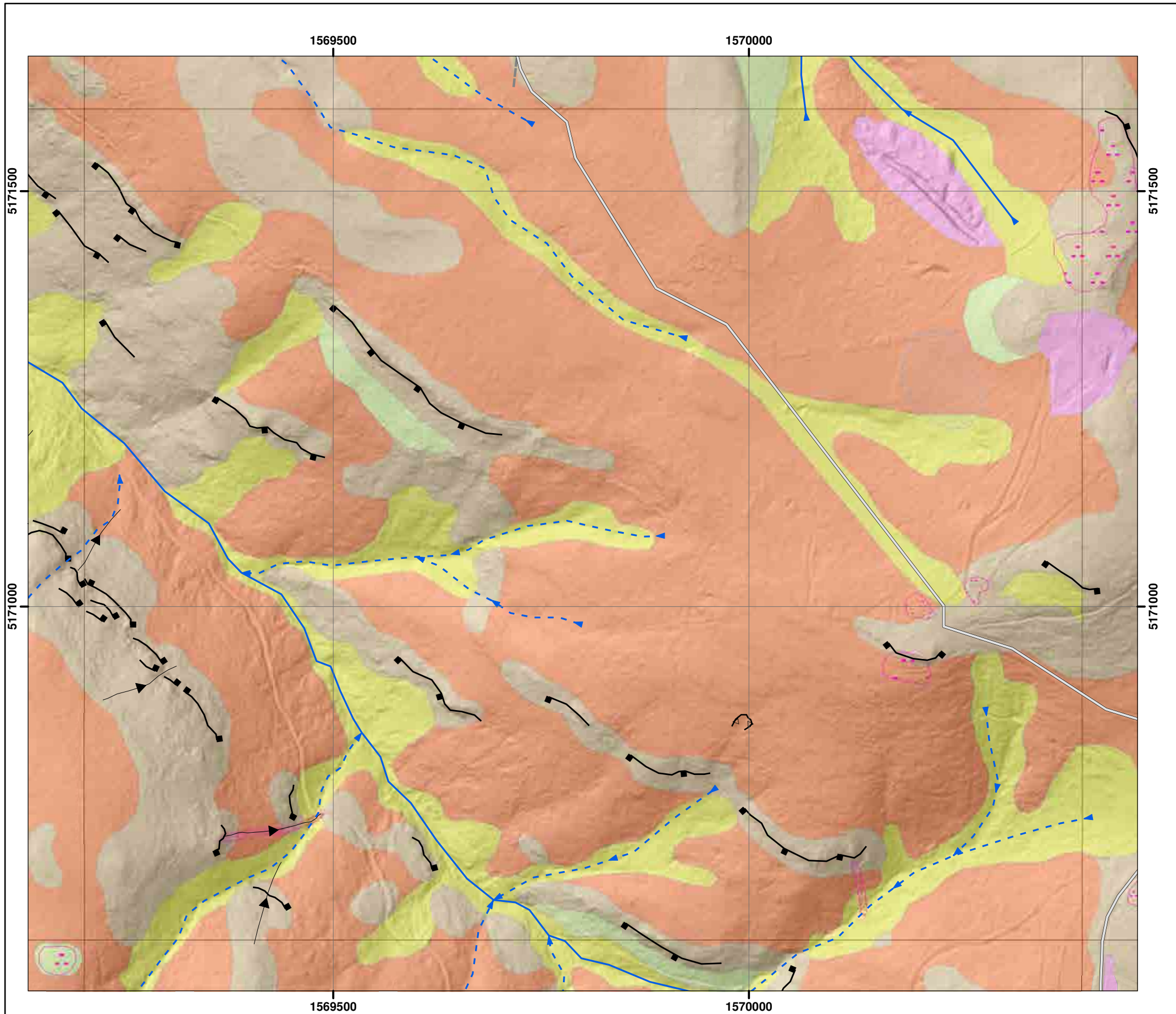
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

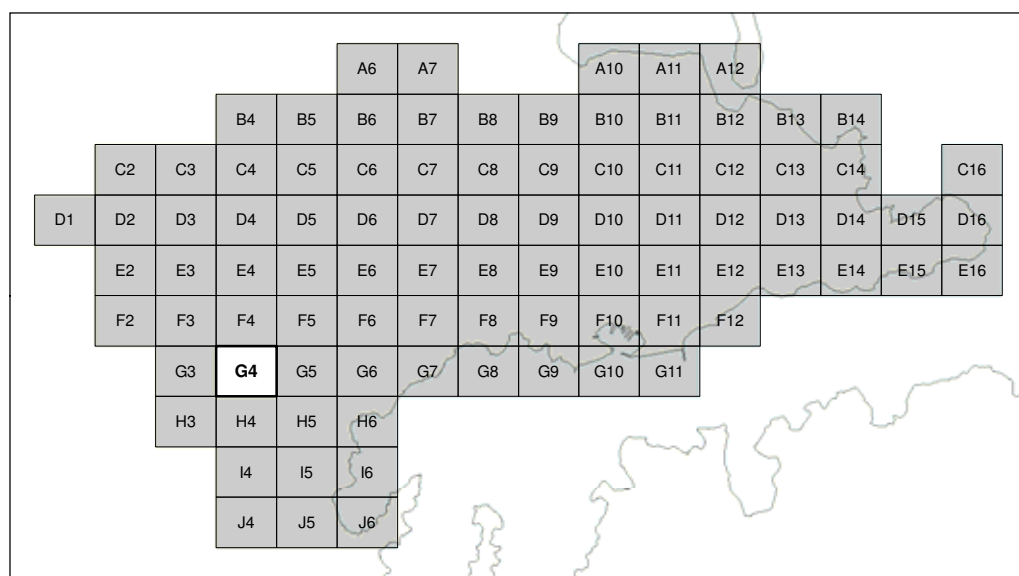
APPENDIX 4  
Map G3

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



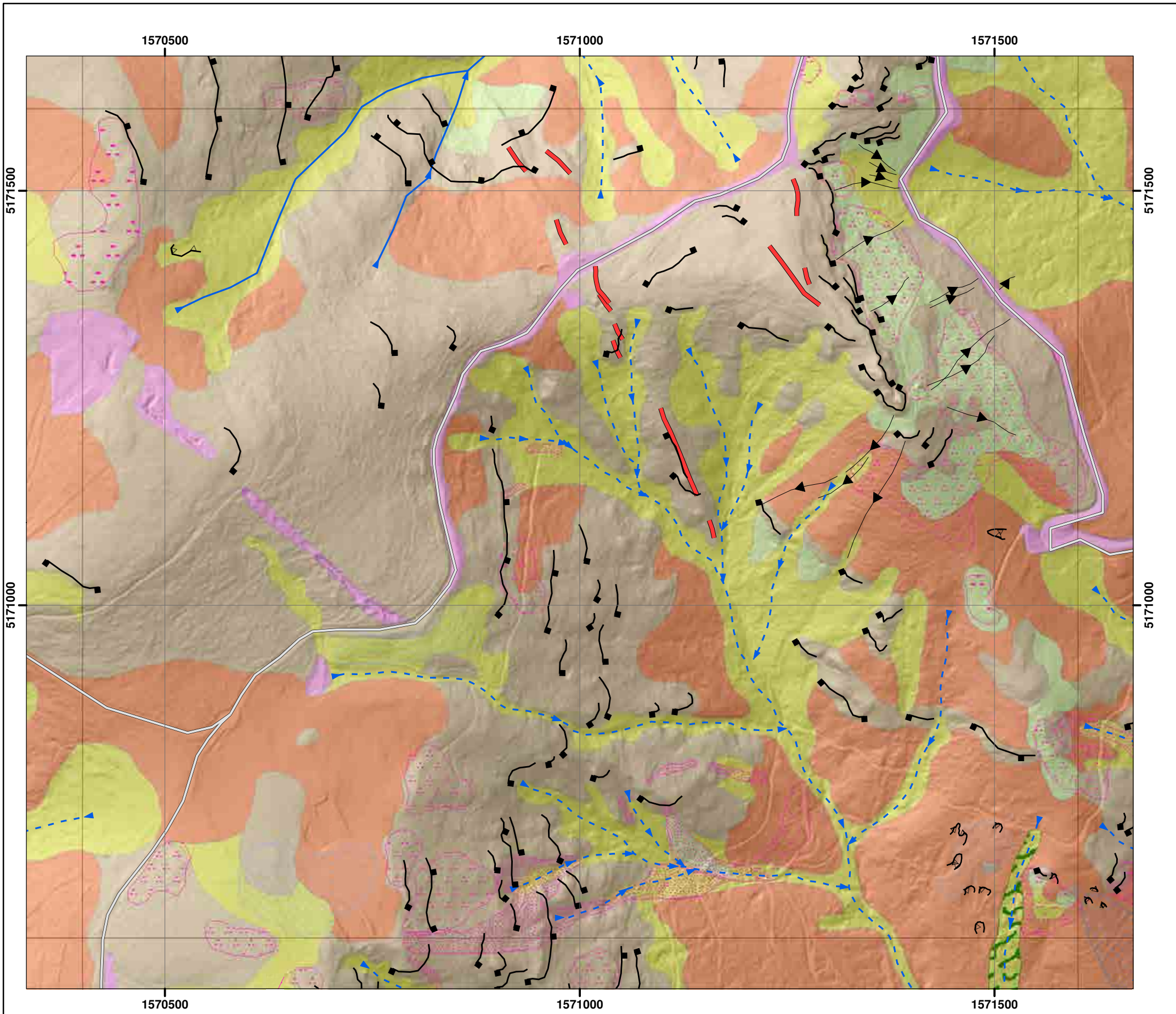
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

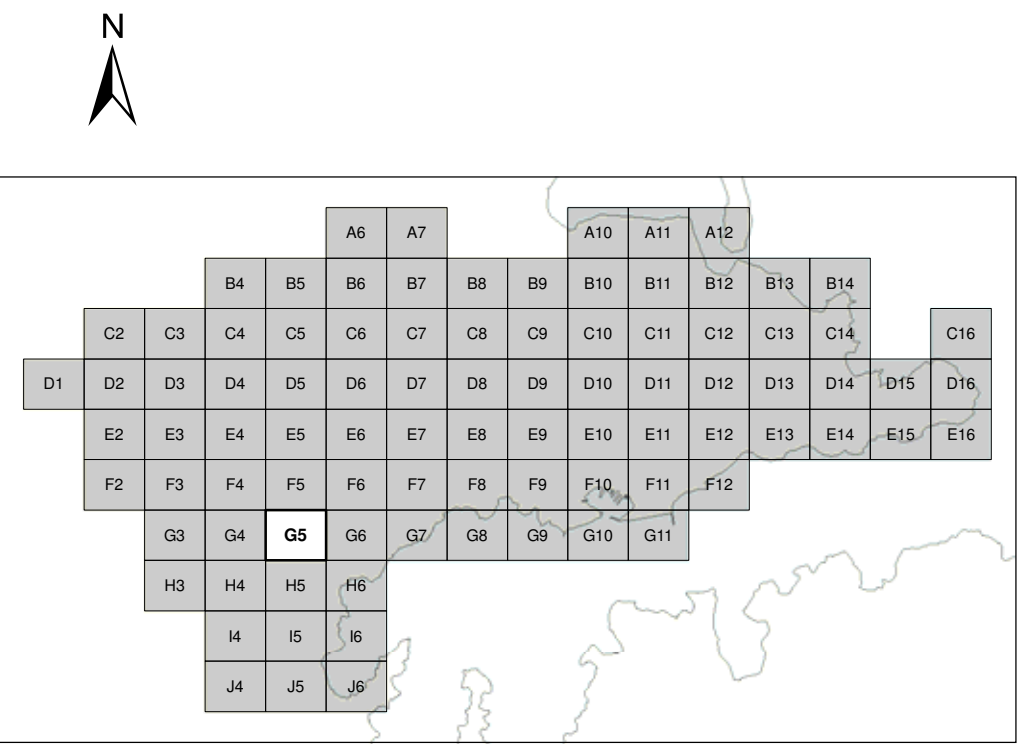
APPENDIX 4  
Map G4

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lination	Sand and gravel	Rills
Sharp lination (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
 CHK:  
CM



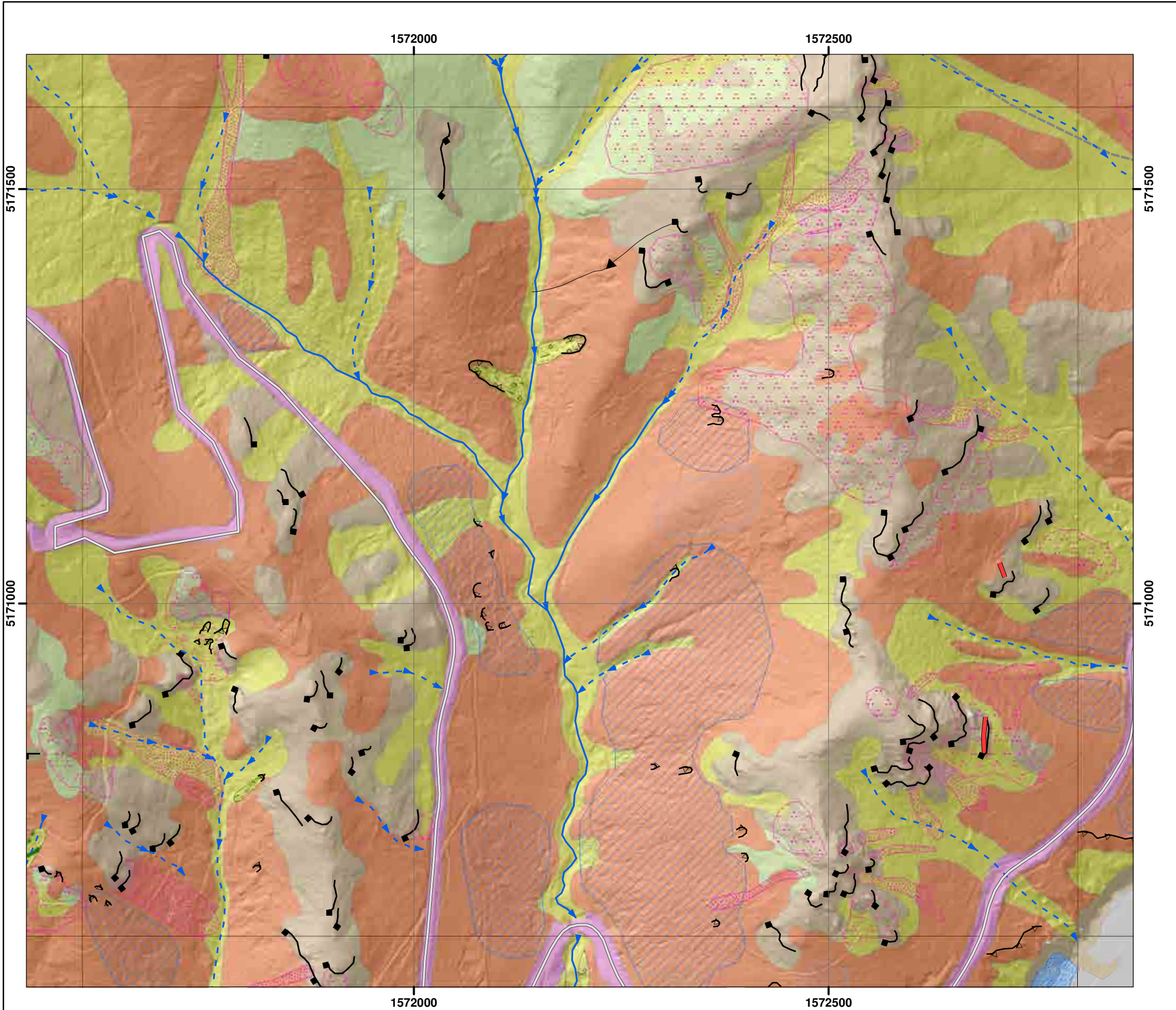
**GEOMORPHOLOGY MAPPING FOR  
 ROCKFALL RISK ASSESSMENT**

**Port Hills  
 Christchurch**

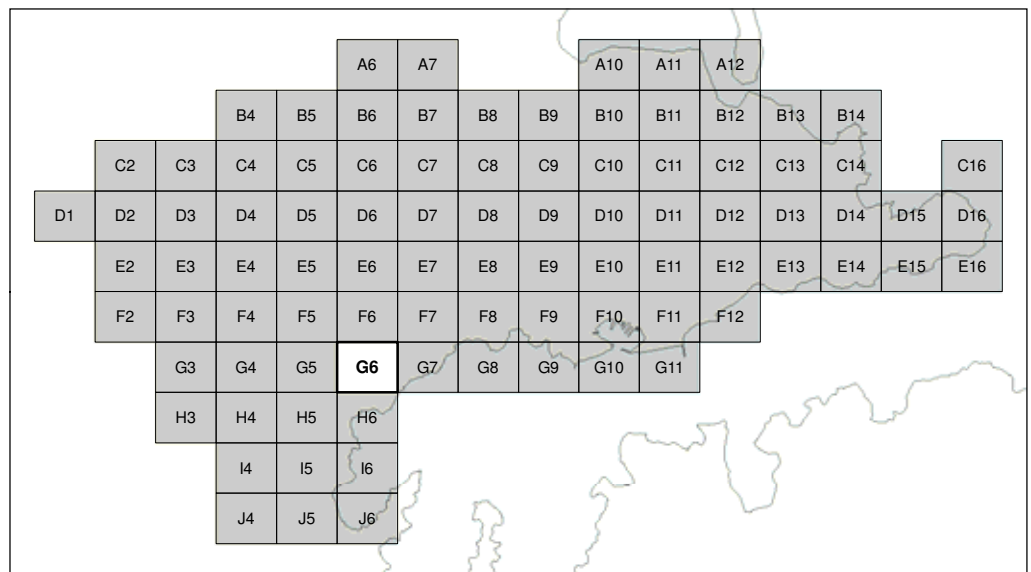
APPENDIX 4  
 Map G5

**FINAL**

REPORT: CR2012/15      DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



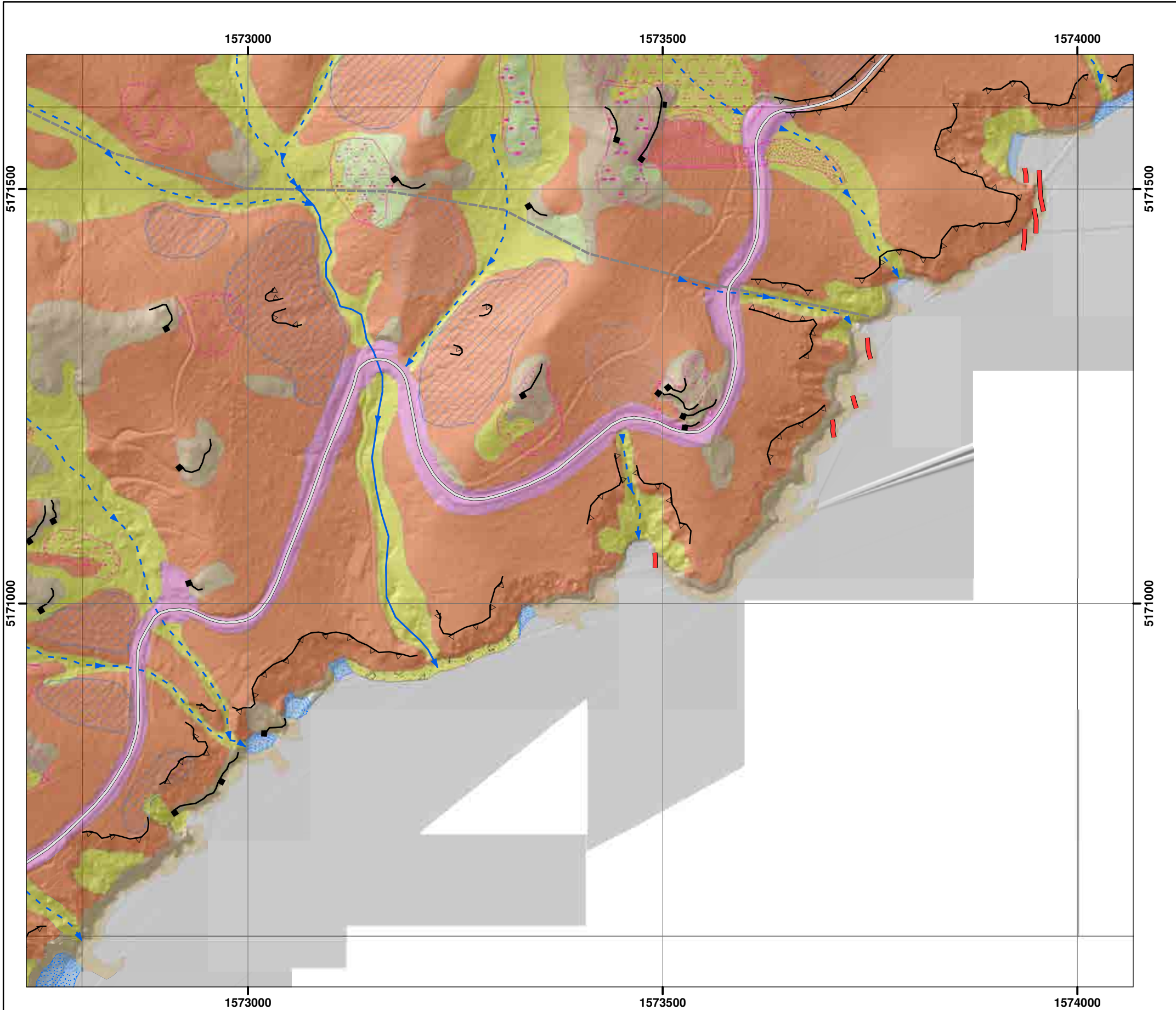
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

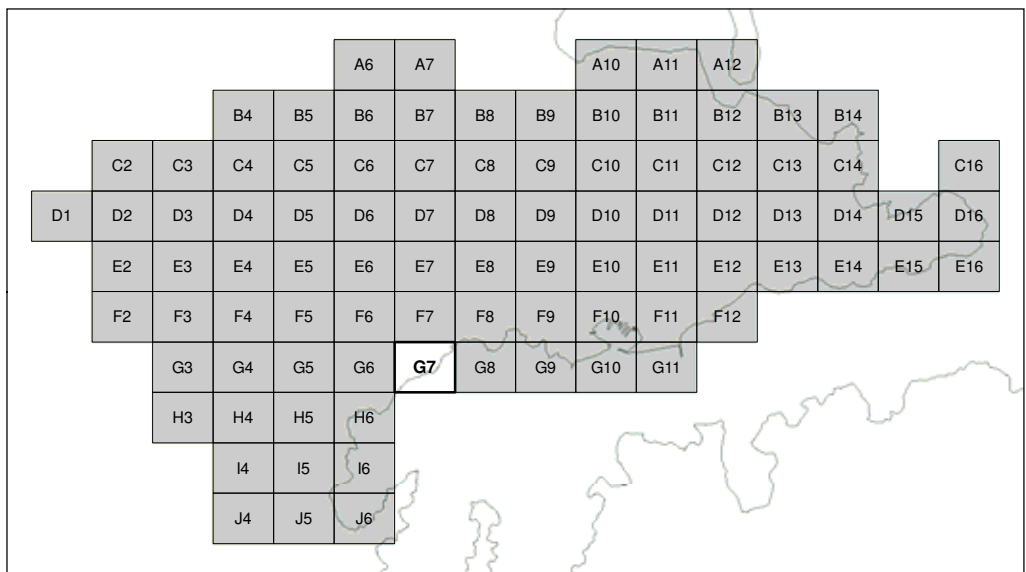
APPENDIX 4  
Map G6

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



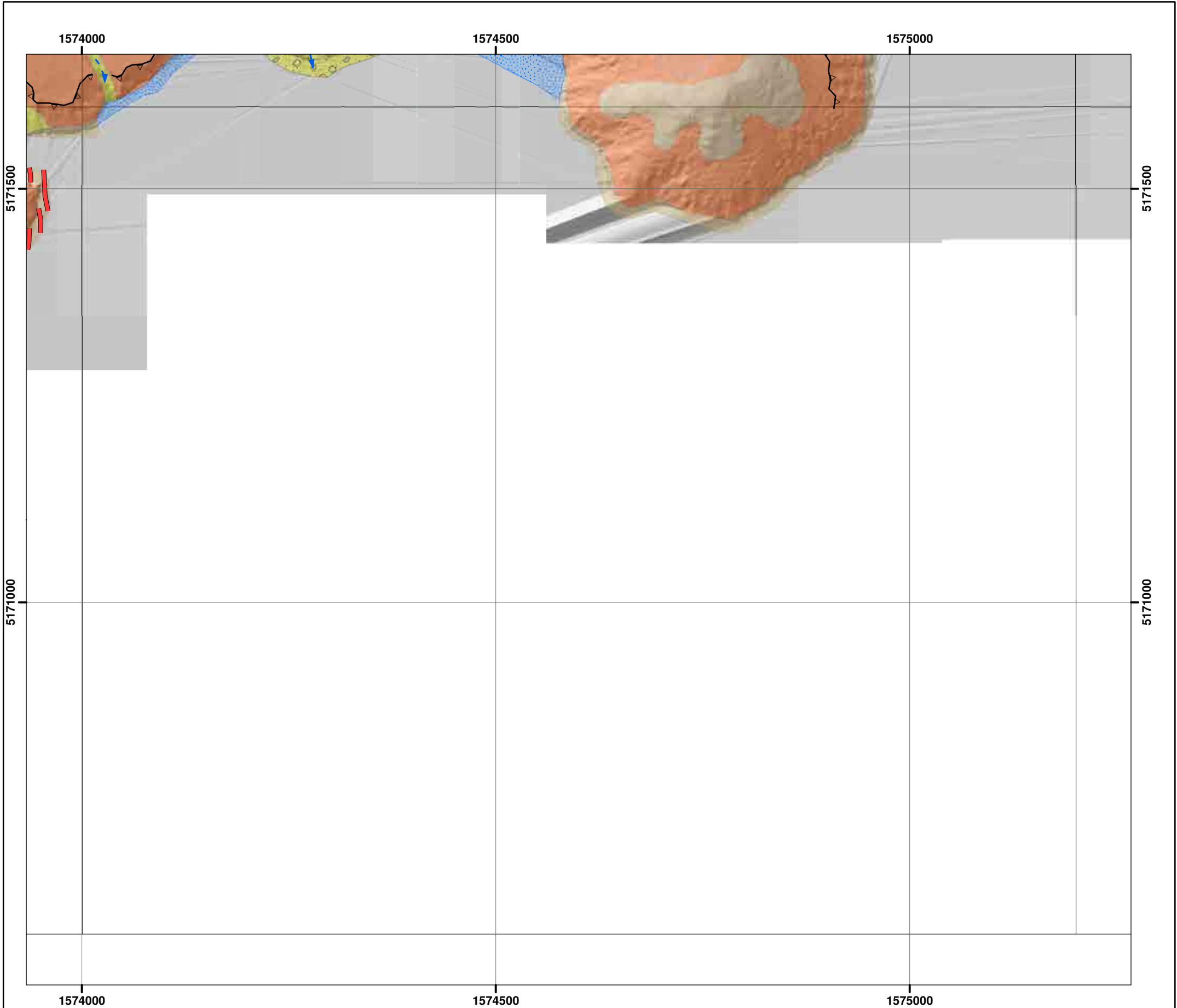
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

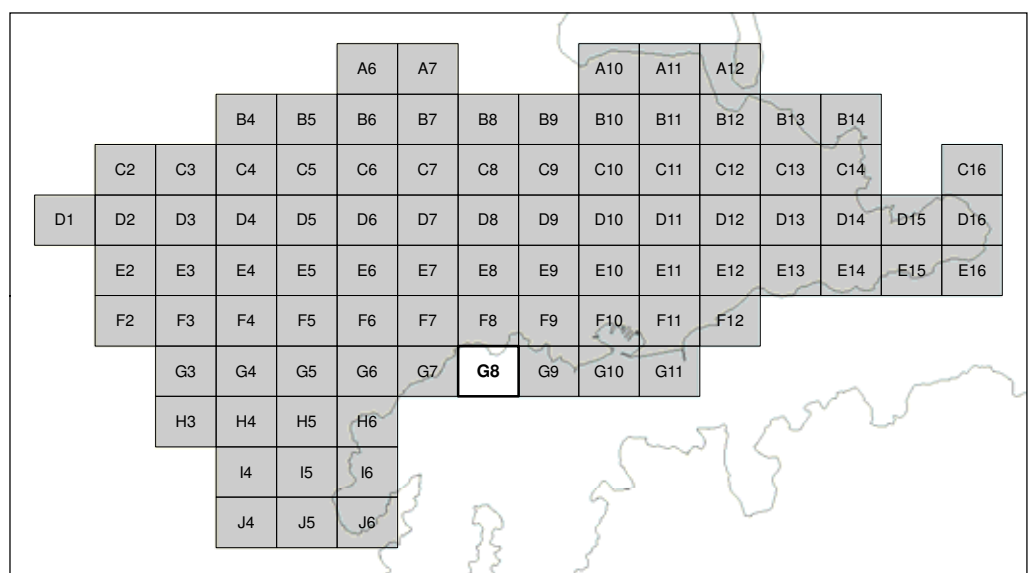
APPENDIX 4  
Map G7

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



## GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT

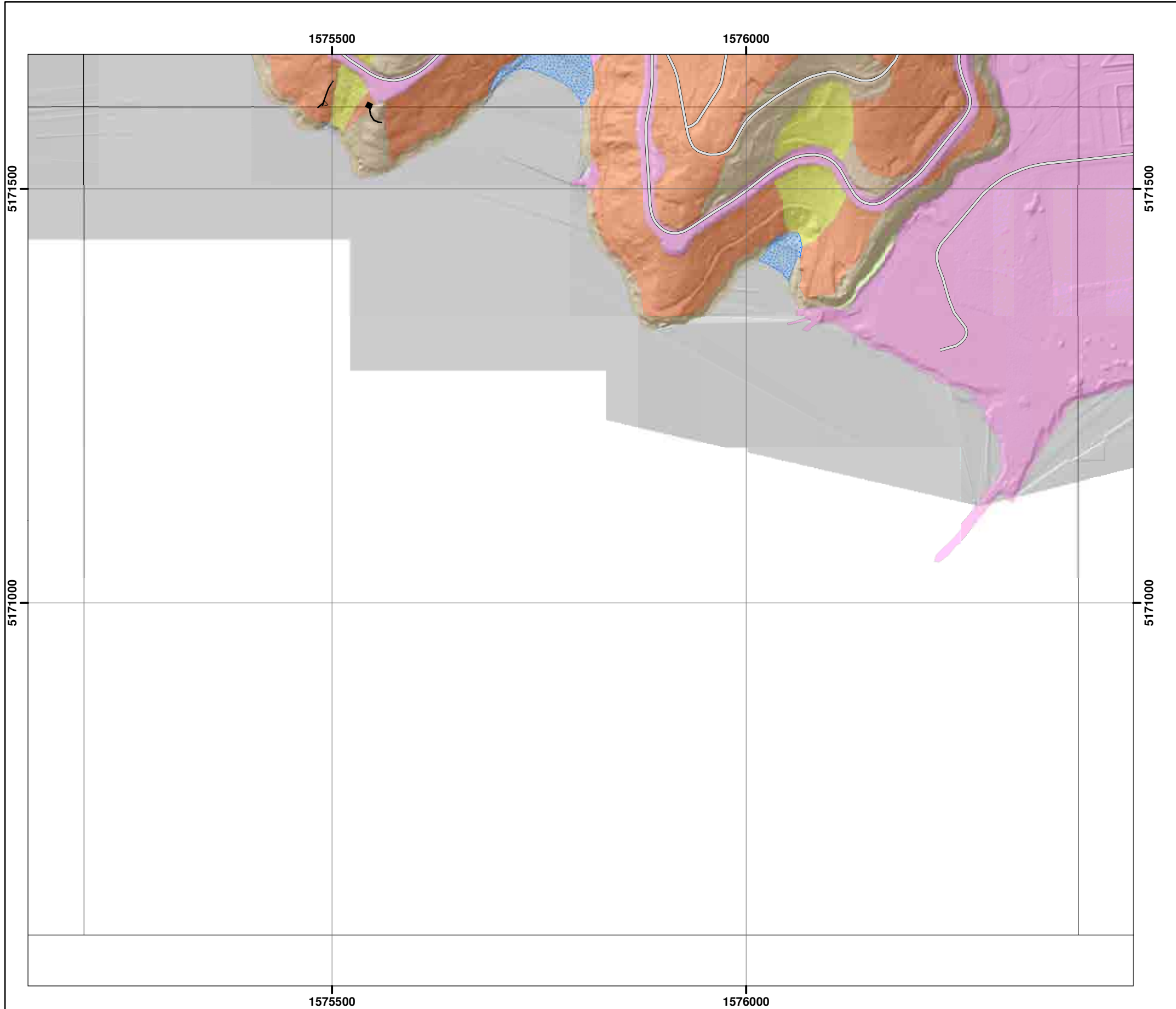
Port Hills  
Christchurch

APPENDIX 4  
Map G8

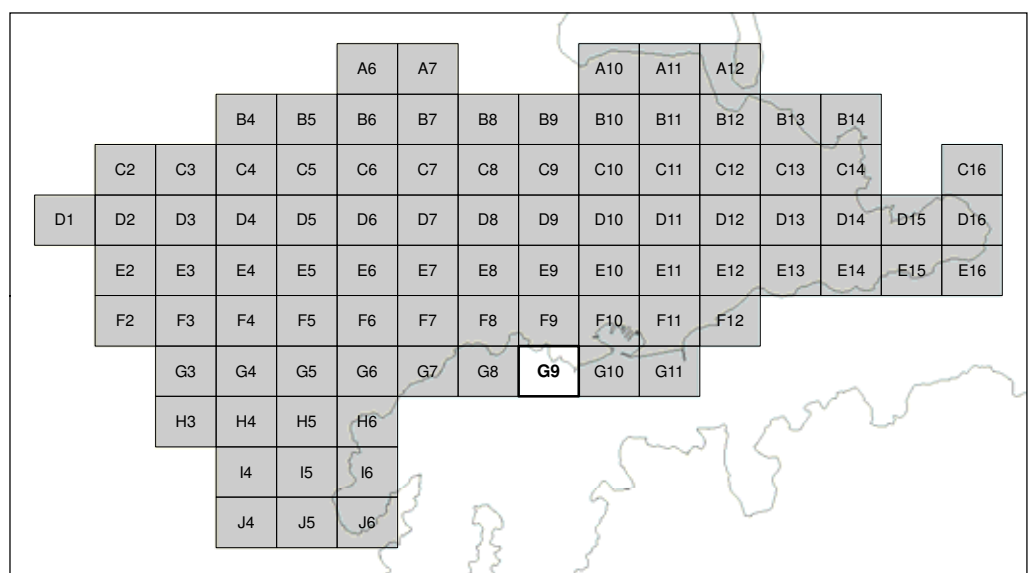
**FINAL**

REPORT: CR2012/15 DATE: Sept 2012





Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



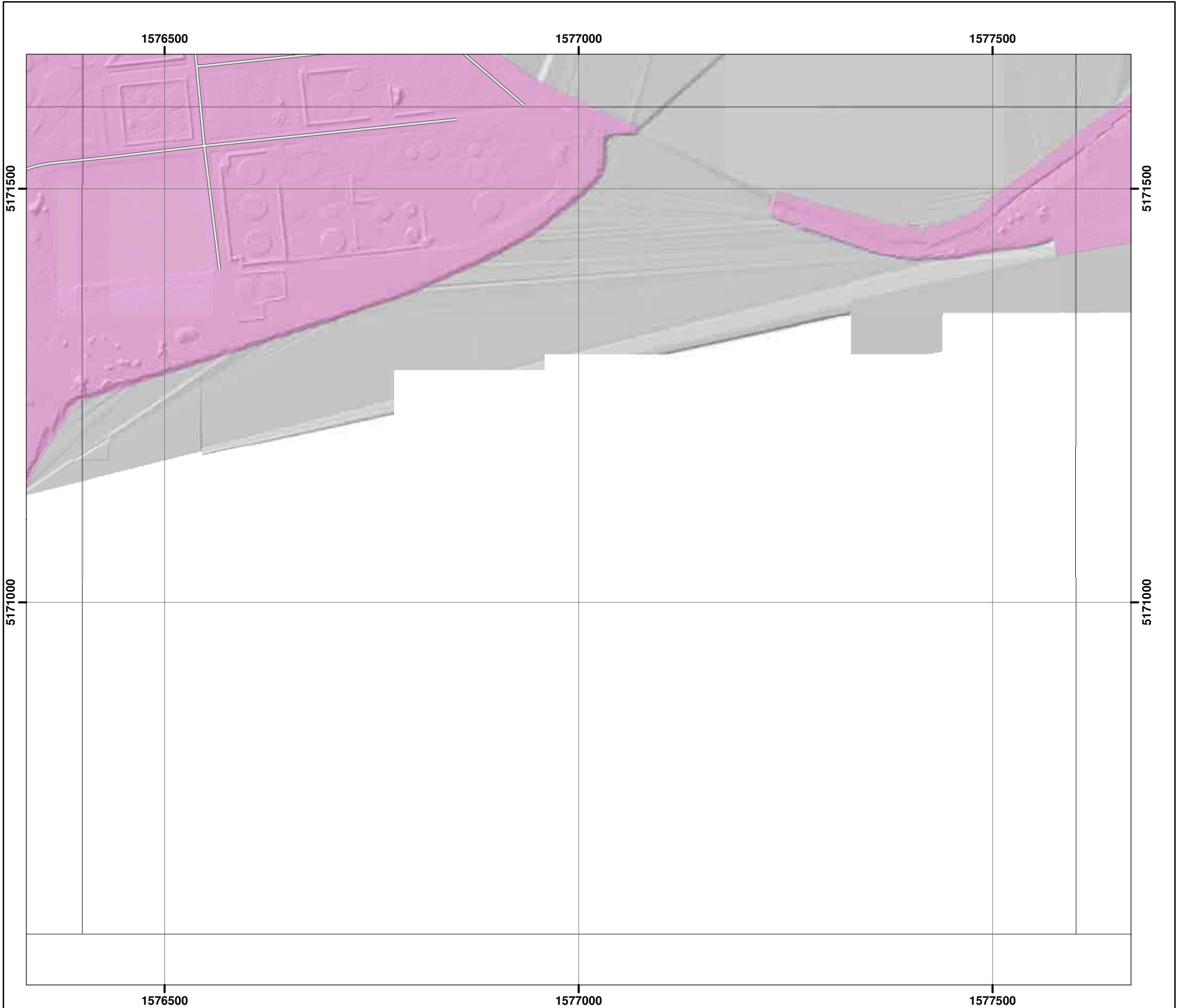
## GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT

Port Hills  
Christchurch

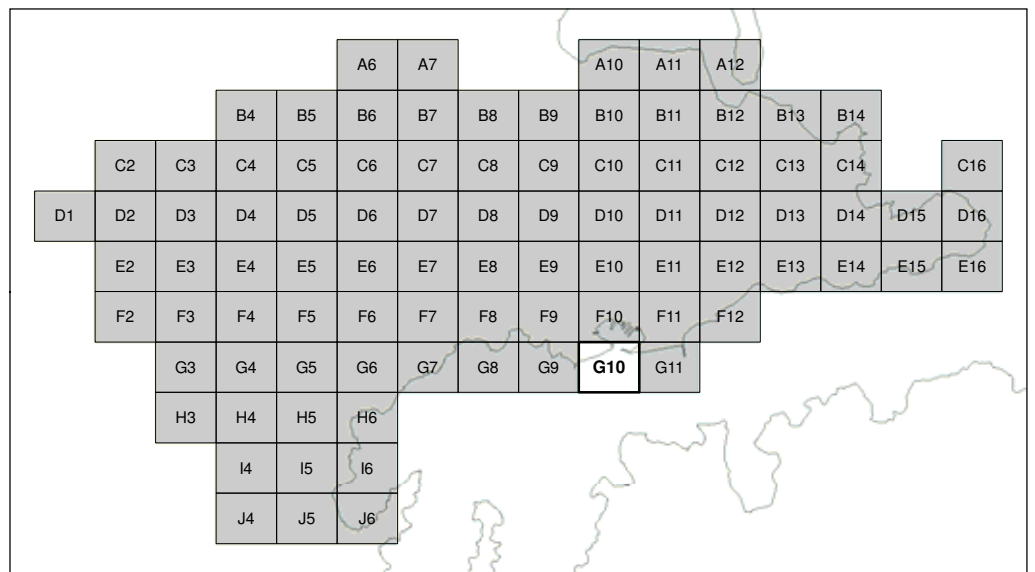
APPENDIX 4  
Map G9

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



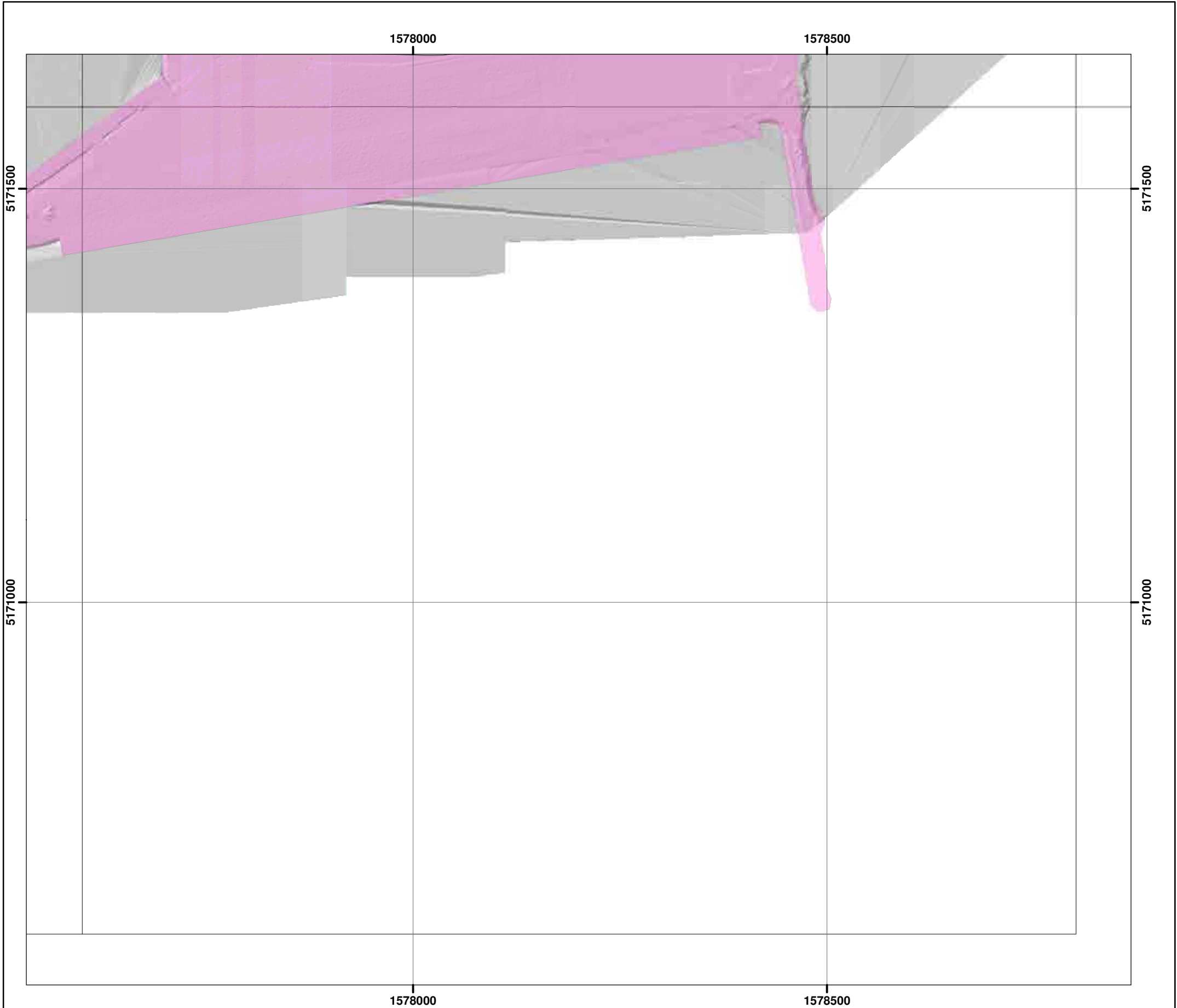
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

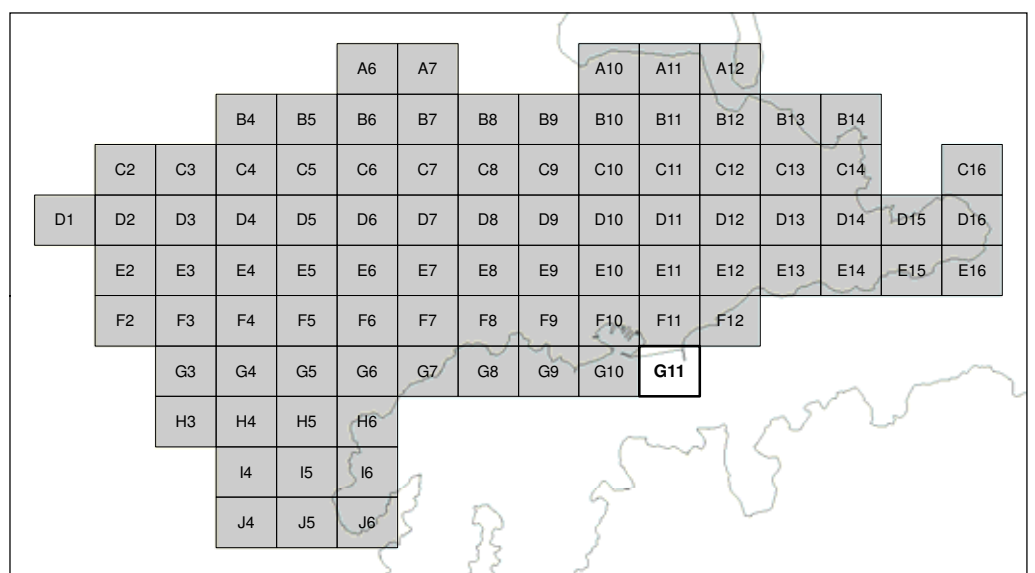
APPENDIX 4  
Map G10

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



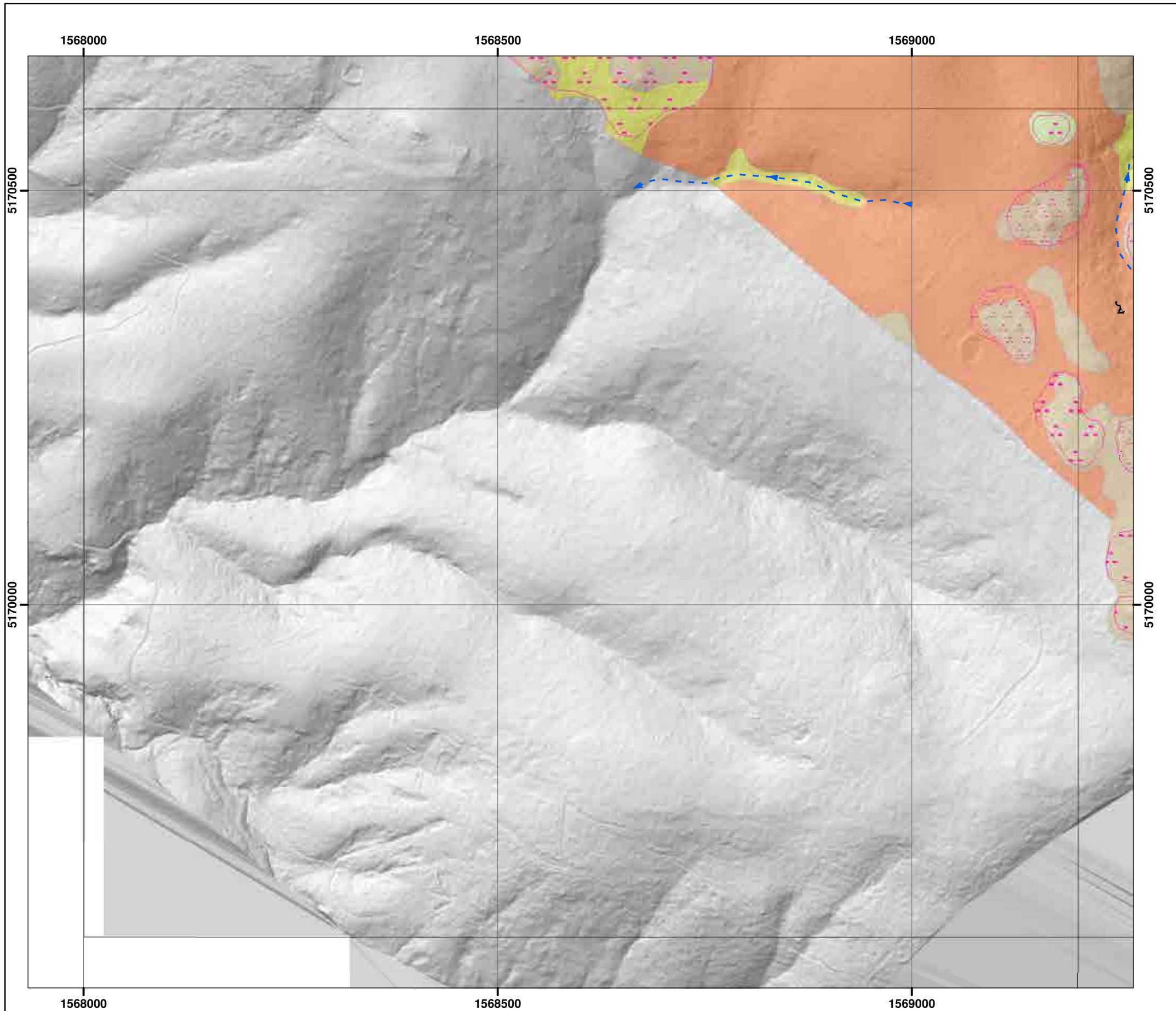
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

APPENDIX 4  
Map G11

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



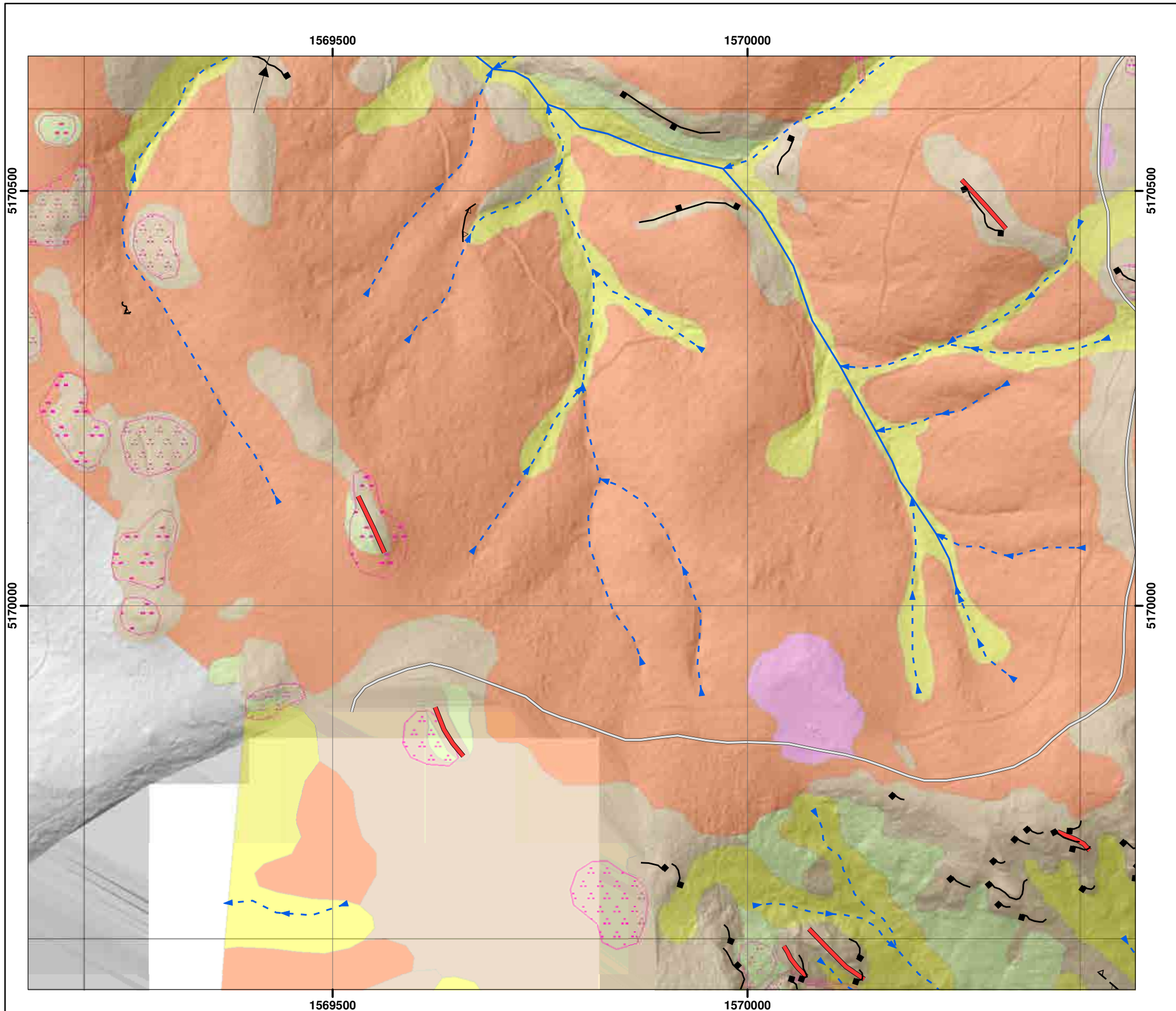
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

APPENDIX 4  
Map H3

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



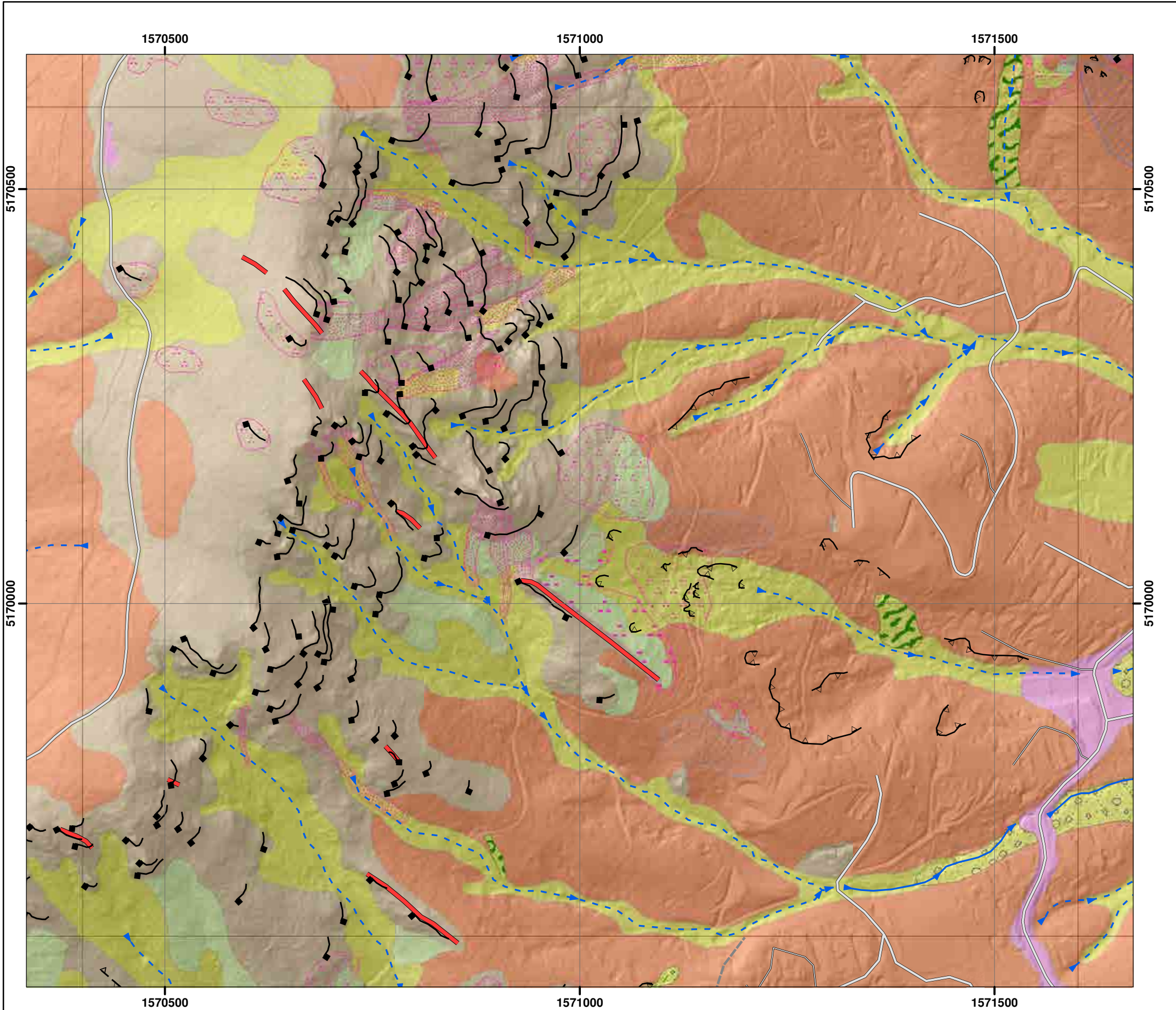
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

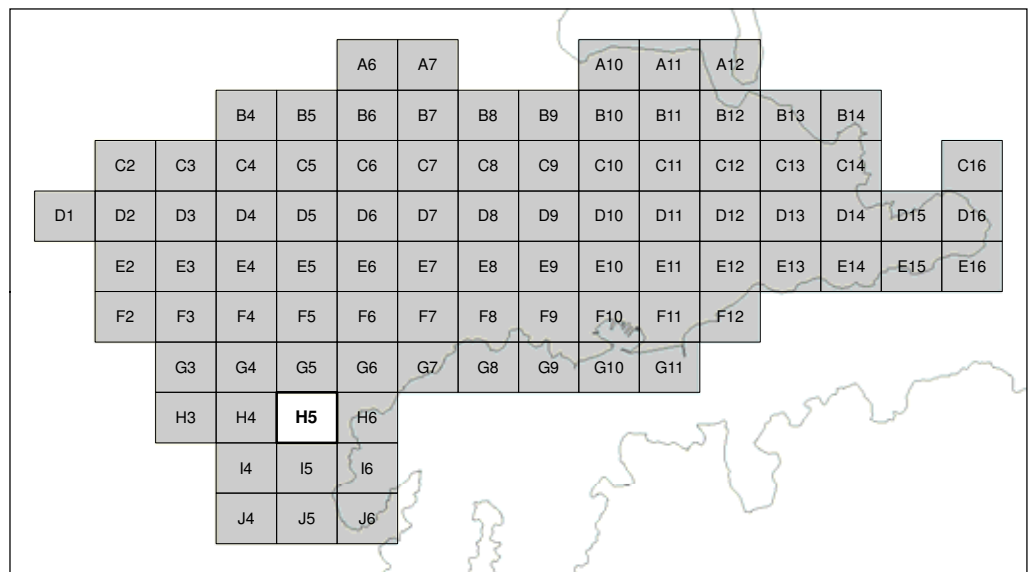
APPENDIX 4  
Map H4

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



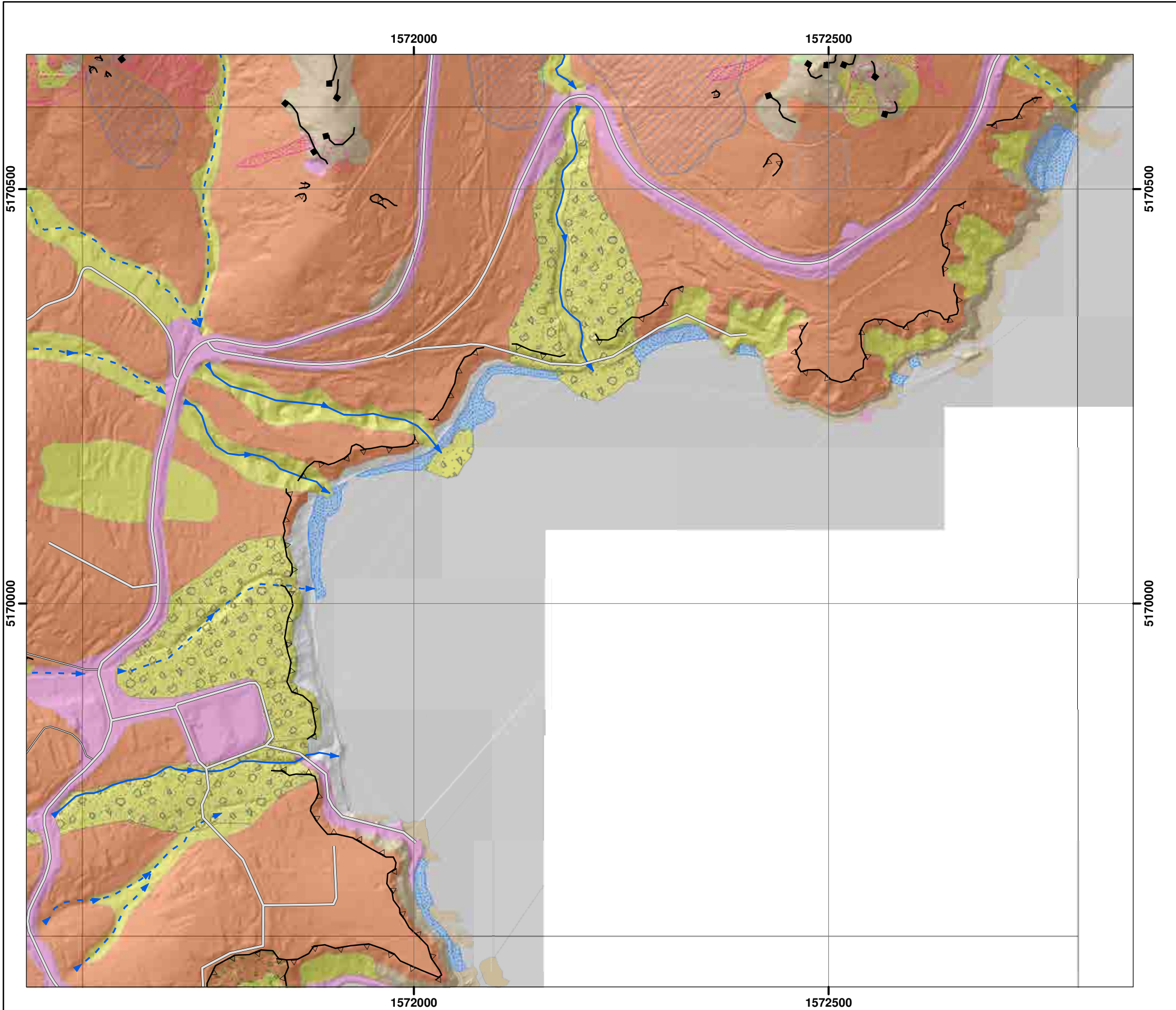
**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

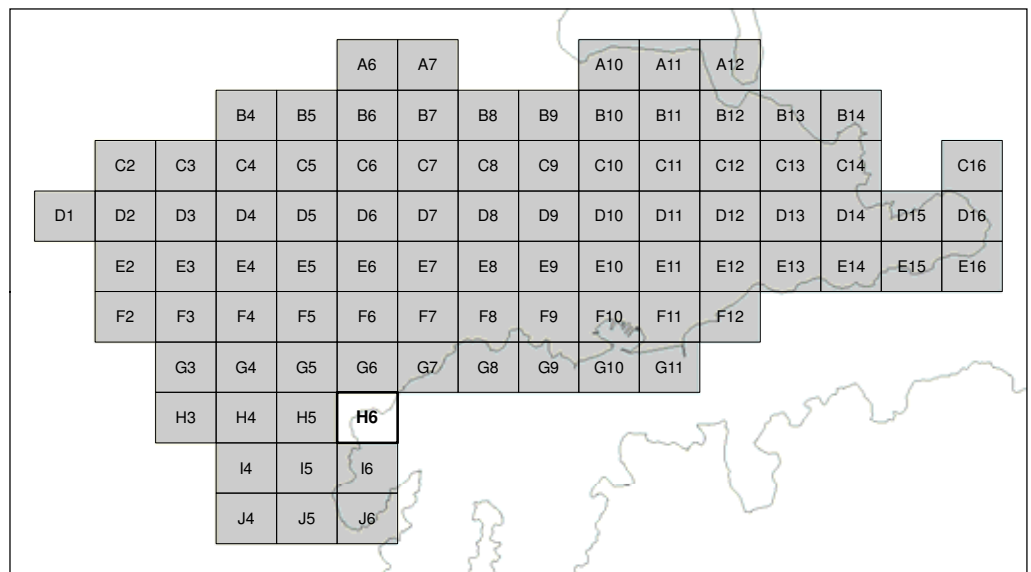
APPENDIX 4  
Map H5

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



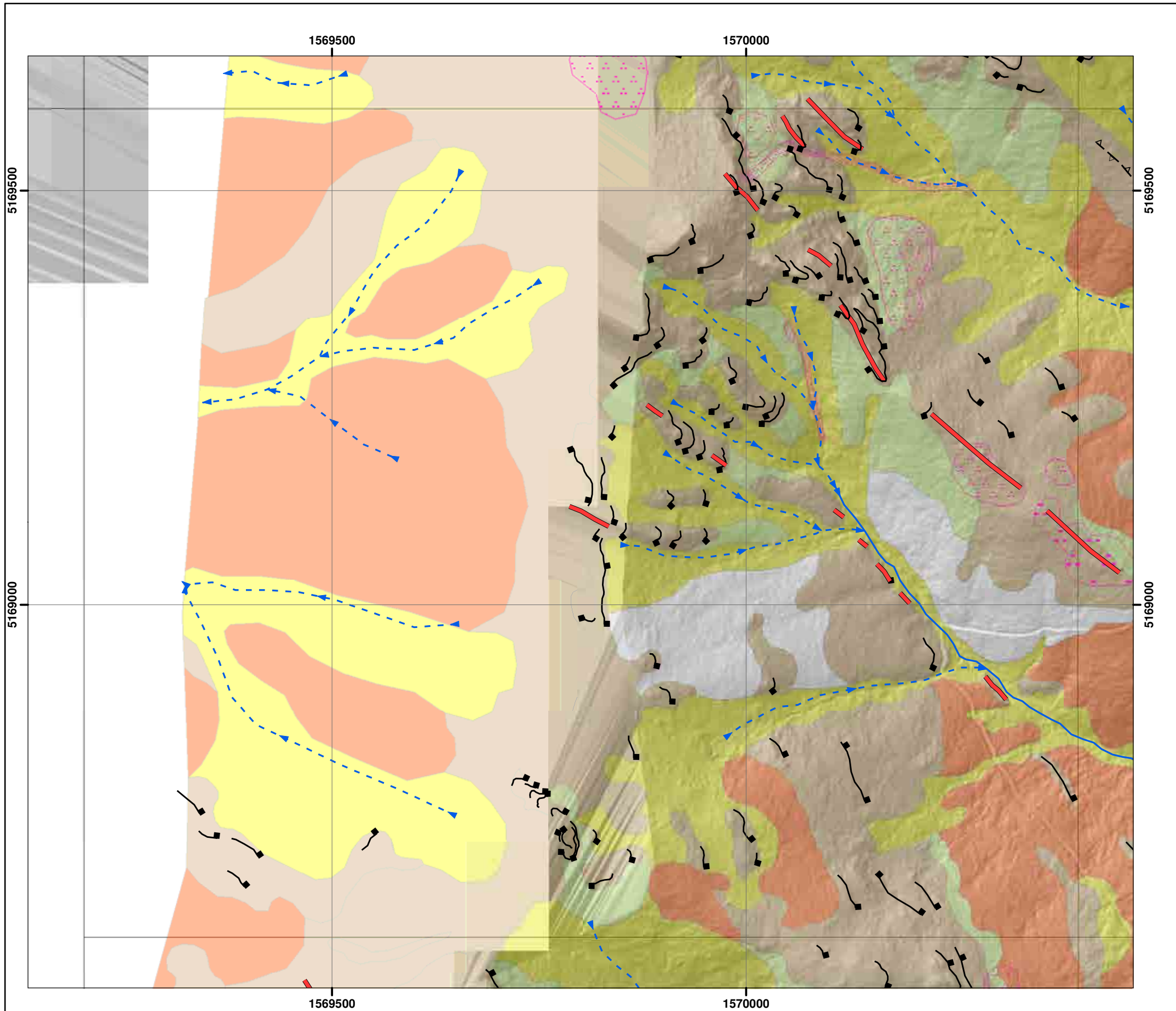
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

APPENDIX 4  
Map H6

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

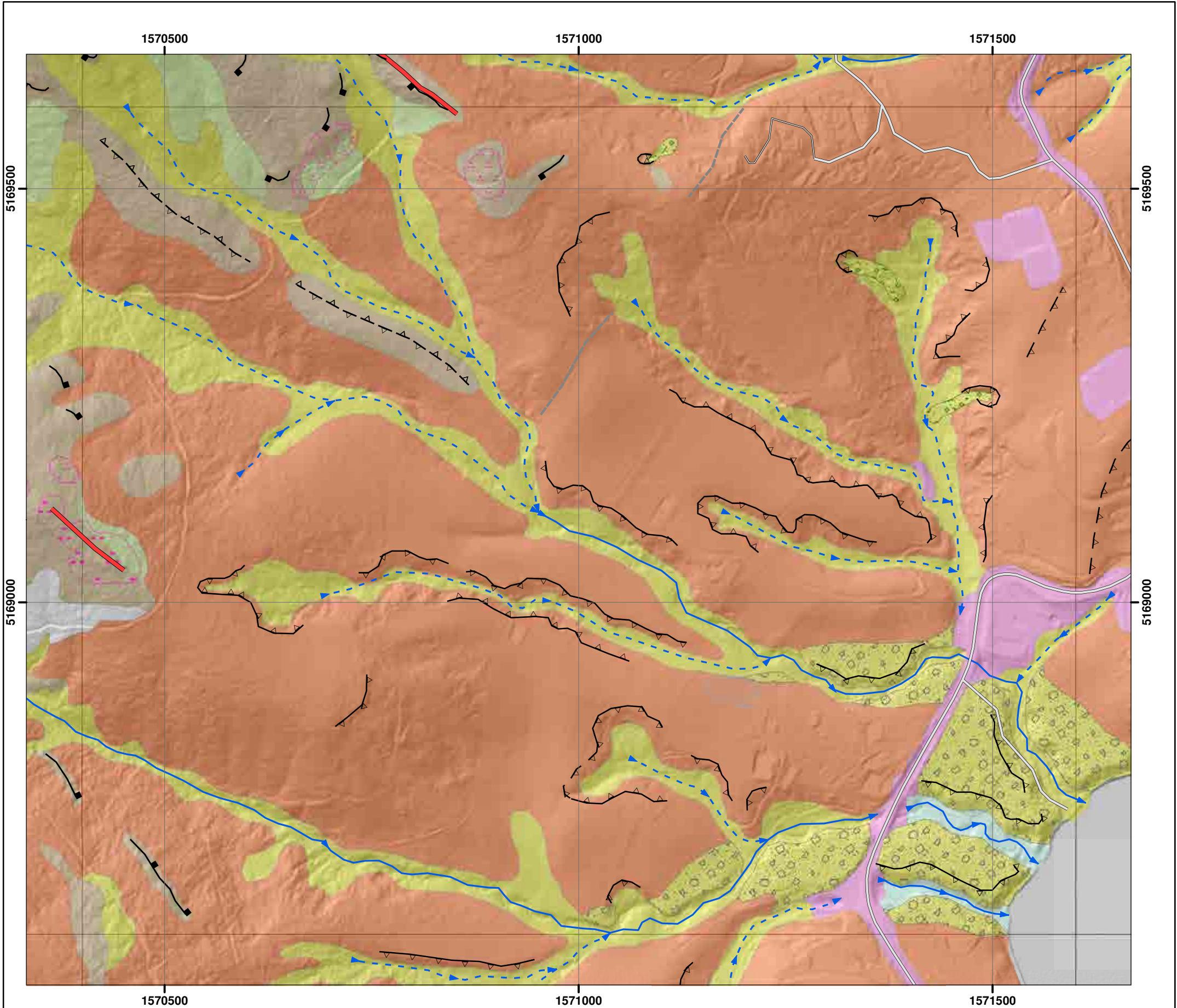
**Port Hills Christchurch**

APPENDIX 4  
Map I4

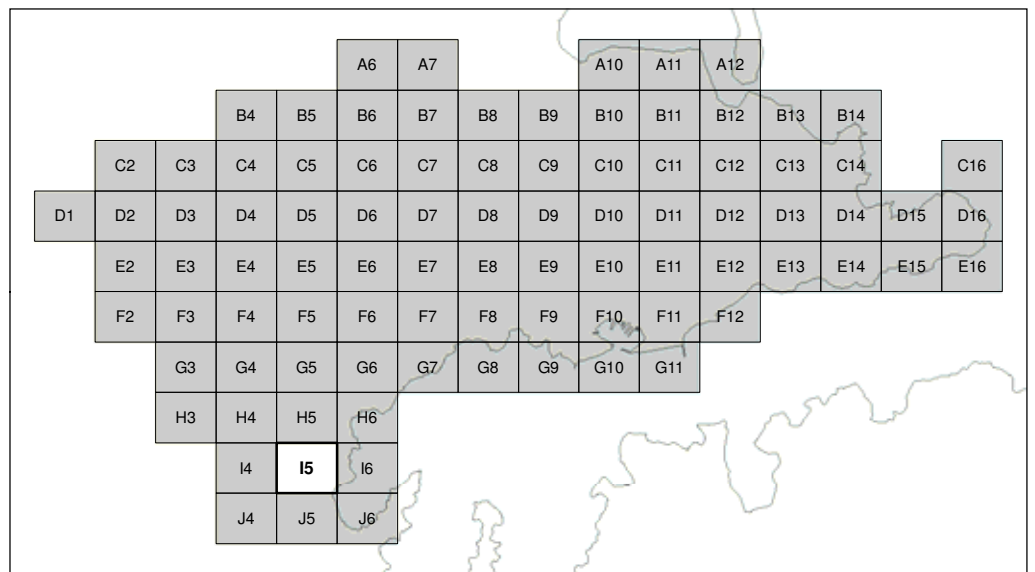
**FINAL**

REPORT: CR2012/15 DATE: Sept 2012





Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



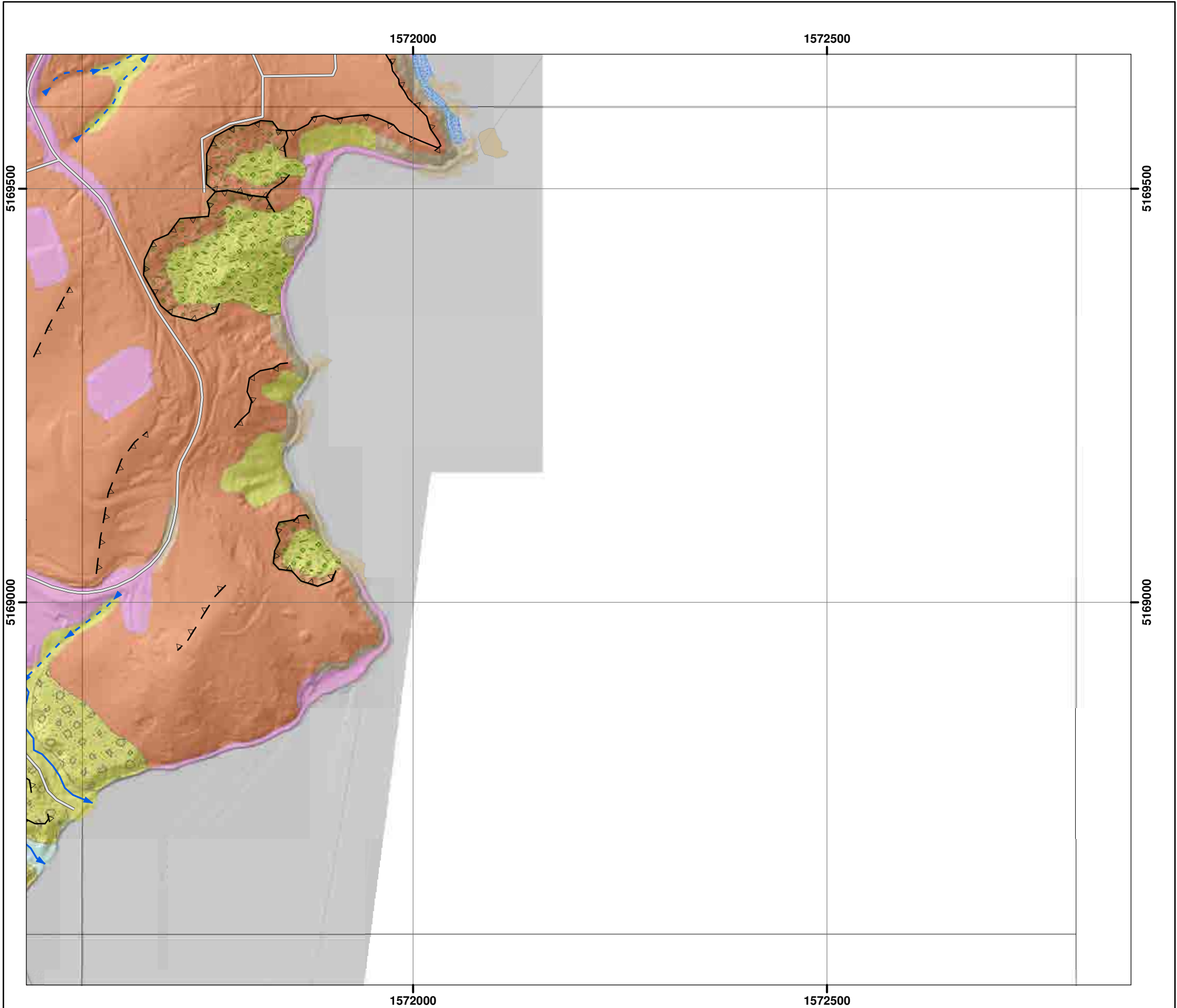
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

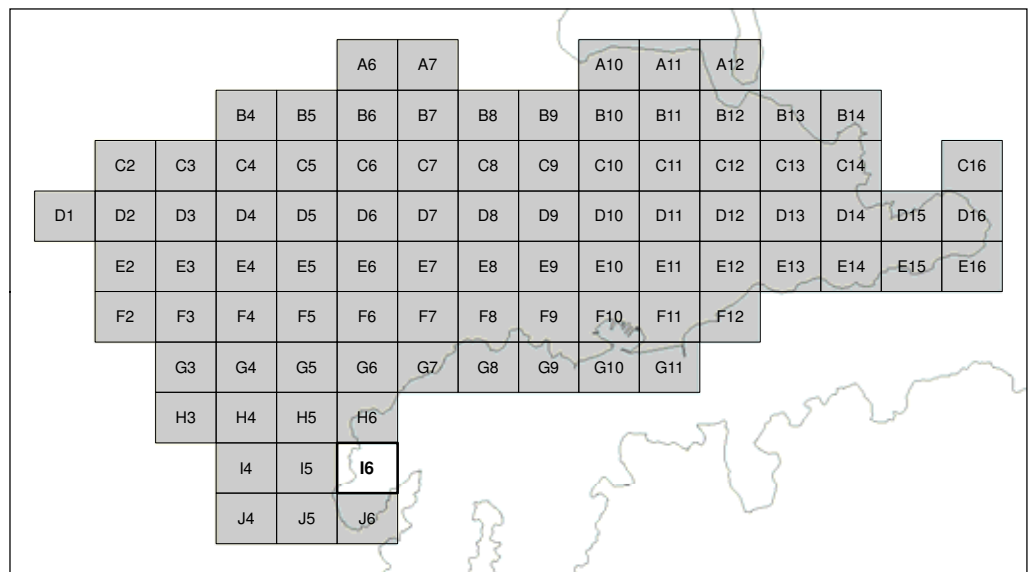
APPENDIX 4  
Map I5

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



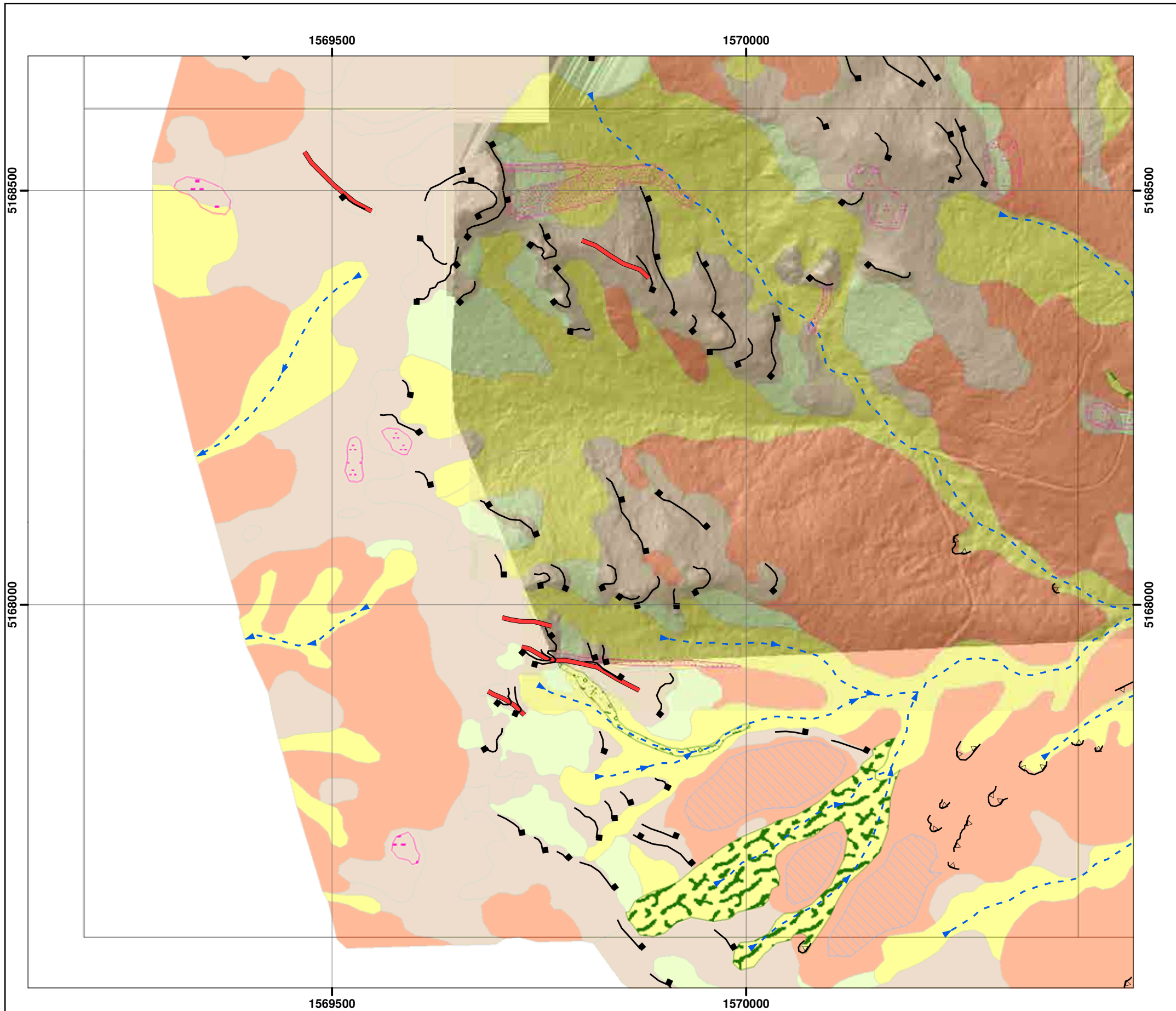
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

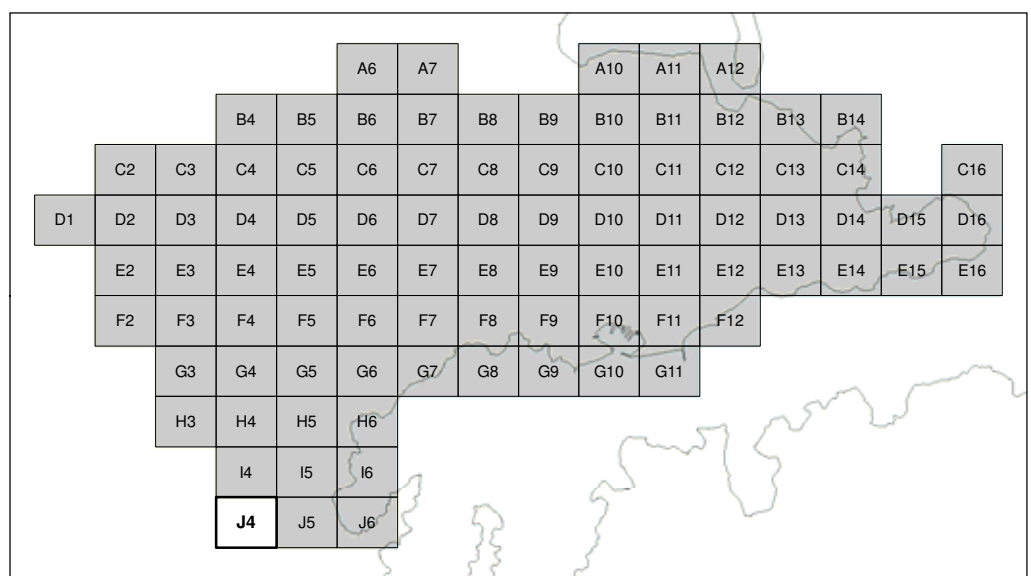
APPENDIX 4  
Map I6

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 1: 5000  
m

EXPLANATION:  
Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
Roads provided by Christchurch City Council (20/02/2012).  
PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



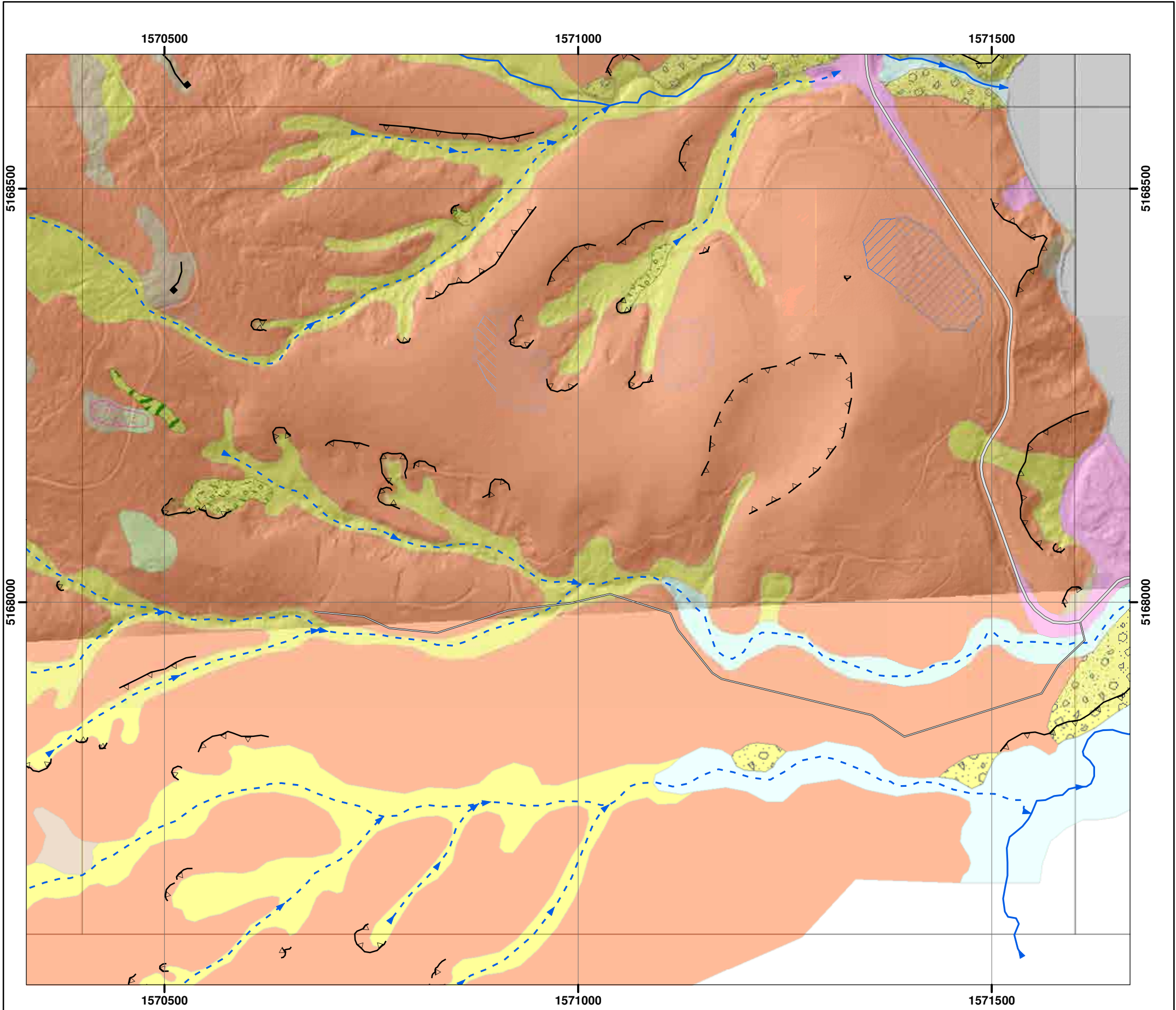
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

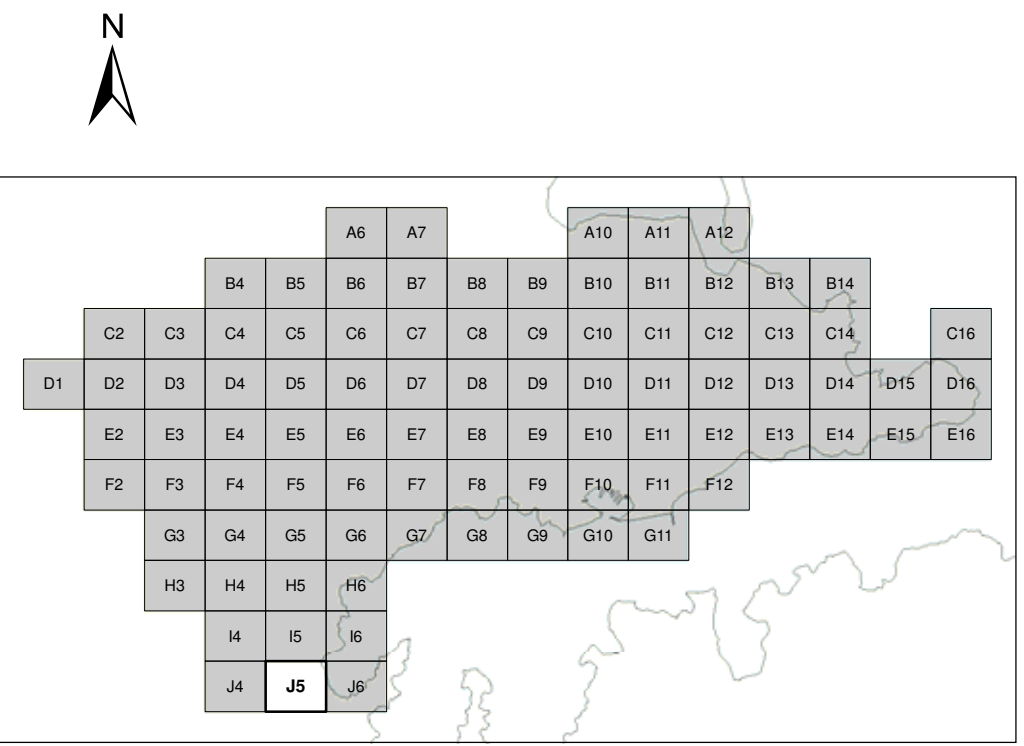
APPENDIX 4  
Map J4

**FINAL**

REPORT: CR2012/15  
DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1: 5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



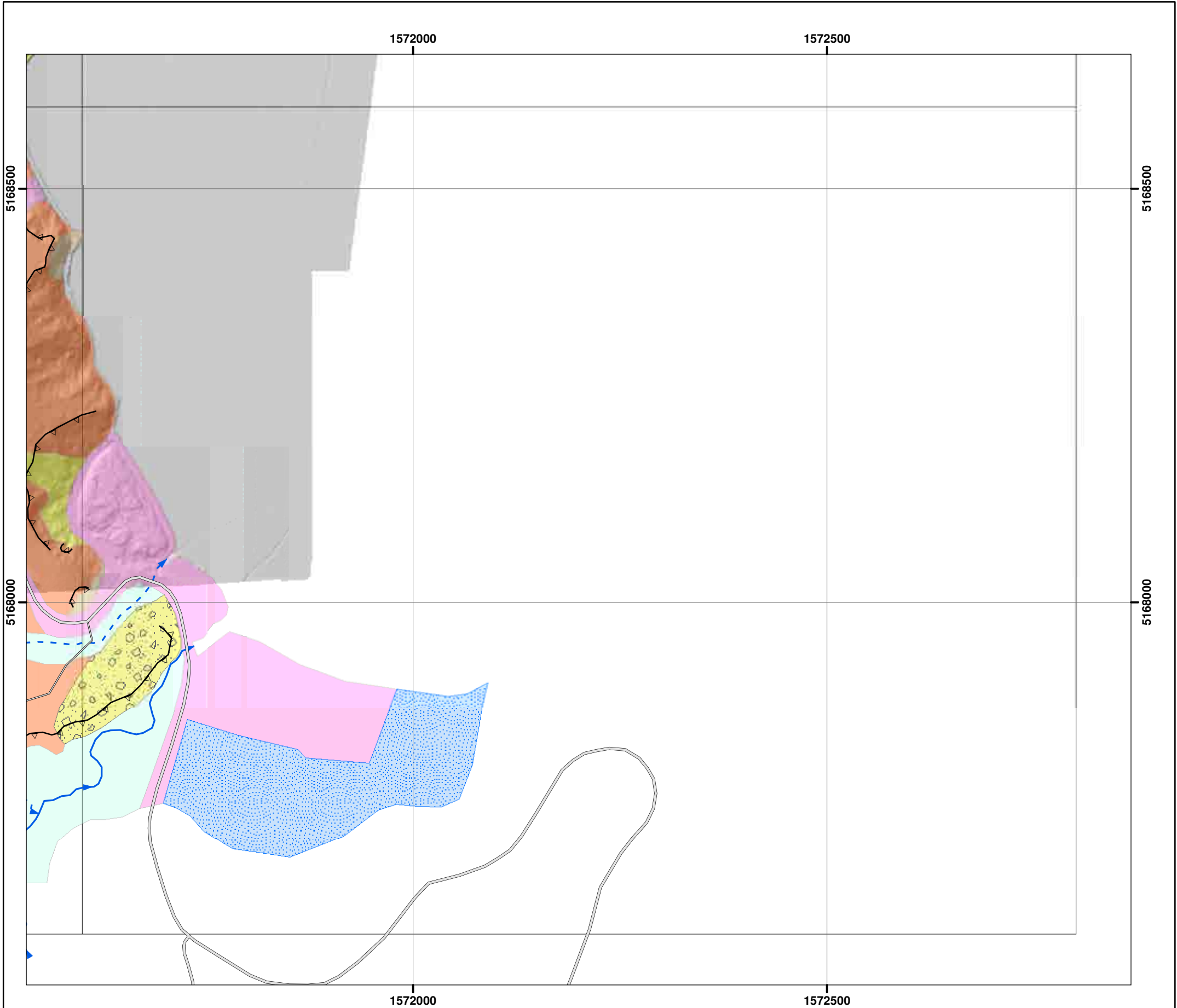
**GEOMORPHOLOGY MAPPING FOR ROCKFALL RISK ASSESSMENT**

**Port Hills Christchurch**

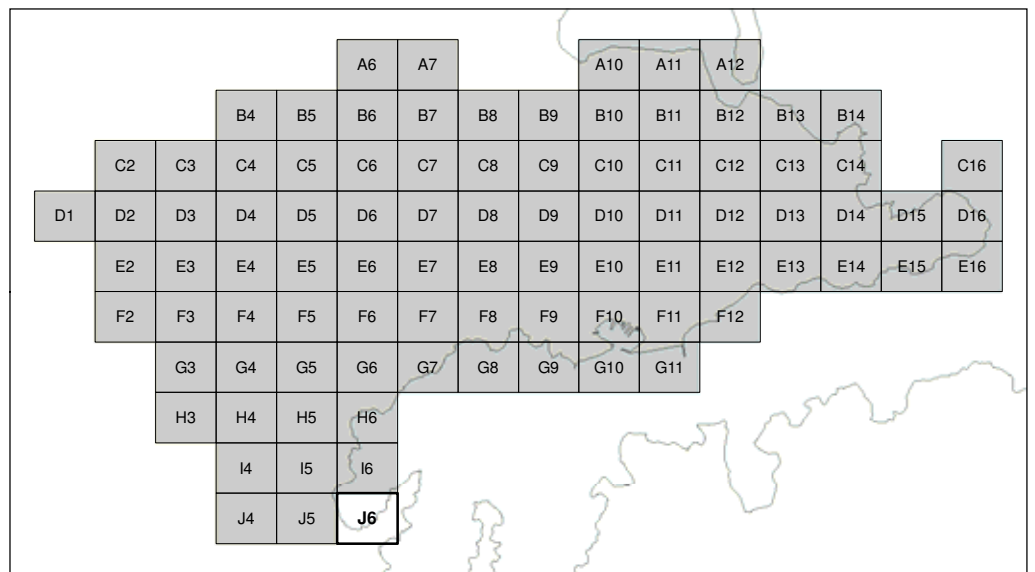
APPENDIX 4  
Map J5

**FINAL**

REPORT: CR2012/15      DATE: Sept 2012



Morphology description	Interpreted Materials type	Genesis type
Boulder trail	Rock at/near surface	Rockfall (recent)
Dike	Talus	Rockfall (many scattered boulders)
Bund	Colluvium	Rockfall (few scattered boulders)
Ephemeral drainage line (well defined)	Loess	Dune
Ephemeral drainage line (poorly defined)	Alluvium	Beach
Lineation	Sand and gravel	Rills
Sharp lineation (crack)	Boulders	Terracettes
Rounded concave break in slope	Fill	Fan
Rounded convex break in slope	Unknown	Landslide scar (recent)
Rounded ridge line		Landslide scar (relict)
Sharp concave break in slope		Swamp/wetland
Sharp convex break in slope		
Cliff		
Shelter belt/trees		



SCALE BAR: 0 100 200 m 1:5000

EXPLANATION:  
 Background shade model derived from NZAM post-earthquake 2011c (July 2011) LiDAR survey resampled to a 1m ground resolution.  
 Roads provided by Christchurch City Council (20/02/2012).  
 PROJECTION: New Zealand Transverse Mercator 2000.

DRW:  
DBT  
CHK:  
CM



**GEOMORPHOLOGY MAPPING FOR  
ROCKFALL RISK ASSESSMENT**

**Port Hills  
Christchurch**

APPENDIX 4  
Map J6

**FINAL**

REPORT: CR2012/15 DATE: Sept 2012



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