

PEN-Y-BONT (CHIRK) Landfill

Simulations have been carried out using the original parameters of the FCC 466-NW-2013-06 liner integrity report (March 2013).

To simulate the additional loading of top soils, the density of soils has been increased by about 50%. This increase should show the performance of the liner simulating a 50% increase of additional material and depth on the liner. This addition can equate for up to 10m of soils in the deepest areas.

The sensitivity analysis originally carried out (Table 1) has been replicated with the increased density of soils and results shown in Table 2.

Table 1: Original results of soils at 1700 Kg/m³

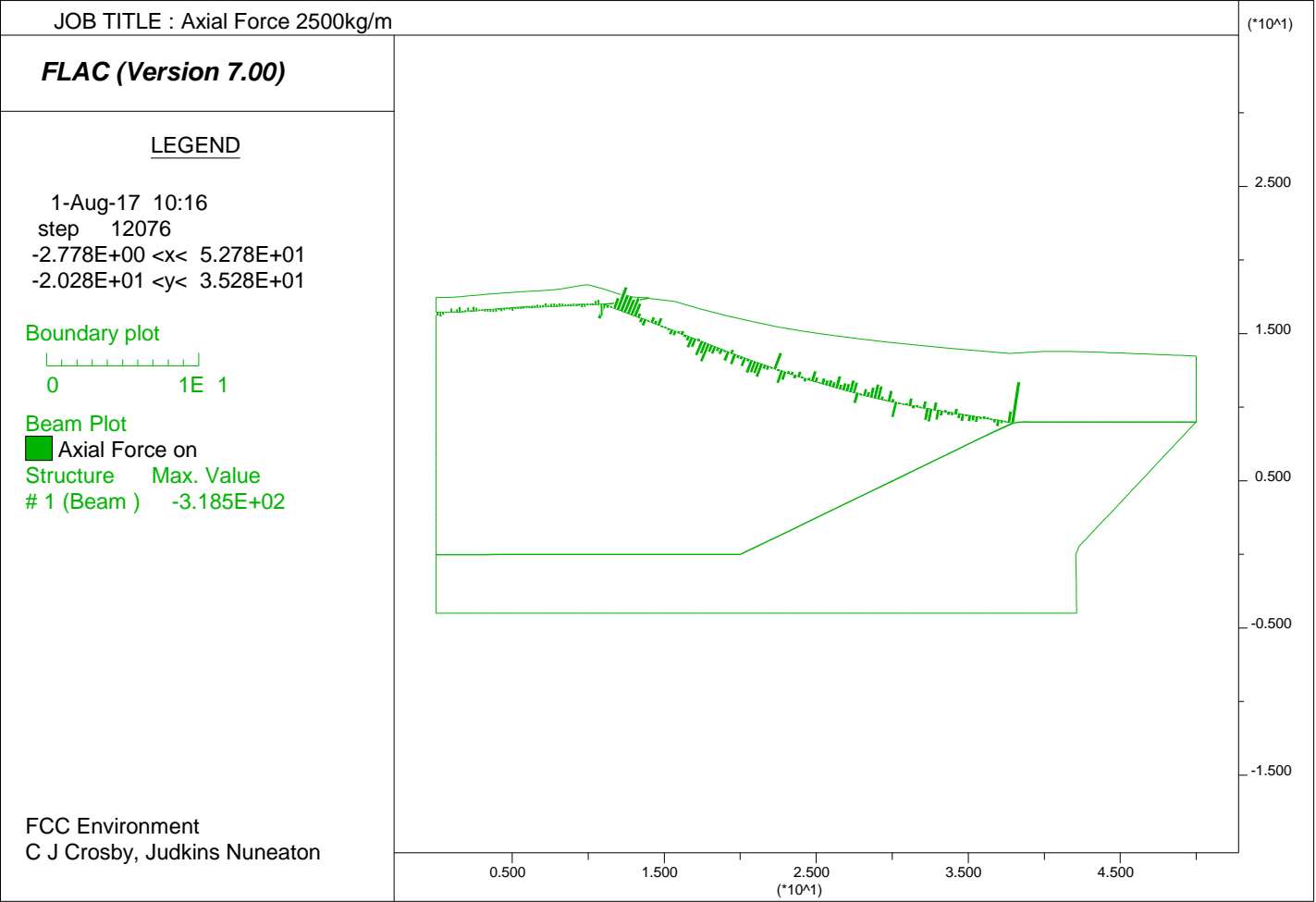
	Max Tensile Force (kN)	Max Tensile Strain (%)
Chirk_1	0.13	4.06
Chirk_2	0.18	4.57
Chirk_3	0.08	2.22
Chirk_4	0.13	3.41
Chirk_5	0.59	1.57

Table 2: Simulated additional loading of soils at 2500 Kg/m³

	Max Tensile Force (kN)	Max Tensile Strain (%)
Chirk_1	0.31	5.4
Chirk_2	0.43	7.4
Chirk_3	0.26	4.5
Chirk_4	0.54	5.4
Chirk_5	1.5	3.1

Highest tensions are experienced in simulation Chirk 5, with high tension of 1.5Kn and low strains of 3.1%. The geomembrane shows that in the extreme scenario case of Chirk 5, it performs well within its tensile specification of 12kN/m. Due to the geometry of the infilled area, compressive forces are prominent on the liner rather than in tension.

Strains do exceed the recommended 3% strains in all cases but can be deemed insignificant due to the geomembranes tensile limits.



JOB TITLE : Axial Strain 2500kg/m

(*10^4)

FLAC (Version 7.00)

LEGEND

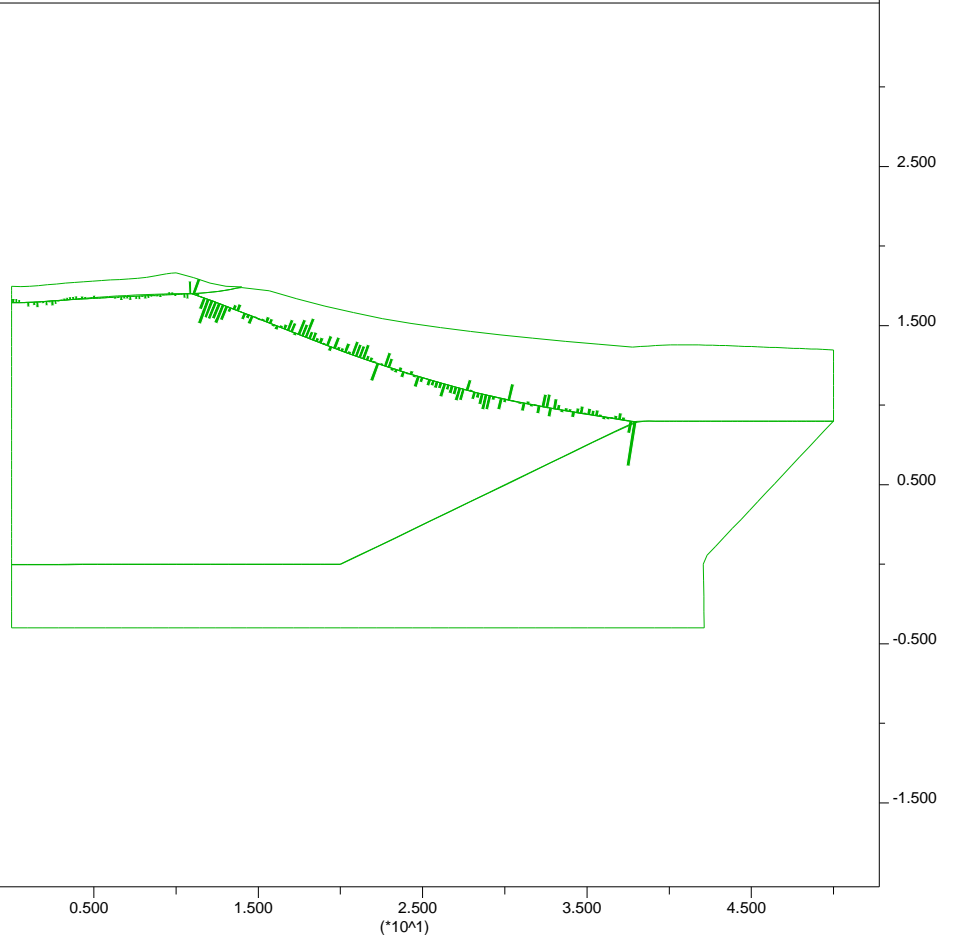
1-Aug-17 10:08
step 12076
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Beam Plot

■ Axial Strn. on
Structure Max. Value
1 (Beam) 5.425E-02
Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton



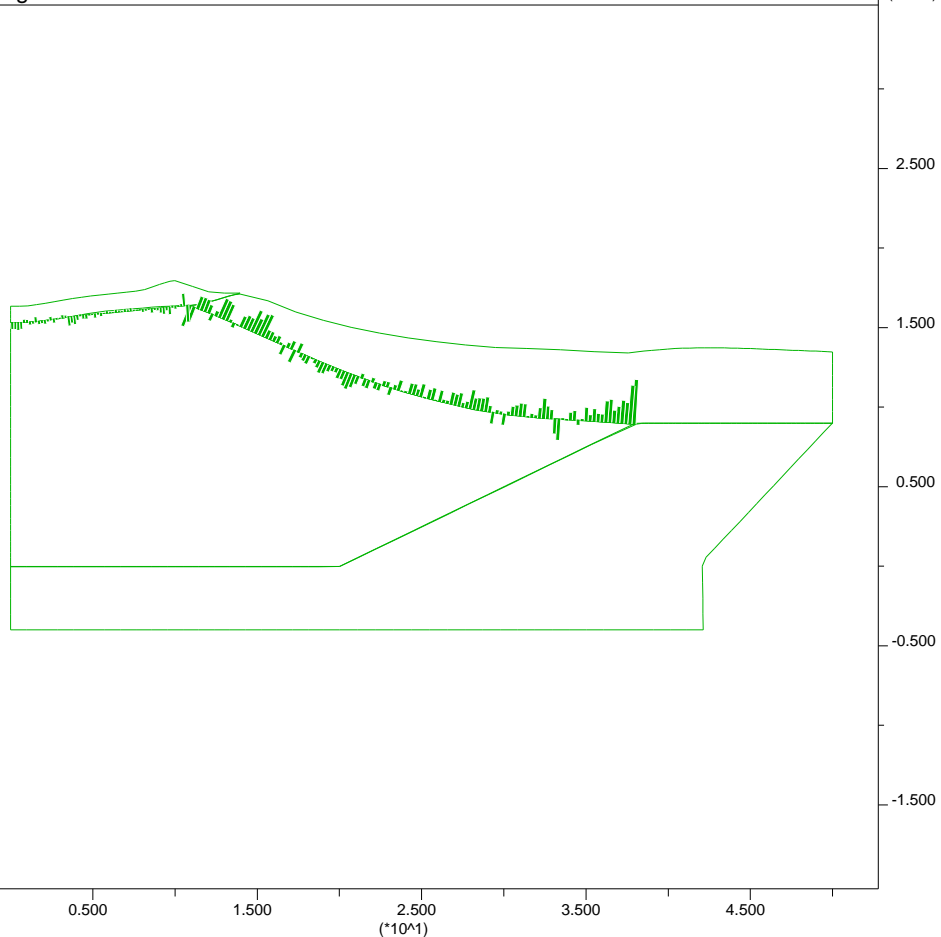
$(\cdot 10^1)$

LEGEND

Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton



JOB TITLE : Chirk 2_Axial Strain 2500Kg/m

(*10^4)

FLAC (Version 7.00)

LEGEND

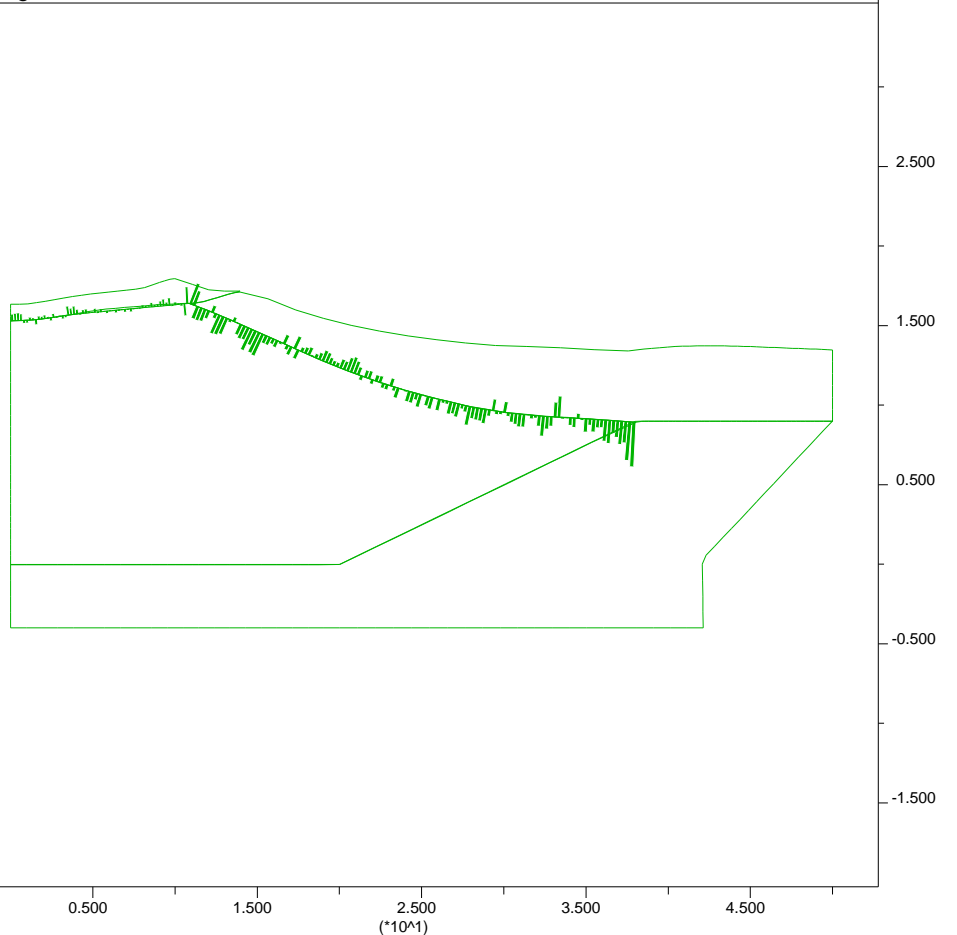
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Beam Plot

■ Axial Strn. on
Structure Max. Value
1 (Beam) 7.487E-02
Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton



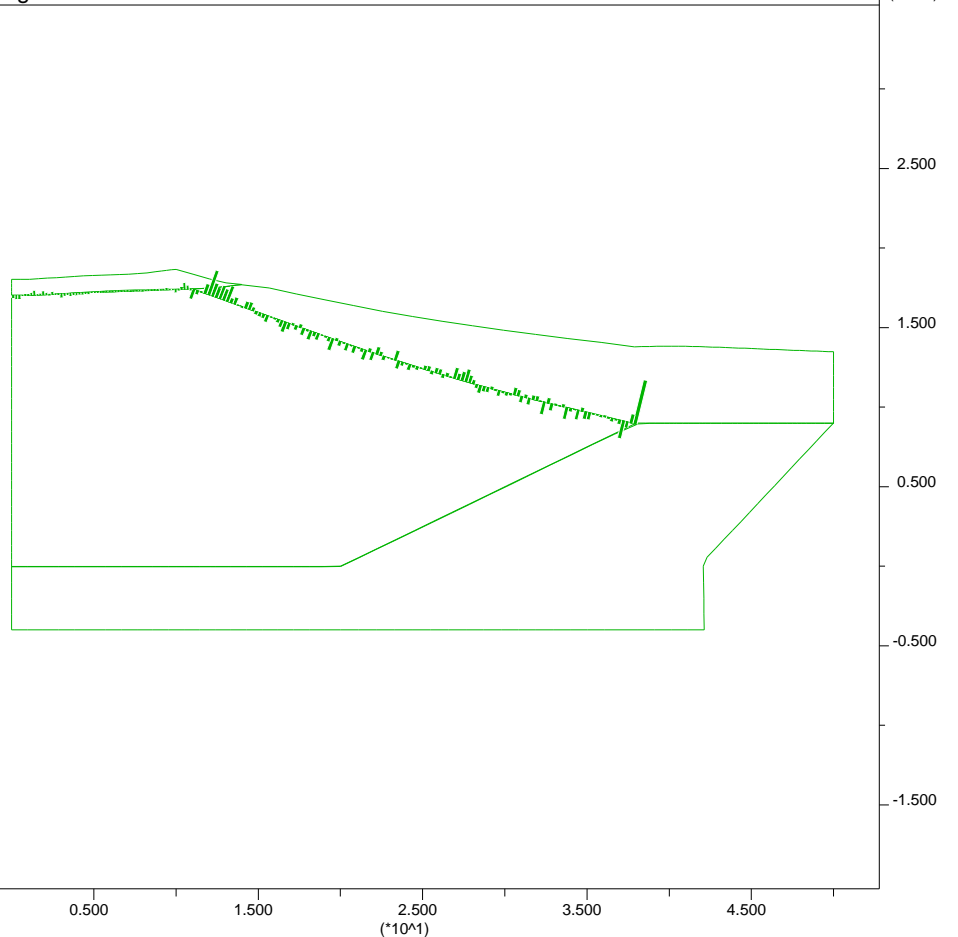
$(\cdot 10^1)$

LEGEND

Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton



JOB TITLE : Chirk 3_Axial Strain 2500Kg/m

(*10^4)

FLAC (Version 7.00)

LEGEND

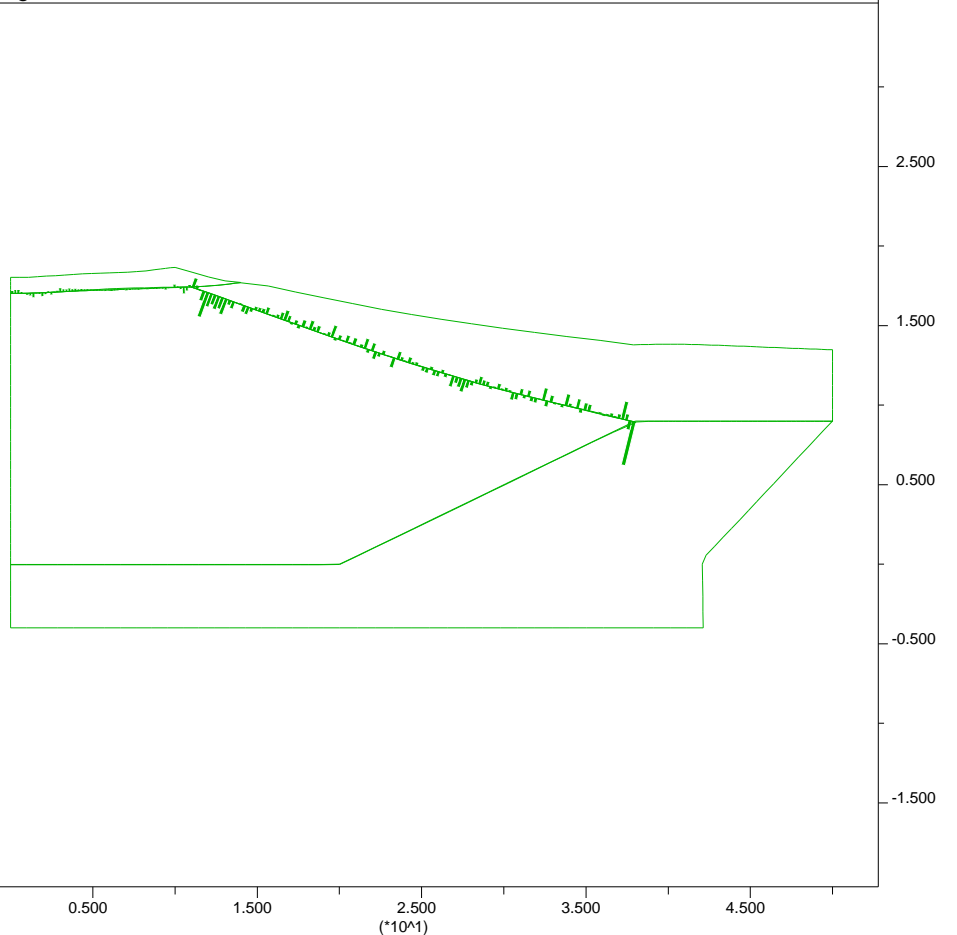
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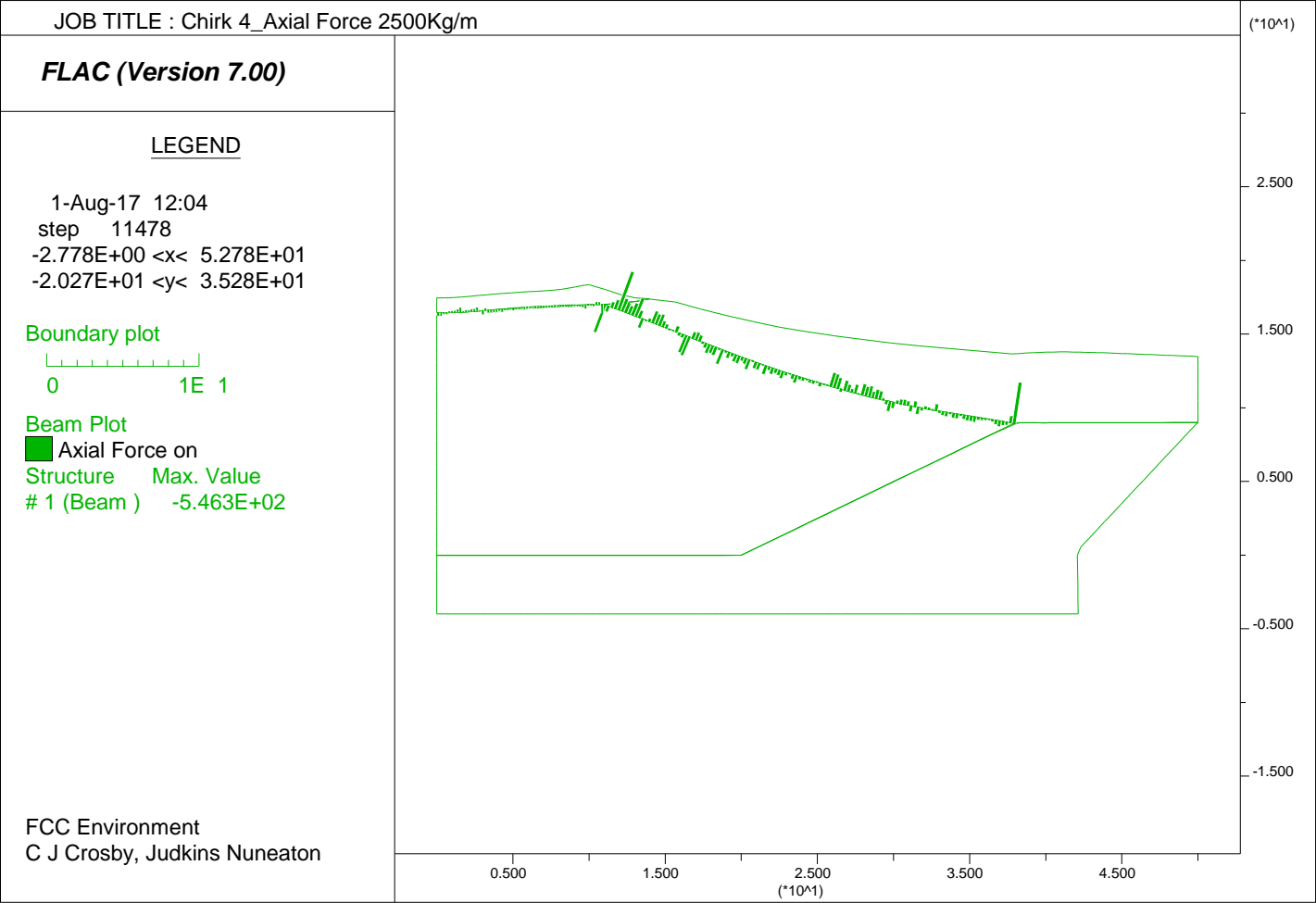
Beam Plot

■ Axial Strn. on
Structure Max. Value
1 (Beam) 4.556E-02
Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton





JOB TITLE : Chirk 4_Axial Strain 2500Kg/m

(*10^4)

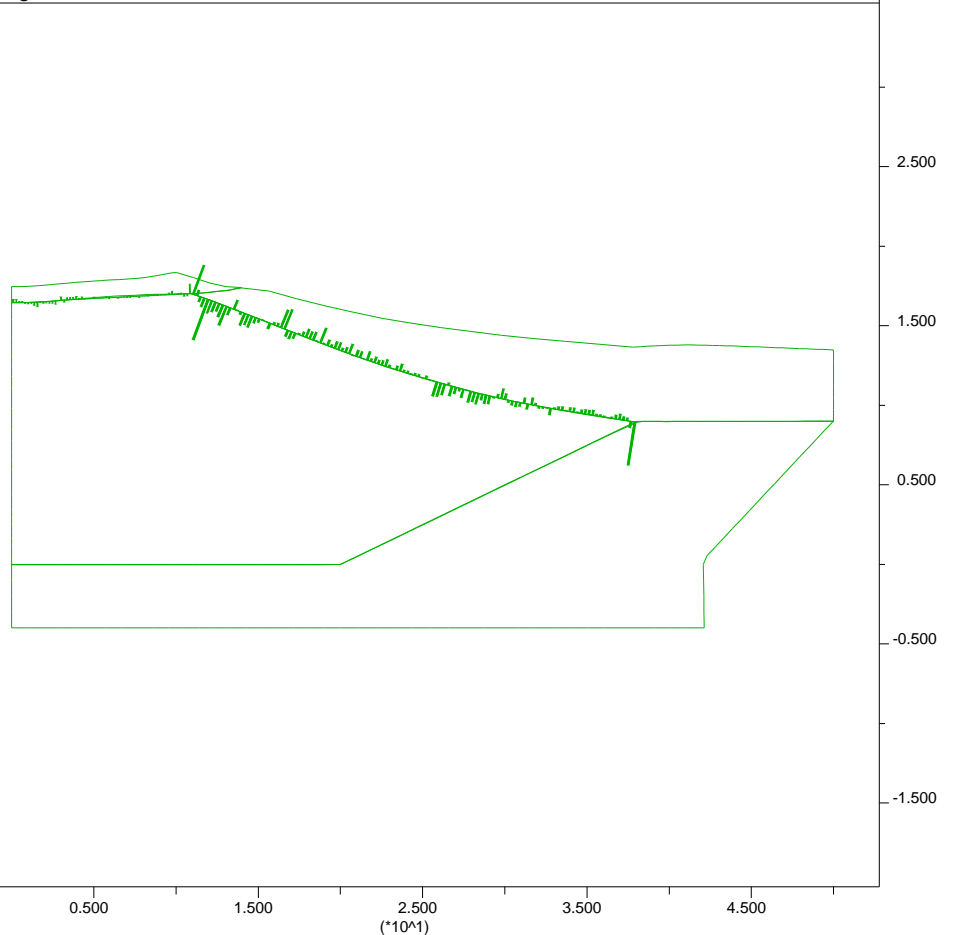
FLAC (Version 7.00)

LEGEND

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Beam Plot

■ Axial Strn. on
Structure Max. Value
1 (Beam) 5.463E-02
Boundary plot



JOB TITLE : Chirk 5_Axial Force 2500Kg/m

(*10^4)

FLAC (Version 7.00)

LEGEND

1-Aug-17 12:06
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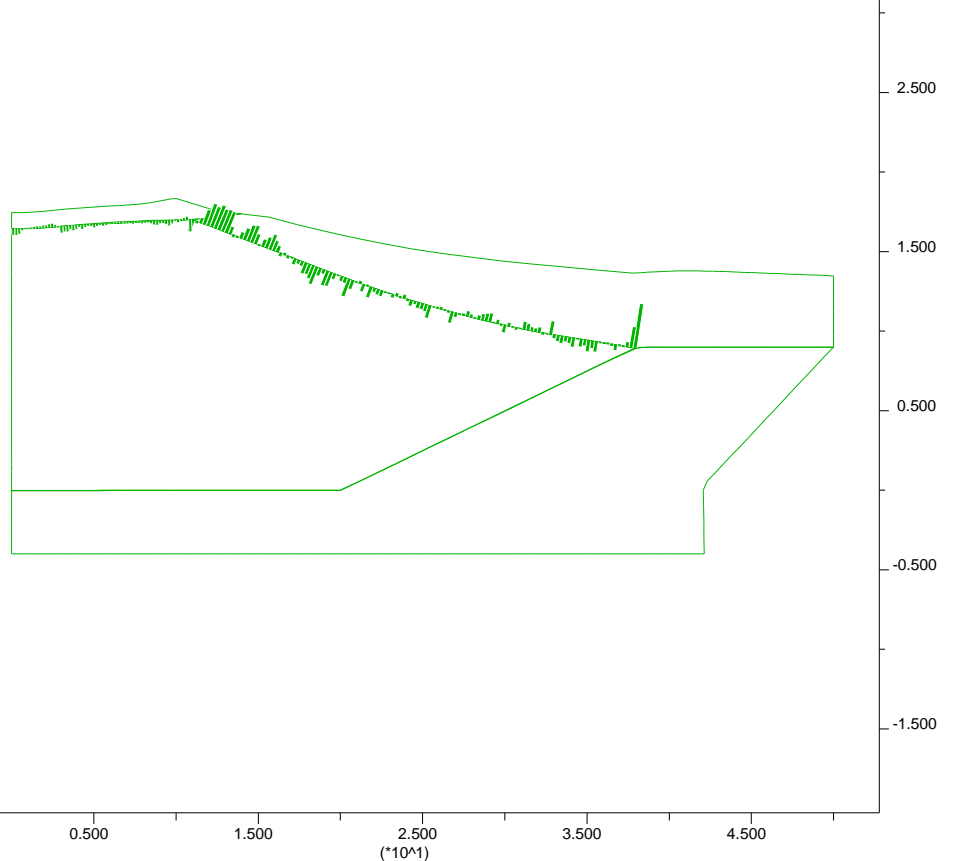
Boundary plot



Beam Plot

■ Axial Force on
Structure Max. Value
1 (Beam) -1.598E+03

FCC Environment
C J Crosby, Judkins Nuneaton



JOB TITLE : Chirk 5_Axial Strain 2500Kg/m

(*10^4)

FLAC (Version 7.00)

LEGEND

1-Aug-17 12:06
step 18046
-2.778E+00 <x< 5.278E+01
-2.028E+01 <y< 3.528E+01

Beam Plot

■ Axial Strn. on
Structure Max. Value
1 (Beam) 3.196E-02
Boundary plot



FCC Environment
C J Crosby, Judkins Nuneaton

