Soil Contamination

Data Insights

BACKGROUND

In November 2016 Compass Environmental has been engaged to complete a soil investigation at a property Gen Fyansford, Hyland Street, Victoria. The site forms part of a larger parcel of land previously occupied by the former Geelong Cement Factory. The site was vacant and proposed to be redeveloped for a low density residential land use.

OBJECTIVES

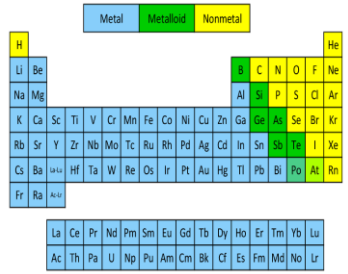
- Assess whether there is a risk to the future site users posed by the residual concentrations of metals in soil under the proposed low density residential land use.

- Provide a data model and statistical insights that will help the mitigations measures (if any)

INITIAL DATASET

The first ground sampling results have been cumulated in a data file with the following structure:

Field ID - unique identifier (string)
Depth - sampling ground depth (numeric)
Location Code - sample location (string - categorical)
Contaminated - 0 or 1 (categorical)
Arsenic - numeric mg/kg
Cadmium - numeric mg/kg
Chromium - numeric mg/kg
Cooper - numeric mg/kg
Nickel - numeric mg/kg
Lead - numeric mg/kg
Manganese - numeric mg/kg
Zinc - numeric mg/kg



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Field ID	Depth	Location Code	Date	Sample Code	Contaminated	Arsenic	Cadmium	Chromium	Copper	Lead	Manganese	Nickel	Zinc
2	TP12/0.2	0.2	TP12	25-Feb-16	16-11537	1	5	0.2	15	13	11	390	13	49
3	TP12/1.1	1.1	TP12	25-Feb-16	16-11537	0	5	0.2	-	13	11	-	12	46
4	TP12/2.5	2.5	TP12	25-Feb-16	16-11537	1	9	0.2	33	32	24	250	31	54
5	TP12/3.5	3.5	TP12	25-Feb-16	16-11537	0	-	-	-	-	-	-	-	-
6	TP12/4.8	4.8	TP12	25-Feb-16	16-11537	0	5	0.2	260	13	11	200	27	31
7	TP212/2.5	2.5	TP12	25-Feb-16	490922	1	13	0.4	30	40	15	250	25	45
8	TP250216A	0.2	TP12	25-Feb-16	16-11537	1	8	0.2	32	36	22	230	29	44
9	TP13/0.2	0.2	TP13	25-Feb-16	16-11537	1	5	0.2	16	14	13	630	22	51
10	TP13/1.1	1.1	TP13	25-Feb-16	16-11537	1	5	0.2	14	5	8	250	10	27
11	TP13/2.2	2.2	TP13	25-Feb-16	16-11537	1	7	0.2	50	25	21	250	27	52
12	TP13/4.4	4.4	TP13	25-Feb-16	16-11537	0	6	0.2	37	11	14	180	25	40
13	TP13/5.4	5.5	TP13	25-Feb-16	16-11537	0	5	0.2	40	10	12	200	26	29
14	TP213/4.4	4.4	TP13	25-Feb-16	490922	0	15	0.4	34	12	7.8	170	20	35
15	TP250216B	0.2	TP13	25-Feb-16	16-11537	0	7	0.2	32	9	11	170	21	33
16	TP250216C	0.2	TP250216	25-Feb-16	16-11537	0	15	0.2	30	19	28	210	27	59
17	TP31/0.6	0.6	TP31	25-Feb-16	16-11537	1	7	0.2	30	26	24	350	24	200
18	TP31/2.1	2.1	TP31	25-Feb-16	16-11537	1	9	0.2	61	22	33	240	29	60

Raw data file contains 151 observations.
There are 9 numeric attributes and 2 categorical attributes.
There is missing information and data need cleaning

HYPOTHESIS

Null Hypothesis
The mean concentration on the contaminant is less than the critical concentration.

Alternative Hypothesis
The mean concentration on the contaminant is greater than the critical concentration.

Critical Concentrations:

Arsenic	100 mg/kg
Cadmium	10 mg/kg
Chromium	430 mg/kg
Cooper	220 mg/kg
Nickel	290 mg/kg
Lead	1100 mg/kg
Manganese	220 mg/kg
Zinc	710 mg/kg

Next ….Modelling Process