Land at Bankside

Banbury

Detailed Remediation Method Statement for Phase 4 Including Country Park (POS)

Report for

Bovis Homes, Barratt Homes and Taylor Wimpey Homes

February 2018

Hydrock Ref: C12702 - 003

DOCUMENT CONTROL SHEET

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Client: **Bovis Homes, Barratt Homes and Taylor Wimpey Homes**

Project: **Land at Bankside, Banbury**

Title: **Detailed Remediation Method Statement**

Status: Final

Date: February 2018

Document Production Record

Issue number:	1	Name	Signature
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Document Revision Record

Issue number	Date	Revision details
1	8th February 2018	Original issue.

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Appendices

1.0 INTRODUCTION

1.1 Terms of Reference

Hydrock Consultants Limited (Hydrock) has been appointed by Bovis Homes, Barratt Homes and Taylor Wimpey Homes to prepare a Remediation Method Statement (RMS) for the required remedial works at Land at Bankside, Banbury. A Site Location Plan and Red Line Boundary Plan are presented in Appendix A.

The proposed development is to comprise combined residential and commercial development with associated public open space and Country Park. An indicative masterplan is shown on Paul Drew Design Drawing GE.B.005 (dated 29/06/10). An Outline Remedial Method Statement was produced by Hydrock (ref: C12702/002 ORMS, dated January 2013) which set out the outline strategy for the above site. A cut and fill exercise is required for the Phase 4 development.

This report summarises the following:

- formulation of a detailed remedial strategy, including detailing the chosen remedial approach, describing the protocol to be followed should unexpected contamination be encountered during the site preparation; and
- construction phase and detail the verification requirements to ensure the correct implementation of the measures prescribed in the RMS.

The works are proposed to mitigate future risks to human health and plant life in the proposed development area.

The following remediation strategy relies on the information presented within the following documents:

- Hydrock Consultants Ltd, dated January 2013 – Additional Ground Investigation for Land at Bankside, Banbury ref: R/12702/001
- Earthworks Strategy drawing ref: LON-HYD-XX-GI-DR-G-1009-P1

The above are presented in Appendix A and B.

The name and address of the companies expected to ensure completion of the items set out in this RMS are:

Barratt West Midlands
60 Whitehall Road
Halesowen
West Midlands
BS3 3JS

Bovis Homes
1 Bromwich Court
Gorsey Lane
Coleshill
B46 1JU

Taylor Wimpey Homes
Windrush Court, Suite J
Abingdon Business park
Abingdon
Oxfordshire
OX14 1SY

The regulating authority's address for the purpose of this RMS are:

Oxfordshire County Council
County Hall
New Road
Oxford
OX1 1ND

2.0 BACKGROUND

2.1 Site Location

The site is located on land north east of Oxford Road, west of the Oxford Canal and east of Bankside in Banbury (nearest postcode: OX15 4AD, National Grid Reference of centroid 446470E 238326N). A site location plan is presented in Appendix A.

2.2 Site Description – Phase 4

The Phase 4 site covers approximately 15 ha and is currently predominantly agricultural land with a fenced off area of overgrown open ground. Topographically the site falls to the east towards a canal adjacent to the eastern boundary. There is a road adjacent to the western boundary called bankside which is aligned along its entirety.

2.3 Proposed Development

The proposed development is to comprise combined residential and commercial development with public open space. Access to the Phase 4 development is proposed from the north off Bankside road. A mass earthworks cut and fill scheme is required to lower site levels within the western area and raise levels within the eastern area. An Engineering Layout for the Phase 4 development are contained within Appendix A ref: LON-HYD-PH4-XX-M2-C-002 and a plan detailing the areas of POS ref: 20488_02_040_06 dated July 2014.

2.4 Site History Summary

The previous assessment of the site by Corsair Consultants in 2005 identified the area of land at the northern end of the site is known to formerly have been used as a Made Ground. Available information indicates that Made Ground materials included brick, concrete, timber, ironstone, tarmac, tile, asbestos, flint, ash, coal, slate and metal in a gravelly, sandy, clayey matrix in this area. It is thought that the materials were placed on to the natural surface and may be up to 4m thick in places. However, there is no official record of the materials that have been infilled in this area, nor is the site known to be a registered landfill site.

The remainder of the site is greenfield and has no history of development.

2.5 Published Geology

The general geology of the site area is shown on the 1:50,000 geological map of Chipping Norton (Sheet 218) and is summarised in the Table below.

Stratigraphic Name	Description
Whitby Mudstone Formation - Mudstone.	The geological records indicate a small outlier of the Whitby Mudstone Formation in the south eastern part of the site.
Marlstone Rock Formation Ferruginous Limestone And Ironstone	The Marlstone Rock Bed is shown to crop out in the southern half of the site. The Marlstone Rock Bed contains ironstone deposits.

Stratigraphic Name	Description
	Weathered ironstone deposits are known to be associated with elevated levels of metals/metalloids, especially arsenic and vanadium in soils. Generally, areas which are rich in ironstone have naturally elevated levels of arsenic and vanadium in soils.
Dyrham Formation- Siltstone And Mudstone, Interbedded.	There is an outcrop of the Dyrham Formation recorded as clays and silts, in the central portion of the site.
Charmouth Mudstone Formation Mudstone.	There is an outcrop of the Charmouth Mudstone Formation in the northern portion of the site. It is reported that the junction between the Charmouth Mudstone Formation and the Dyrham Formation is marked by a change in slope and water seepages which are in places pronounced by a spring line. The geological map notes two springs (however, up to four springs are noted on some of the historic plans) within the site area near this junction.

2.6 Radon

Reference to the Annex A maps in BR 211 (Scivyer 2007), based on the Indicative Atlas of Radon in England and Wales (Miles et al 2007) indicates that full radon protection is required for new dwellings at this location in line with current guidance.

The documentation indicates that between 10% and 30% of houses record radon levels above the action level of 200 bq/m3, therefore full radon protective measures would be required within the construction of residential dwellings at the Bankside site.

2.7 Hydrogeology

The strata beneath the site are classified by the Environment Agency as a Secondary Aquifer or Unproductive Strata, depending on the underlying geology.

2.8 Hydrology

The nearest watercourse shown on current plans is the Oxford Canal which forms the eastern boundary of the site. The River Cherwell lies approximately 230m beyond the Oxford Canal to the east of the site and is classified as Grade B by the Environment Agency. A number of springs (up to four) are identified to issue within the site. Additionally, anecdotal evidence from Cherwell District Council, reported in the Environmental Statement submitted with the Planning Application, suggests that minor ephemeral shallow ponds form from time to time in two stretches along the Oxford Canal. Therefore groundwater flow is considered to be to the north, below the canal, to the River Cherwell.

3.0 GROUND CONDITIONS

3.1 Previous Works

A number of ground investigations have been carried out in recent years. These are summarised below and in greater detail in Hydrock Report R/12702/001 (January 2013).

3.1.1 Corsair Consultants Site Investigation – October 2005

In October 2005, Corsair Consultants focussed on the area of Made Ground in Phase 4 of the Bankside site. These works comprised the excavation of 18 trial pits using a JCB 3CX excavator. The trial pits encountered generally Made Ground materials which comprised gravelly and cobbly, sandy clay materials with varying proportions of broken brick, concrete and other construction debris. Geochemical testing of materials recovered from the investigation locations was undertaken to provide information on the contaminative nature of the materials. Elevated levels of arsenic were detected in both Made Ground and natural soils at the site. Five samples were also analysed for asbestos fibres where asbestos containing material was suspected. Of the five samples tested, four returned positive results for asbestos fibres within cement bound materials. No quantifications were undertaken.

3.1.2 Corsair Consultants Site Investigation – April 2006

In April 2006 further site investigation designed to provide a broader assessment of the ground conditions across the site was undertaken by Corsair Consultants. The investigation involved the drilling of four cable percussion boreholes, excavation of forty two trial pits, undertaking five California Bearing Ratio (CBR) tests and four soakaway tests. The exploratory holes in this phase of investigation record varying geologic conditions across the site area broadly consistent with the published geology. All locations record natural material below the top soil across the site area investigated.

3.1.3 Wardell Armstrong LLP Site Investigation and Testing – 2007

In 2007, Wardell Armstrong undertook an intrusive investigation in order to assess the potential significance of elevated arsenic recorded at the site, further sampling was undertaken in the southern site area. Soil samples were collected from areas of the site where arsenic was known to be elevated. The soil samples were subject to geochemical analysis for total and PBET for arsenic.

The results enabled the generic assessment criteria to be modified to produce a Site Specific Assessment Criteria (SSAC). Through the development of Site Specific Assessment Criteria (SSAC) which took into account the PBET results it was demonstrated that the elevated concentrations of arsenic were within the SSAC.

This work demonstrated that the naturally occurring arsenic levels encountered at the site do not pose an unacceptable risk to human health.

3.1.4 Wardell Armstrong LLP Report on Ground Conditions, Bankside, Banbury – August 2010

No intrusive investigation was undertaken as part of this phase of works. The report presents relevant background information regarding the geo-environmental setting of the site in the form of desk study researches and a review of published environmental information including hydrology, hydrogeology, radon, geology along with a site history and the findings from all the previous site investigations.

The report concludes that where necessary, depending on the extent of the excavations and subsequent processing of materials in the northern site area, a clean cover pathway break may be required to separate end users (this area of the site is proposed for residential development) from the underlying materials, if Made Ground materials are left in place. The extent of areas requiring clean cover (if any) would need to be developed following delineation of this area along with assessment of current and proposed finished ground levels in the development.

3.1.5 Wardell Armstrong Letter Report, Site at Bankside, Banbury – *Results of Ground Gas Monitoring* - March 2012,

This ground gas monitoring letter report presents the results of the ground investigation to assess ground gas generation associated with the area of Made Ground in Phase 4. The purpose of the report was the assessment of the current near-surface soil gas regime in the Made Ground area with respect to the proposed future residential development. The site investigation included the installation of 20 boreholes on a 50m grid across the former Made Ground area of the site to depths ranging between 3 and 4m bgl. All of the boreholes were installed with gas monitoring standpipes.

It was concluded that a “Green” classification should be applicable Phase 4 of the site and no gas protection would be required in new build in respect of methane or carbon dioxide in near surface soils.

3.1.6 Geo Environmental Group, Intrusive Assessment of Canal Base, Oxford Canal, Banbury, Oxfordshire - May 2012

Geo Environmental Group (GEG) was commissioned to undertake an intrusive investigation of the canal base at a single location on the Oxford Canal in order to provide relevant information with respect to the proposed drilling of a 300mm drain directly beneath the canal.

The ground conditions encountered in the window sample borehole next to the canal (BH1) included a layer of re-worked topsoil which comprised red brown, slightly clayey to clayey topsoil with occasional charcoal fragments to 1.20m bgl over alluvium to the base of the borehole (6.00m).

3.1.7 Wardell Armstrong LLP, Remediation Ground Investigation Report, Bankside, Banbury - August 2012

This report was prepared to provide an assessment of the ground conditions which exist across the wider strategic Bankside site and to identify potential geotechnical constraints to the proposed residential development. The works were aimed at determining the geotechnical

characteristics of the ground conditions for the outline recommendation of foundation zoning areas across the site.

The investigation works comprised the excavation of 64 trial pits and the drilling of 29 light percussion probe holes and 7 cable percussion boreholes with 10 CBR tests. The investigation works were undertaken across the whole of the site area focussing particularly on the areas of the proposed residential development within the north east and south of the site. Investigation was undertaken on an approximate 70m grid across the development areas with an approximate 200m grid across the areas of public open space.

3.1.8 Hydrock Consultants Limited, Additional Ground Investigation for Land at Bankside, Banbury – January 2013 and Vanadium Letter

During this phase of work Hydrock undertook 35 additional trial pits to obtain a better spread of geo-environmental data points. The data from the most recent investigations was used alongside historical data sets to analyse the suitability of use for various soil types across the site.

The findings were that arsenic and vanadium were present in the natural strata with a US_{95} in excess of their generic assessment criteria (GAC). There is no evidence of a man-made source of these metals on the site. The local geology has naturally high levels of arsenic and vanadium and the concentrations at this site are similar to the normal background levels given in *The Advanced Geochemical Atlas of England and Wales* (Rowlins *et al* 2012)[1]. In addition, the arsenic US_{95} is below the site specific assessment criterion (SSAC) when bioaccessibility is taken into account.

The Made Ground also contains arsenic and vanadium and it is most likely that this is also in natural soils that were placed in Phase 4. Consequently, they are not a cause for concern. However, the Made Ground also contains a number of PAH species and is considered unsuitable for use as shallow soil in the proposed garden and soft landscaped areas, thee elevations are detailed in the table below. Furthermore, the Topsoil overlying the Made Ground also has elevated PAH species and is unsuitable for use as shallow soil in the proposed garden and soft landscaping areas.

Chemical of Potential Concern	Generic Criterion (mg/kg)	No. Samples	Max. (mg/kg)	No. Samples Exceeding Generic Criterion	US_{95} (mg/kg)
Benz(a)anthracene	4.7	19	36	4	16
Benzo(a)pyrene	0.94	19	56	9	20
Benzo(b)fluoranthene	6.5	19	40	4	16.2
Chrysene	8	19	40	4	18
Dibenz(a,h)anthracene	0.86	19	4.5	4	1.8
Indeno(1,2,3,cd)pyrene	3.9	19	43	4	15
Naphthalene	3.7	19	42	3	14

[1] RAWLINS, B. G., McGRATH, S. P., SCHEIB, A. J., CAVE, N., LISTER, T. R., INGHAM, M., GOWING, C. and CARTER, S. 2012 .*The advanced geochemical atlas of England and Wales.* British Geological Survey, Keyworth.

Additional works to assess the bioavailability of vanadium within the site was undertaken to determine a Site Specific Assessment Criteria (SSAC) value. This was discussed with the local Environmental Protection Officer (email dated 8th July 2013) who agreed that the US_{95} for vanadium is below the SSAC and there is no significant risk to human health.

3.2 Geology Encountered – Phase 4

3.2.1 Made Ground

Made Ground was only encountered in the northern part of the site, at depths ranging from the ground surface to 3.8m bgl.

In general, the Made Ground is of variable content comprising gravelly clay with cobbles and boulders, gravel, cobbles and boulders of brick, white polystyrene, plastic sheeting, concrete, concrete fragments, plastic. A boulder-sized section brick walling was encountered.

3.2.2 Colluvium

Colluvium was not recorded formally within the ground investigation logs, but has been interpreted as such at a later date during works completed for the Foundation Zonation Plan and is shown on Hydrock drawing ref: C12702 – G006, dated April 2016

3.2.3 Charmouth Mudstone Formation

The Charmouth Mudstone Formation was encountered in the northern half of the site including underlying the Made Ground, at depths ranging from 0.2 to 1.6m bgl. The Charmouth Mudstone Formation consisted of low to high strength, orange brown, brown and grey, silty residual clay and moderately packed, light orange brown, residual, fine sand and with depth firm dark brown, mottled, orange brown and grey, residual, clay with frequent fine to medium extremely weak lithorelicts (encountered from 1.7 to 2.2m bgl).

3.2.4 Dyrham Formation

The Dyrham Formation was encountered in HTP12 in the centre of the site and consisted of very low to low strength, orange brown and grey, silty, residual, wet clay to a depth of 2.8m bgl where the trial pit was terminated because of collapse.

3.2.5 Marlstone Rock Bed

The Marlstone Rock Bed was encountered in the southern half of the site. This generally consisted of medium to high strength, red brown and brown, sandy, gravelly, residual clay over moderately strong, blue grey and red brown banded, shelly, partially weathered limestone.

3.2.6 Whitby Mudstone Formation

The Whitby Mudstone Formation was encountered in the southern end of the site and consisted of a layer of medium to high strength, firm to stiff, brown and yellow brown mottled, gravelly, sandy, silty residual clay which was underlain by weathered limestone of the Marlstone Rock Bed.

3.2.7 Groundwater

Only limited groundwater/surface water has been encountered and sampled at the site to date. The south end of the site which overlays the Marlstone Rock Bed is a Secondary A Aquifer and springs are observed at the eastern end of the site which are likely to expel where the Marlstone Rock Bed changes to the either the Dyrham Formation or the Charmouth Mudstone Formation.

The Made Ground area is not underlain by the Secondary A Aquifer and is considered unproductive strata.

3.2.8 Ground gases

Wardell Armstrong determined within their report dated March 2012 that the site could be classified as 'Green' no gas protection would be required within the northern part of the site in respect of methane or carbon dioxide in the near surface soils.

Current advice based on the BR 211 Report states that full radon protection is required for new dwellings across the entire site.

4.0 REMEDIAL REQUIREMENTS

Following a review of the historic investigation data and consideration of the residential nature of the proposed development, it is considered that remedial action are required to mitigate PAH and asbestos and physical suitability of the ground conditions. It is recommended to take the form of a suitable cover system/break layer to protect future residents and to provide a suitable growing medium in areas of garden and soft landscaping. The cover system should be designed to mitigate the following contamination concerns.

4.1 Pervasive Contamination

The provision of a cover system is recommended where Made Ground and topsoil currently overlying the Made Ground remains exposed at the surface post development.

4.2 Asbestos

A total of 25 samples from the area of Made Ground have been analysed for asbestos fibres during site investigation works by Hydrock and Corsair.

Asbestos-containing materials were identified in samples obtained during the Corsair ground investigation in 2005. Four returned positive results for asbestos fibres within cement bound materials but were not quantified. None was encountered by Hydrock during our investigations.

Notwithstanding this it is considered that asbestos fibres are pervasive within the Made Ground and remediation will be required to mitigate the risk to human health in this regard. The proposed cover system will mitigate against this contamination.

5.0 REMEDIATION STRATEGY

5.1 Objectives

The stated objectives of this Remediation Strategy are as follows;

- Satisfying those planning conditions imposed in respect of land contamination (planning application ref: 15/00344/REM).
- Making the site safe and suitable for use.
- Rendering the site incapable of determination as contaminated land under Part 2A (in accordance with the new National Planning Policy Framework) in respect of this development.
- Using best practicable means to remediate contamination present at the site without compromising safety.
- Wherever technically or financially possible, utilising sustainable solutions.

5.2 Remedial Actions

Due to the topographic fall of the site the development process will include re-profiling and levelling of the land. This process will involve cut and fill from within the area of Made Ground and use of surplus Made Ground arising's to achieve ground level raise in parcel immediately adjacent as detailed on the Earthworks Strategy in Appendix A.

Hydrock recommend that in order to mitigate the risk to human health posed by the Made Ground and adjacent earthwork where Made Ground is to be placed and POS. The installation and verification of a cover system to all soft landscaped areas is undertaken. This would apply in any section of the site where Made Ground and/or topsoil within the Made Ground area remains post development as shown on the clean cover plan in Appendix A.

Hydrock has assumed that the material used to form the cover system will be 80% of the relevant Generic Assessment Criteria (GAC) to ensure chemical suitability (See Appendix C).

Proposed cover materials will be taken from stockpiles which have been validated prior to use within soft standing areas.

5.3 Clean Cover

In order to mitigate the pervasive contamination from the Made Ground on site there is a requirement for a clean cover system to be installed in accordance with BR465 within all gardens and Public Open Space. Given the identified contamination Hydrock recommend an 'engineered' clean cover system made up of 600mm of suitable material is required in private gardens and 450mm in areas of Public Open Space/Soft Landscaping.

The clean cover system should comprise (described from the base up) the following:

- Basal geotextile anti dig layer;

- 350mm sub soil; and
- 250mm topsoil (min. 150mm).

In areas of public open space, where the land is intended for amenity or as soft landscaping, the thickness of the cover system may be reduced to 450mm, comprising:

- 300mm sub soil; and
- 150mm topsoil.

Should standard planting, such as deep rooting shrubs be proposed, they should be planted within a deepened tree pit, lined with a geotextile as above, but extended to an appropriate depth to permit planting.

The cover system is required throughout the Made Ground area and in any other places where Made Ground or topsoil from the Made Ground area are placed. These areas are shown on the clean cover plan within Appendix A.

5.4 Nuisance, Health and Safety

During the implementation of the remedial works, the contractor should ensure that appropriate measures are in place to protect local residents from nuisance. The contractor shall implement measures that protect the local environment from surface water run-off from the development, from unacceptable quantities of dust being generated during site activities and from soil being tracked into, or dropped onto, public highways.

Consequently, it is recommended that any soil export or import to site is undertaken utilising covered vehicles and that suitable road cleaning equipment is available to maintain the highways. Dust suppression systems shall be utilised as required, dependent upon site activities.

6.0 IMPORT OF CLEAN COVER MATERIALS

6.1 Sourcing of Imported Materials

It is anticipated that no materials will be required to be imported. However, the below is given in case of a change of strategy. If they are required the client will advise Hydrock of potential suitable sources of topsoil and sub soil for use in the cover system. This material will be imported to site nearing completion of the development, as required and Hydrock will be invited to visit and sample/assess materials to check the chemical suitability for its use at the site.

As discussed above, the material used to form the cover system will be 80% of the relevant Generic Assessment Criteria (GAC) to ensure chemical suitability (See Appendix C). Furthermore, the Environment Agency has requested that the leachable contaminant concentrations of any import material are below the relevant EQS values (also presented in Appendix C).

6.2 Sampling at Source

Hydrock will collect 1 sample per 250m^3 with a minimum of 3 samples per source. The samples will be screened for a standard Hydrock soil suite (metals, PAH and asbestos screen). The results of the chemical sampling will be compared to the GACs/EQSs presented in Appendix C to determine if the material is suitable for use.

Where assessment of soil quality in advance of import is not possible then assessment of material at the above frequency will be required from a segregated on-site stockpile.

6.3 Confirmation of Material Delivered to Site

Hydrock would then test this material at a frequency of 1 sample per 500m^3 to confirm that the material is has not been cross contaminated during delivery to site or through movement within site. The results of the sampling will be competed to the GACs/EQSs presented in Appendix C.

If sampling has not been undertaken prior to import then testing at a frequency of 1 in 250m^3, with a minimum of 3 samples, will be required.

7.0 PROTOCOL IF UNEXPECTED CONTAMINATION IS ENCOUNTERED

7.1 General

As with any site, potential exists for encountering materials that were not recorded during the original site investigation works.

Should any previously unidentified material suspected (by visual or olfactory means) of being contaminated be encountered during the development of the site, then the following protocol should be implemented:

- site activities in the immediate vicinity shall cease and Hydrock shall be contacted and provided with a summary of the observations made;
- Hydrock to attend site and undertake appropriate investigations to establish the extent of the materials in question. Depending upon the extent and hence volume of material present, the materials may be removed and temporarily stockpiled (on heavy grade polythene sheeting) to enable construction activities to continue;
- the resultant chemical analyses shall be compared with the appropriate trigger concentrations for the land use in question. The findings and recommendations shall be discussed and agreed with the relevant Regulator(s); and
- update to this RMS if required. In the majority of cases it would be proposed that unexpected contaminative issues are dealt with via independent correspondence, but upon occasion it may be necessary to revisit and update the RMS.

Prior to implementing any amendments to the remedial strategy, as presented within this RMS, the regulators shall be consulted and the amendments agreed in writing.

8.0 VERIFICATION

8.1 Objectives

This RMS has identified a number of mitigation measures as being necessary at the subject site in order to provide a development that is fit for purpose/suitable for use.

These remedial requirements need verification, such that the regulating bodies can be satisfied that the RMS has been fully complied with, and ultimately such that any associated Planning Conditions relating to land quality can be discharged.

The verification process is also required to provide a permanent record of the remedial works undertaken at the subject site. The sections below summarise the various activities requiring verification and also comment upon the verification reporting process.

Verification visits shall be made by a suitably experienced/qualified independent geo-environmental consultant who shall undertake the necessary works outlined below.

8.2 Imported materials

The verification requirements for imported materials (if required) are detailed in Section 6.

8.3 *In-situ* Cover System Verification

There will be a requirement to validate the natural soil to ensure that it is chemically clean via an audit trail and sampling of the stockpiles during the earthworks process. This should be done on the basis of one sample per 500m^3.

All gardens require physical validation on a 1 in 4 basis by Hydrock by observing the excavation of a hand dug trial pit (by the groundworker) at a location of their choice to confirm the thickness of the topsoil and sub soil and confirm the presence of the geotextile. A photographic record will be provided of each location. A staff will be used to mark the ground surface so that placed thickness can be clearly seen in the photograph.

9.0 VERIFICATION REPORTING

Hydrock will then prepare a verification letter addressed to the regulator. This memo will include verification photographs showing the thickness of the placed cap, chemical data for the topsoil and sub soil (previously sampled).

9.1 Site Vigilance

The site manager will use the site induction and tool box talks to ensure that the ground workers are briefed about the contamination and remain vigilant at all times.

9.2 Purchaser Engagement

It is recommended that purchasers of the houses will be provided with a briefing document informing them of the remediation carried out. This document should advise on the presence of the clean cover system and that the anti-dig layer at the base of the cover should not be punctured.

10.0 REFERENCES

ENVIRONMENT AGENCY. 2004. Model procedures for the management of land contamination. *Contaminated Land Report 11.* The Environment Agency.

HOLLINGSWORTH, S. C. 2004. *Cover systems for land regeneration*. BRE 465, Garston. 88pp + CD-ROM.

DCLG. November 2004. Planning and pollution control. Planning Policy Statement 23.

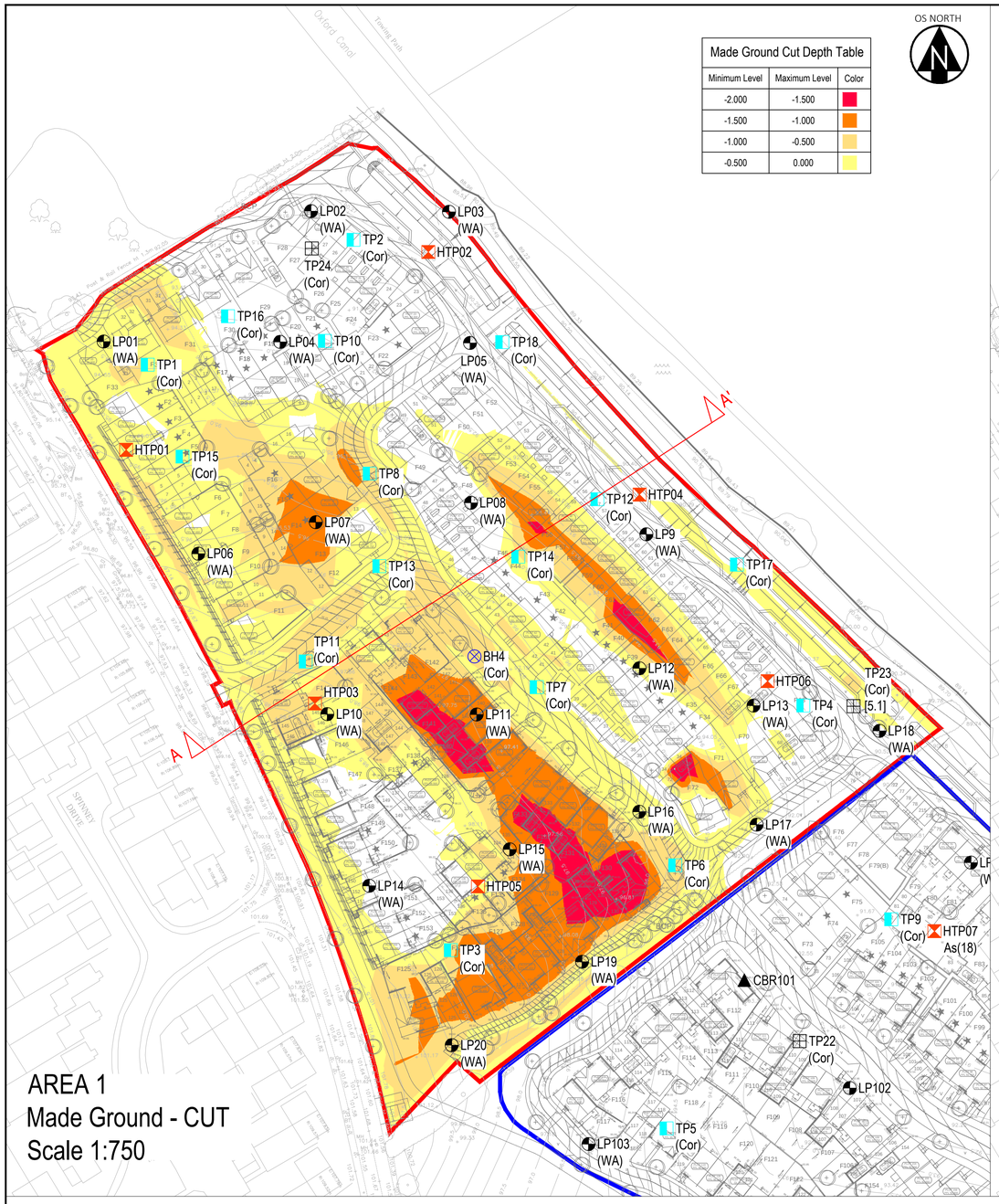
SCIVYER, C. 2007. Radon: Guidance on protective measures for new buildings, extensions, conversions and refurbishment (2007 edition). Building Research Establishment Report BR 211. BRE, Garston.

CIRIA. 2007. Assessing risks posed by hazardous ground gases to buildings. C665

Appendix A

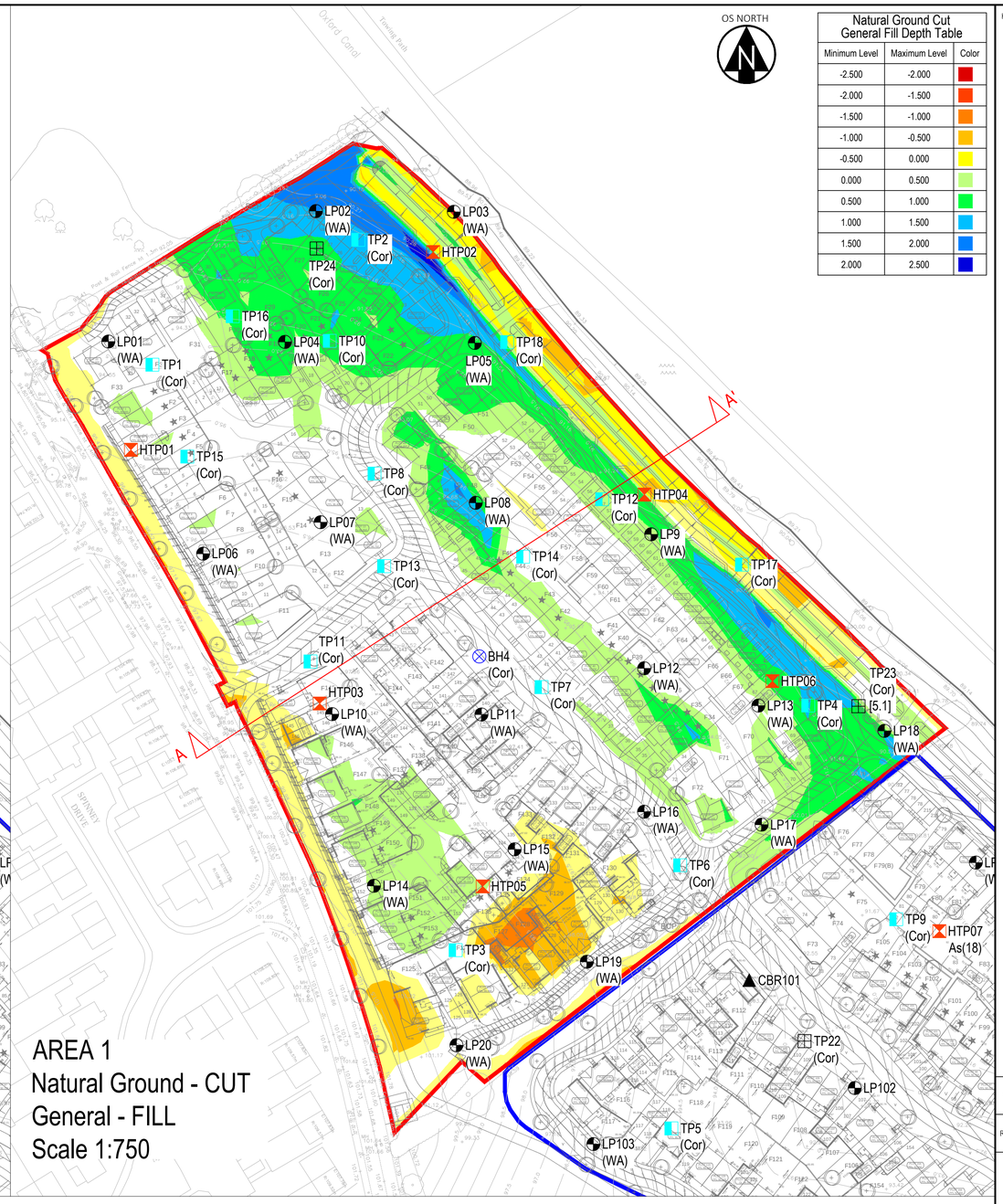
Drawings

Made Ground Cut Depth Table		
Minimum Level	Maximum Level	Color
-2.000	-1.500	
-1.500	-1.000	
-1.000	-0.500	
-0.500	0.000	



AREA 1
Made Ground - CUT
Scale 1:750

Natural Ground Cut General Fill Depth Table		
Minimum Level	Maximum Level	Color
-2.500	-2.000	
-2.000	-1.500	
-1.500	-1.000	
-1.000	-0.500	
-0.500	0.000	
0.000	0.500	
0.500	1.000	
1.000	1.500	
1.500	2.000	
2.000	2.500	



AREA 1
Natural Ground - CUT
General - FILL
Scale 1:750

KEY

- Area 1 Boundary
- Area 2 Boundary
- Trial Pit - Hydrock April 2013
- Trial Pit - Hydrock 2012
- Historical Well - November 2011 & May 2012 (Wardell Armstrong)
- Historical Trial Pit - May 2012 (Wardell Armstrong)
- Historical Trial Pit - March 2006 (Corsair)
- Historical Trial Pit - October 2005 (Corsair)
- Historical Trial Pit - May 2007
- Historical Hand Sample - June 2007
- Historical Trial Pit - Dec 2011 (Wardell Armstrong)
- Historical Borehole - April 2006 (Corsair)
- Cable Percussion Borehole - May 2012 (CC Ground Investigations)
- CBR Test
- Water Sample
- As(21) Arsenic (mg/kg)
- [5.1] Pbet (%)
- Existing ground profile
- Top Soil profile
- FFL - Finish Floor Level ref drawings: LON-HYD-PH4-XX-M2-C-0001 - Highway Alignment LON-HYD-PH4-XX-M2-C-0020 - Architects Layout LON-HYD-PH4-XX-M2-C-0002 - Engineering Layout - TW
- FL - Formation Level (FFL-750mm)
- Made Ground profile
- Top soil strip
- Made ground
- Natural ground (Clay, Sand, Silt)
- Made Ground CUT
- Natural ground CUT
- General FILL

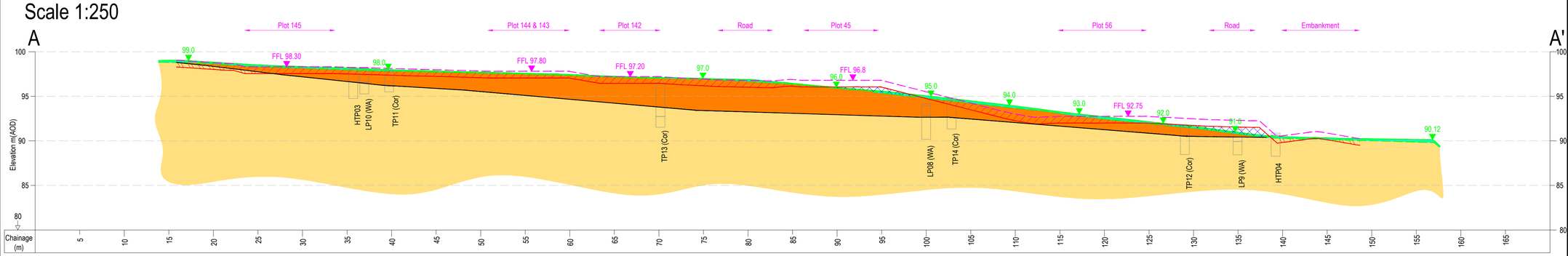
BULK EARTHWORKS

SITE TOPSOIL STRIP - Site Topsoil Strip depths based on the site investigations and varies between 0.08m - 0.4m

TOPSOIL STRIP VOLUME	AREA 1 (m^3) = 5700 AREA 2 (m^3) = 9100 Total (m^3) = 14800
MADE GROUND CUT VOLUME (m^3) =	11055
NATURAL GROUND CUT VOLUME	Area1: CUT (m^3) = 1820 Area2: CUT (m^3) = 12400 Total (m^3) = 14220
GENERAL FILL VOLUME	Area1: FILL (m^3) = 6500 Area2: FILL (m^3) = 9900 Total (m^3) = 16400

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
2. This drawing is to be read in conjunction with all other relevant drawings, details and specifications.
3. This drawing has been based on the following drawings and information:
   - Topographical Survey: Greenhatch ground drawing ref: 10477A_OGL, rev 2
   - Proposed Layout: Hydrock drawing:
     LON-HYD-PH4-XX-M2-C-0001 - Highway Alignment
     LON-HYD-PH4-XX-M2-C-0020 - Architects Layout
     LON-HYD-PH4-XX-M2-C-0002 - Engineering Layout - TW
4. The contractor shall take all necessary safety precautions in line with current legislation when working in/near confined spaces, deep excavations and utilities.
5. All levels and dimensions shall be verified on site prior to the commencement of any works. and discrepancies shall immediately be brought to the attention of the engineer.
6. The cut and fill quantities have been calculated using Civil 3D. this programme is a design tool which establishes bulk earthworks volumes and indicates approximate depths of cut and fill across the site. It shall not be used to construct or set formation levels and / or finished levels.
7. Prior to the sub-soil modeling exercise, the following existing strip has been model base on investigation information:
   - Hydrock - 2012 & 2013
   - Wardell Armstrong November 2011, December 2011, May 2012,
   - Corsair - March 2006, April 206, October 2005
   - CC Ground Investigations - May 2012
7. No bulking factor has been taken into account in the cut and fill exercise.
8. No allowance has been made for arisings resulting from excavations to install drainage and construct foundations.
9. It is to be used to assist the contractor in their own assessment of the earthworks.

Section A-A'
Scale 1:250



P1	DRAFT ISSUE					
	IB	20/1/17	RH	21/11/17	RH	22/11/17
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT: Taylor Wimpey

PROJECT: LONGFORD PARK, BANKSIDE, BANBURY - PH4

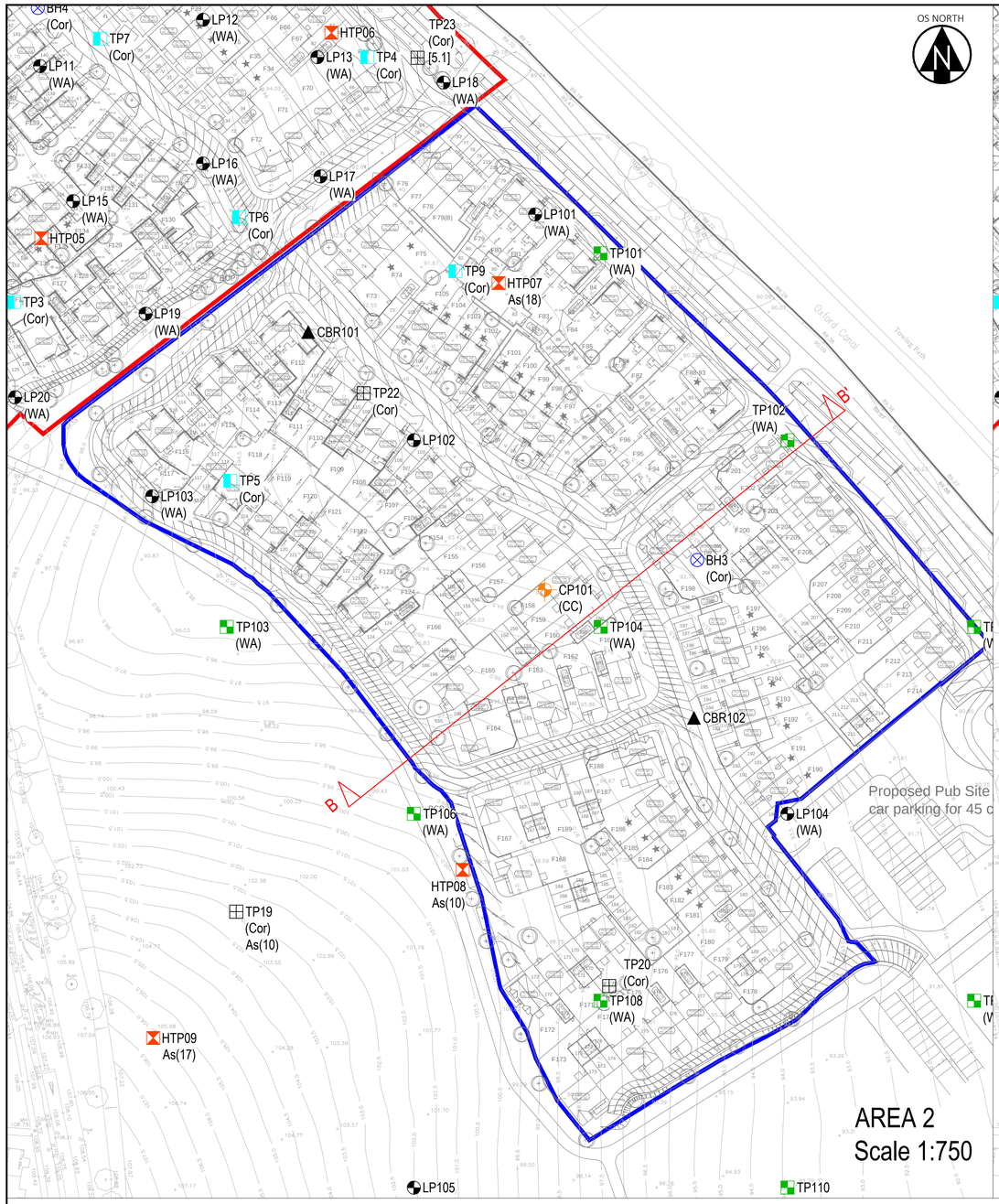
TITLE: CUT AND FILL ASSESMENT - AREA 1

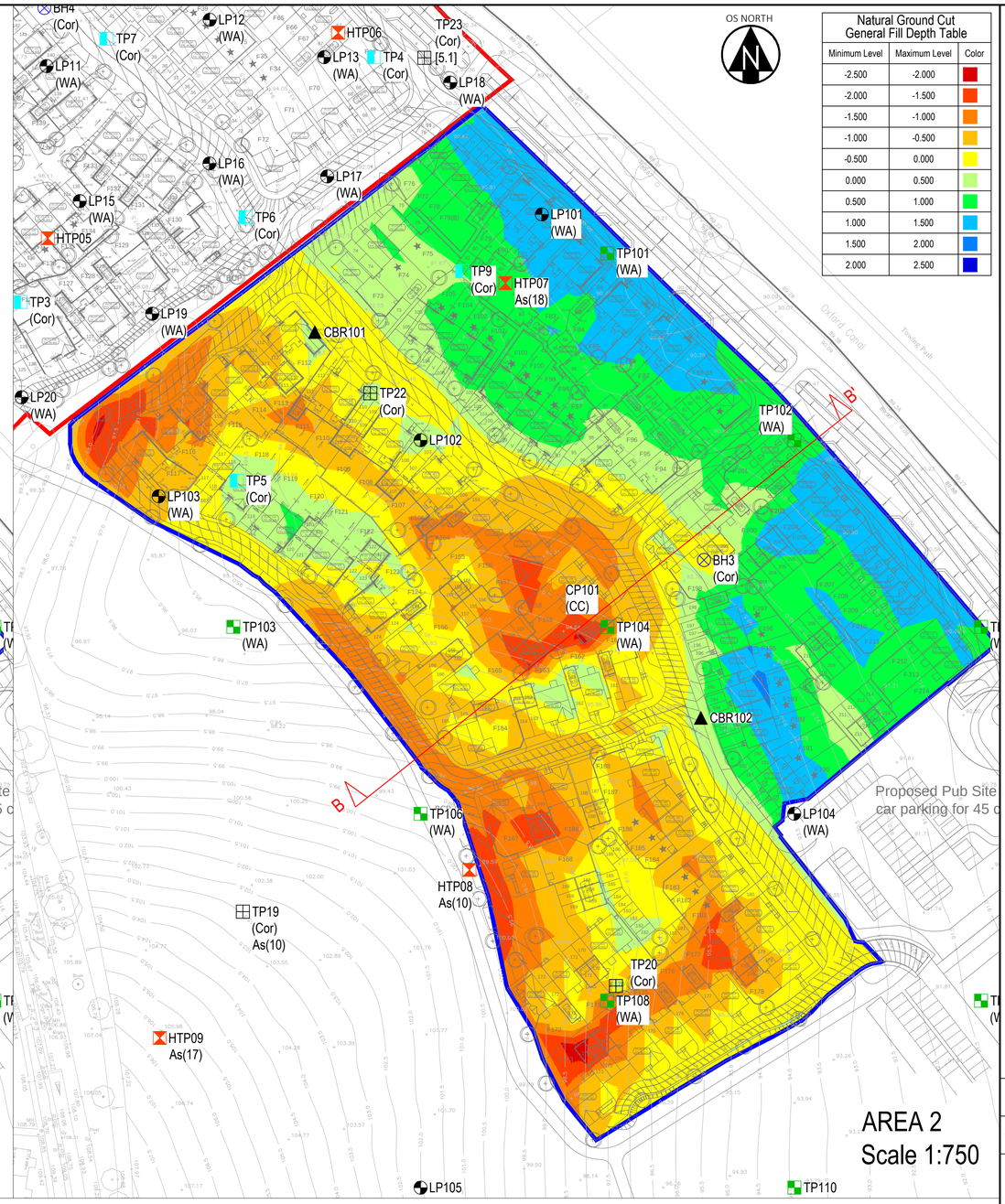
HYDROCK PROJECT NO.	SCALE @ A1
C12702	AS SHOWN

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): LON-HYD-XX-GI-M2-G-1007

REVISION: P1





Natural Ground Cut General Fill Depth Table		
Minimum Level	Maximum Level	Color
-2.500	-2.000	
-2.000	-1.500	
-1.500	-1.000	
-1.000	-0.500	
-0.500	0.000	
0.000	0.500	
0.500	1.000	
1.000	1.500	
1.500	2.000	
2.000	2.500	

KEY

- Area 1 Boundary
- Area 2 Boundary
- Trial Pit - Hydrock April 2013
- Trial Pit - Hydrock 2012
- Historical Well - November 2011 & May 2012 (Wardell Armstrong)
- Historical Trial Pit - May 2012 (Wardell Armstrong)
- Historical Trial Pit - March 2006 (Corsair)
- Historical Trial Pit - October 2005 (Corsair)
- Historical Trial Pit - May 2007
- Historical Hand Sample - June 2007
- Historical Trial Pit - Dec 2011 (Wardell Armstrong)
- Historical Borehole - April 2006 (Corsair)
- Cable Percussion Borehole - May 2012 (CC Ground Investigations)
- CBR Test
- Water Sample
- As(21) Arsenic (mg/kg)
- [5.1] Pbet (%)
- Existing ground profile
- Top Soil profile
- FFL - Finish Floor Level ref drawings: LON-HYD-PH4-XX-M2-C-0001 - Highway Alignment LON-HYD-PH4-XX-M2-C-0020 - Architects Layout LON-HYD-PH4-XX-M2-C-0002 - Engineering Layout - TW
- FL - Formation Level (FFL-750mm)
- Made Ground profile
- Top soil strip
- Made ground
- Natural ground (Clay, Sand, Silt)
- Made Ground CUT
- Natural ground CUT
- General FILL

BULK EARTHWORKS

SITE TOPSOIL STRIP - Site Topsoil Strip depths based on the site investigations and varies between 0.08m - 0.4m

TOPSOIL STRIP VOLUME
AREA 1 (m^3) = 5700
AREA 2 (m^3) = 9100
Total (m^3) = 14800

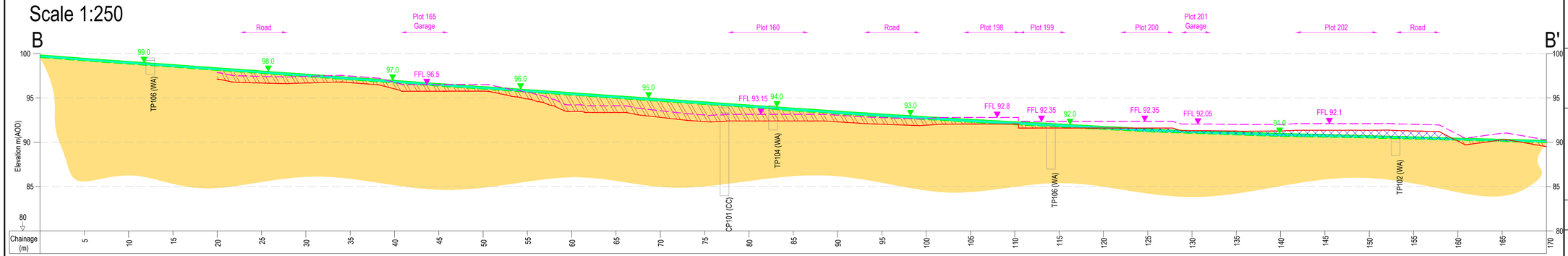
MADE GROUND CUT VOLUME (m^3) = 11055

NATURAL GROUND CUT VOLUME
Area1: CUT (m^3) = 1820
Area2: CUT (m^3) = 12400
Total (m^3) = 14220

GENERAL FILL VOLUME
Area1: FILL (m^3) = 6500
Area2: FILL (m^3) = 9900
Total (m^3) = 16400

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
2. This drawing is to be read in conjunction with all other relevant drawings, details and specifications.
3. This drawing has been based on the following drawings and information:
   - Topographical Survey: Greenhatch ground drawing ref: 10477A_OGL, rev 2
   - Proposed Layout: Hydrock drawing:
     LON-HYD-PH4-XX-M2-C-0001 - Highway Alignment
     LON-HYD-PH4-XX-M2-C-0020 - Architects Layout
     LON-HYD-PH4-XX-M2-C-0002 - Engineering Layout - TW
4. The contractor shall take all necessary safety precautions in line with current legislation when working in/near confined spaces, deep excavations and utilities.
5. All levels and dimensions shall be verified on site prior to the commencement of any works. and discrepancies shall immediately be brought to the attention of the engineer.
6. The cut and fill quantities have been calculated using Civil 3D. this programme is a design tool which establishes bulk earthworks volumes and indicates approximate depths of cut and fill across the site. It shall not be used to construct or set formation levels and / or finished levels.
7. Prior to the sub-soil modeling exercise, the following existing strip has been model base on investigation information:
   - Hydrock - 2012 & 2013
   - Wardell Armstrong November 2011, December 2011, May 2012,
   - Corsair - March 2006, April 206, October 2005
   - CC Ground Investigations - May 2012
7. No bulking factor has been taken into account in the cut and fill exercise.
8. No allowance has been made for arisings resulting from excavations to install drainage and construct foundations.
9. It is to be used to assist the contractor in their own assessment of the earthworks.

Section B-B'
Scale 1:250



P1	DRAFT ISSUE					
	IB	20/1/17	RH	21/11/17	RH	22/11/17
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT: Taylor Wimpey

PROJECT: LONGFORD PARK, BANKSIDE, BANBURY - PH4

TITLE: CUT AND FILL ASSESMENT - AREA 2

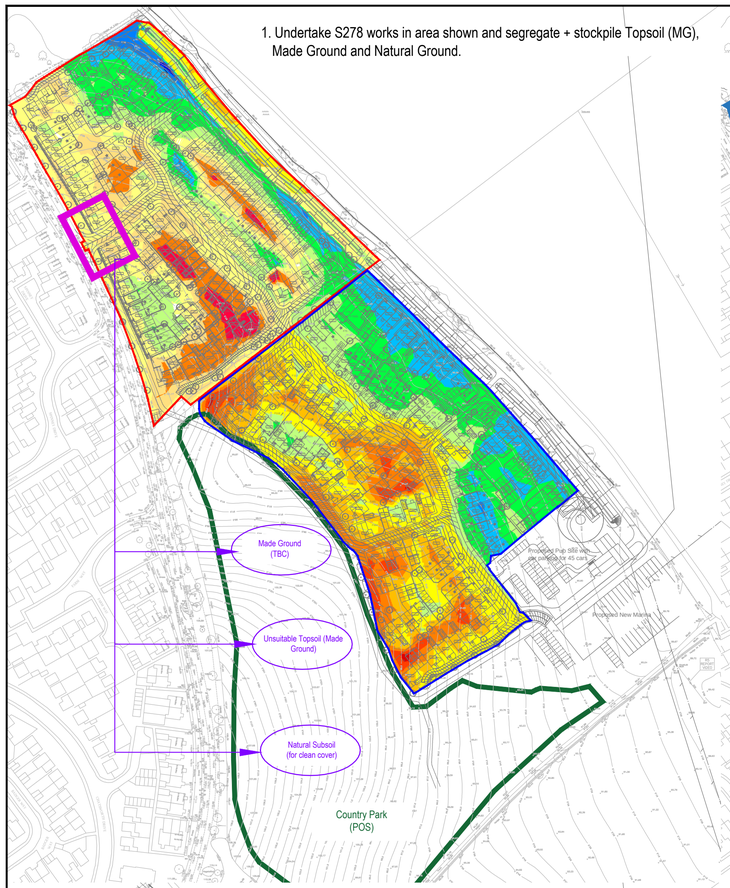
HYDROCK PROJECT NO.	SCALE @ A1
C12702	AS SHOWN

PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2

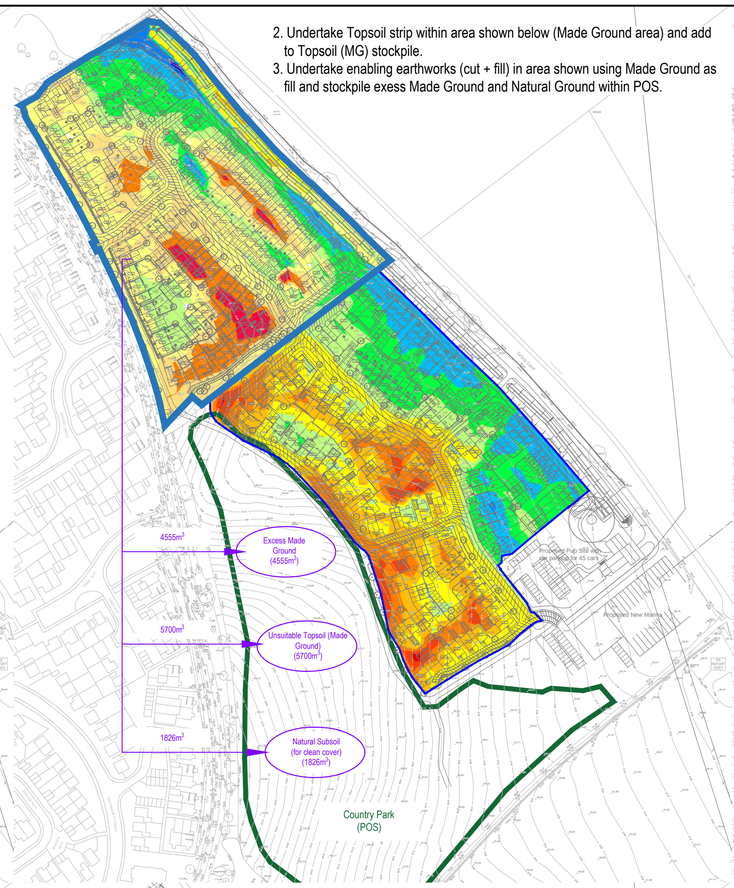
DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): LON-HYD-XX-GI-M2-G-1008

REVISION: P1

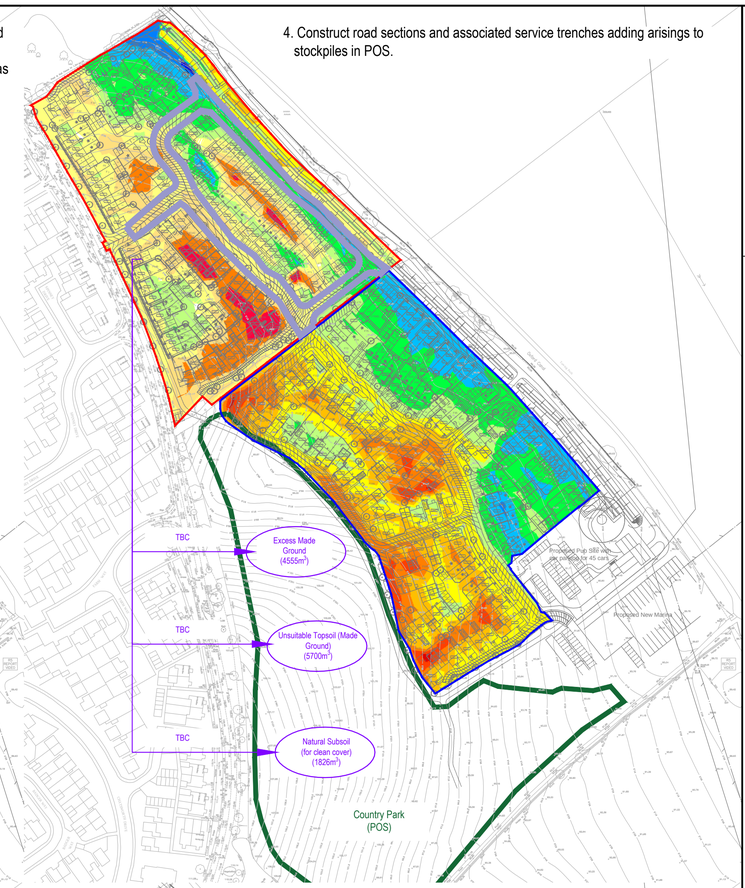
1. Undertake S278 works in area shown and segregate + stockpile Topsoil (MG), Made Ground and Natural Ground.



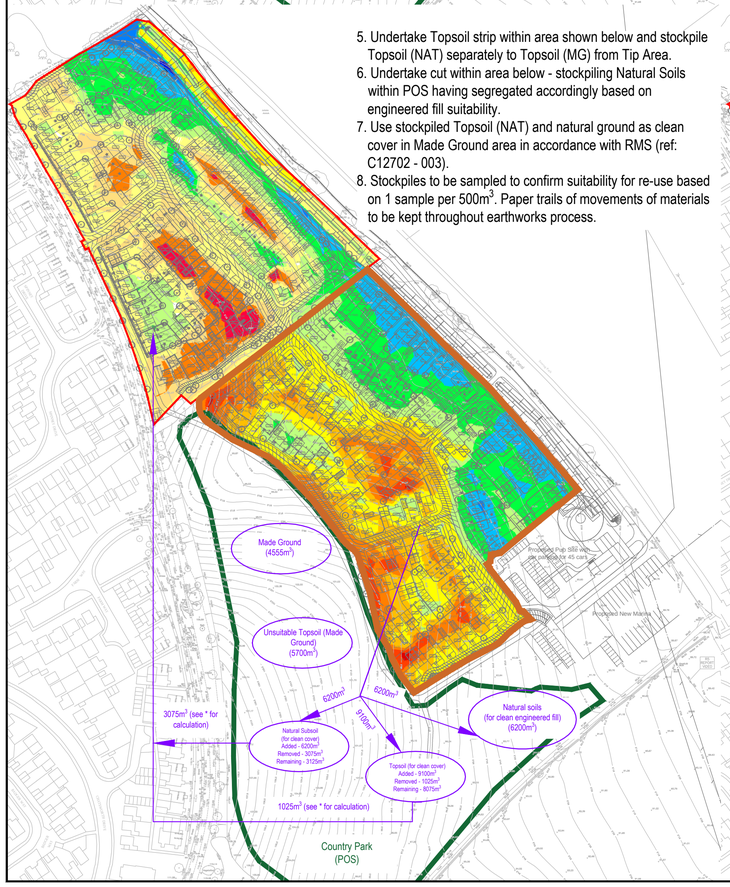
2. Undertake Topsoil strip within area shown below (Made Ground area) and add to Topsoil (MG) stockpile.
3. Undertake enabling earthworks (cut + fill) in area shown using Made Ground as fill and stockpile exess Made Ground and Natural Ground within POS.



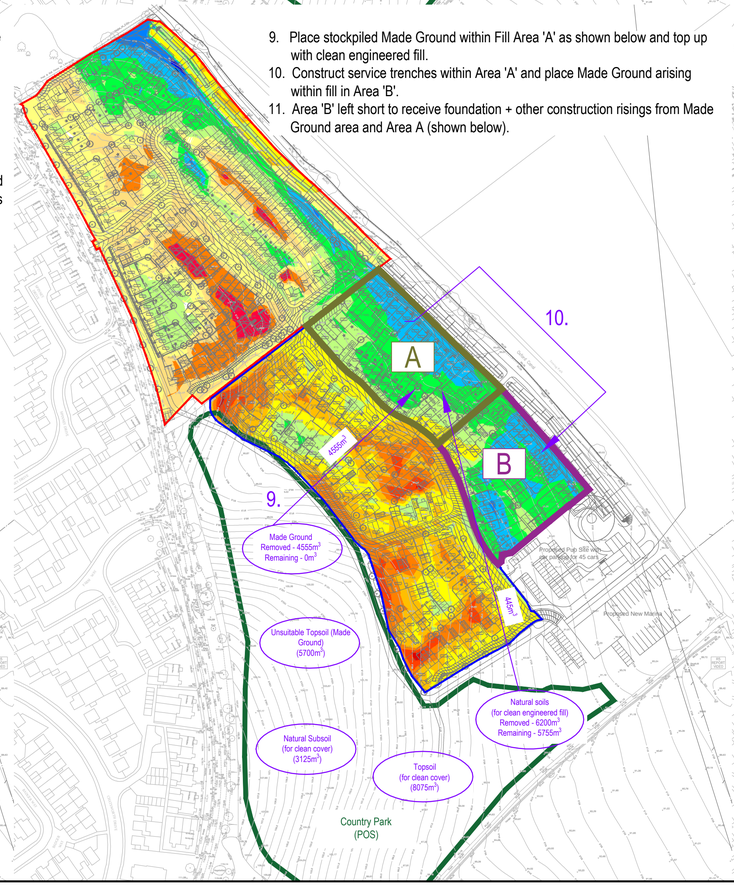
4. Construct road sections and associated service trenches adding arisings to stockpiles in POS.



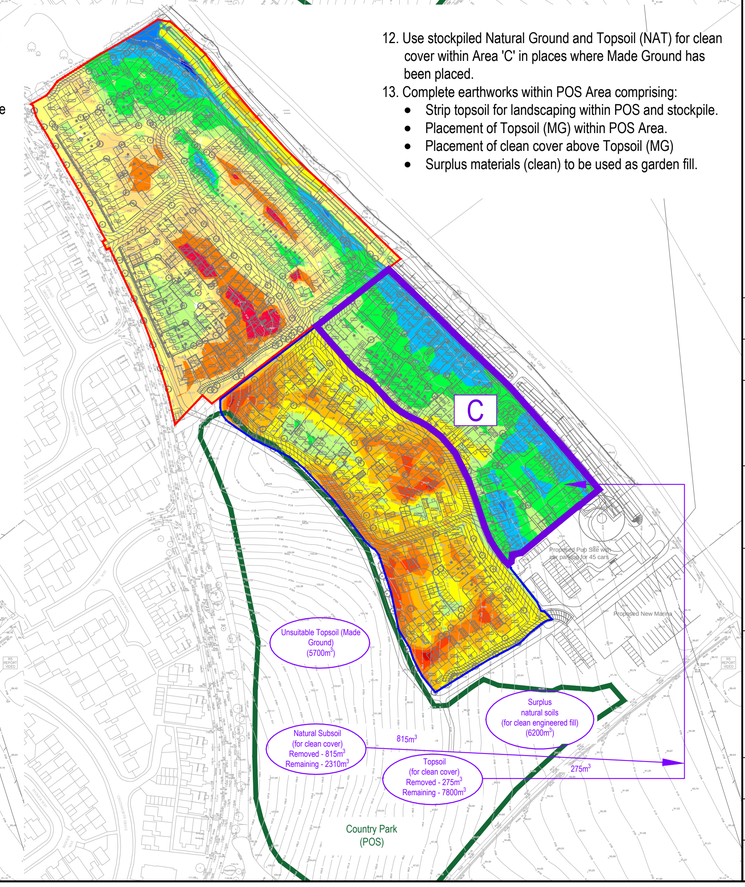
5. Undertake Topsoil strip within area shown below and stockpile Topsoil (NAT) separately to Topsoil (MG) from Tip Area.
6. Undertake cut within area below - stockpiling Natural Soils within POS having segregated accordingly based on engineered fill suitability.
7. Use stockpiled Topsoil (NAT) and natural ground as clean cover in Made Ground area in accordance with RMS (ref: C12702 - 003).
8. Stockpiles to be sampled to confirm suitability for re-use based on 1 sample per 500m³. Paper trails of movements of materials to be kept throughout earthworks process.



9. Place stockpiled Made Ground within Fill Area 'A' as shown below and top up with clean engineered fill.
10. Construct service trenches within Area 'A' and place Made Ground arising within fill in Area 'B'.
11. Area 'B' left short to receive foundation + other construction risings from Made Ground area and Area A (shown below).



12. Use stockpiled Natural Ground and Topsoil (NAT) for clean cover within Area 'C' in places where Made Ground has been placed.
13. Complete earthworks within POS Area comprising:
    - Strip topsoil for landscaping within POS and stockpile.
    - Placement of Topsoil (MG) within POS Area.
    - Placement of clean cover above Topsoil (MG)
    - Surplus materials (clean) to be used as garden fill.



KEY

Proposed Stockpile locations - positions to be confirmed.

NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.

2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information:
- Topographical Survey: Greenhatch ground drawing ref: 10477A_OGL, rev 2
- Proposed Layout: Hydrock drawing:
  LON-HYD-PH4-XX-M2-C-0001 - Highway Alignment
  LON-HYD-PH4-XX-M2-C-0020 - Architects Layout
  LON-HYD-PH4-XX-M2-C-0002 - Engineering Layout - TW
4. Cut and Fill assessment colouring from Hydrock drawing ref: LON-HYD-XX-GI-M2-G-1007 & LON-HYD-XX-GI-M2-G-1008

Natural Ground Cut General Fill Depth Table		
Minimum Level	Maximum Level	Color
-2.500	-2.000	
-2.000	-1.500	
-1.500	-1.000	
-1.000	-0.500	
-0.500	0.000	
0.000	0.500	
0.500	1.000	
1.000	1.500	
1.500	2.000	
2.000	2.500	

REV.						
P1	FOR COMMENT					
	IB	05/02/18	RC	06/02/18	RHo	07/02/18
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

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CLIENT: Taylor Wimpey

PROJECT: LONGFORD PARK, BANKSIDE, BANBURY - PH4

TITLE: EARTHWORKS STRATEGY PLAN

HYDROCK PROJECT NO.	SCALE @ A1
C12702	1:2000

PURPOSE OF ISSUE	STATUS
WORK IN PROGRESS	S0

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): LON-HYD-XX-GI-M2-G-1009

REVISION: P1

Appendix B

GACs for Import Material

Proposed Soil Quality Import Criteria – Clean Cover System - Residential (with Plant uptake)

Note: The importation criteria given below have been set to be 80% of the relevant GAC value

Determinands	80% of GAC (mg/kg)	Hydrock Source (of original GAC)
Metals		
Arsenic	32	SGV report + CLEA 1.07
Beryllium	58.4	LQM/CIEH + CLEA 1.07
Boron	8800	LQM/CIEH + CLEA 1.07
Cadmium	69.6	SGV report + CLEA 1.07
Chromium (III)	712	LQM/CIEH + CLEA 1.07
Chromium (VI)	4.88	LQM/CIEH + CLEA 1.07
Copper	5840	LQM/CIEH + CLEA 1.07
Lead	248	C4SL
Mercury, inorganic	192	SGV report + CLEA 1.07
Nickel	144	Hydrock + CLEA 1.07
Selenium	480	SGV report + CLEA 1.07
Vanadium	960	LQM/CIEH + CLEA 1.07
Zinc	32000	LQM/CIEH + CLEA 1.07
Cyanide (free)	640	Hydrock + CLEA 1.07
Phenol (total)	600	SGV report + CLEA 1.07
Organics		
	Soil Organic Matter (SOM)	
	1%	
PAH		
Acenaphthene	2400	LQM/CIEH + CLEA 1.06
Acenaphthylene	2320	
Anthracene	24800	
Benz(a)anthracene	4.4	
Benzo(a)pyrene	1.2	
Benzo(b)fluoranthene	8.8	
Benzo(ghi)perylene	56.8	
Benzo(k)fluoranthene	12	
Chrysene	10.4	
Dibenz(a,h)anthracene	1.04	
Fluoranthene	1200	
Fluorene	2240	
Indeno(1,2,3,cd)pyrene	5.04	
Naphthalene	1.84	
Phenanthrene	1040	
Pyrene	2960	
Petroleum Hydrocarbons		
Aliphatics EC5-EC6	33.6	
Aliphatics >EC6-EC8	80	
Aliphatics >EC8-EC10	21.6	
Aliphatics >EC10-EC12	38.4	

Aliphatics >EC12-EC16	19.2	LQM/CIEH + CLEA 1.06
Aliphatics >EC16-EC35	52000	
Aliphatics >EC35-EC44	52000	
Aromatics EC5-EC7	296	
Aromatics >EC7-EC8	688	
Aromatics >EC8-EC10	37.6	
Aromatics >EC10-EC12	200	
Aromatics >EC12-EC16	1440	
Aromatics >EC16-EC21	1520	
Aromatics >EC21-EC35	1520	
Aromatics >EC35-EC44	1520	
All >EC44-EC70	1520	
Other		
pH	>5, <9	
Asbestos	<0.001%	

Proposed Soil Quality Import Criteria – Clean Cover System – Environmental Quality Standard (EQS)

Determinand	EQS (Inland) (in µg/l)
Arsenic	50
Boron	2000
Cadmium	0.08
Chromium (III)	4.7
Chromium (VI)	3.4
Cobolt	3
Copper	1
Iron	1000
Lead	1.2
Mercury, inorganic	0.07
Manganese	123
Nickel	4
Silver	0.05
Tin	25
Vanadium	20
Zinc	10.9
Cyanide (free)	1
Chloride	250000
Fluoride	1000
Sulfate	400000
pH	>6.0 – <9.0
Phenol	7.7
Anthracene	0.1
Benz(a)anthracene	4.4
Benzo(a)pyrene	0.00017
Naphthalene	2
Benzene	10
Toluene	74
Ethylbenzene	20
Xylenes	30

Appendix C

Chemical Analysis Data

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

						Soil Type	NAT	NAT	NAT	NAT	NAT	NAT						
	All values in mg/kg unless otherwise stated					Location & Depth	HTP07	HTP09	HTP10	HTP13	TP19	TP21						
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**0.50**	**0.20**	**0.50**	**0.20**	**0.5**	**0.4**						
Arsenic	2	6	10	22	0	32	18	22	18	17	10	21						
Beryllium	1	4	1	1	0	51	1	1	1	1								
Boron	0.4	6	0.4	0.77	0	290	0.5	0.4	0.5	0.7	0.65	0.77						
Cadmium	0.1	6	0.1	0.5	0	11	0.1	0.1	0.1	0.1	0.5	0.5						
Chromium (III)	5	6	38.5	48.5	0	630	48.5	40.5	41.5	38.5	42	45						
Chromium (VI)	0.5	4	0.5	0.5	0	4.3	0.5	0.5	0.5	0.5								
Copper	5	6	5.9	15	0	2300	15	12	10	12	11	5.9						
Lead	5	6	14	29	0	450	26	16	24	29	14	17						
Mercury, inorganic	0.1	6	0.1	0.2	0	170	0.1	0.1	0.1	0.1	0.2	0.2						
Nickel	5	6	21	33	0	130	33	22	22	21	31	26						
Selenium	0.2	6	0.2	0.3	0	350	0.2	0.2	0.2	0.2	0.3	0.3						
Vanadium	5	4	53	61	0	74	61	58	58	53								
Zinc	10	6	59	85	0	3700	85	59	66	61	60	69						
Cyanide (free)	0.5	6	0.5	2	0	750	0.5	0.5	0.5	0.5	2	2						
Phenol (total)	0.3	6	0.3	0.5	0	290	0.3	0.3	0.3	0.3	0.5	0.5						
Acenaphthene	0.01	4	0.01	0.01	0	480	0.01	0.01	0.01	0.01								
Acenaphthylene	0.01	4	0.01	0.01	0	400	0.01	0.01	0.01	0.01								
Anthracene	0.01	4	0.01	0.01	0	4900	0.01	0.01	0.01	0.01								
Benz(a)anthracene	0.01	4	0.01	0.023	0	4.7	0.023	0.01	0.012	0.021								
Benzo(a)pyrene	0.01	4	0.01	0.01	0	0.94	0.01	0.01	0.01	0.01								
Benzo(b)fluoranthene	0.01	4	0.01	0.01	0	6.5	0.01	0.01	0.01	0.01								
Benzo(ghi)perylene	0.01	4	0.01	0.01	0	46	0.01	0.01	0.01	0.01								
Benzo(k)fluoranthene	0.01	4	0.01	0.01	0	9.6	0.01	0.01	0.01	0.01								
Chrysene	0.01	4	0.01	0.013	0	8	0.013	0.01	0.01	0.012								
Dibenz(a,h)anthracene	0.01	4	0.01	0.01	0	0.86	0.01	0.01	0.01	0.01								
Fluoranthene	0.01	4	0.01	0.088	0	460	0.047	0.01	0.031	0.088								
Fluorene	0.01	4	0.01	0.01	0	380	0.01	0.01	0.01	0.01								
Indeno(1,2,3,cd)pyrene	0.01	4	0.01	0.01	0	3.9	0.01	0.01	0.01	0.01								
Naphthalene	0.01	4	0.01	0.01	0	3.7	0.01	0.01	0.01	0.01								
Phenanthrene	0.01	4	0.01	0.018	0	200	0.018	0.01	0.01	0.014								
Pyrene	0.01	4	0.01	0.061	0	1000	0.035	0.01	0.017	0.061								
	Mean																	
FOC (dimensionless)	0.013						0.023	0.0046	0.019	0.018	0.003081	0.00814						
SOM (calculated)	2.18%						3.97%	0.79%	3.28%	3.10%	0.53%	1.40%						
pH (su)	7.3						7.1	6.9	7.3	7.3	7.6	7.5						

Risk parameter: Human health - residential with plant uptake (2.5%SOM)
Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

							Soil Type	NAT	NAT	NAT	NAT	NAT	NAT						
	All values in mg/kg unless otherwise stated						Location & Depth	HTP07	HTP09	HTP10	HTP13	TP19	TP21						
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**		**0.50**	**0.20**	**0.50**	**0.20**	**0.5**	**0.4**						
Arsenic	2	6	10	22	0	250		18	22	18	17	10	21						
Boron	0.4	6	0.4	0.77	0	3		0.5	0.4	0.5	0.7	0.65	0.77						
Chromium (III)	5	6	38.5	48.5	0	400		48.5	40.5	41.5	38.5	42	45						
Chromium (VI)	0.5	4	0.5	0.5	0	25		0.5	0.5	0.5	0.5								
Copper	5	6	5.9	15	0	135		15	12	10	12	11	5.9						
Nickel	5	6	21	33	0	75		33	22	22	21	31	26						
Zinc	10	6	59	85	0	300		85	59	66	61	60	69						
	Mean																		
pH (su)	7.3							7.1	6.9	7.3	7.3	7.6	7.5						

Risk parameter: Plant life pH 7
Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

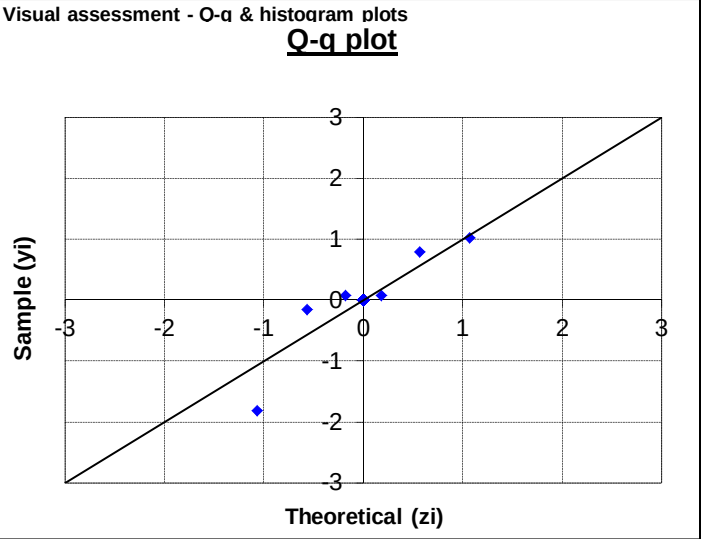
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

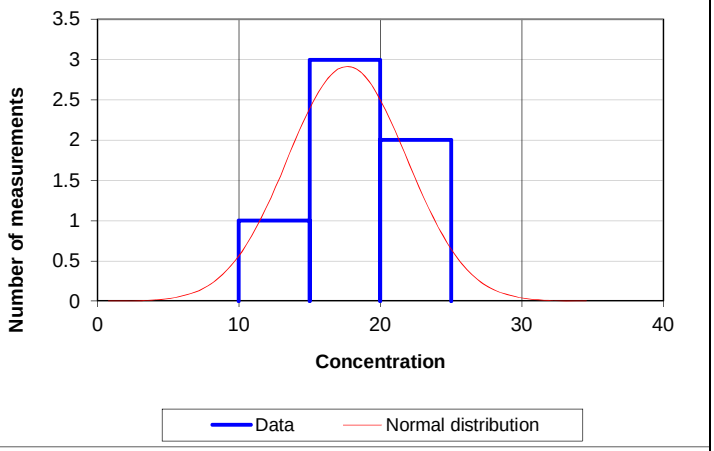
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Arsenic	Potential Outlier?	Sample
18		HTP07 @ 0.50
22		HTP09 @ 0.20
18		HTP10 @ 0.50
17		HTP13 @ 0.20
10		TP19 @ 0.5
21		TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

32 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
10 = min. value	
22 = max. value	2 = laboratory reporting limit (RL)
17.66667 = mean	0 = no. samples at RL
4.226898 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8.306175 = t_0	-8.30617 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
21.1438 = 95% UCL (US_{95})	25.19039 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 25.190387 GAC = 32 (US95 = 0.787 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

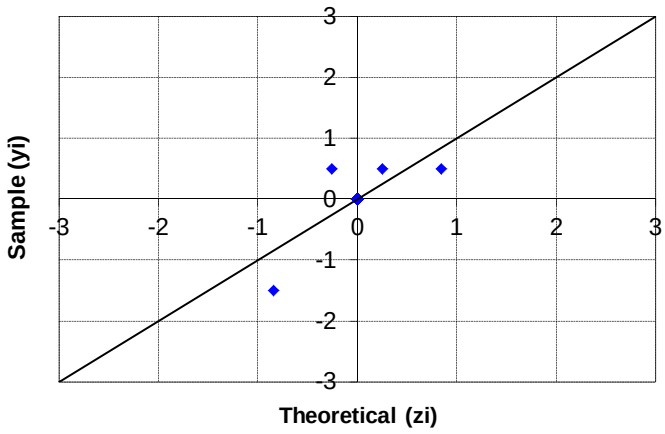
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

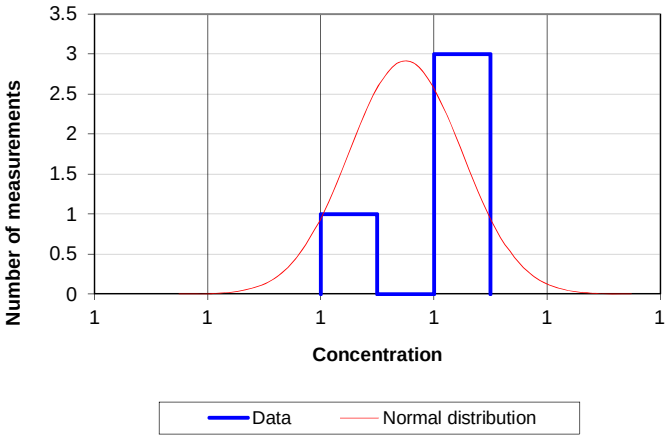
Beryllium	Potential Outlier?	Sample
1	n/a	HTP07 @ 0.50
1	n/a	HTP09 @ 0.20
1	n/a	HTP10 @ 0.50
1	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Beryllium



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

51 = GAC (critical conc.) (mg/kg)

4 = no. samples
1 = min. value
1 = max. value
1 = mean
5E-11 = standard deviation

0 = no. samples > or = GAC
1 = laboratory reporting limit (RL)
4 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test

-2E+12 = t_0
2.353 = $t_{(n-1,0.95)}$
1 = 95% UCL (US_{95})

One-sided Chebychev Theorem

-2E+12 = k_0
4.36 = $k_{0.05}$
1 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1 **GAC = 51** (US95 = 0.02 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

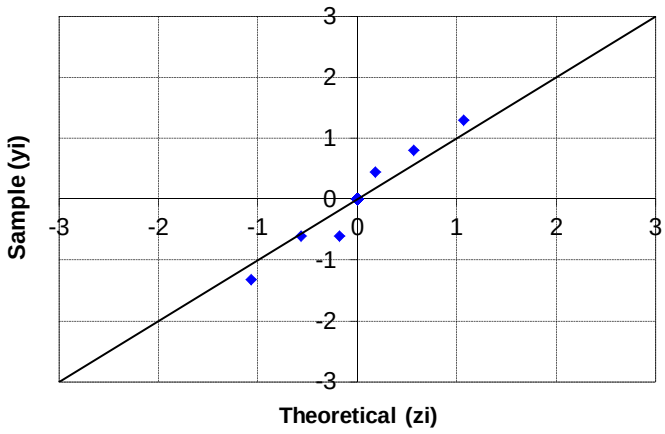
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

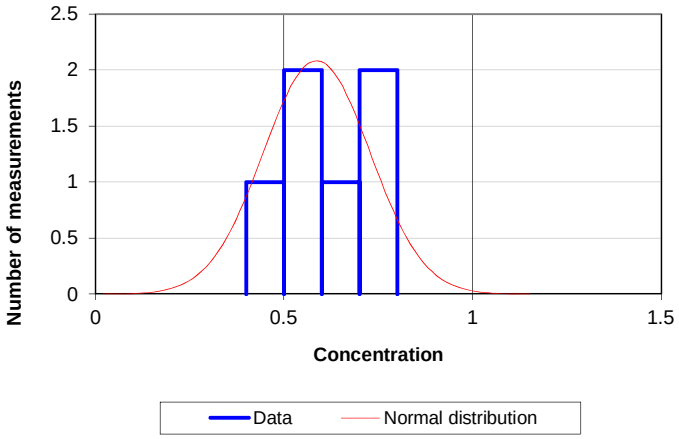
Boron	Potential Outlier?	Sample
0.5		HTP07 @ 0.50
0.4		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.7		HTP13 @ 0.20
0.65		TP19 @ 0.5
0.77		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.4 = min. value	
0.77 = max. value	0.4 = laboratory reporting limit (RL)
0.586667 = mean	1 = no. samples at RL
0.141657 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-5004.452 = t_0	-5004.45 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.703196 = 95% UCL (US_{95})	0.838811 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.8388106 GAC = 290 (US95 = 0.003 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

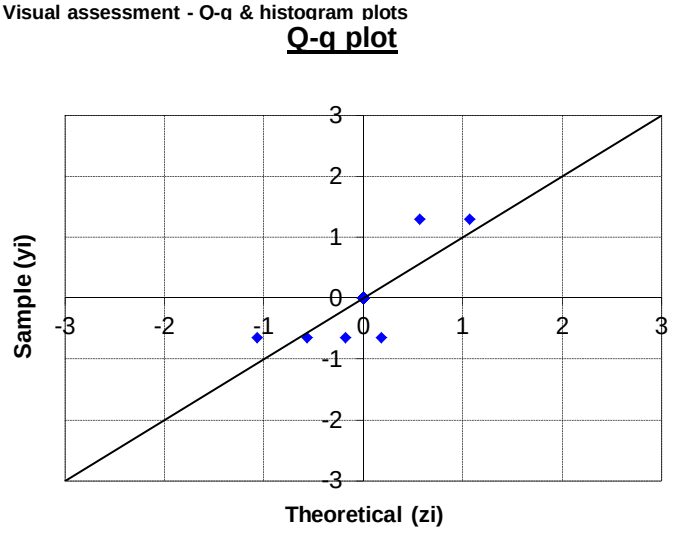
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

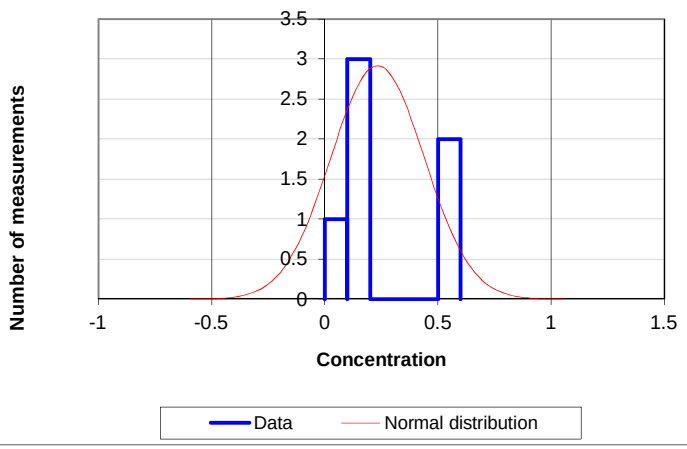
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Cadmium		
0.1		HTP07 @ 0.50
0.1		HTP09 @ 0.20
0.1		HTP10 @ 0.50
0.1		HTP13 @ 0.20
0.5	Yes	TP19 @ 0.5
0.5	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

11 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
0.5 = max. value	0.1 = laboratory reporting limit (RL)
0.233333 = mean	4 = no. samples at RL
0.206559 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-127.677 = t_0	-127.677 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.403253 = 95% UCL (US_{95})	0.601001 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.6010008 GAC = 11 (US95 = 0.055 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

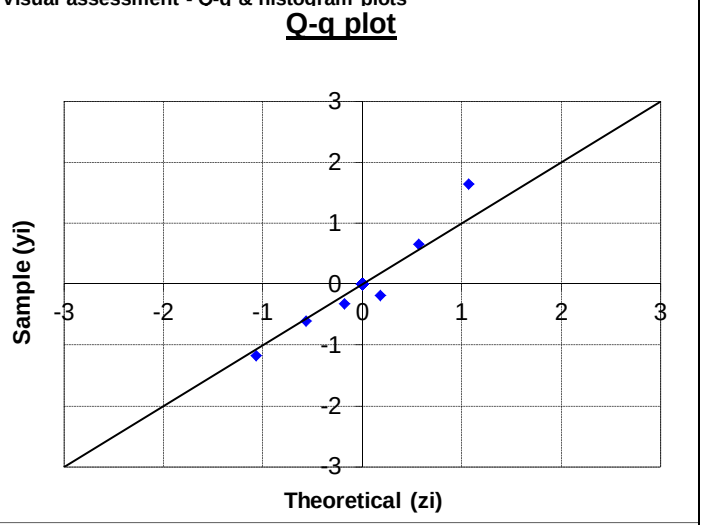
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

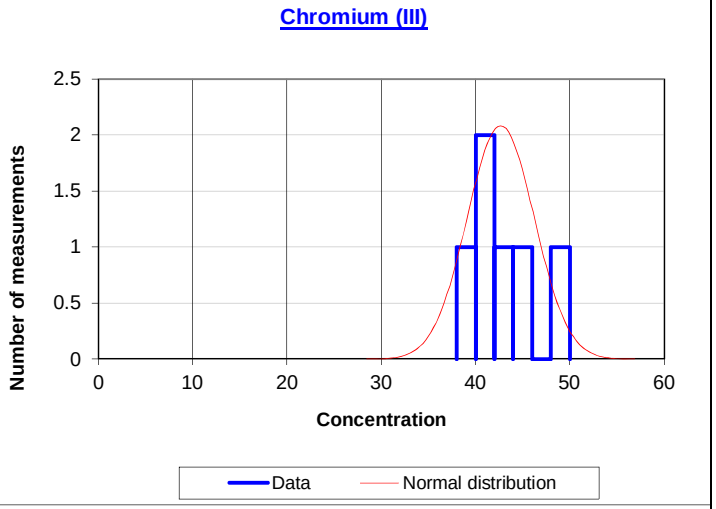
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (III)		
48.5		HTP07 @ 0.50
40.5		HTP09 @ 0.20
41.5		HTP10 @ 0.50
38.5		HTP13 @ 0.20
42		TP19 @ 0.5
45		TP21 @ 0.4

Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

630 = GAC (critical conc.) (mg/kg)

6	= no. samples	0	= no. samples > or = GAC
38.5	= min. value		
48.5	= max. value	5	= laboratory reporting limit (RL)
42.66667	= mean	0	= no. samples at RL
3.559026	= standard deviation	RL is limit of detection of the method used	

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-404.2305	= t_0	-404.231	= k_0
2.015	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
45.59439	= 95% UCL (US_{95})	49.0016	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 49.0016 **GAC = 630** (US95 = 0.078 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

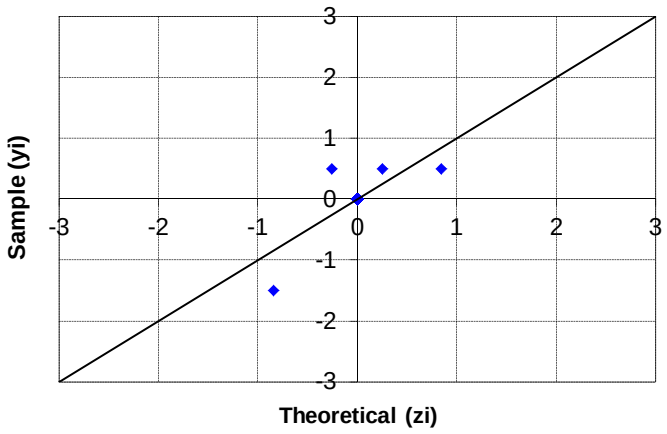
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

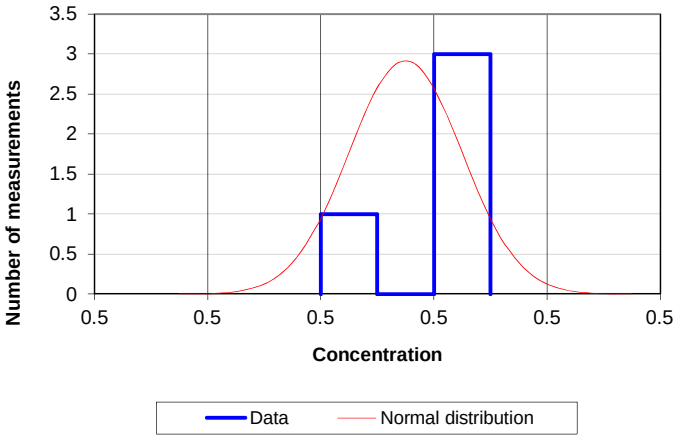
Chromium (VI)	Potential Outlier?	Sample
0.5	n/a	HTP07 @ 0.50
0.5	n/a	HTP09 @ 0.20
0.5	n/a	HTP10 @ 0.50
0.5	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (VI)



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.3 = GAC (critical conc.) (mg/kg)

4 = no. samples	0 = no. samples > or = GAC
0.5 = min. value	
0.5 = max. value	0.5 = laboratory reporting limit (RL)
0.5 = mean	4 = no. samples at RL
5E-12 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.52E+12 = t_0	-1.5E+12 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.5 = 95% UCL (US_{95})	0.5 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5 **GAC = 4.3** (US95 = 0.116 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

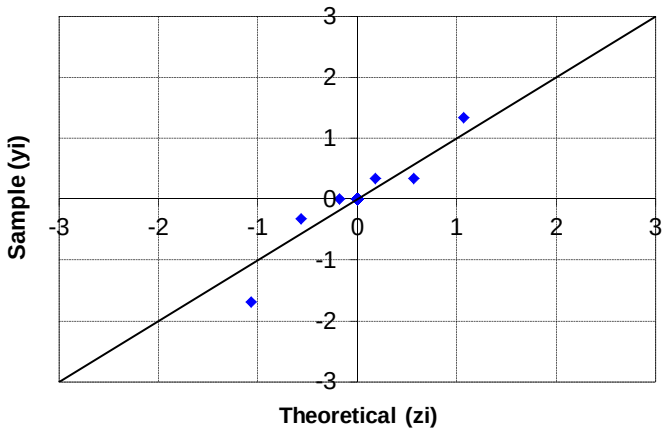
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

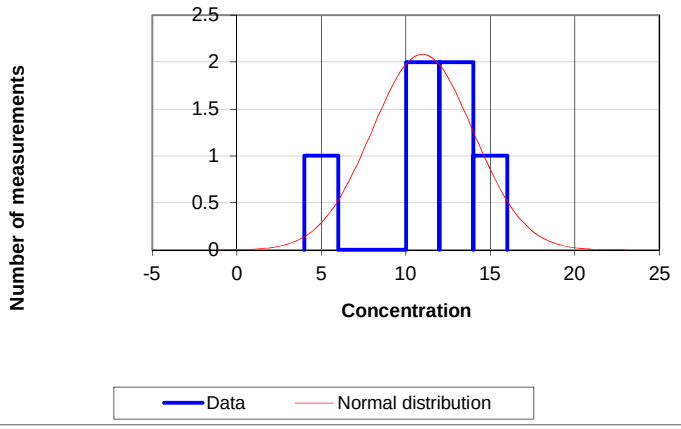
Copper	Potential Outlier?	Sample
15		HTP07 @ 0.50
12		HTP09 @ 0.20
10		HTP10 @ 0.50
12		HTP13 @ 0.20
11		TP19 @ 0.5
5.9	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

2300 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
5.9 = min. value	
15 = max. value	5 = laboratory reporting limit (RL)
10.98333 = mean	0 = no. samples at RL
3.000278 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1868.801 = t_0	-1868.8 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
13.45142 = 95% UCL (US_{95})	16.32372 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 16.323715 GAC = 2300 (US95 = 0.007 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

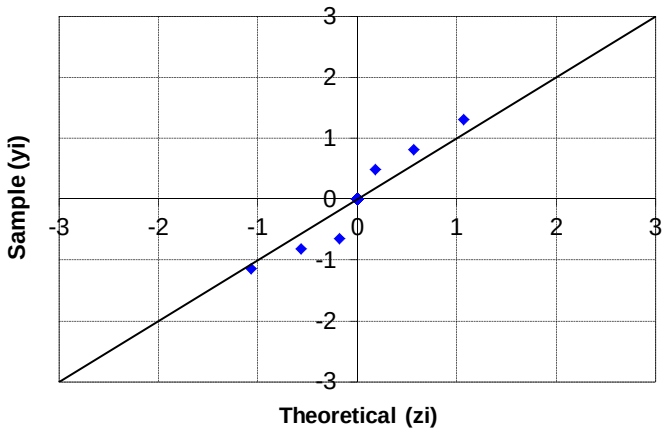
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

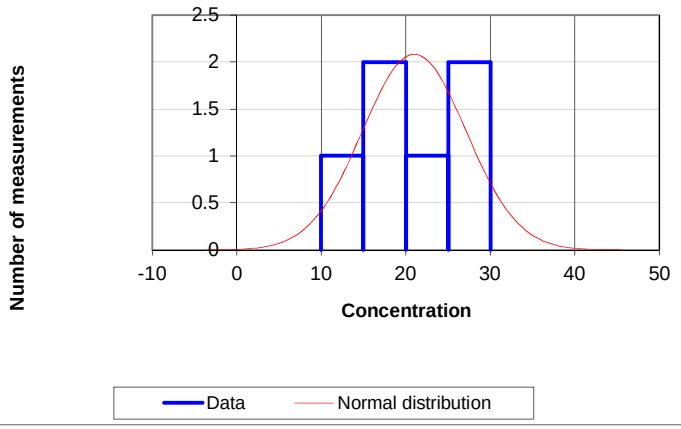
Lead	Potential Outlier?	Sample
26		HTP07 @ 0.50
16		HTP09 @ 0.20
24		HTP10 @ 0.50
29		HTP13 @ 0.20
14		TP19 @ 0.5
17		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Lead



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

450 = GAC (critical conc.) (mg/kg)

6	= no. samples	0	= no. samples > or = GAC
14	= min. value		
29	= max. value	5	= laboratory reporting limit (RL)
21	= mean	0	= no. samples at RL
6.131884	= standard deviation	RL is limit of detection of the method used	

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-171.3717	= t_0	-171.372	= k_0
2.015	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
26.04421	= 95% UCL (US_{95})	31.91452	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 31.914524 GAC = 450 (US95 = 0.071 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

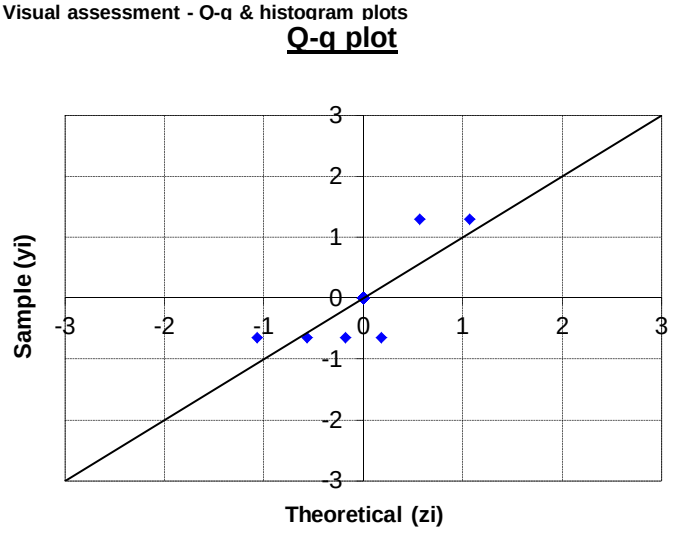
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

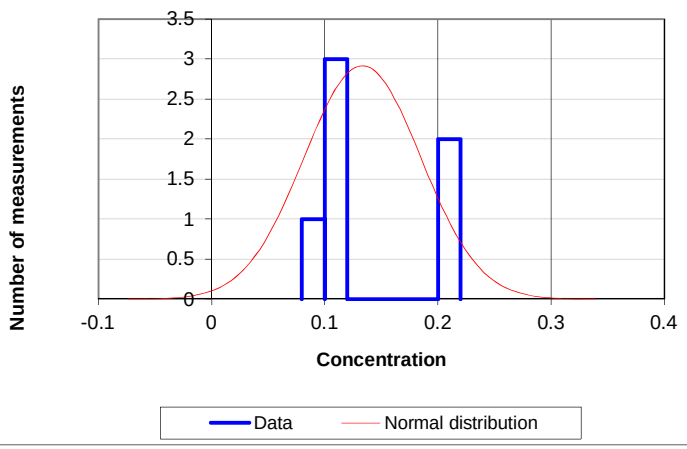
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Mercury, inorganic		
0.1		HTP07 @ 0.50
0.1		HTP09 @ 0.20
0.1		HTP10 @ 0.50
0.1		HTP13 @ 0.20
0.2	Yes	TP19 @ 0.5
0.2	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

170 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
0.2 = max. value	0.1 = laboratory reporting limit (RL)
0.133333 = mean	4 = no. samples at RL
0.05164 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8057.483 = t_0	-8057.48 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.175813 = 95% UCL (US_{95})	0.22525 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.2252502 GAC = 170 (US95 = 0.001 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

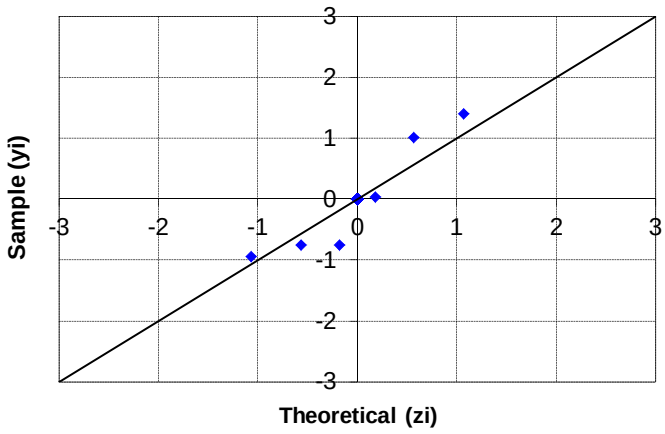
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

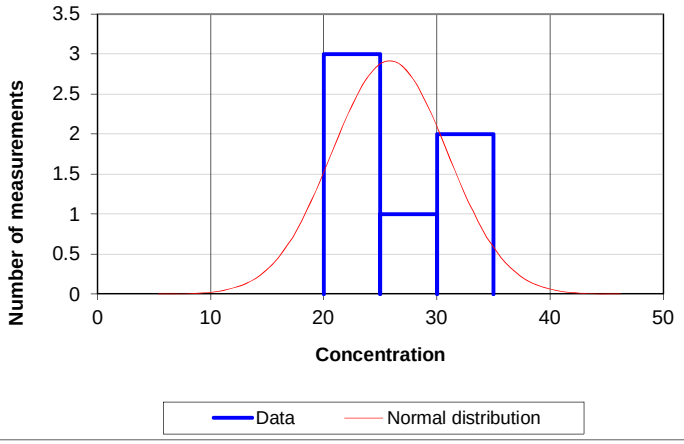
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
33		HTP07 @ 0.50
22		HTP09 @ 0.20
22		HTP10 @ 0.50
21		HTP13 @ 0.20
31		TP19 @ 0.5
26		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

130 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
21 = min. value	
33 = max. value	5 = laboratory reporting limit (RL)
25.83333 = mean	0 = no. samples at RL
5.115336 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-49.88043 = t_0	-49.8804 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
30.04131 = 95% UCL (US_{95})	34.93844 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 34.938441 GAC = 130 (US95 = 0.269 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

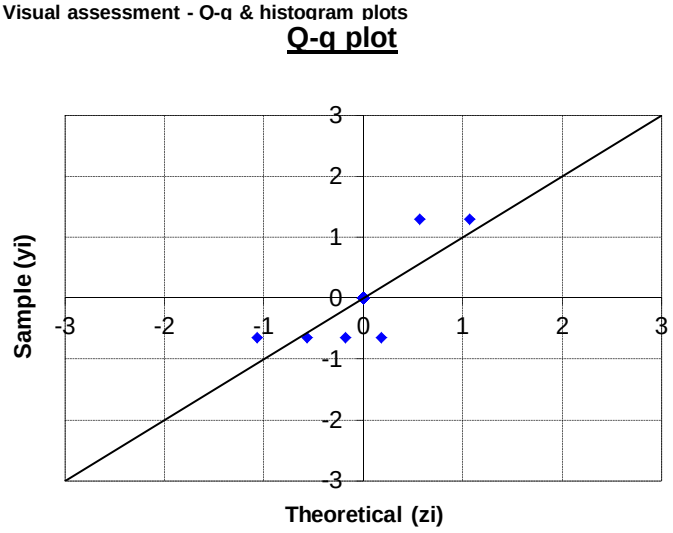
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

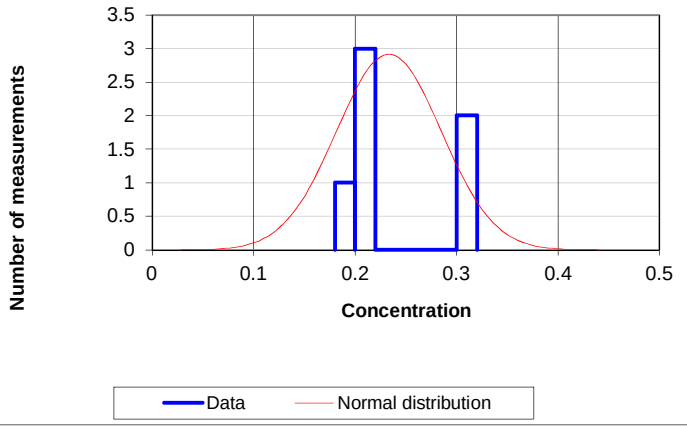
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Selenium		
0.2		HTP07 @ 0.50
0.2		HTP09 @ 0.20
0.2		HTP10 @ 0.50
0.2		HTP13 @ 0.20
0.3	Yes	TP19 @ 0.5
0.3	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

350 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.2 = min. value	
0.3 = max. value	0.2 = laboratory reporting limit (RL)
0.233333 = mean	4 = no. samples at RL
0.05164 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-16590.89 = t_0	-16590.9 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.275813 = 95% UCL (US_{95})	0.32525 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3252502 GAC = 350 (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

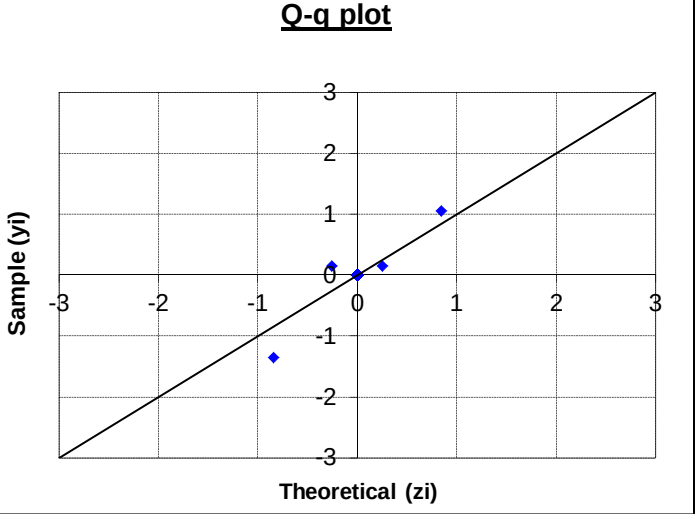
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

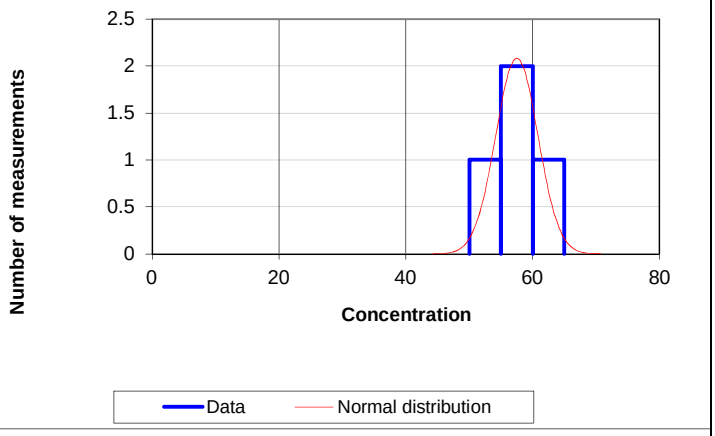
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Vanadium	Potential Outlier?	Sample
61		HTP07 @ 0.50
58		HTP09 @ 0.20
58		HTP10 @ 0.50
53		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

74	= GAC (critical conc.) (mg/kg)	
4	= no. samples	0 = no. samples > or = GAC
53	= min. value	
61	= max. value	5 = laboratory reporting limit (RL)
57.5	= mean	0 = no. samples at RL
3.316625	= standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-9.949874	= t_0	-9.94987	= k_0
2.353	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
61.40201	= 95% UCL (US_{95})	64.73024	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 64.730242 GAC = 74 (US95 = 0.875 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

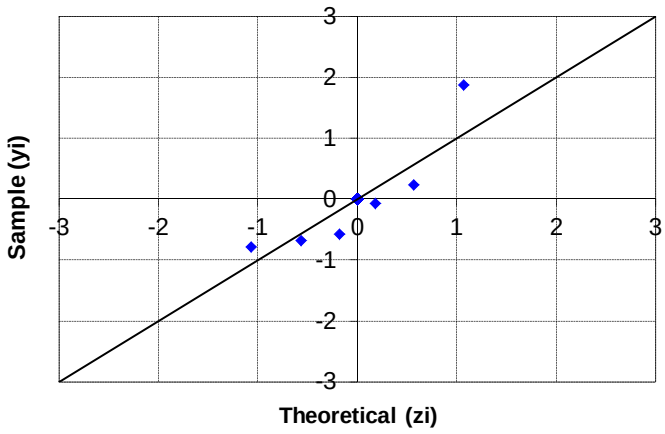
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

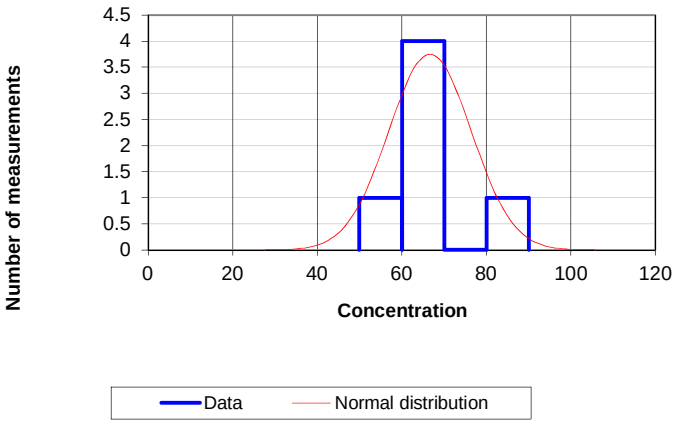
Zinc	Potential Outlier?	Sample
85	Yes	HTP07 @ 0.50
59		HTP09 @ 0.20
66		HTP10 @ 0.50
61		HTP13 @ 0.20
60		TP19 @ 0.5
69		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3700 = GAC (critical conc.) (mg/kg)

6	= no. samples	0	= no. samples > or = GAC
59	= min. value		
85	= max. value	10	= laboratory reporting limit (RL)
66.66667	= mean	0	= no. samples at RL
9.770705	= standard deviation	RL is limit of detection of the method used	

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-910.867	= t_0	-910.867	= k_0
2.015	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
74.70425	= 95% UCL (US_{95})	84.05815	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 84.058155 GAC = 3700 (US95 = 0.023 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

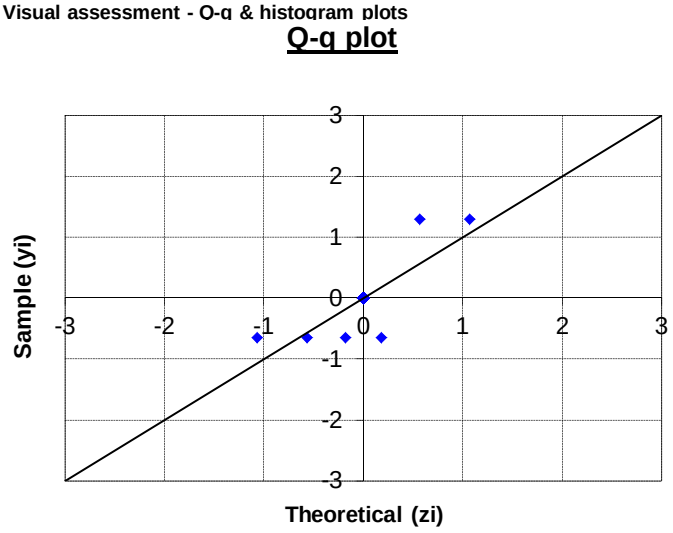
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

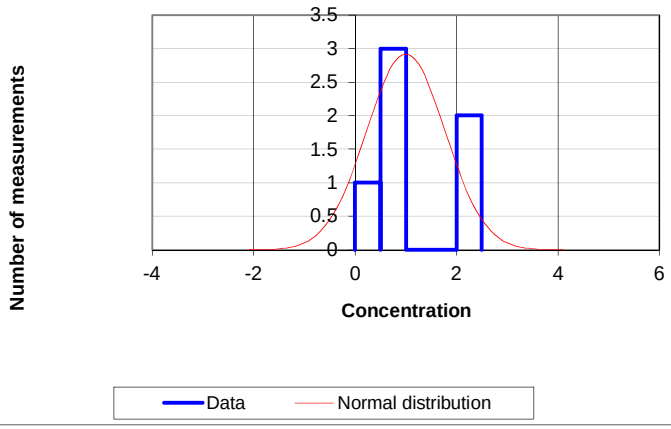
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Cyanide (free)		
0.5		HTP07 @ 0.50
0.5		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.5		HTP13 @ 0.20
2	Yes	TP19 @ 0.5
2	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

750 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.5 = min. value	
2 = max. value	0.5 = laboratory reporting limit (RL)
1 = mean	4 = no. samples at RL
0.774597 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-2368.546 = t_0	-2368.55 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
1.637199 = 95% UCL (US_{95})	2.378753 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 2.3787531 GAC = 750 (US95 = 0.003 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

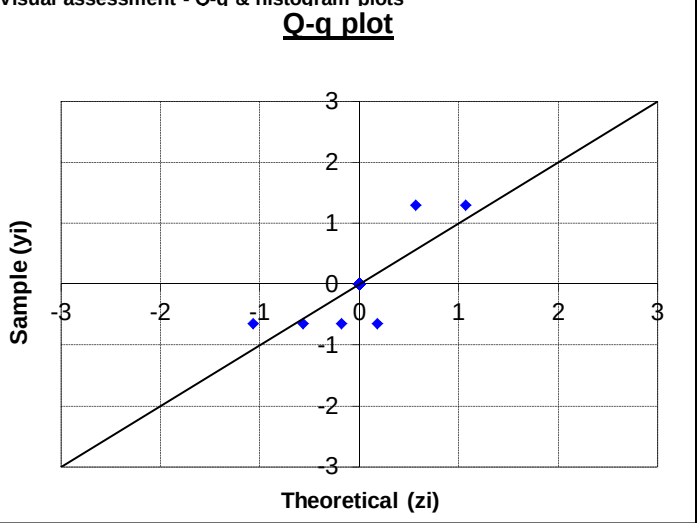
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

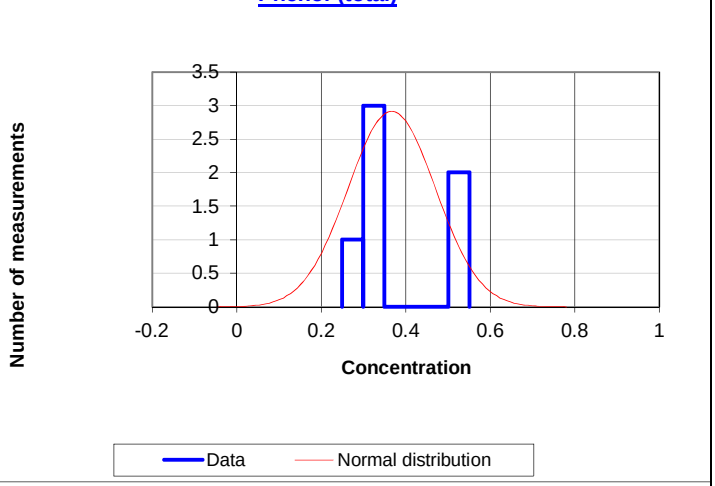
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Phenol (total)		
0.3		HTP07 @ 0.50
0.3		HTP09 @ 0.20
0.3		HTP10 @ 0.50
0.3		HTP13 @ 0.20
0.5	Yes	TP19 @ 0.5
0.5	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
0.3 = min. value	
0.5 = max. value	0.3 = laboratory reporting limit (RL)
0.366667 = mean	4 = no. samples at RL
0.10328 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-6869.258 = t_0	-6869.26 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.451627 = 95% UCL (US_{95})	0.5505 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5505004 GAC = 290 (US95 = 0.002 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

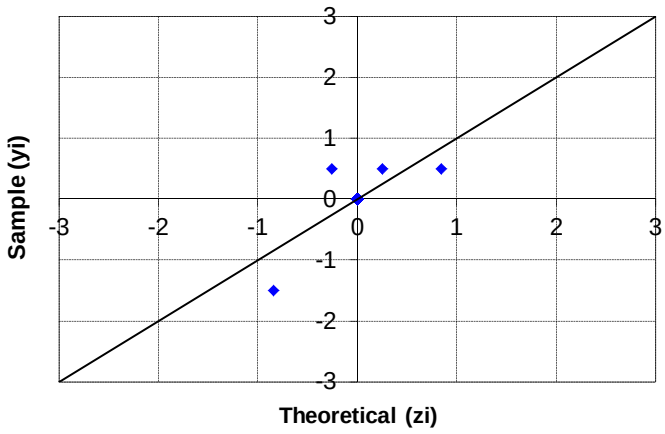
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Acenaphthene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

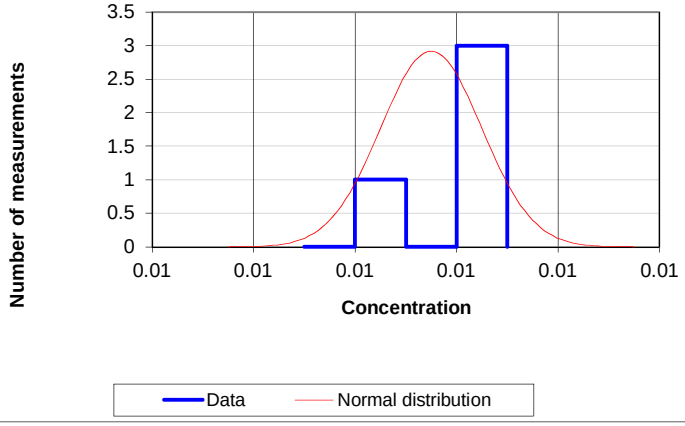
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

480 = GAC (critical conc.) (mg/kg)

4 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.01 = max. value

0.01 = laboratory reporting limit (RL)

0.01 = mean

4 = no. samples at RL

5E-13 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.92E+15 = t_0	-1.9E+15 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 480** (US95 = 0 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Acenaphthylene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

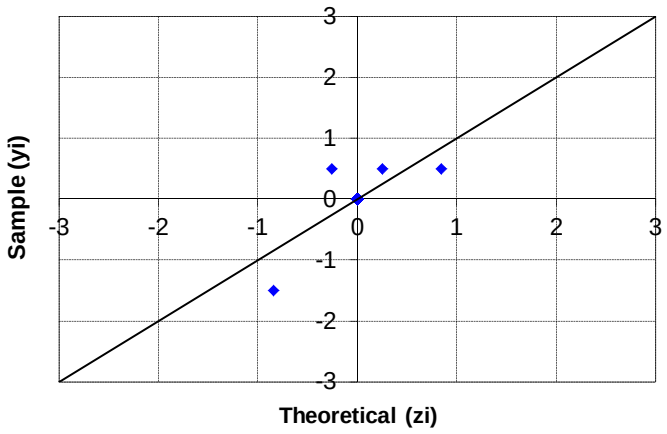
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

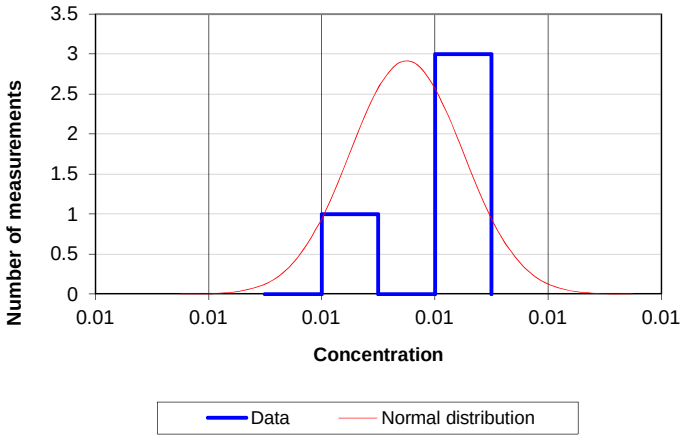
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Acenaphthylene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

400 = GAC (critical conc.) (mg/kg)

4 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.01 = max. value	0.01 = laboratory reporting limit (RL)
0.01 = mean	4 = no. samples at RL
5E-13 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.6E+15 = t_0	-1.6E+15 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 400** (US95 = 0 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Anthracene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

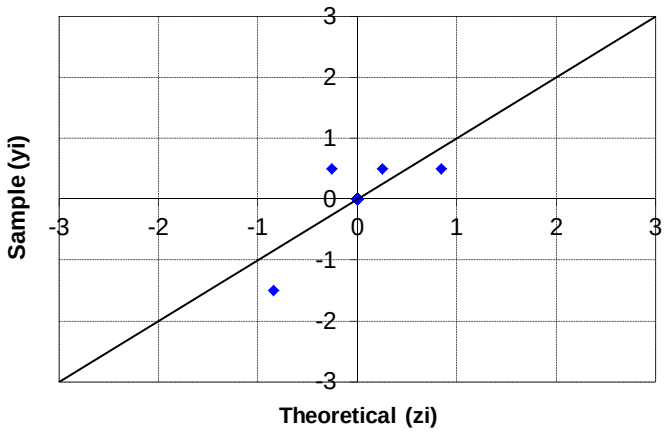
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

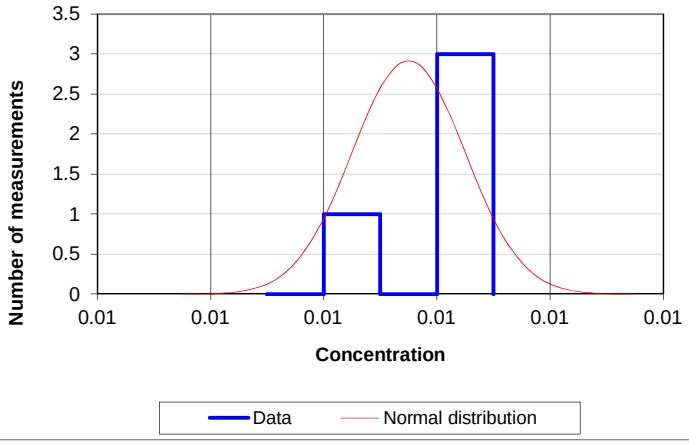
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Anthracene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4900 = GAC (critical conc.) (mg/kg)

4 = no. samples

0.01 = min. value

0.01 = max. value

0.01 = mean

5E-13 = standard deviation

0 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

4 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.96E+16 = t_0	-2E+16 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 4900** (US95 = 0 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

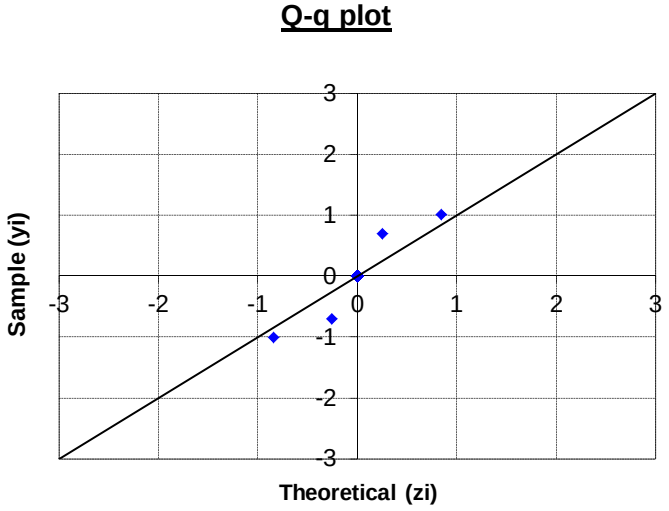
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

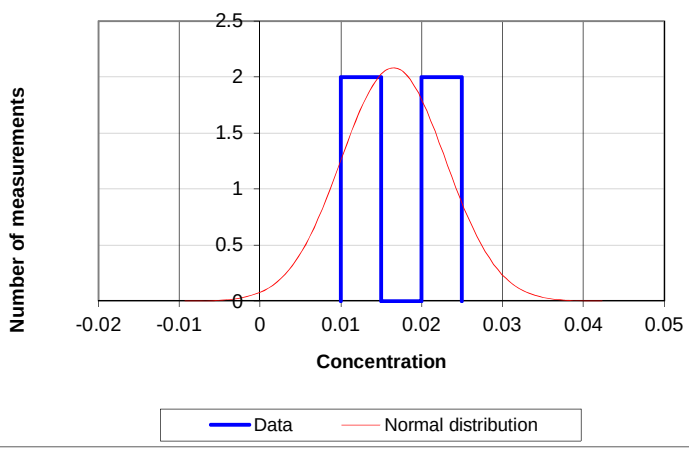
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Benz(a)anthracene	Potential Outlier?	Sample
0.023		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.012		HTP10 @ 0.50
0.021		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.7 = GAC (critical conc.) (mg/kg)

4	= no. samples	0	= no. samples > or = GAC
0.01	= min. value		
0.023	= max. value	0.01	= laboratory reporting limit (RL)
0.0165	= mean	1	= no. samples at RL
0.006455	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1451.129	= t_0	-1451.13	= k_0
2.353	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.024094	= 95% UCL (US_{95})	0.030572	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.0305718 GAC = 4.7 (US95 = 0.007 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(a)pyrene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

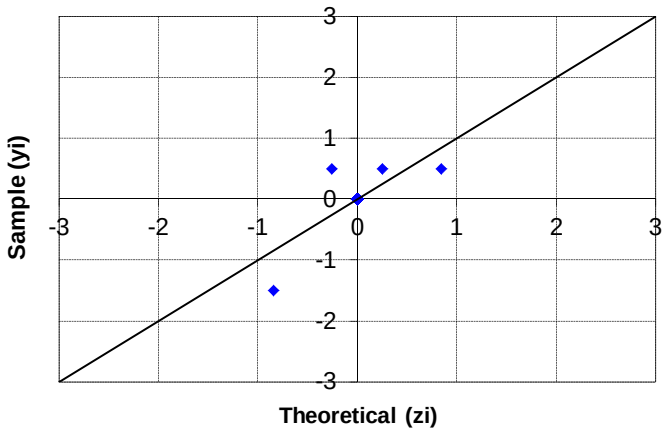
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

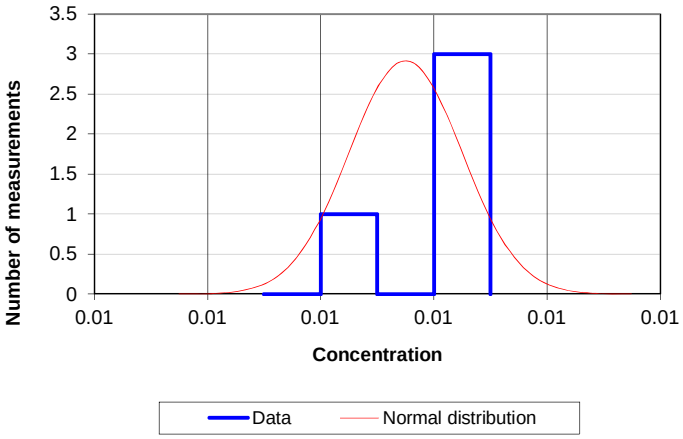
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(a)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.94 = GAC (critical conc.) (mg/kg)

4 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.01 = max. value	0.01 = laboratory reporting limit (RL)
0.01 = mean	4 = no. samples at RL
5E-13 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-3.72E+12 = t_0	-3.7E+12 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 0.94** (US95 = 0.011 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(b)fluoranthene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

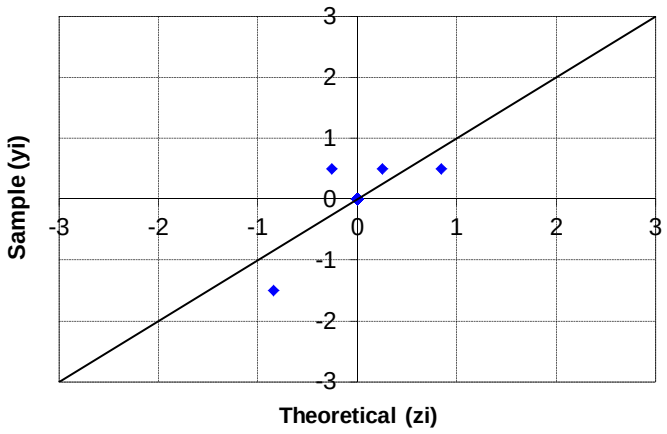
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

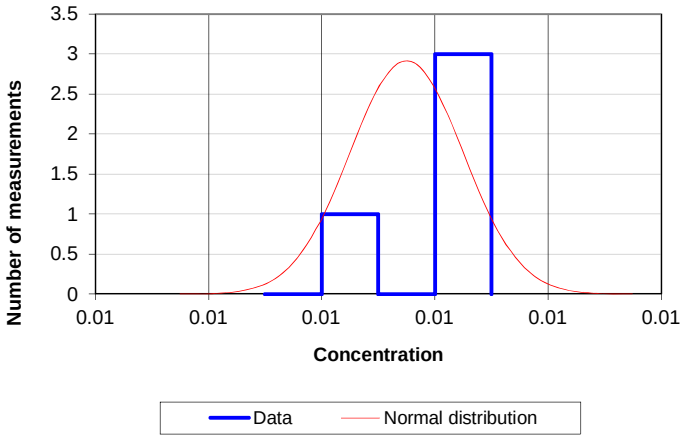
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(b)fluoranthene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

6.5 = GAC (critical conc.) (mg/kg)

4 = no. samples

0.01 = min. value

0.01 = max. value

0.01 = mean

5E-13 = standard deviation

0 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

4 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-2.6E+13 = t_0	-2.6E+13 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 6.5** (US95 = 0.002 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

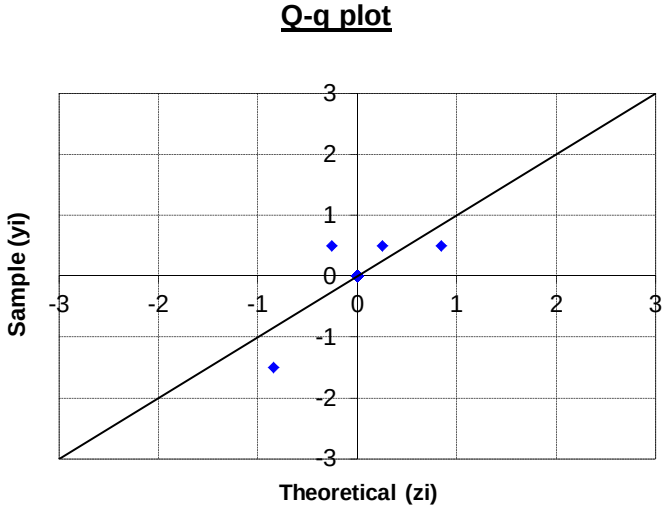
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(ghi)perylene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

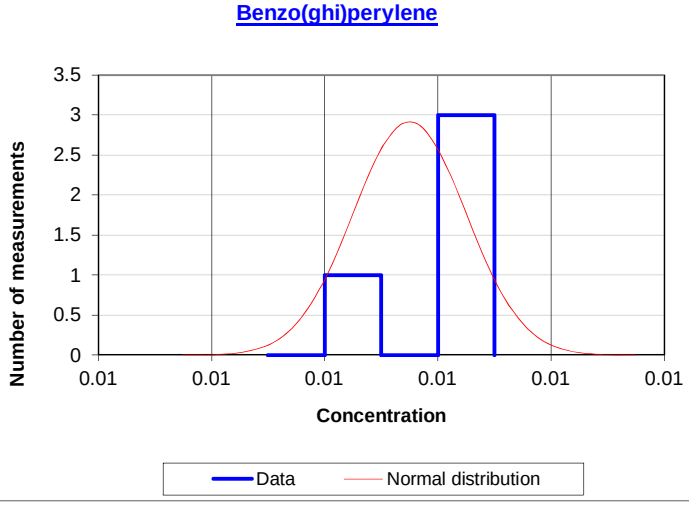
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

46 = GAC (critical conc.) (mg/kg)

4 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.01 = max. value

0.01 = laboratory reporting limit (RL)

0.01 = mean

4 = no. samples at RL

5E-13 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.84E+14 = t_0	-1.8E+14 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 46** (US95 = 0 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(k)fluoranthene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

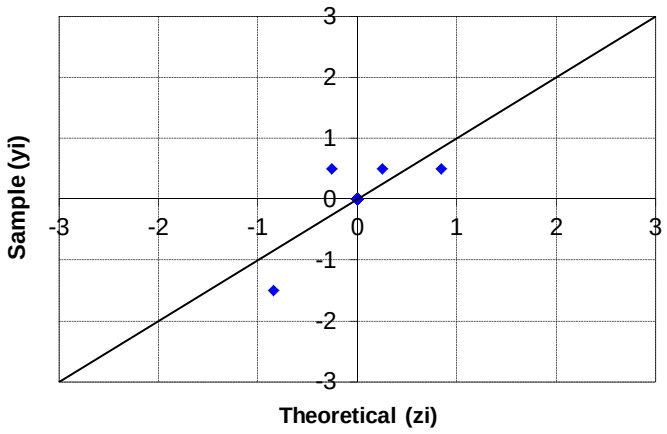
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

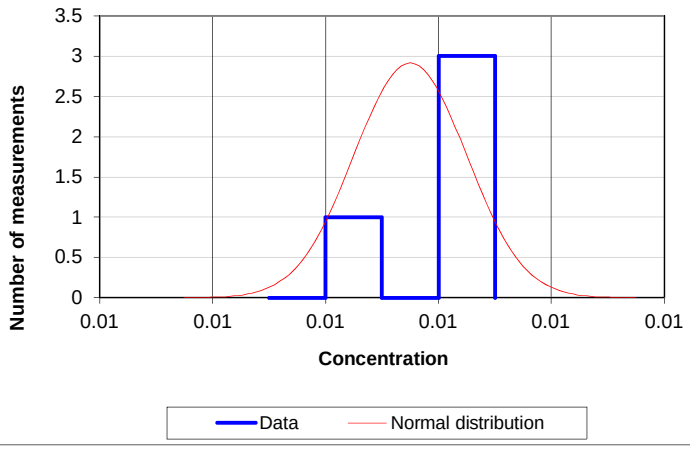
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(k)fluoranthene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

9.6 = GAC (critical conc.) (mg/kg)

4 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.01 = max. value	0.01 = laboratory reporting limit (RL)
0.01 = mean	4 = no. samples at RL
5E-13 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-3.84E+13 = t_0	-3.8E+13 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 9.6** (US95 = 0.001 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

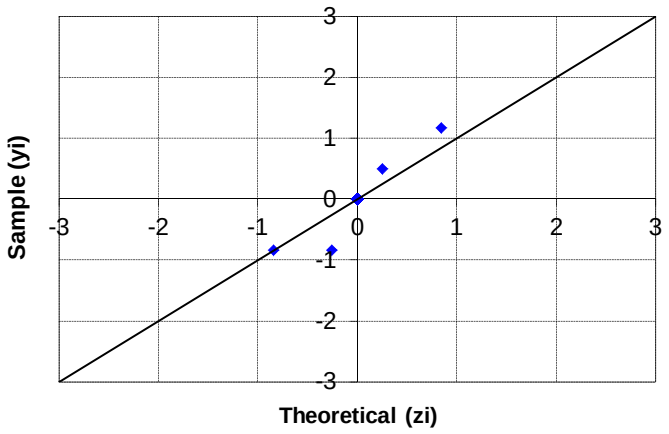
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

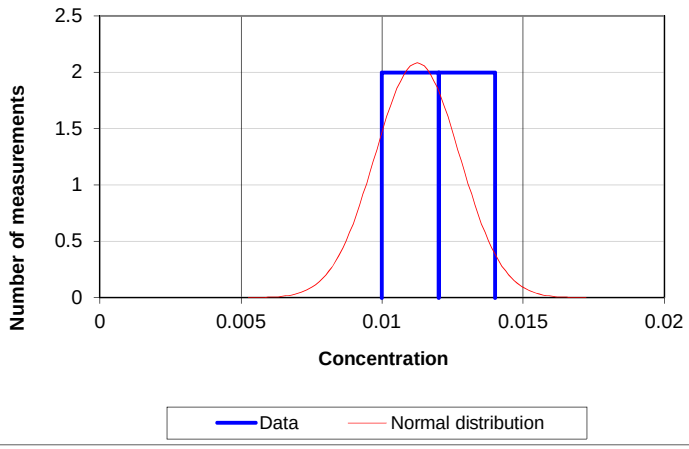
Chrysene	Potential Outlier?	Sample
0.013		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.012		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Chrysene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

8 = GAC (critical conc.) (mg/kg)

4 = no. samples
0.01 = min. value
0.013 = max. value
0.01125 = mean
0.0015 = standard deviation

0 = no. samples > or = GAC
0.01 = laboratory reporting limit (RL)
2 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-10651.67	= t_0	-10651.7	= k_0
2.353	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.013015	= 95% UCL (US_{95})	0.01452	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01452 **GAC = 8** (US95 = 0.002 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Dibenz(a,h)anthracene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

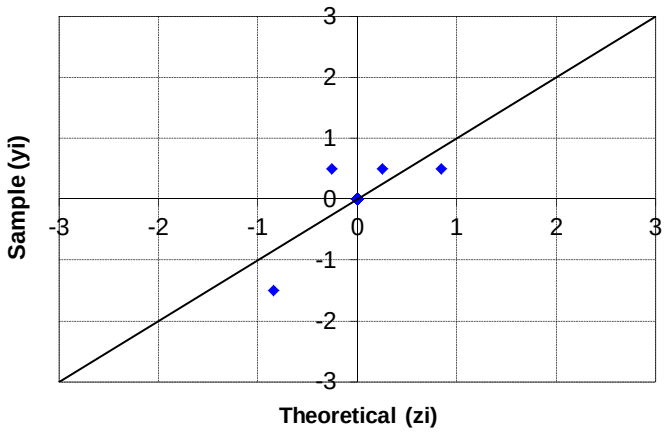
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

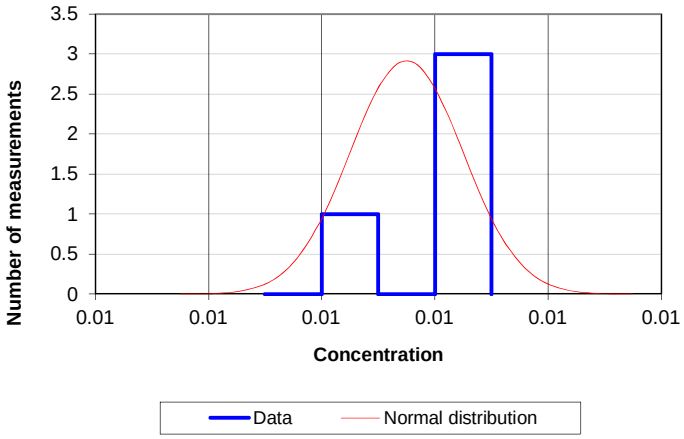
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Dibenz(a,h)anthracene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.86 = GAC (critical conc.) (mg/kg)

4 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.01 = max. value

0.01 = laboratory reporting limit (RL)

0.01 = mean

4 = no. samples at RL

5E-13 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-3.4E+12 = t_0	-3.4E+12 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 0.86** (US95 = 0.012 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

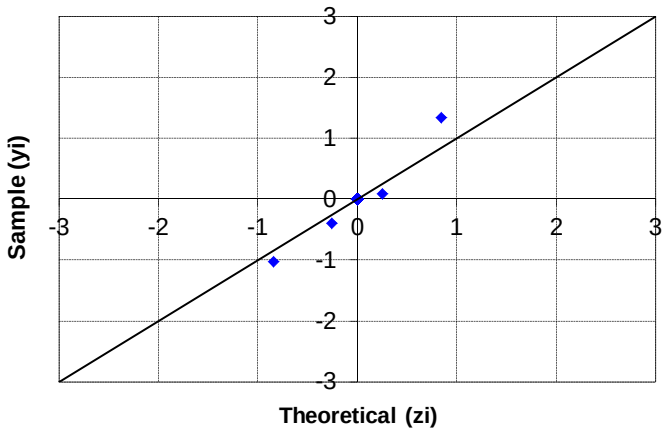
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

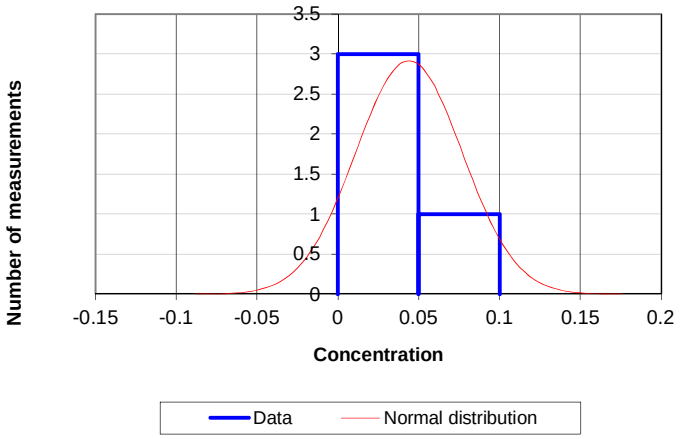
Fluoranthene	Potential Outlier?	Sample
0.047		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.031		HTP10 @ 0.50
0.088		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Fluoranthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

460 = GAC (critical conc.) (mg/kg)

4 = no. samples
0 = no. samples > or = GAC
0.01 = min. value
0.088 = max. value
0.01 = laboratory reporting limit (RL)
0.044 = mean
1 = no. samples at RL
0.033015 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-27863.33 = t_0	-27863.3 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.082842 = 95% UCL (US_{95})	0.115973 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.115973 **GAC = 460** (US95 = 0 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

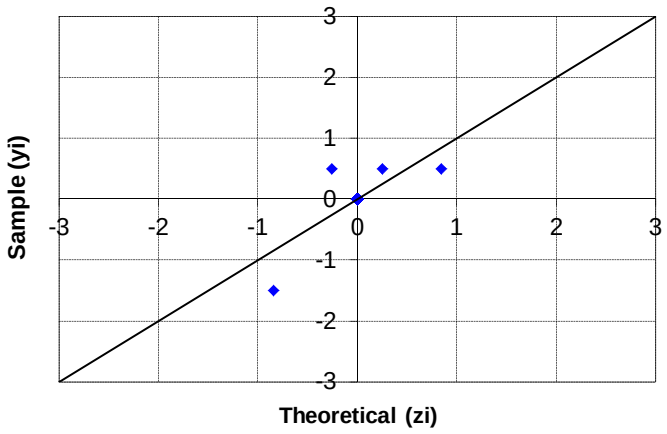
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

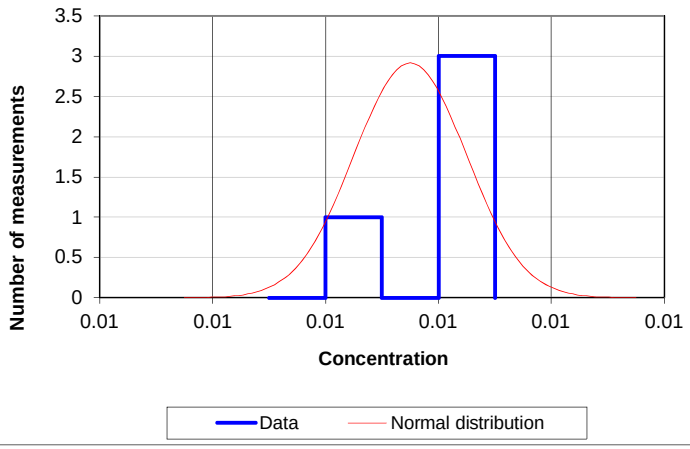
Fluorene	Potential Outlier?	Sample
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Fluorene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

380 = GAC (critical conc.) (mg/kg)

4 = no. samples
0 = no. samples > or = GAC
0.01 = min. value
0.01 = max. value
0.01 = laboratory reporting limit (RL)
0.01 = mean
4 = no. samples at RL
5E-13 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.52E+15 = t_0	-1.5E+15 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 380** (US95 = 0 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Indeno(1,2,3,cd)pyrene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

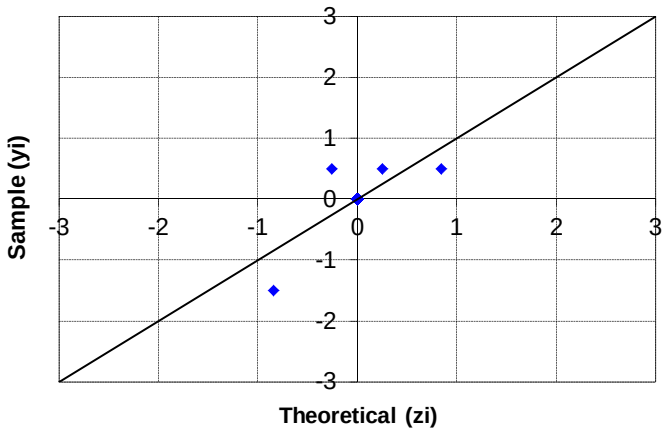
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

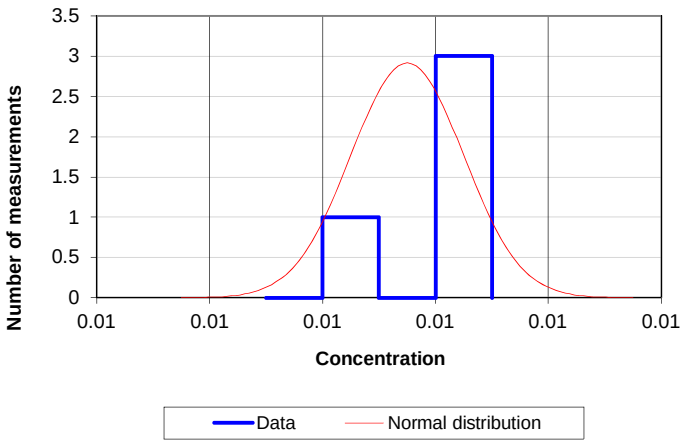
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Indeno(1,2,3,cd)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.9 = GAC (critical conc.) (mg/kg)

4 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.01 = max. value

0.01 = laboratory reporting limit (RL)

0.01 = mean

4 = no. samples at RL

5E-13 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.56E+13 = t_0	-1.6E+13 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 3.9** (US95 = 0.003 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

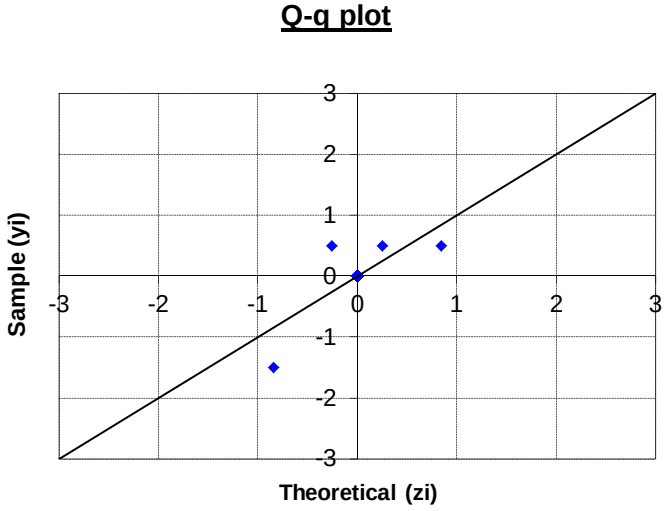
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Naphthalene		
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

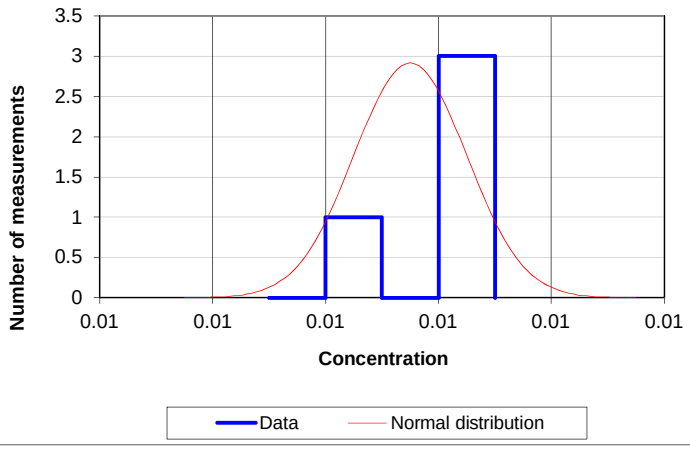
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.7 = GAC (critical conc.) (mg/kg)

4 = no. samples

0.01 = min. value

0.01 = max. value

0.01 = mean

5E-13 = standard deviation

0 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

4 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1.48E+13 = t_0	-1.5E+13 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.01 = 95% UCL (US_{95})	0.01 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.01 **GAC = 3.7** (US95 = 0.003 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

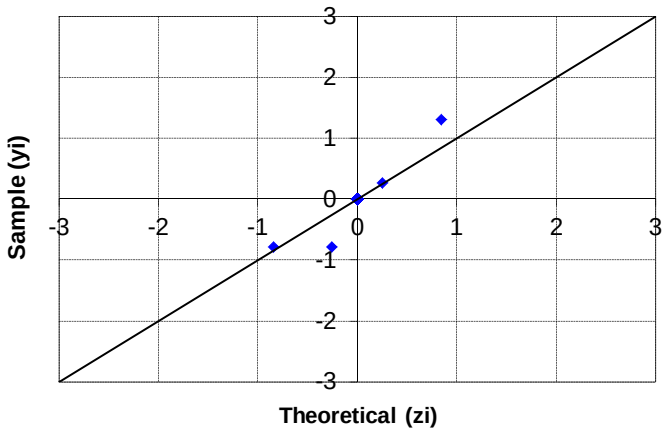
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

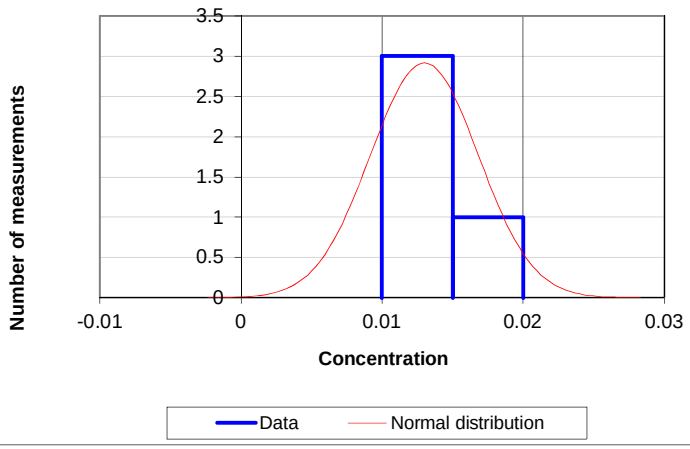
Phenanthrene	Potential Outlier?	Sample
0.018		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.014		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Phenanthrene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

200 = GAC (critical conc.) (mg/kg)

4	= no. samples	0 = no. samples > or = GAC
0.01	= min. value	
0.018	= max. value	0.01 = laboratory reporting limit (RL)
0.013	= mean	2 = no. samples at RL
0.00383	= standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-104439.8	= t_0	-104440	= k_0
2.353	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.017506	= 95% UCL (US_{95})	0.021349	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.0213488 GAC = 200 (US95 = 0 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

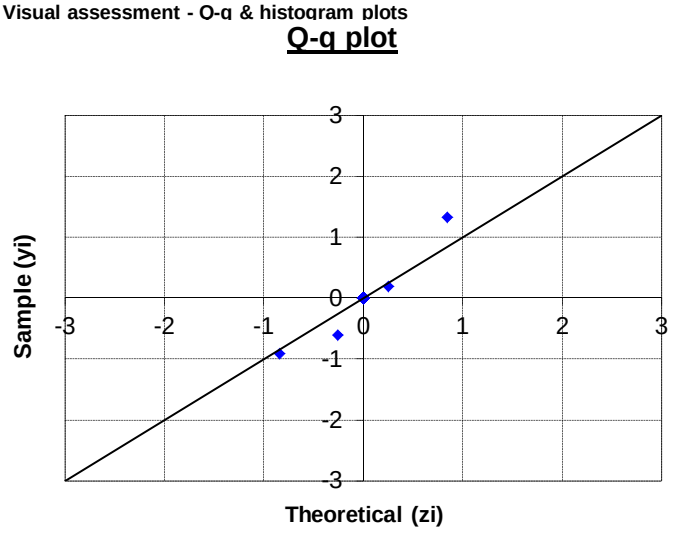
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

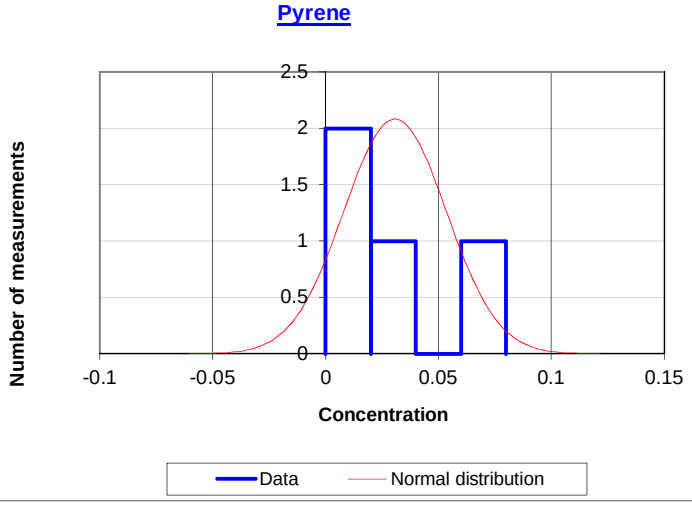
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Pyrene	Potential Outlier?	Sample
0.035		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.017		HTP10 @ 0.50
0.061		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

1000 = GAC (critical conc.) (mg/kg)

4 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.061 = max. value	0.01 = laboratory reporting limit (RL)
0.03075 = mean	1 = no. samples at RL
0.02275 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-87907.62 = t_0	-87907.6 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.057516 = 95% UCL (US_{95})	0.080346 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.080346 GAC = 1000 (US95 = 0 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

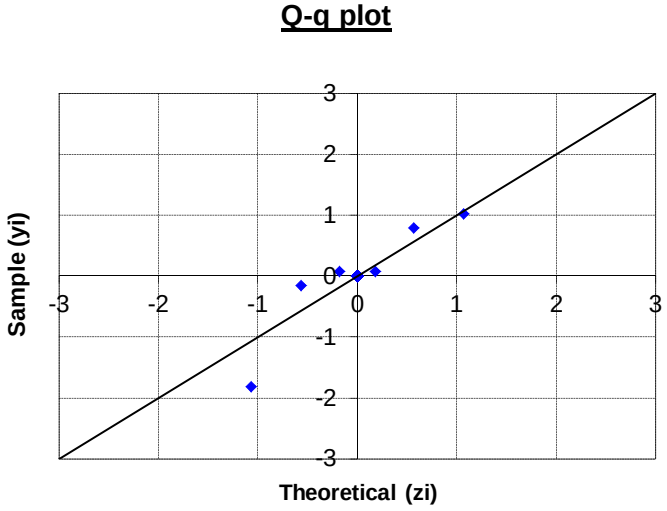
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

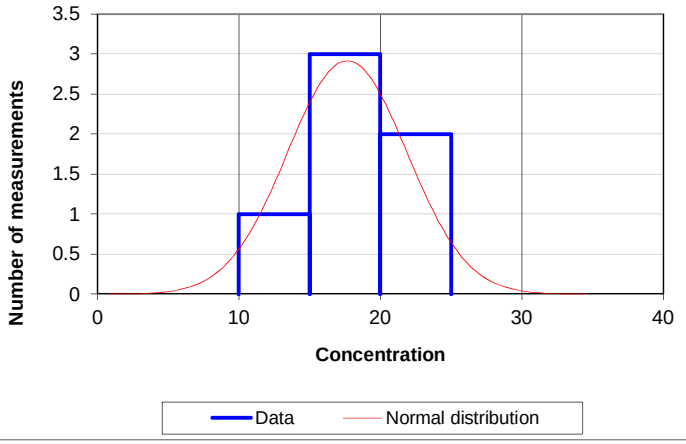
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Arsenic	Potential Outlier?	Sample
18		HTP07 @ 0.50
22		HTP09 @ 0.20
18		HTP10 @ 0.50
17		HTP13 @ 0.20
10		TP19 @ 0.5
21		TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter
Plant life pH 7

250 = **GAC (critical conc.) (mg/kg)**
6 = no. samples
10 = min. value
22 = max. value
17.66667 = mean
4.226898 = standard deviation

0 = no. samples > or = GAC
2 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-134.6373	$= t_0$	-134.637	$= k_0$
2.015	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
21.1438	= 95% UCL (US_{95})	25.19039	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 25.190387 GAC = 250 (US95 = 0.101 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

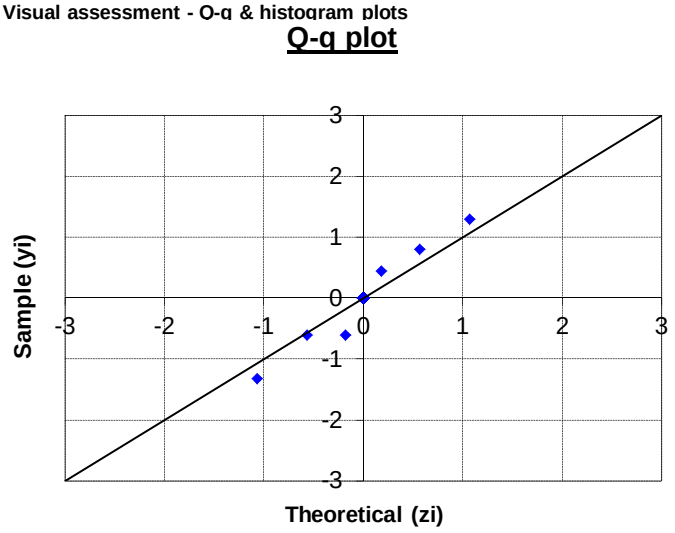
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

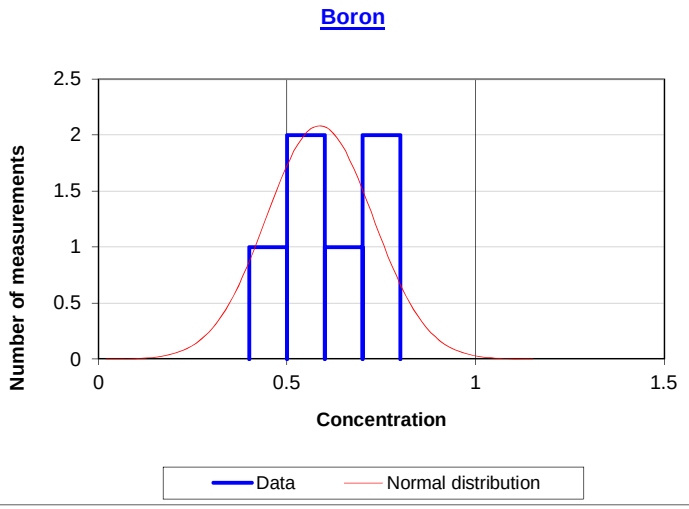
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Boron	Potential Outlier?	Sample
0.5		HTP07 @ 0.50
0.4		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.7		HTP13 @ 0.20
0.65		TP19 @ 0.5
0.77		TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter
Plant life pH 7

3 = GAC (critical conc.) (mg/kg)
6 = no. samples
0.4 = min. value
0.77 = max. value
0.586667 = mean
0.141657 = standard deviation

0 = no. samples > or = GAC
0.4 = laboratory reporting limit (RL)
1 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-41.73067 = t_0	-41.7307 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.703196 = 95% UCL (US_{95})	0.838811 = 95% UCL (US_{95})

Results of significance test at 95% confidence level
Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC
Data set treated as **non-normally distributed**
Therefore:
Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 0.8388106 GAC = 3 (US95 = 0.28 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

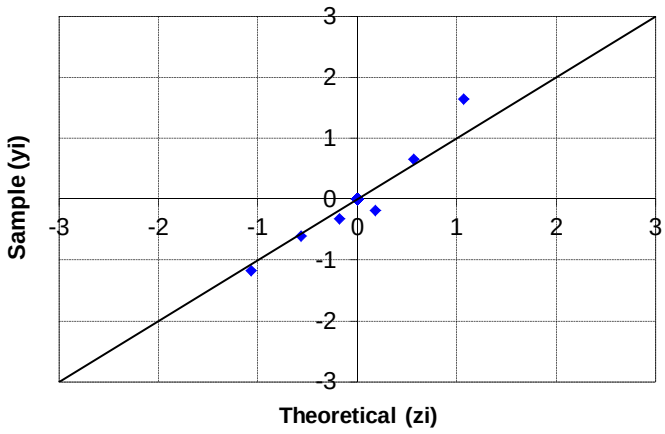
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

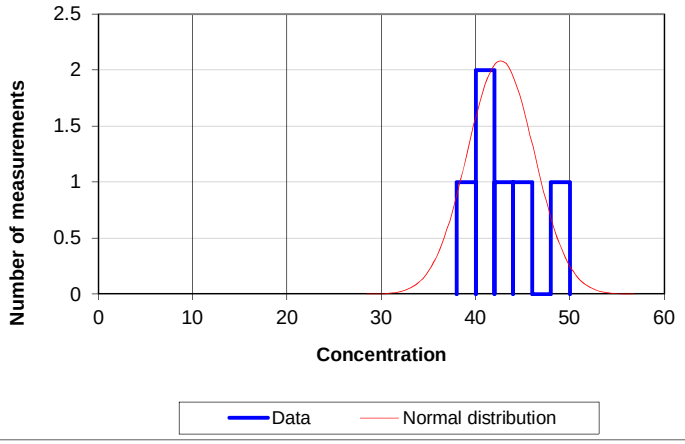
Chromium (III)	Potential Outlier?	Sample
48.5		HTP07 @ 0.50
40.5		HTP09 @ 0.20
41.5		HTP10 @ 0.50
38.5		HTP13 @ 0.20
42		TP19 @ 0.5
45		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (III)



Basic data

Risk parameter
Plant life pH 7

400 = GAC (critical conc.) (mg/kg)

6 = no. samples	0 = no. samples > or = GAC
38.5 = min. value	
48.5 = max. value	5 = laboratory reporting limit (RL)
42.66667 = mean	0 = no. samples at RL
3.559026 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-245.9337 = t_0	-245.934 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
45.59439 = 95% UCL (US_{95})	49.0016 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 49.0016 **GAC = 400** (US95 = 0.123 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

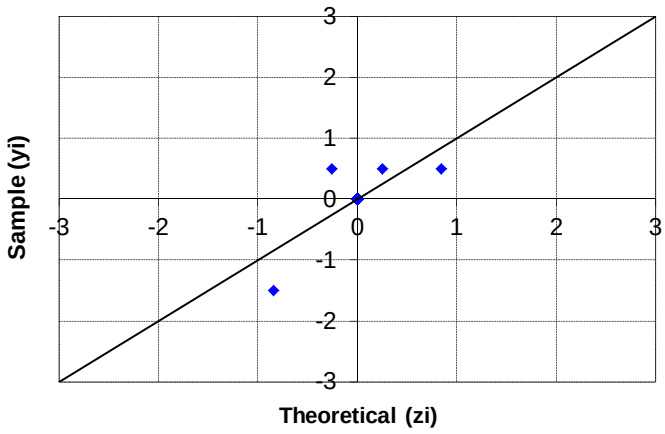
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (VI)		
0.5	n/a	HTP07 @ 0.50
0.5	n/a	HTP09 @ 0.20
0.5	n/a	HTP10 @ 0.50
0.5	n/a	HTP13 @ 0.20

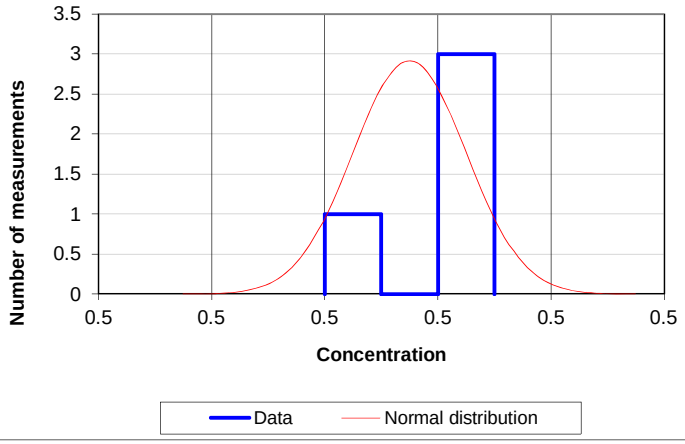
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter

Plant life pH 7

25 = GAC (critical conc.) (mg/kg)

4 = no. samples

0.5 = min. value

0.5 = max. value

0.5 = mean

5E-12 = standard deviation

0 = no. samples > or = GAC

0.5 = laboratory reporting limit (RL)

4 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-9.8E+12 = t_0	-9.8E+12 = k_0
2.353 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.5 = 95% UCL (US_{95})	0.5 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5 **GAC = 25** (US95 = 0.02 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

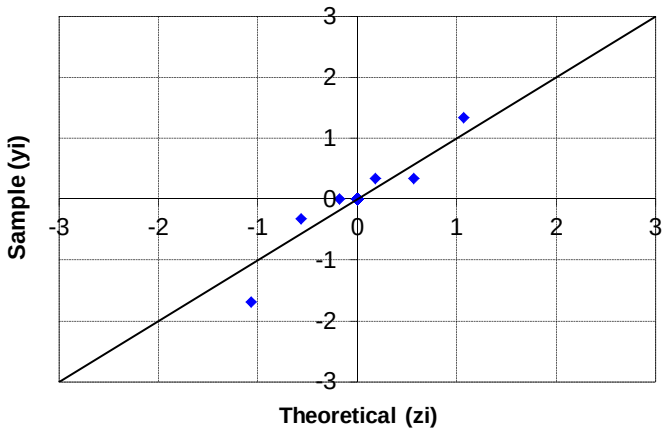
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

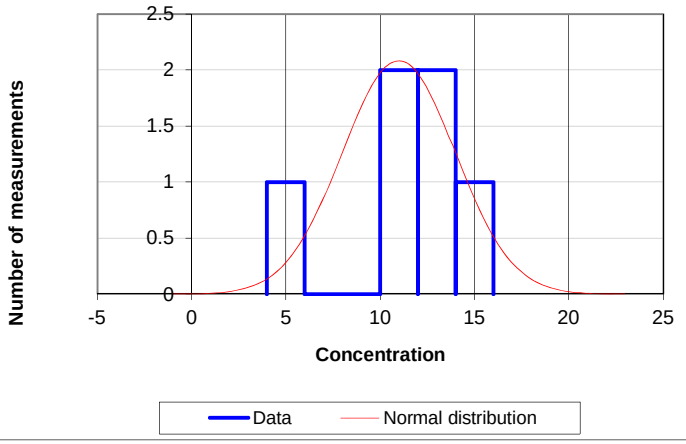
Copper	Potential Outlier?	Sample
15		HTP07 @ 0.50
12		HTP09 @ 0.20
10		HTP10 @ 0.50
12		HTP13 @ 0.20
11		TP19 @ 0.5
5.9	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data

Risk parameter
Plant life pH 7

135 = **GAC (critical conc.) (mg/kg)**
6 = no. samples
5.9 = min. value
15 = max. value
10.98333 = mean
3.000278 = standard deviation

0 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-101.2498	t_0	-101.25	k_0
2.015	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
13.45142	95% UCL (US_{95})	16.32372	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 16.323715 GAC = 135 (US95 = 0.121 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

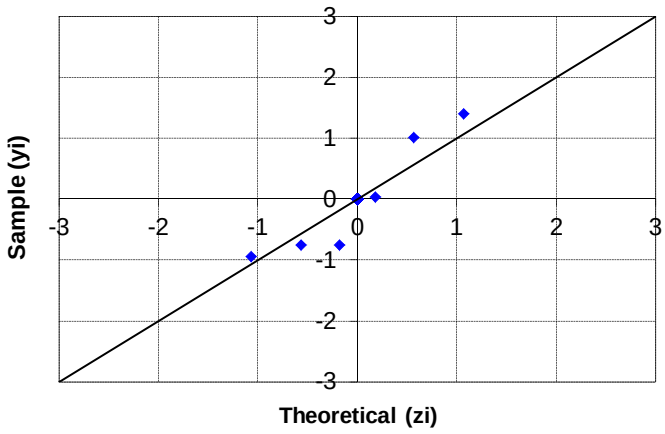
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

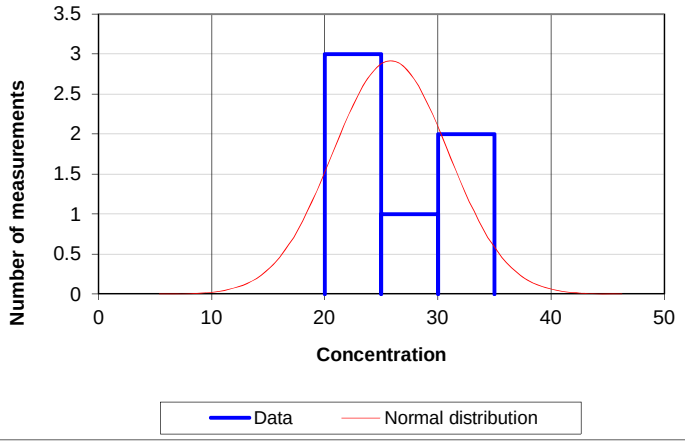
Nickel	Potential Outlier?	Sample
33		HTP07 @ 0.50
22		HTP09 @ 0.20
22		HTP10 @ 0.50
21		HTP13 @ 0.20
31		TP19 @ 0.5
26		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data

Risk parameter
Plant life pH 7

75 = **GAC (critical conc.) (mg/kg)**
6 = no. samples
21 = min. value
33 = max. value
25.83333 = mean
5.115336 = standard deviation

0 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-23.54356 = t_0	-23.5436 = k_0
2.015 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
30.04131 = 95% UCL (US_{95})	34.93844 = 95% UCL (US_{95})

Results of significance test at 95% confidence level
Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC
Data set treated as **non-normally distributed**
Therefore:
Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 34.938441 GAC = 75 (US95 = 0.466 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference
Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

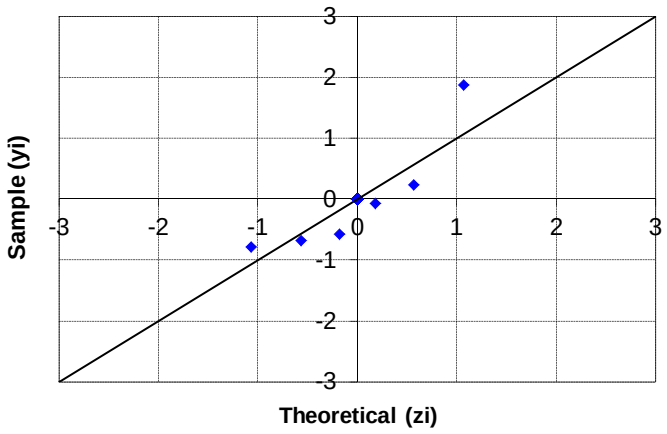
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

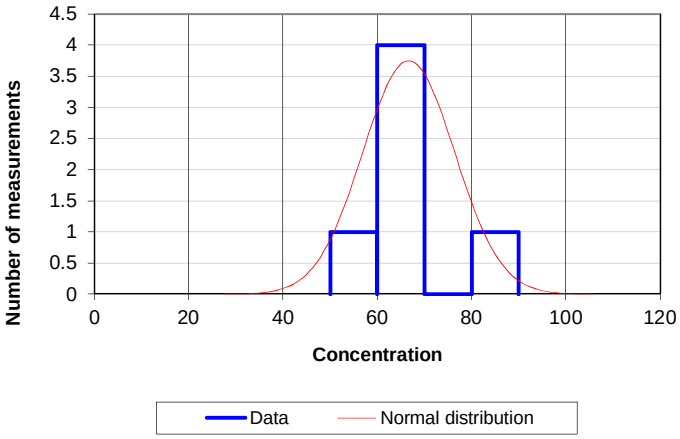
Zinc	Potential Outlier?	Sample
85	Yes	HTP07 @ 0.50
59		HTP09 @ 0.20
66		HTP10 @ 0.50
61		HTP13 @ 0.20
60		TP19 @ 0.5
69		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data

Risk parameter
Plant life pH 7

300 = **GAC (critical conc.) (mg/kg)**
6 = no. samples
59 = min. value
85 = max. value
66.66667 = mean
9.770705 = standard deviation

0 = no. samples > or = GAC
10 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-58.49605	= t_0	-58.496	= k_0
2.015	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
74.70425	= 95% UCL (US_{95})	84.05815	= 95% UCL (US_{95})

Results of significance test at 95% confidence level
Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC
Data set treated as **non-normally distributed**
Therefore:
Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 84.058155 GAC = 300 (US95 = 0.28 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: CMF & DF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HTP15	HTP17	HTP20	HTP22	HTP24	HTP25	HTP26	HTP29	HTP33	HTP39	HTP40
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.25**	**0.15**	**0.15**	**0.20**	**0.20**	**0.15**	**0.10**	**0.15**	**0.25**	**0.20**	**0.20**
Arsenic	2	40	17	230	37	32	110.5811	FURTHER ASSESSMENT REQUIRED	110	66	68	86	79	140	120	58	76	52	58
Beryllium	1	18	0.5	5.6	0	51	4.442717	POTENTIALLY SUITABLE FOR USE	4.1	1.6	2.3	2.5	2	4.2	3.7	1.6	2.1	1.4	1.6
Boron	0.4	20	0.5	2.2	0	290	1.440611	POTENTIALLY SUITABLE FOR USE	0.8	0.9	1.4	0.7	0.9	0.5	1.1	1.3	1.2	0.7	0.9
Cadmium	0.1	23	0.1	1.8	0	11	0.693381	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.28	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Chromium (III)	5	23	46.6	589.5	0	630	329.0309	POTENTIALLY SUITABLE FOR USE	269.5	77.5	87.5	109.5	109.5	269.5	239.5	77.5	99.5	77.5	81.5
Chromium (VI)	0.5	20	0.2	1.2	0	4.3	0.683627	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Copper	5	23	6	49	0	2300	38.32559	POTENTIALLY SUITABLE FOR USE	21	23	31	31	31	41	46	28	40	23	26
Lead	5	23	19	120	0	450	82.2043	POTENTIALLY SUITABLE FOR USE	39	46	62	55	51	70	120	48	71	44	49
Mercury, inorganic	0.1	23	0.1	0.6	0	170	0.349307	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nickel	5	40	29	210	8	130	110.2809	POTENTIALLY SUITABLE FOR USE	110	62	99	100	92	150	120	69	79	52	60
Selenium	0.2	23	0.2	3	0	350	1.454144	POTENTIALLY SUITABLE FOR USE	0.2	0.2	0.2	0.2	0.2	0.22	0.2	0.2	0.2	0.2	0.2
Vanadium	5	16	100	740	16	74	549.9117	FURTHER ASSESSMENT REQUIRED	410	120	150	150	160	380	320	120	150	100	120
Zinc	10	23	74	970	0	3700	393.701	POTENTIALLY SUITABLE FOR USE	190	110	180	140	160	300	260	110	150	100	120
Cyanide (free)	0.5	20	0.5	5	0	750	3.200455	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Phenol (total)	0.3	20	0.01	1.1	0	290	0.539339	POTENTIALLY SUITABLE FOR USE	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Acenaphthene	0.01	20	0.01	0.5	0	480	0.312093	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Acenaphthylene	0.01	20	0.01	0.5	0	400	0.309073	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.073	0.026
Anthracene	0.01	20	0.01	0.78	0	4900	0.363842	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.11	0.01	0.01	0.01	0.01	0.012	0.01	0.14	0.064
Benz(a)anthracene	0.01	20	0.01	0.95	0	4.7	0.507781	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.36	0.01	0.01	0.01	0.047	0.099	0.023	0.95	0.48
Benzo(a)pyrene	0.01	20	0.01	0.95	1	0.94	0.483634	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.38	0.01	0.01	0.01	0.01	0.07	0.018	0.69	0.33
Benzo(b)fluoranthene	0.01	20	0.01	1.2	0	6.5	0.575744	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.5	0.01	0.01	0.01	0.046	0.12	0.021	1.2	0.62
Benzo(ghi)perylene	0.01	20	0.01	0.5	0	46	0.320275	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.12	0.01	0.01	0.01	0.01	0.013	0.01	0.21	0.076
Benzo(k)fluoranthene	0.01	20	0.01	0.5	0	9.6	0.333785	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.13	0.01	0.01	0.01	0.01	0.011	0.01	0.35	0.099
Chrysene	0.01	20	0.01	0.78	0	8	0.454279	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.3	0.01	0.01	0.01	0.029	0.08	0.024	0.78	0.32
Dibenz(a,h)anthracene	0.01	20	0.01	0.5	0	0.86	0.30405	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fluoranthene	0.01	20	0.01	2.3	0	460	1.011848	POTENTIALLY SUITABLE FOR USE	0.096	0.019	0.81	0.043	0.01	0.028	0.13	0.26	0.076	1.7	0.84
Fluorene	0.01	20	0.01	0.5	0	380	0.311894	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Indeno(1,2,3,cd)pyrene	0.01	20	0.01	0.5	0	3.9	0.318916	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.083	0.01	0.01	0.01	0.01	0.01	0.01	0.22	0.069
Naphthalene	0.01	20	0.01	2	0	3.7	1.049686	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Phenanthrene	0.01	20	0.01	2.1	0	200	0.725232	POTENTIALLY SUITABLE FOR USE	0.039	0.01	0.39	0.01	0.01	0.01	0.043	0.059	0.029	0.28	0.17
Pyrene	0.01	20	0.01	2.3	0	1000	0.928259	POTENTIALLY SUITABLE FOR USE	0.037	0.028	0.64	0.03	0.01	0.024	0.1	0.21	0.056	1.4	0.65
	Mean																		
FOC (dimensionless)	0.020								0.0099	0.017	0.023	0.021	0.057	0.012	0.013	0.023	0.017	0.011	0.013
SOM (calculated)	3.40%								1.71%	2.93%	3.97%	3.62%	9.83%	2.07%	2.24%	3.97%	2.93%	1.90%	2.24%
pH (su)	7.7								7.1	7.5	7.7	8.3	7.7	7.7	7.9	7.9	7.6	7.6	7.3

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative es
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HTP41	HTP43	HTP44	HTP45	HTP46	TP5	TP8	TP8	TP9	HS1 TS1
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.1**	**0.2**	**0.7**	**0.4**	**0.7**	**0.1**	**0.4**	**2.8**	**0.6**	**0.21**
Arsenic	2	40	17	230	37	32	110.5811	FURTHER ASSESSMENT REQUIRED	190	130	230	120	170	19	58	17	27	120
Beryllium	1	18	0.5	5.6	0	51	4.442717	POTENTIALLY SUITABLE FOR USE	5.4	3.6	5.6	3.3	4.8	0.5	0.5			
Boron	0.4	20	0.5	2.2	0	290	1.440611	POTENTIALLY SUITABLE FOR USE	1	1	0.7	1	1.2	1.8	1	2.2	0.7	
Cadmium	0.1	23	0.1	1.8	0	11	0.693381	POTENTIALLY SUITABLE FOR USE	0.36	0.37	0.27	0.4	0.23	0.5	0.5	0.5	0.5	
Chromium (III)	5	23	46.6	589.5	0	630	329.0309	POTENTIALLY SUITABLE FOR USE	479.5	209.5	539.5	189.5	589.5	55.57	109.8	53.8	46.6	
Chromium (VI)	0.5	20	0.2	1.2	0	4.3	0.683627	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.43	0.2	1.2	0.4	
Copper	5	23	6	49	0	2300	38.32559	POTENTIALLY SUITABLE FOR USE	40	49	35	43	25	11	18	13	12	
Lead	5	23	19	120	0	450	82.2043	POTENTIALLY SUITABLE FOR USE	81	90	84	81	33	32	37	25	19	
Mercury, inorganic	0.1	23	0.1	0.6	0	170	0.349307	POTENTIALLY SUITABLE FOR USE	0.19	0.19	0.13	0.17	0.1	0.2	0.27	0.2	0.2	
Nickel	5	40	29	210	8	130	110.2809	POTENTIALLY SUITABLE FOR USE	170	160	210	130	180	29	57	32	43	100
Selenium	0.2	23	0.2	3	0	350	1.454144	POTENTIALLY SUITABLE FOR USE	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	
Vanadium	5	16	100	740	16	74	549.9117	FURTHER ASSESSMENT REQUIRED	670	330	710	290	740					
Zinc	10	23	74	970	0	3700	393.701	POTENTIALLY SUITABLE FOR USE	340	290	380	220	970	82	130	74	84	
Cyanide (free)	0.5	20	0.5	5	0	750	3.200455	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	5	5	5	5	
Phenol (total)	0.3	20	0.01	1.1	0	290	0.539339	POTENTIALLY SUITABLE FOR USE	0.01	0.1	0.044	0.054	0.091	0.5	0.5	1.1	0.5	
Acenaphthene	0.01	20	0.01	0.5	0	480	0.312093	POTENTIALLY SUITABLE FOR USE	0.01	0.1	0.044	0.054	0.091	0.5	0.5	0.5	0.5	
Acenaphthylene	0.01	20	0.01	0.5	0	400	0.309073	POTENTIALLY SUITABLE FOR USE	0.01	0.063	0.03	0.028	0.01	0.5	0.5	0.5	0.5	
Anthracene	0.01	20	0.01	0.78	0	4900	0.363842	POTENTIALLY SUITABLE FOR USE	0.03	0.02	0.01	0.01	0.031	0.5	0.78	0.5	0.5	
Benz(a)anthracene	0.01	20	0.01	0.95	0	4.7	0.507781	POTENTIALLY SUITABLE FOR USE	0.11	0.04	0.01	0.01	0.01	0.5	0.76	0.5	0.5	
Benzo(a)pyrene	0.01	20	0.01	0.95	1	0.94	0.483634	POTENTIALLY SUITABLE FOR USE	0.055	0.023	0.01	0.01	0.01	0.5	0.95	0.5	0.5	
Benzo(b)fluoranthene	0.01	20	0.01	1.2	0	6.5	0.575744	POTENTIALLY SUITABLE FOR USE	0.18	0.056	0.01	0.01	0.01	0.5	0.7	0.5	0.5	
Benzo(ghi)perylene	0.01	20	0.01	0.5	0	46	0.320275	POTENTIALLY SUITABLE FOR USE	0.032	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5	
Benzo(k)fluoranthene	0.01	20	0.01	0.5	0	9.6	0.333785	POTENTIALLY SUITABLE FOR USE	0.014	0.023	0.01	0.01	0.01	0.5	0.5	0.5	0.5	
Chrysene	0.01	20	0.01	0.78	0	8	0.454279	POTENTIALLY SUITABLE FOR USE	0.11	0.054	0.01	0.01	0.01	0.5	0.72	0.5	0.5	
Dibenz(a,h)anthracene	0.01	20	0.01	0.5	0	0.86	0.30405	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5	
Fluoranthene	0.01	20	0.01	2.3	0	460	1.011848	POTENTIALLY SUITABLE FOR USE	0.24	0.17	0.091	0.071	0.096	0.5	2.3	0.5	0.5	
Fluorene	0.01	20	0.01	0.5	0	380	0.311894	POTENTIALLY SUITABLE FOR USE	0.01	0.08	0.038	0.053	0.11	0.5	0.5	0.5	0.5	
Indeno(1,2,3,cd)pyrene	0.01	20	0.01	0.5	0	3.9	0.318916	POTENTIALLY SUITABLE FOR USE	0.025	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5	
Naphthalene	0.01	20	0.01	2	0	3.7	1.049686	POTENTIALLY SUITABLE FOR USE	0.8	1.5	0.95	1.2	2	0.5	1.1	0.5	0.5	
Phenanthrene	0.01	20	0.01	2.1	0	200	0.725232	POTENTIALLY SUITABLE FOR USE	0.22	0.17	0.1	0.08	0.24	0.5	2.1	0.5	0.5	
Pyrene	0.01	20	0.01	2.3	0	1000	0.928259	POTENTIALLY SUITABLE FOR USE	0.17	0.12	0.072	0.045	0.063	0.5	2.3	0.5	0.5	
	Mean																	
FOC (dimensionless)	0.020								0.023	0.018	0.012	0.022	0.0053					0.025
SOM (calculated)	3.40%								3.97%	3.10%	2.07%	3.79%	0.91%					4.31%
pH (su)	7.7								7.7	7.5	7.6	6.9	7.9	7.2	8.1	7.4	7.1	8.2

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

stimate.

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated																		
								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HS1 TS2	HS1 SS1	HS1 SS1	HS2 TS1	HS2 TS2	HS2 SS1	HS3 TS1	HS3 TS2	HS3 TS2	HS3SS1	HS4 TS1
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.15**	**0.33**	**No depth**	**0.22**	**0.28**	**0.35**	**0.24**	**0.25**	**No depth**	**0.4**	**0.22**
Arsenic	2	40	17	230	37	32	110.5811	FURTHER ASSESSMENT REQUIRED	140	150	150	110	110	110	60	66	86	58	79
Beryllium	1	18	0.5	5.6	0	51	4.442717	POTENTIALLY SUITABLE FOR USE											
Boron	0.4	20	0.5	2.2	0	290	1.440611	POTENTIALLY SUITABLE FOR USE											
Cadmium	0.1	23	0.1	1.8	0	11	0.693381	POTENTIALLY SUITABLE FOR USE											
Chromium (III)	5	23	46.6	589.5	0	630	329.0309	POTENTIALLY SUITABLE FOR USE											
Chromium (VI)	0.5	20	0.2	1.2	0	4.3	0.683627	POTENTIALLY SUITABLE FOR USE											
Copper	5	23	6	49	0	2300	38.32559	POTENTIALLY SUITABLE FOR USE											
Lead	5	23	19	120	0	450	82.2043	POTENTIALLY SUITABLE FOR USE											
Mercury, inorganic	0.1	23	0.1	0.6	0	170	0.349307	POTENTIALLY SUITABLE FOR USE											
Nickel	5	40	29	210	8	130	110.2809	POTENTIALLY SUITABLE FOR USE	100	130	150	110	110	110	75	75	87	65	83
Selenium	0.2	23	0.2	3	0	350	1.454144	POTENTIALLY SUITABLE FOR USE											
Vanadium	5	16	100	740	16	74	549.9117	FURTHER ASSESSMENT REQUIRED											
Zinc	10	23	74	970	0	3700	393.701	POTENTIALLY SUITABLE FOR USE											
Cyanide (free)	0.5	20	0.5	5	0	750	3.200455	POTENTIALLY SUITABLE FOR USE											
Phenol (total)	0.3	20	0.01	1.1	0	290	0.539339	POTENTIALLY SUITABLE FOR USE											
Acenaphthene	0.01	20	0.01	0.5	0	480	0.312093	POTENTIALLY SUITABLE FOR USE											
Acenaphthylene	0.01	20	0.01	0.5	0	400	0.309073	POTENTIALLY SUITABLE FOR USE											
Anthracene	0.01	20	0.01	0.78	0	4900	0.363842	POTENTIALLY SUITABLE FOR USE											
Benz(a)anthracene	0.01	20	0.01	0.95	0	4.7	0.507781	POTENTIALLY SUITABLE FOR USE											
Benzo(a)pyrene	0.01	20	0.01	0.95	1	0.94	0.483634	POTENTIALLY SUITABLE FOR USE											
Benzo(b)fluoranthene	0.01	20	0.01	1.2	0	6.5	0.575744	POTENTIALLY SUITABLE FOR USE											
Benzo(ghi)perylene	0.01	20	0.01	0.5	0	46	0.320275	POTENTIALLY SUITABLE FOR USE											
Benzo(k)fluoranthene	0.01	20	0.01	0.5	0	9.6	0.333785	POTENTIALLY SUITABLE FOR USE											
Chrysene	0.01	20	0.01	0.78	0	8	0.454279	POTENTIALLY SUITABLE FOR USE											
Dibenz(a,h)anthracene	0.01	20	0.01	0.5	0	0.86	0.30405	POTENTIALLY SUITABLE FOR USE											
Fluoranthene	0.01	20	0.01	2.3	0	460	1.011848	POTENTIALLY SUITABLE FOR USE											
Fluorene	0.01	20	0.01	0.5	0	380	0.311894	POTENTIALLY SUITABLE FOR USE											
Indeno(1,2,3,cd)pyrene	0.01	20	0.01	0.5	0	3.9	0.318916	POTENTIALLY SUITABLE FOR USE											
Naphthalene	0.01	20	0.01	2	0	3.7	1.049686	POTENTIALLY SUITABLE FOR USE											
Phenanthrene	0.01	20	0.01	2.1	0	200	0.725232	POTENTIALLY SUITABLE FOR USE											
Pyrene	0.01	20	0.01	2.3	0	1000	0.928259	POTENTIALLY SUITABLE FOR USE											
	Mean																		
FOC (dimensionless)	0.020								0.021512	0.012791		0.024419		0.026744	0.026163	0.024419		0.013372	0.025581
SOM (calculated)	3.40%								3.71%	2.21%		4.21%		4.61%	4.51%	4.21%		2.31%	4.41%
pH (su)	7.7								8.1	8.1		8.1	8.1	8.1	8	8		8	7.9

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HS4TS2	HS4 SS1	HS5 TS1	HS5 TS1	HS5TS2	WAHS1	WAHS2	WAHS4
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.19**	**0.38**	**0.16**	**No depth**	**0.17**	**No depth**	**No depth**	**No depth**
Arsenic	2	40	17	230	37	32	110.5811	FURTHER ASSESSMENT REQUIRED	60	70	130	110	110	150	120	69
Beryllium	1	18	0.5	5.6	0	51	4.442717	POTENTIALLY SUITABLE FOR USE								
Boron	0.4	20	0.5	2.2	0	290	1.440611	POTENTIALLY SUITABLE FOR USE								
Cadmium	0.1	23	0.1	1.8	0	11	0.693381	POTENTIALLY SUITABLE FOR USE						1.8	0.7	0.7
Chromium (III)	5	23	46.6	589.5	0	630	329.0309	POTENTIALLY SUITABLE FOR USE						270	150	87
Chromium (VI)	0.5	20	0.2	1.2	0	4.3	0.683627	POTENTIALLY SUITABLE FOR USE								
Copper	5	23	6	49	0	2300	38.32559	POTENTIALLY SUITABLE FOR USE						6	6	14
Lead	5	23	19	120	0	450	82.2043	POTENTIALLY SUITABLE FOR USE						46	110	49
Mercury, inorganic	0.1	23	0.1	0.6	0	170	0.349307	POTENTIALLY SUITABLE FOR USE						0.6	0.6	0.6
Nickel	5	40	29	210	8	130	110.2809	POTENTIALLY SUITABLE FOR USE	78	86	110	120	110	110	98	79
Selenium	0.2	23	0.2	3	0	350	1.454144	POTENTIALLY SUITABLE FOR USE						3	3	3
Vanadium	5	16	100	740	16	74	549.9117	FURTHER ASSESSMENT REQUIRED								
Zinc	10	23	74	970	0	3700	393.701	POTENTIALLY SUITABLE FOR USE						310	290	170
Cyanide (free)	0.5	20	0.5	5	0	750	3.200455	POTENTIALLY SUITABLE FOR USE								
Phenol (total)	0.3	20	0.01	1.1	0	290	0.539339	POTENTIALLY SUITABLE FOR USE								
Acenaphthene	0.01	20	0.01	0.5	0	480	0.312093	POTENTIALLY SUITABLE FOR USE								
Acenaphthylene	0.01	20	0.01	0.5	0	400	0.309073	POTENTIALLY SUITABLE FOR USE								
Anthracene	0.01	20	0.01	0.78	0	4900	0.363842	POTENTIALLY SUITABLE FOR USE								
Benz(a)anthracene	0.01	20	0.01	0.95	0	4.7	0.507781	POTENTIALLY SUITABLE FOR USE								
Benzo(a)pyrene	0.01	20	0.01	0.95	1	0.94	0.483634	POTENTIALLY SUITABLE FOR USE								
Benzo(b)fluoranthene	0.01	20	0.01	1.2	0	6.5	0.575744	POTENTIALLY SUITABLE FOR USE								
Benzo(ghi)perylene	0.01	20	0.01	0.5	0	46	0.320275	POTENTIALLY SUITABLE FOR USE								
Benzo(k)fluoranthene	0.01	20	0.01	0.5	0	9.6	0.333785	POTENTIALLY SUITABLE FOR USE								
Chrysene	0.01	20	0.01	0.78	0	8	0.454279	POTENTIALLY SUITABLE FOR USE								
Dibenz(a,h)anthracene	0.01	20	0.01	0.5	0	0.86	0.30405	POTENTIALLY SUITABLE FOR USE								
Fluoranthene	0.01	20	0.01	2.3	0	460	1.011848	POTENTIALLY SUITABLE FOR USE								
Fluorene	0.01	20	0.01	0.5	0	380	0.311894	POTENTIALLY SUITABLE FOR USE								
Indeno(1,2,3,cd)pyrene	0.01	20	0.01	0.5	0	3.9	0.318916	POTENTIALLY SUITABLE FOR USE								
Naphthalene	0.01	20	0.01	2	0	3.7	1.049686	POTENTIALLY SUITABLE FOR USE								
Phenanthrene	0.01	20	0.01	2.1	0	200	0.725232	POTENTIALLY SUITABLE FOR USE								
Pyrene	0.01	20	0.01	2.3	0	1000	0.928259	POTENTIALLY SUITABLE FOR USE								
	Mean															
FOC (dimensionless)	0.020								0.026744	0.025581	0.024419		0.023256	0.009884	0.012209	0.012209
SOM (calculated)	3.40%								4.61%	4.41%	4.21%		4.01%	1.70%	2.10%	2.10%
pH (su)	7.7								7.6	7.7	7.7		7.8	7.45	7.58	6.88

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HTP15	HTP17	HTP20	HTP22	HTP24	HTP25	HTP26	HTP29	HTP33	HTP39	HTP40	HTP41	HTP43	HTP44
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.25**	**0.15**	**0.15**	**0.20**	**0.20**	**0.15**	**0.10**	**0.15**	**0.25**	**0.20**	**0.20**	**0.1**	**0.2**	**0.7**
Arsenic	2	40	17	230	0	250	130.0778	POTENTIALLY SUITABLE FOR USE	110	66	68	86	79	140	120	58	76	52	58	190	130	230
Boron	0.4	20	0.5	2.2	0	3	1.440611	POTENTIALLY SUITABLE FOR USE	0.8	0.9	1.4	0.7	0.9	0.5	1.1	1.3	1.2	0.7	0.9	1	1	0.7
Chromium (III)	5	23	46.6	589.5	3	400	329.0309	POTENTIALLY SUITABLE FOR USE	269.5	77.5	87.5	109.5	109.5	269.5	239.5	77.5	99.5	77.5	81.5	479.5	209.5	539.5
Chromium (VI)	0.5	20	0.2	1.2	0	25	0.683627	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Copper	5	23	6	49	0	135	38.32559	POTENTIALLY SUITABLE FOR USE	21	23	31	31	31	41	46	28	40	23	26	40	49	35
Nickel	5	40	29	210	31	75	126.9991	FURTHER ASSESSMENT REQUIRED	110	62	99	100	92	150	120	69	79	52	60	170	160	210
Zinc	10	23	74	970	5	300	393.701	FURTHER ASSESSMENT REQUIRED	190	110	180	140	160	300	260	110	150	100	120	340	290	380
	Mean																					
pH (su)	7.7								7.1	7.5	7.7	8.3	7.7	7.7	7.9	7.9	7.6	7.6	7.3	7.7	7.5	7.6

Risk parameter: Plant life pH 7
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HTP45	HTP46	TP5	TP8	TP8	TP9	HS1 TS1	HS1 TS2	HS1 SS1	HS1 SS1	HS2 TS1	HS2 TS2	HS2 SS1	HS3 TS1
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.4**	**0.7**	**0.1**	**0.4**	**2.8**	**0.6**	**0.21**	**0.15**	**0.33**	**No depth**	**0.22**	**0.28**	**0.35**	**0.24**
Arsenic	2	40	17	230	0	250	130.0778	POTENTIALLY SUITABLE FOR USE	120	170	19	58	17	27	120	140	150	150	110	110	110	60
Boron	0.4	20	0.5	2.2	0	3	1.440611	POTENTIALLY SUITABLE FOR USE	1	1.2	1.8	1	2.2	0.7								
Chromium (III)	5	23	46.6	589.5	3	400	329.0309	POTENTIALLY SUITABLE FOR USE	189.5	589.5	55.57	109.8	53.8	46.6								
Chromium (VI)	0.5	20	0.2	1.2	0	25	0.683627	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.43	0.2	1.2	0.4								
Copper	5	23	6	49	0	135	38.32559	POTENTIALLY SUITABLE FOR USE	43	25	11	18	13	12								
Nickel	5	40	29	210	31	75	126.9991	FURTHER ASSESSMENT REQUIRED	130	180	29	57	32	43	100	100	130	150	110	110	110	75
Zinc	10	23	74	970	5	300	393.701	FURTHER ASSESSMENT REQUIRED	220	970	82	130	74	84								
	Mean																					
pH (su)	7.7								6.9	7.9	7.2	8.1	7.4	7.1	8.2	8.1	8.1		8.1	8.1	8.1	8

Risk parameter: **Plant life pH 7**
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT
								Location & Depth	HS3 TS2	HS3 TS2	HS3SS1	HS4 TS1	HS4TS2	HS4 SS1	HS5 TS1	HS5 TS1	HS5TS2	WAHS1	WAHS2	WAHS4
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.25**	**No depth**	**0.4**	**0.22**	**0.19**	**0.38**	**0.16**	**No depth**	**0.17**	**No depth**	**No depth**	**No depth**
Arsenic	2	40	17	230	0	250	130.0778	POTENTIALLY SUITABLE FOR USE	66	86	58	79	60	70	130	110	110	150	120	69
Boron	0.4	20	0.5	2.2	0	3	1.440611	POTENTIALLY SUITABLE FOR USE												
Chromium (III)	5	23	46.6	589.5	3	400	329.0309	POTENTIALLY SUITABLE FOR USE										270	150	87
Chromium (VI)	0.5	20	0.2	1.2	0	25	0.683627	POTENTIALLY SUITABLE FOR USE												
Copper	5	23	6	49	0	135	38.32559	POTENTIALLY SUITABLE FOR USE										6	6	14
Nickel	5	40	29	210	31	75	126.9991	FURTHER ASSESSMENT REQUIRED	75	87	65	83	78	86	110	120	110	110	98	79
Zinc	10	23	74	970	5	300	393.701	FURTHER ASSESSMENT REQUIRED										310	290	170
	Mean																			
pH (su)	7.7								8		8	7.9	7.6	7.7	7.7		7.8	7.45	7.58	6.88

Risk parameter: **Plant life pH 7**
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

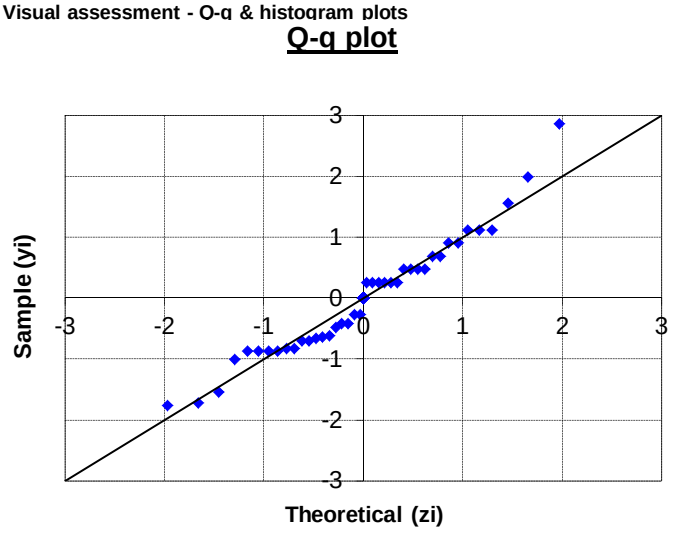
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

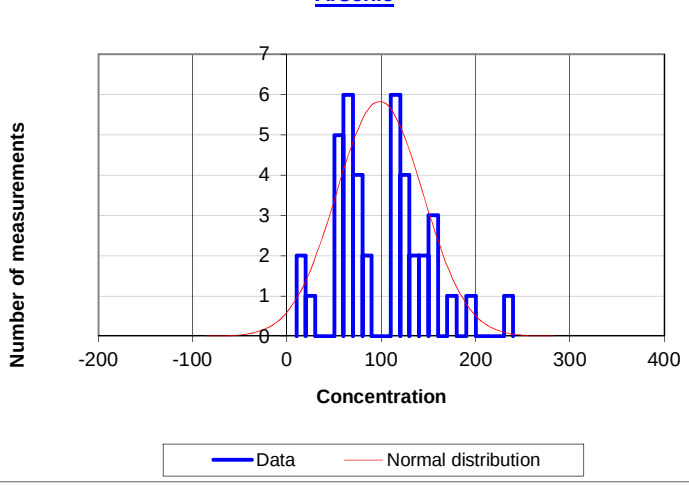
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Arsenic	Potential Outlier?	Sample
110		HTP15 @ 0.25
66		HTP17 @ 0.15
68		HTP20 @ 0.15
86		HTP22 @ 0.20
79		HTP24 @ 0.20
140		HTP25 @ 0.15
120		HTP26 @ 0.10
58		HTP29 @ 0.15
76		HTP33 @ 0.25
52		HTP39 @ 0.20
58		HTP40 @ 0.20
190		HTP41 @ 0.1
130		HTP43 @ 0.2
230		HTP44 @ 0.7
120		HTP45 @ 0.4
170		HTP46 @ 0.7
19		TP5 @ 0.1
58		TP8 @ 0.4
17		TP8 @ 2.8
27		TP9 @ 0.6
120		HS1 TS1 @ 0.21
140		HS1 TS2 @ 0.15
150		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
60		HS3 TS1 @ 0.24
66		HS3 TS2 @ 0.25
86		HS3 TS2 @ No depth
58		HS3SS1 @ 0.4
79		HS4 TS1 @ 0.22
60		HS4TS2 @ 0.19
70		HS4 SS1 @ 0.38
130		HS5 TS1 @ 0.16
110		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
150		WAHS1 @ No depth
120		WAHS2 @ No depth
69		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

32 = GAC (critical conc.) (mg/kg)
40 = no. samples
17 = min. value
230 = max. value
98.3 = mean (mean>GAC)
46.09644 = standard deviation
37 = no. samples > or = GAC
2 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
9.096537 = t_0	9.096537 = k_0
1.685 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
110.5811 = 95% UCL (US_{95})	130.0778 = 95% UCL (US_{95})

Results of significance test at 95% confidence level
Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC
Data set treated as **normally distributed**
Therefore:
Use one-sample t-test - Ho accepted, true mean >GAC
US_{95} = 110.5811 **GAC = 32** (US95 = 3.456 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference
Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

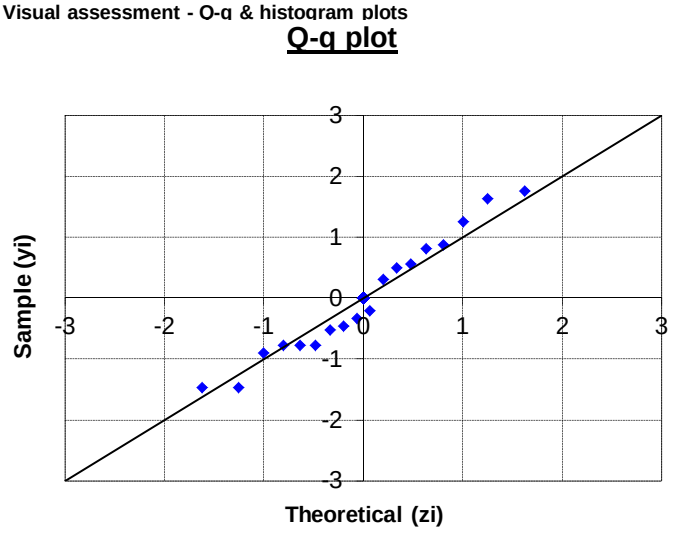
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

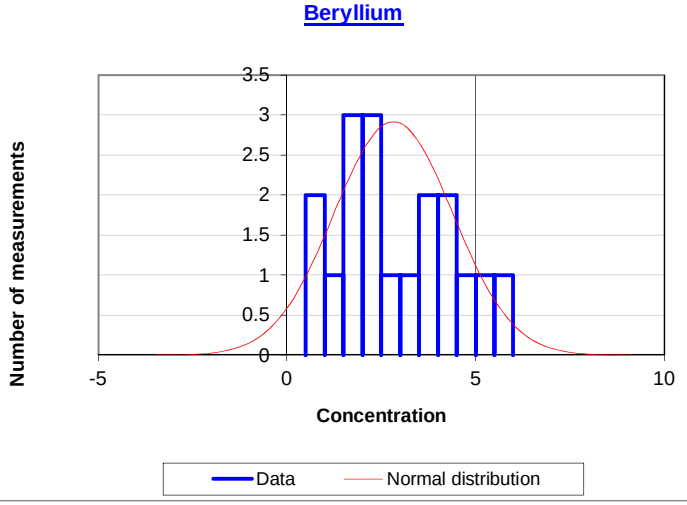
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Beryllium	Potential Outlier?	Sample
4.1		HTP15 @ 0.25
1.6		HTP17 @ 0.15
2.3		HTP20 @ 0.15
2.5		HTP22 @ 0.20
2		HTP24 @ 0.20
4.2		HTP25 @ 0.15
3.7		HTP26 @ 0.10
1.6		HTP29 @ 0.15
2.1		HTP33 @ 0.25
1.4		HTP39 @ 0.20
1.6		HTP40 @ 0.20
5.4		HTP41 @ 0.1
3.6		HTP43 @ 0.2
5.6		HTP44 @ 0.7
3.3		HTP45 @ 0.4
4.8		HTP46 @ 0.7
0.5		TP5 @ 0.1
0.5		TP8 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

51 = GAC (critical conc.) (mg/kg)

18 = no. samples
0 = no. samples > or = GAC
0.5 = min. value
5.6 = max. value
1 = laboratory reporting limit (RL)
2.822222 = mean
2 = no. samples at RL
1.576875 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-129.6241 = t_0	-129.624 = k_0
0.174 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
2.886893 = 95% UCL (US_{95})	4.442717 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 4.4427169 GAC = 51 (US95 = 0.087 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

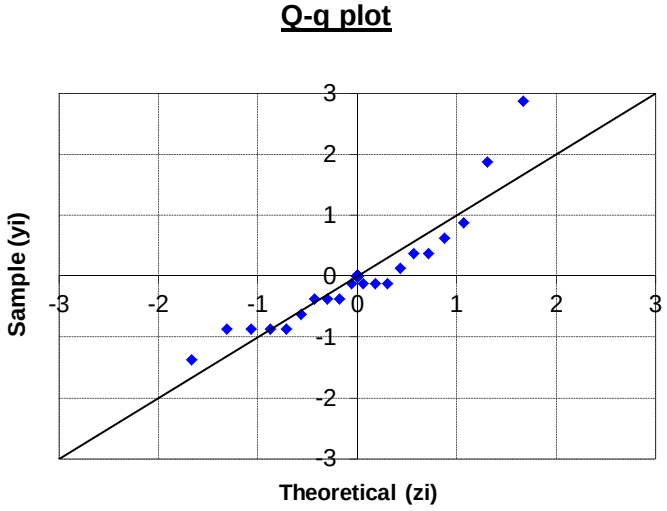
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

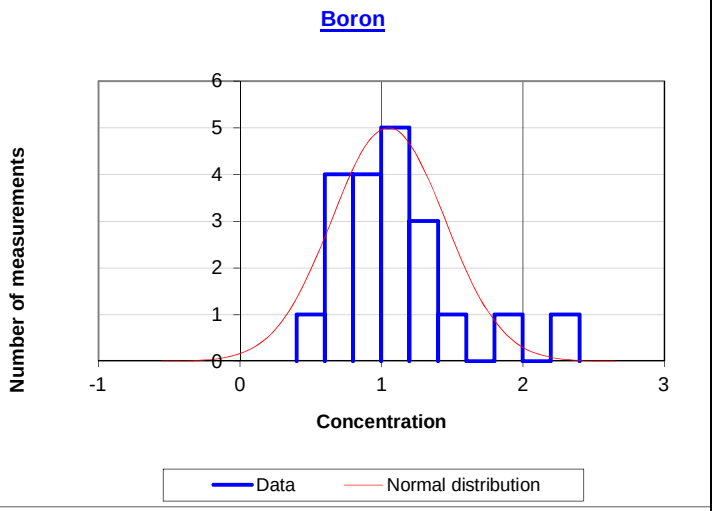
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Boron	Potential Outlier?	Sample
0.8		HTP15 @ 0.25
0.9		HTP17 @ 0.15
1.4		HTP20 @ 0.15
0.7		HTP22 @ 0.20
0.9		HTP24 @ 0.20
0.5		HTP25 @ 0.15
1.1		HTP26 @ 0.10
1.3		HTP29 @ 0.15
1.2		HTP33 @ 0.25
0.7		HTP39 @ 0.20
0.9		HTP40 @ 0.20
1		HTP41 @ 0.1
1		HTP43 @ 0.2
0.7		HTP44 @ 0.7
1		HTP45 @ 0.4
1.2		HTP46 @ 0.7
1.8		TP5 @ 0.1
1		TP8 @ 0.4
2.2	Yes	TP8 @ 2.8
0.7		TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

20 = no. samples
0 = no. samples > or = GAC
0.5 = min. value
2.2 = max. value
0.4 = laboratory reporting limit (RL)
1.05 = mean
0 = no. samples at RL
0.400657 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-3225.259	= t_0	-3225.26	= k_0
1.729	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.204901	= 95% UCL (US_{95})	1.440611	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.4406111 GAC = 290 (US95 = 0.005 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

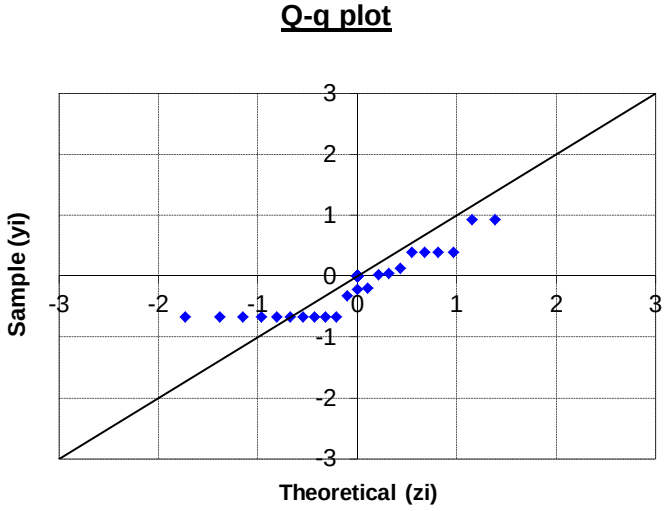
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

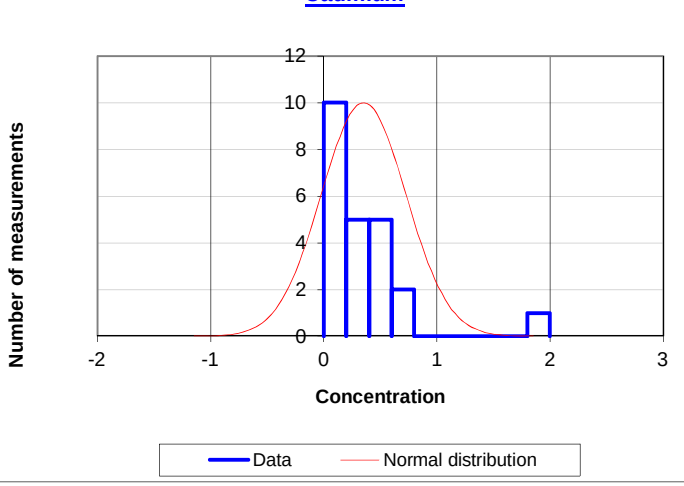
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Cadmium		
0.1		HTP15 @ 0.25
0.1		HTP17 @ 0.15
0.28		HTP20 @ 0.15
0.1		HTP22 @ 0.20
0.1		HTP24 @ 0.20
0.1		HTP25 @ 0.15
0.1		HTP26 @ 0.10
0.1		HTP29 @ 0.15
0.1		HTP33 @ 0.25
0.1		HTP39 @ 0.20
0.1		HTP40 @ 0.20
0.36		HTP41 @ 0.1
0.37		HTP43 @ 0.2
0.27		HTP44 @ 0.7
0.4		HTP45 @ 0.4
0.23		HTP46 @ 0.7
0.5		TP5 @ 0.1
0.5		TP8 @ 0.4
0.5		TP8 @ 2.8
0.5		TP9 @ 0.6
1.8	Yes	WAHS1 @ No depth
0.7		WAHS2 @ No depth
0.7		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

11 = GAC (critical conc.) (mg/kg)

23 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
1.8 = max. value	0.1 = laboratory reporting limit (RL)
0.352609 = mean	10 = no. samples at RL
0.374836 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-136.2279 = t_0	-136.228 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.486807 = 95% UCL (US_{95})	0.693381 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.6933806 GAC = 11 (US95 = 0.063 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

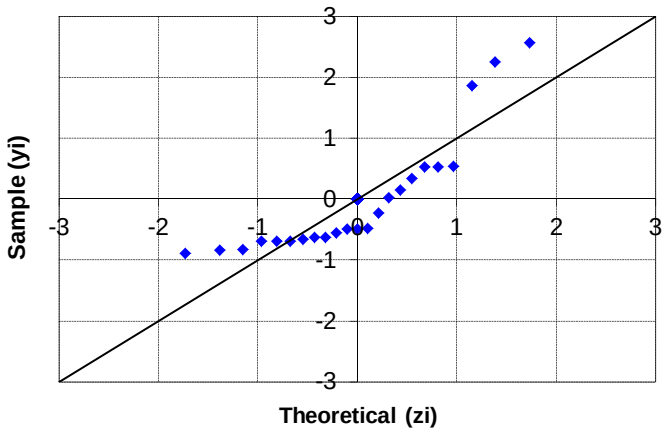
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

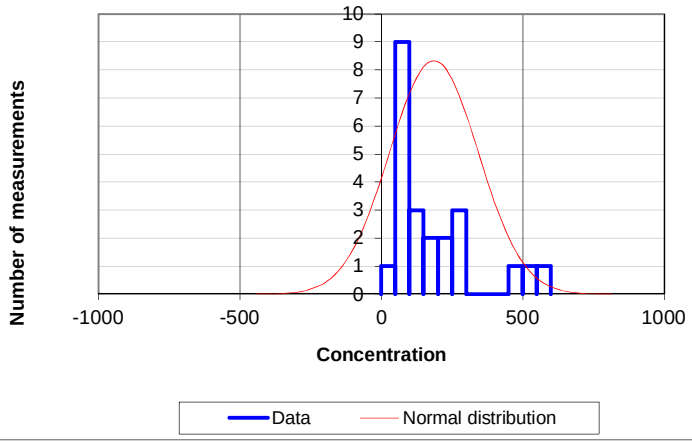
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC) Chromium (III)	Potential Outlier?	Sample
269.5		HTP15 @ 0.25
77.5		HTP17 @ 0.15
87.5		HTP20 @ 0.15
109.5		HTP22 @ 0.20
109.5		HTP24 @ 0.20
269.5		HTP25 @ 0.15
239.5		HTP26 @ 0.10
77.5		HTP29 @ 0.15
99.5		HTP33 @ 0.25
77.5		HTP39 @ 0.20
81.5		HTP40 @ 0.20
479.5	Yes	HTP41 @ 0.1
209.5		HTP43 @ 0.2
539.5	Yes	HTP44 @ 0.7
189.5		HTP45 @ 0.4
589.5	Yes	HTP46 @ 0.7
55.57		TP5 @ 0.1
109.8		TP8 @ 0.4
53.8		TP8 @ 2.8
46.6		TP9 @ 0.6
270		WAHS1 @ No depth
150		WAHS2 @ No depth
87		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (III)



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

630 = GAC (critical conc.) (mg/kg)

23 = no. samples	0 = no. samples > or = GAC
46.6 = min. value	
589.5 = max. value	5 = laboratory reporting limit (RL)
186.0335 = mean	0 = no. samples at RL
157.2917 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-13.53656 = t_0	-13.5366 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
242.3469 = 95% UCL (US_{95})	329.0309 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 329.03091 GAC = 630 (US95 = 0.522 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

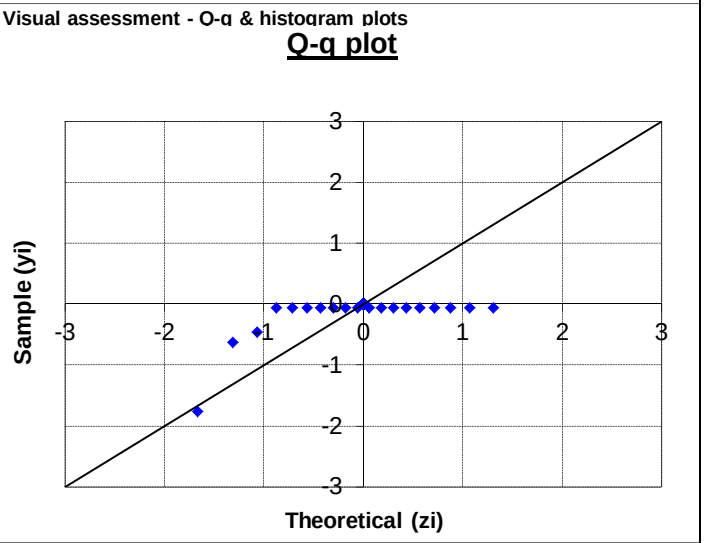
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

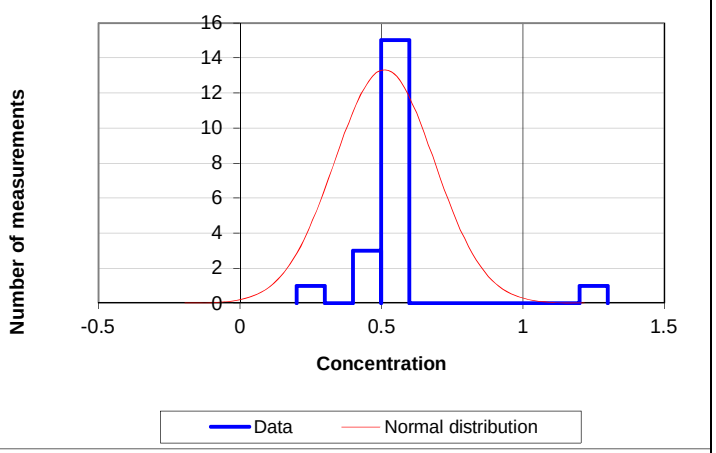
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chromium (VI)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
0.5	n/a	HTP41 @ 0.1
0.5	n/a	HTP43 @ 0.2
0.5	n/a	HTP44 @ 0.7
0.5	n/a	HTP45 @ 0.4
0.5	n/a	HTP46 @ 0.7
0.43	n/a	TP5 @ 0.1
0.2	n/a	TP8 @ 0.4
1.2	n/a	TP8 @ 2.8
0.4	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.3 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.2 = min. value	
1.2 = max. value	0.5 = laboratory reporting limit (RL)
0.5115 = mean	19 = no. samples at RL
0.176554 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-95.9632 = t_0	-95.9632 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.579759 = 95% UCL (US_{95})	0.683627 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.683627 **GAC = 4.3** (US95 = 0.159 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

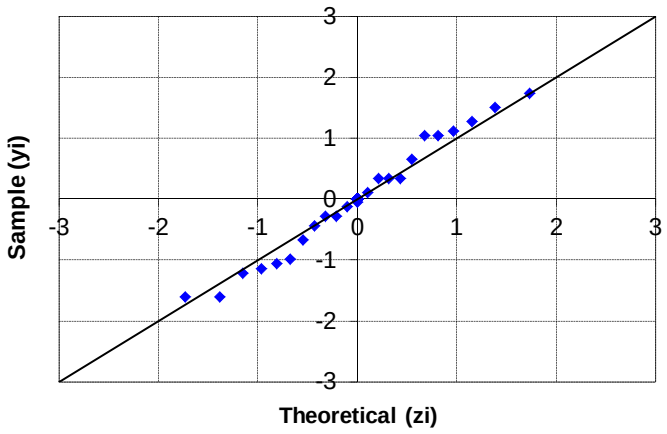
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

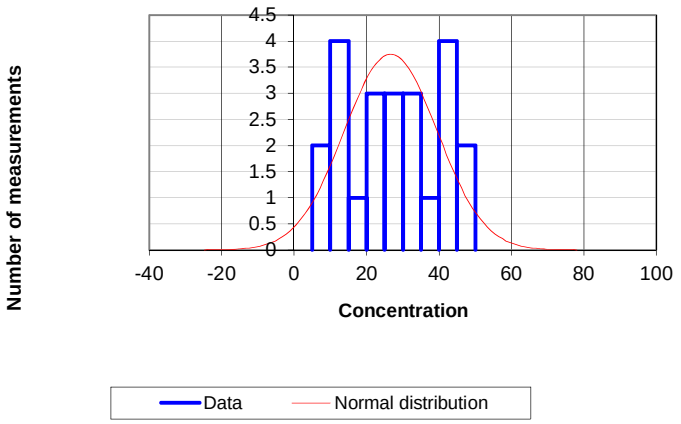
Copper	Potential Outlier?	Sample
21		HTP15 @ 0.25
23		HTP17 @ 0.15
31		HTP20 @ 0.15
31		HTP22 @ 0.20
31		HTP24 @ 0.20
41		HTP25 @ 0.15
46		HTP26 @ 0.10
28		HTP29 @ 0.15
40		HTP33 @ 0.25
23		HTP39 @ 0.20
26		HTP40 @ 0.20
40		HTP41 @ 0.1
49		HTP43 @ 0.2
35		HTP44 @ 0.7
43		HTP45 @ 0.4
25		HTP46 @ 0.7
11		TP5 @ 0.1
18		TP8 @ 0.4
13		TP8 @ 2.8
12		TP9 @ 0.6
6		WAHS1 @ No depth
6		WAHS2 @ No depth
14		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

2300 = GAC (critical conc.) (mg/kg)

23 = no. samples	0 = no. samples > or = GAC
6 = min. value	
49 = max. value	5 = laboratory reporting limit (RL)
26.65217 = mean	0 = no. samples at RL
12.84031 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-849.0912 = t_0	-849.091 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
31.24925 = 95% UCL (US_{95})	38.32559 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 38.325592 GAC = 2300 (US95 = 0.017 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

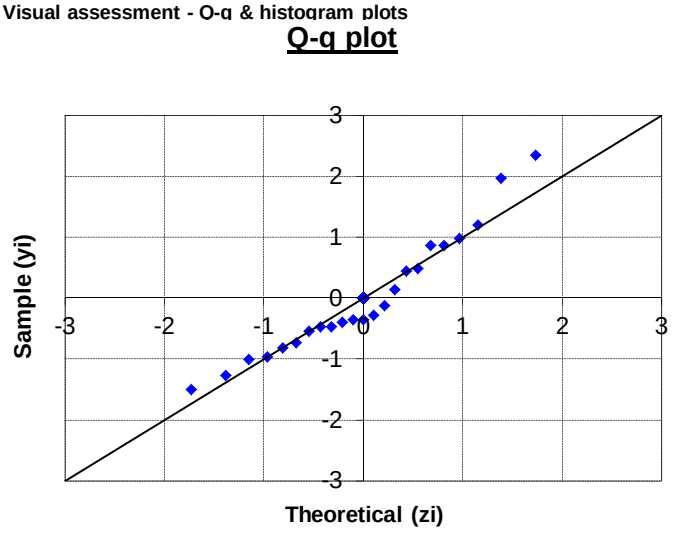
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

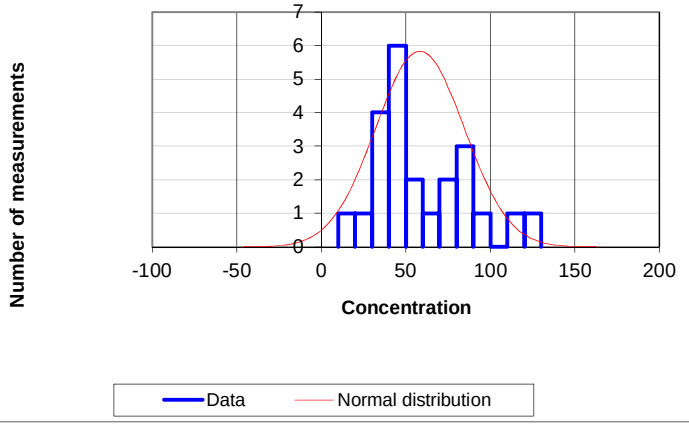
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Lead		
39		HTP15 @ 0.25
46		HTP17 @ 0.15
62		HTP20 @ 0.15
55		HTP22 @ 0.20
51		HTP24 @ 0.20
70		HTP25 @ 0.15
120		HTP26 @ 0.10
48		HTP29 @ 0.15
71		HTP33 @ 0.25
44		HTP39 @ 0.20
49		HTP40 @ 0.20
81		HTP41 @ 0.1
90		HTP43 @ 0.2
84		HTP44 @ 0.7
81		HTP45 @ 0.4
33		HTP46 @ 0.7
32		TP5 @ 0.1
37		TP8 @ 0.4
25		TP8 @ 2.8
19		TP9 @ 0.6
46		WAHS1 @ No depth
110		WAHS2 @ No depth
49		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

450 = GAC (critical conc.) (mg/kg)

23 = no. samples

19 = min. value

120 = max. value

58.34783 = mean

26.2412 = standard deviation

0 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	**One-sided Chebychev Theorem**
-71.57819 = t_0	-71.5782 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
67.74268 = 95% UCL (US_{95})	82.2043 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 82.204304 GAC = 450 (US95 = 0.183 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

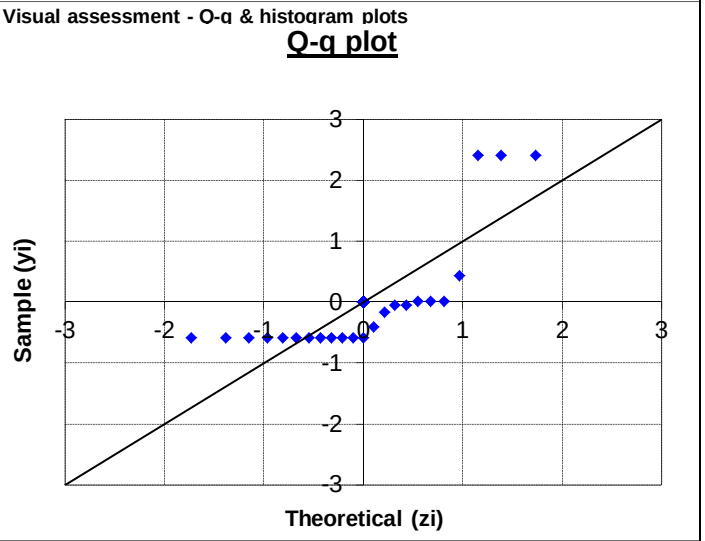
Mean Absolute Deviation for potential outliers

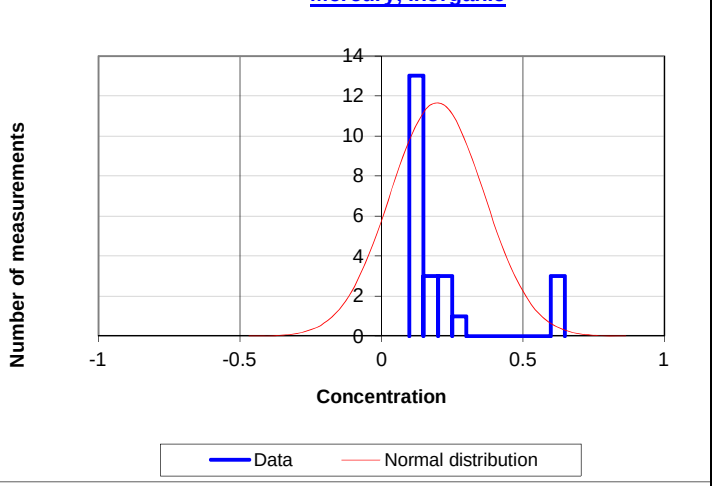
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Mercury, inorganic		
0.1	n/a	HTP15 @ 0.25
0.1	n/a	HTP17 @ 0.15
0.1	n/a	HTP20 @ 0.15
0.1	n/a	HTP22 @ 0.20
0.1	n/a	HTP24 @ 0.20
0.1	n/a	HTP25 @ 0.15
0.1	n/a	HTP26 @ 0.10
0.1	n/a	HTP29 @ 0.15
0.1	n/a	HTP33 @ 0.25
0.1	n/a	HTP39 @ 0.20
0.1	n/a	HTP40 @ 0.20
0.19	n/a	HTP41 @ 0.1
0.19	n/a	HTP43 @ 0.2
0.13	n/a	HTP44 @ 0.7
0.17	n/a	HTP45 @ 0.4
0.1	n/a	HTP46 @ 0.7
0.2	n/a	TP5 @ 0.1
0.27	n/a	TP8 @ 0.4
0.2	n/a	TP8 @ 2.8
0.2	n/a	TP9 @ 0.6
0.6	n/a	WAHS1 @ No depth
0.6	n/a	WAHS2 @ No depth
0.6	n/a	WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

170 = GAC (critical conc.) (mg/kg)

23 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
0.6 = max. value	0.1 = laboratory reporting limit (RL)
0.197826 = mean	12 = no. samples at RL
0.166623 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-4887.335 = t_0	-4887.33 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.25748 = 95% UCL (US_{95})	0.349307 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3493069 GAC = 170 (US95 = 0.002 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

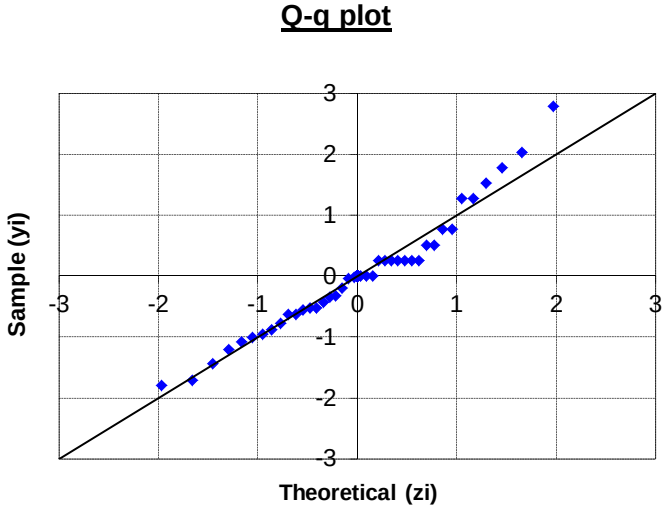
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

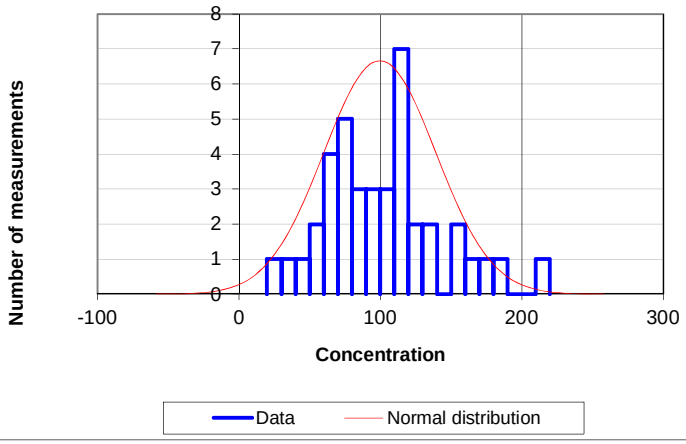
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
110		HTP15 @ 0.25
62		HTP17 @ 0.15
99		HTP20 @ 0.15
100		HTP22 @ 0.20
92		HTP24 @ 0.20
150		HTP25 @ 0.15
120		HTP26 @ 0.10
69		HTP29 @ 0.15
79		HTP33 @ 0.25
52		HTP39 @ 0.20
60		HTP40 @ 0.20
170		HTP41 @ 0.1
160		HTP43 @ 0.2
210	Yes	HTP44 @ 0.7
130		HTP45 @ 0.4
180		HTP46 @ 0.7
29		TP5 @ 0.1
57		TP8 @ 0.4
32		TP8 @ 2.8
43		TP9 @ 0.6
100		HS1 TS1 @ 0.21
100		HS1 TS2 @ 0.15
130		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
75		HS3 TS1 @ 0.24
75		HS3 TS2 @ 0.25
87		HS3 TS2 @ No depth
65		HS3SS1 @ 0.4
83		HS4 TS1 @ 0.22
78		HS4TS2 @ 0.19
86		HS4 SS1 @ 0.38
110		HS5 TS1 @ 0.16
120		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
110		WAHS1 @ No depth
98		WAHS2 @ No depth
79		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

130 = GAC (critical conc.) (mg/kg)

40 = no. samples

29 = min. value

210 = max. value

99.75 = mean

39.52717 = standard deviation

8 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-4.840159 = t_0	-4.84016 = k_0
1.685 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
110.2809 = 95% UCL (US_{95})	126.9991 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **normally distributed**

Therefore:

Use one-sample t-test - Ho rejected, true mean <=GAC

US_{95} = 110.2809 GAC = 130 (US95 = 0.848 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Mean Absolute Deviation for potential outliers

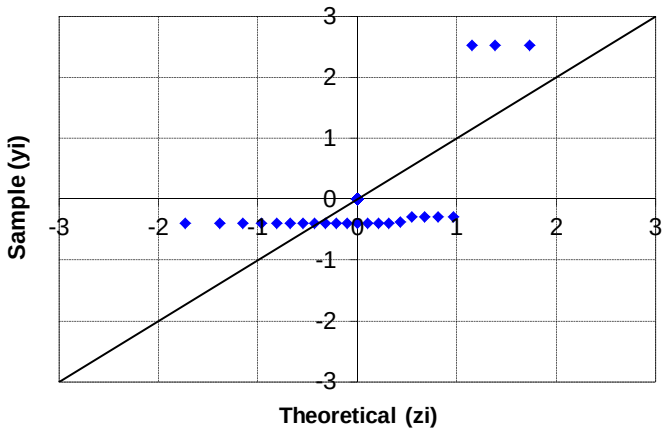
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

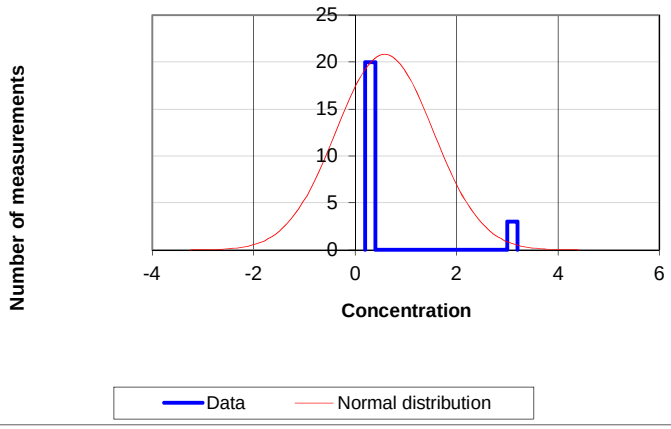
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Selenium		
0.2	n/a	HTP15 @ 0.25
0.2	n/a	HTP17 @ 0.15
0.2	n/a	HTP20 @ 0.15
0.2	n/a	HTP22 @ 0.20
0.2	n/a	HTP24 @ 0.20
0.22	n/a	HTP25 @ 0.15
0.2	n/a	HTP26 @ 0.10
0.2	n/a	HTP29 @ 0.15
0.2	n/a	HTP33 @ 0.25
0.2	n/a	HTP39 @ 0.20
0.2	n/a	HTP40 @ 0.20
0.2	n/a	HTP41 @ 0.1
0.2	n/a	HTP43 @ 0.2
0.2	n/a	HTP44 @ 0.7
0.2	n/a	HTP45 @ 0.4
0.2	n/a	HTP46 @ 0.7
0.3	n/a	TP5 @ 0.1
0.3	n/a	TP8 @ 0.4
0.3	n/a	TP8 @ 2.8
0.3	n/a	TP9 @ 0.6
3	n/a	WAHS1 @ No depth
3	n/a	WAHS2 @ No depth
3	n/a	WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Selenium



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

350 = GAC (critical conc.) (mg/kg)

23 = no. samples

0.2 = min. value

3 = max. value

0.583478 = mean

0.957699 = standard deviation

0 = no. samples > or = GAC

0.2 = laboratory reporting limit (RL)

15 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1749.759	t_0	-1749.76	k_0
1.717	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
0.926353	95% UCL (US_{95})	1.454144	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.4541443 GAC = 350 (US95 = 0.004 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

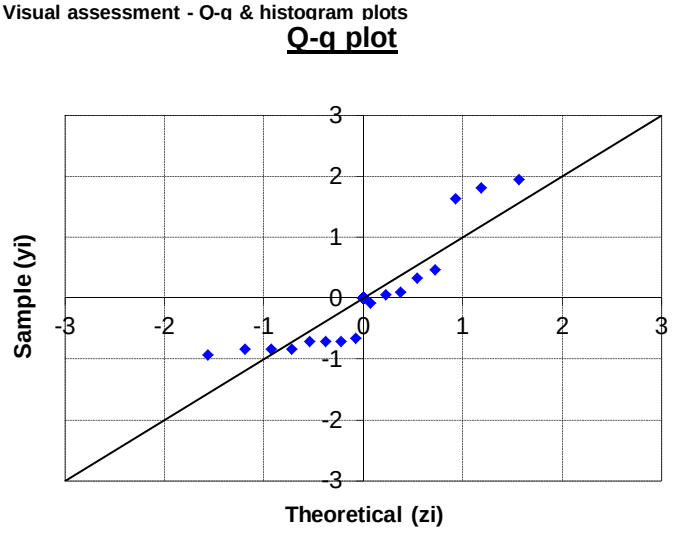
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

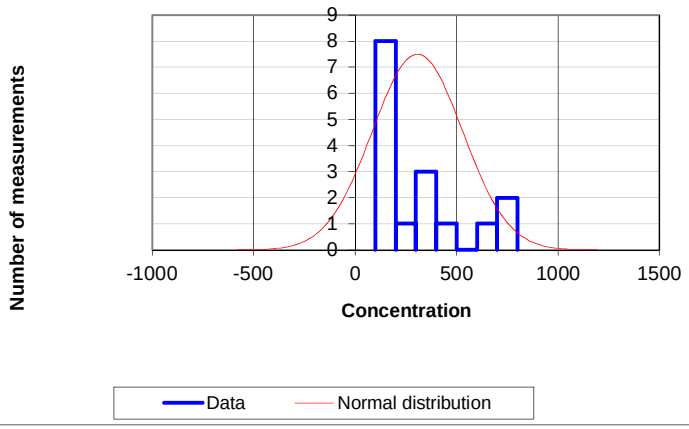
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Vanadium	Potential Outlier?	Sample
410		HTP15 @ 0.25
120		HTP17 @ 0.15
150		HTP20 @ 0.15
150		HTP22 @ 0.20
160		HTP24 @ 0.20
380		HTP25 @ 0.15
320		HTP26 @ 0.10
120		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
670		HTP41 @ 0.1
330		HTP43 @ 0.2
710		HTP44 @ 0.7
290		HTP45 @ 0.4
740		HTP46 @ 0.7

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

74 = GAC (critical conc.) (mg/kg)

16 = no. samples
100 = min. value
740 = max. value
307.5 = mean (mean>GAC)
222.396 = standard deviation

16 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
4.199715 = t_0	4.199715 = k_0
1.753 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
404.9651 = 95% UCL (US_{95})	549.9117 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 549.91169 GAC = 74 (US95 = 7.431 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

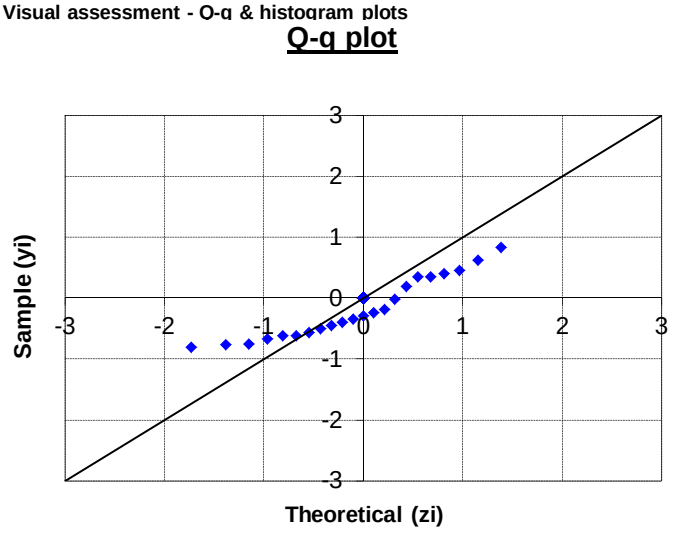
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

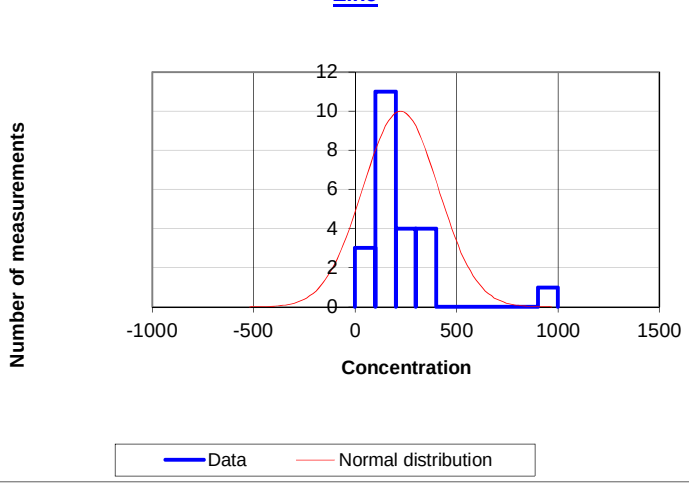
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Zinc		
190		HTP15 @ 0.25
110		HTP17 @ 0.15
180		HTP20 @ 0.15
140		HTP22 @ 0.20
160		HTP24 @ 0.20
300		HTP25 @ 0.15
260		HTP26 @ 0.10
110		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
340		HTP41 @ 0.1
290		HTP43 @ 0.2
380		HTP44 @ 0.7
220		HTP45 @ 0.4
970	Yes	HTP46 @ 0.7
82		TP5 @ 0.1
130		TP8 @ 0.4
74		TP8 @ 2.8
84		TP9 @ 0.6
310		WAHS1 @ No depth
290		WAHS2 @ No depth
170		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3700 = GAC (critical conc.) (mg/kg)

23 = no. samples	0 = no. samples > or = GAC
74 = min. value	
970 = max. value	10 = laboratory reporting limit (RL)
224.3478 = mean	0 = no. samples at RL
186.2819 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-89.48072 = t_0	-89.4807 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
291.0403 = 95% UCL (US_{95})	393.701 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 393.701 **GAC = 3700** (US95 = 0.106 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

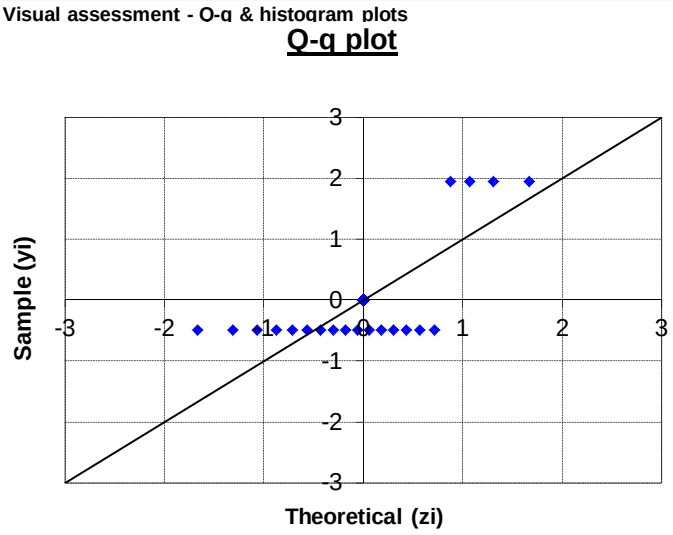
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

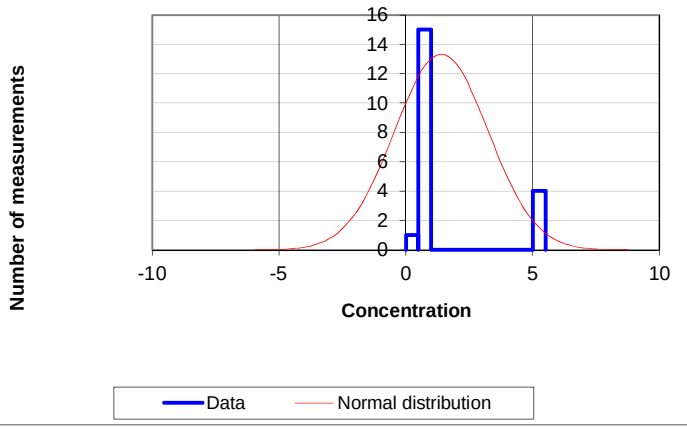
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Cyanide (free)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
0.5	n/a	HTP41 @ 0.1
0.5	n/a	HTP43 @ 0.2
0.5	n/a	HTP44 @ 0.7
0.5	n/a	HTP45 @ 0.4
0.5	n/a	HTP46 @ 0.7
5	n/a	TP5 @ 0.1
5	n/a	TP8 @ 0.4
5	n/a	TP8 @ 2.8
5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

750 = GAC (critical conc.) (mg/kg)

20 = no. samples
0 = no. samples > or = GAC
0.5 = min. value
5 = max. value
0.5 = laboratory reporting limit (RL)
1.4 = mean
16 = no. samples at RL
1.846761 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1812.818	t_0	-1812.82	k_0
1.729	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
2.113988	95% UCL (US_{95})	3.200455	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 3.2004547 GAC = 750 (US95 = 0.004 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

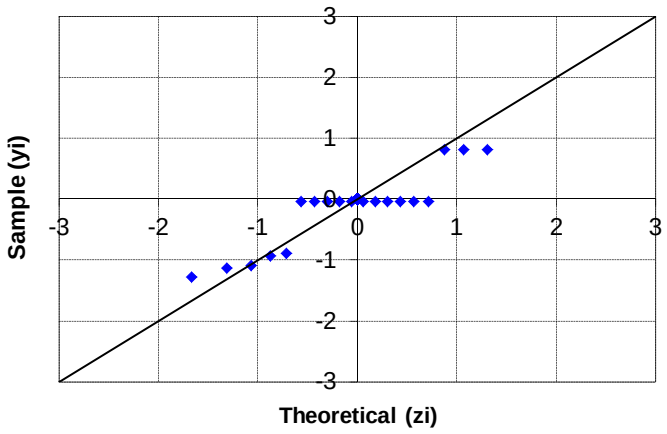
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

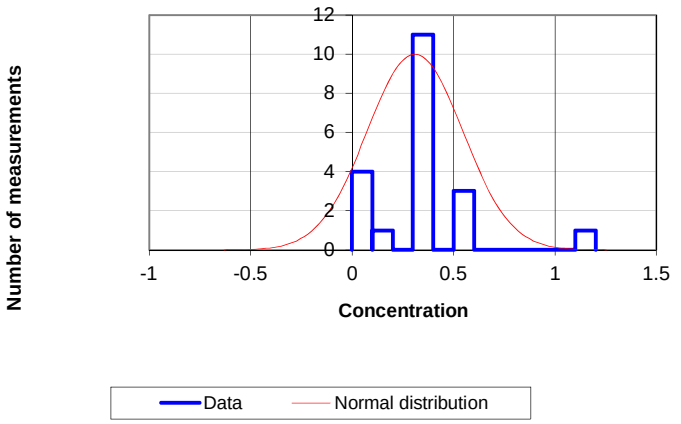
Phenol (total)	Potential Outlier?	Sample
0.3	n/a	HTP15 @ 0.25
0.3	n/a	HTP17 @ 0.15
0.3	n/a	HTP20 @ 0.15
0.3	n/a	HTP22 @ 0.20
0.3	n/a	HTP24 @ 0.20
0.3	n/a	HTP25 @ 0.15
0.3	n/a	HTP26 @ 0.10
0.3	n/a	HTP29 @ 0.15
0.3	n/a	HTP33 @ 0.25
0.3	n/a	HTP39 @ 0.20
0.3	n/a	HTP40 @ 0.20
0.01	n/a	HTP41 @ 0.1
0.1	n/a	HTP43 @ 0.2
0.044	n/a	HTP44 @ 0.7
0.054	n/a	HTP45 @ 0.4
0.091	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
1.1	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Phenol (total)



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
1.1 = max. value	0.3 = laboratory reporting limit (RL)
0.30995 = mean	16 = no. samples at RL
0.235289 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-5506.148 = t_0	-5506.15 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.400916 = 95% UCL (US_{95})	0.539339 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5393388 GAC = 290 (US95 = 0.002 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

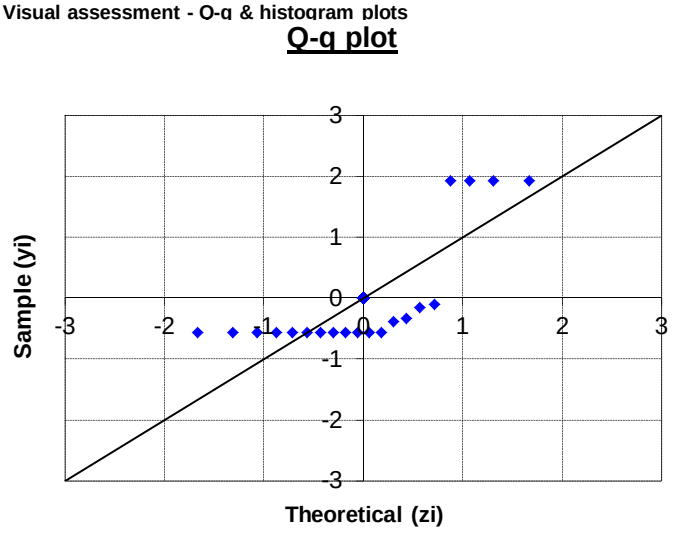
Mean Absolute Deviation for potential outliers

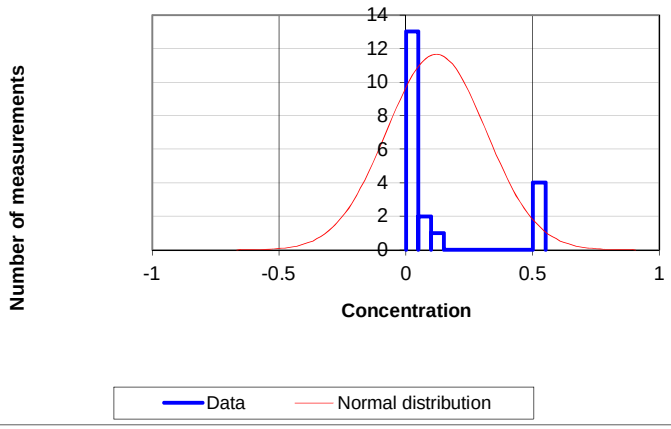
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Acenaphthene		
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.01	n/a	HTP41 @ 0.1
0.1	n/a	HTP43 @ 0.2
0.044	n/a	HTP44 @ 0.7
0.054	n/a	HTP45 @ 0.4
0.091	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

480 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.12045 = mean	12 = no. samples at RL
0.196572 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-10917.57 = t_0	-10917.6 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.196448 = 95% UCL (US_{95})	0.312093 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3120929 GAC = 480 (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

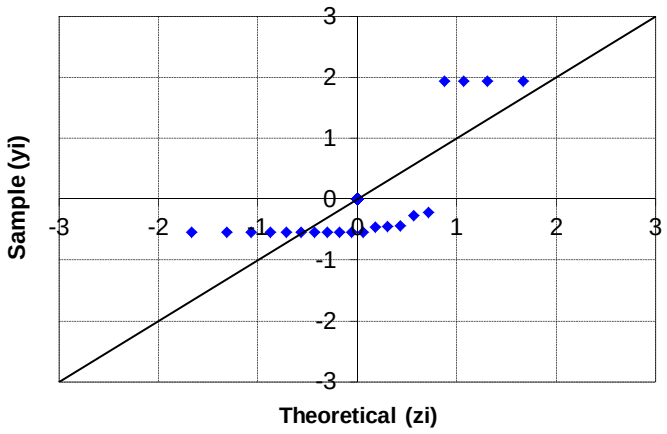
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

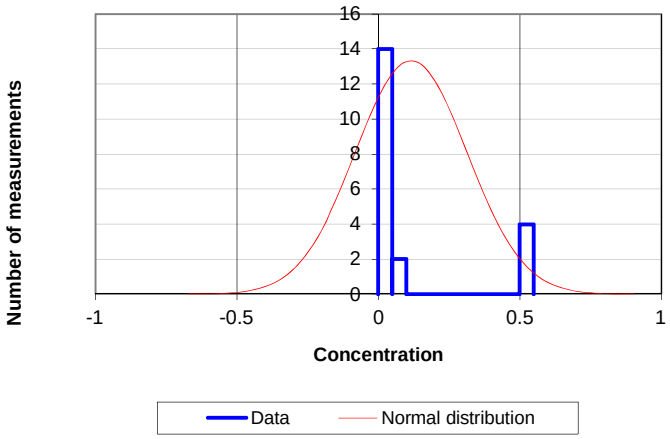
Acenaphthylene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.073	n/a	HTP39 @ 0.20
0.026	n/a	HTP40 @ 0.20
0.01	n/a	HTP41 @ 0.1
0.063	n/a	HTP43 @ 0.2
0.03	n/a	HTP44 @ 0.7
0.028	n/a	HTP45 @ 0.4
0.01	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Acenaphthylene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

400 = GAC (critical conc.) (mg/kg)	
20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.1165 = mean	11 = no. samples at RL
0.197526 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-9053.666 = t_0	-9053.67 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.192867 = 95% UCL (US_{95})	0.309073 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.309073 **GAC = 400** (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

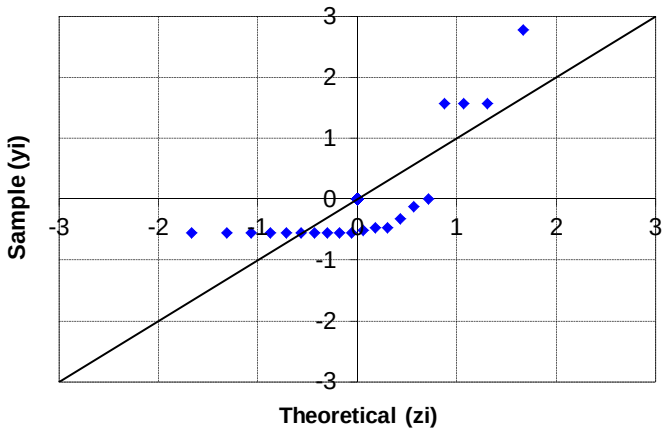
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

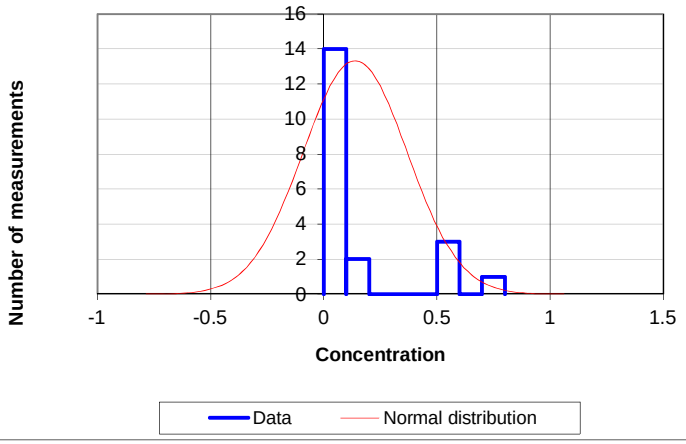
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Anthracene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.11	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.01		HTP26 @ 0.10
0.012		HTP29 @ 0.15
0.01		HTP33 @ 0.25
0.14	Yes	HTP39 @ 0.20
0.064	Yes	HTP40 @ 0.20
0.03		HTP41 @ 0.1
0.02		HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.031		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.78	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Anthracene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4900 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.78 = max. value	0.01 = laboratory reporting limit (RL)
0.13885 = mean	9 = no. samples at RL
0.230778 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-94951.9 = t_0	-94951.9 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.228073 = 95% UCL (US_{95})	0.363842 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3638418 GAC = 4900 (US95 = 0 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

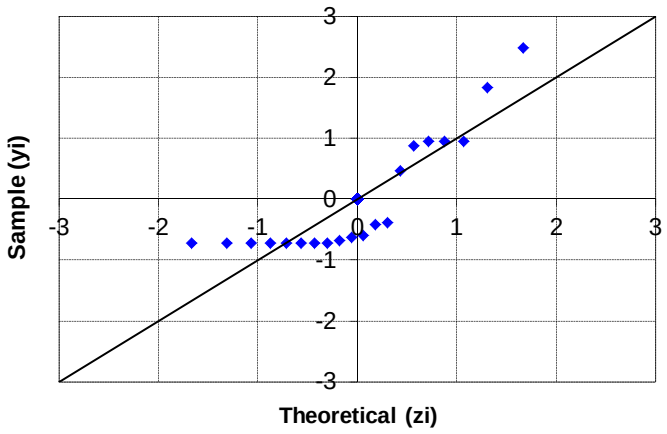
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

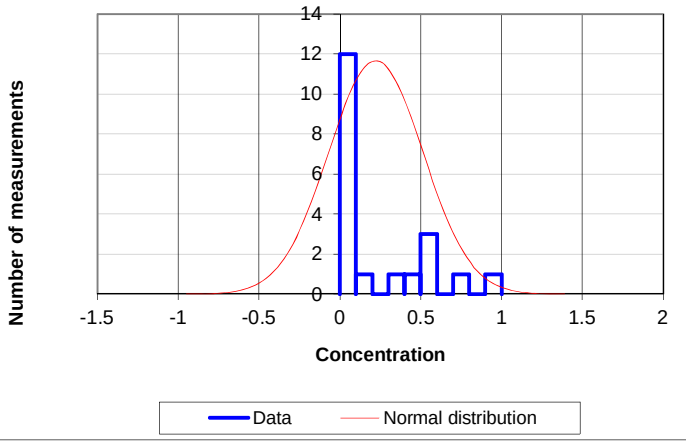
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benz(a)anthracene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.36	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.047		HTP26 @ 0.10
0.099		HTP29 @ 0.15
0.023		HTP33 @ 0.25
0.95	Yes	HTP39 @ 0.20
0.48	Yes	HTP40 @ 0.20
0.11		HTP41 @ 0.1
0.04		HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.01		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.76	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Benz(a)anthracene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.7 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.95 = max. value	0.01 = laboratory reporting limit (RL)
0.22245 = mean	8 = no. samples at RL
0.29267 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-68.41908 = t_0	-68.4191 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.335601 = 95% UCL (US_{95})	0.507781 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5077815 GAC = 4.7 (US95 = 0.108 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

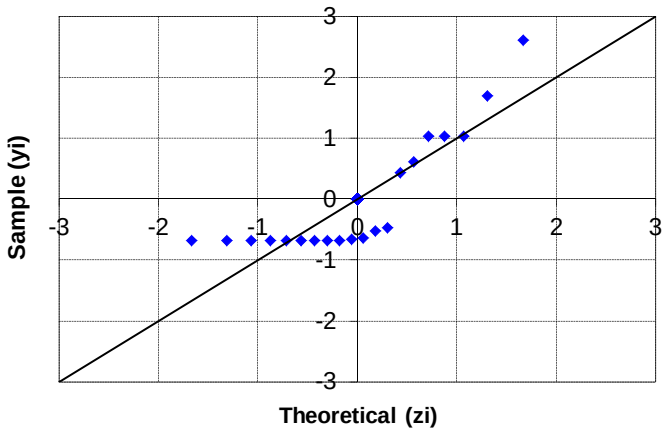
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

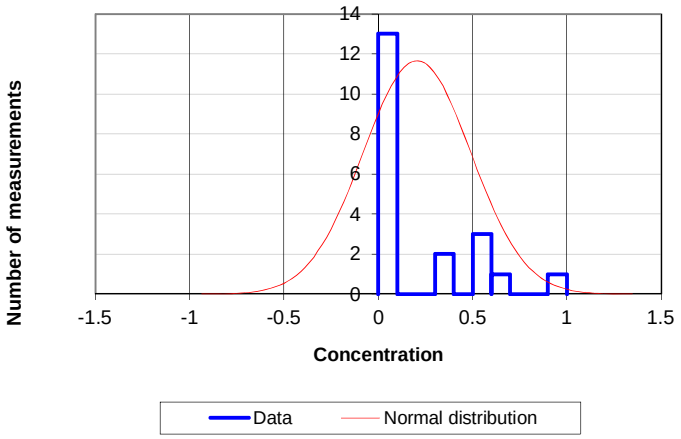
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(a)pyrene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.38	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.01		HTP26 @ 0.10
0.07		HTP29 @ 0.15
0.018		HTP33 @ 0.25
0.69	Yes	HTP39 @ 0.20
0.33	Yes	HTP40 @ 0.20
0.055		HTP41 @ 0.1
0.023		HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.01		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.95	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(a)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.94 = GAC (critical conc.) (mg/kg)

20 = no. samples	1 = no. samples > or = GAC
0.01 = min. value	
0.95 = max. value	0.01 = laboratory reporting limit (RL)
0.2053 = mean	9 = no. samples at RL
0.285493 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-11.5088 = t_0	-11.5088 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.315676 = 95% UCL (US_{95})	0.483634 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4836342 GAC = 0.94 (US95 = 0.515 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

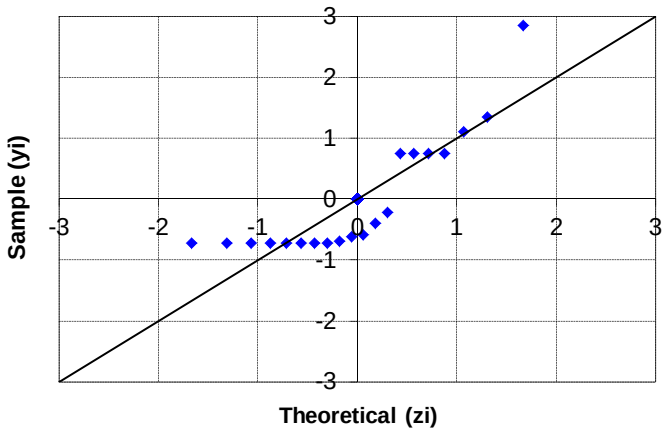
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

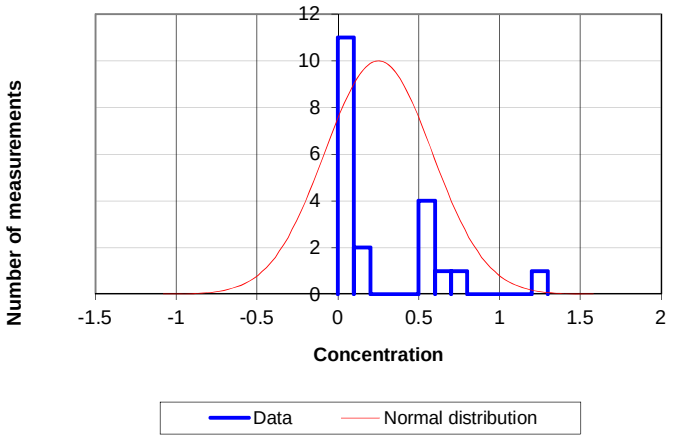
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(b)fluoranthene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.5	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.046		HTP26 @ 0.10
0.12		HTP29 @ 0.15
0.021		HTP33 @ 0.25
1.2	Yes	HTP39 @ 0.20
0.62	Yes	HTP40 @ 0.20
0.18		HTP41 @ 0.1
0.056		HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.01		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.7	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(b)fluoranthene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

6.5 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
1.2 = max. value	0.01 = laboratory reporting limit (RL)
0.25115 = mean	8 = no. samples at RL
0.332943 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-83.93547 = t_0	-83.9355 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.379871 = 95% UCL (US_{95})	0.575744 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5757444 GAC = 6.5 (US95 = 0.089 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

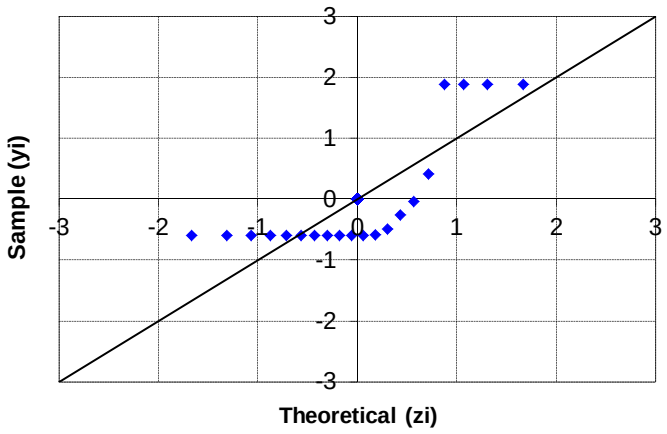
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

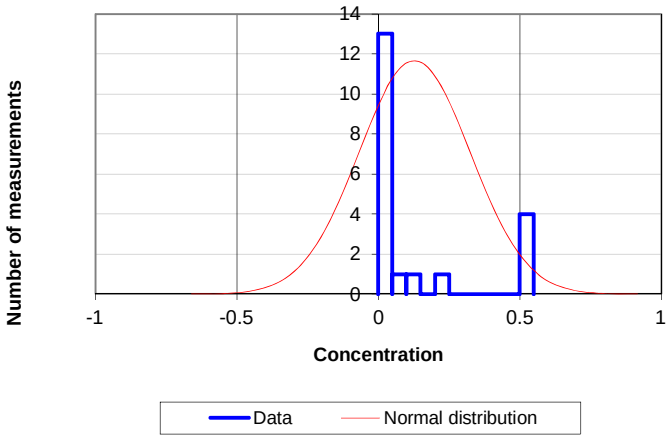
Benzo(ghi)perylene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.12	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.013	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.21	n/a	HTP39 @ 0.20
0.076	n/a	HTP40 @ 0.20
0.032	n/a	HTP41 @ 0.1
0.01	n/a	HTP43 @ 0.2
0.01	n/a	HTP44 @ 0.7
0.01	n/a	HTP45 @ 0.4
0.01	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(ghi)perylene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

46 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.12805 = mean	11 = no. samples at RL
0.197169 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1040.458 = t_0	-1040.46 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.204279 = 95% UCL (US_{95})	0.320275 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3202746 GAC = 46 (US95 = 0.007 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

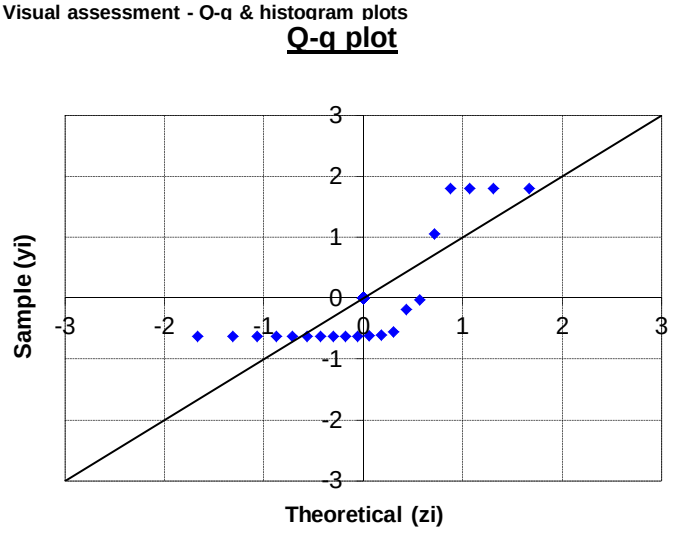
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

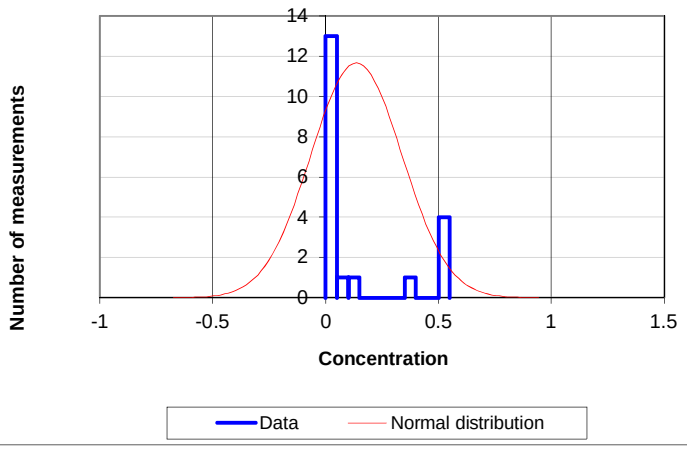
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(k)fluoranthene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.13	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.01		HTP26 @ 0.10
0.011		HTP29 @ 0.15
0.01		HTP33 @ 0.25
0.35	Yes	HTP39 @ 0.20
0.099	Yes	HTP40 @ 0.20
0.014	Yes	HTP41 @ 0.1
0.023	Yes	HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.01		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.5	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

9.6 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.13635 = mean	10 = no. samples at RL
0.202513 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-208.9875 = t_0	-208.987 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.214645 = 95% UCL (US_{95})	0.333785 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3337853 GAC = 9.6 (US95 = 0.035 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

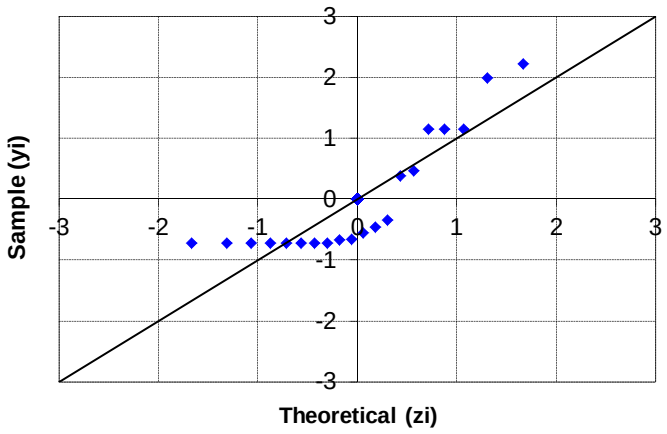
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

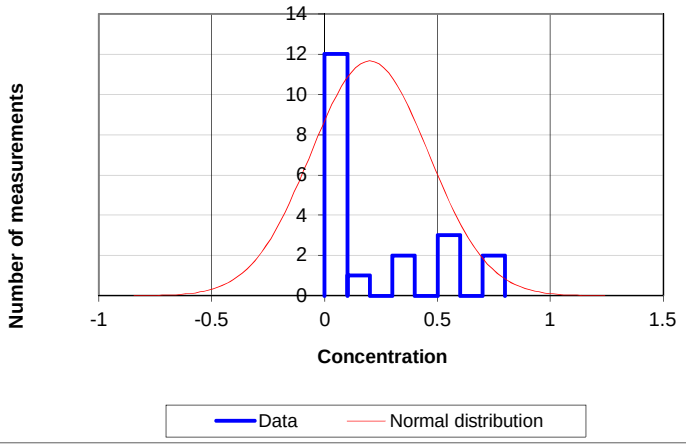
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chrysene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.3	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.029		HTP26 @ 0.10
0.08		HTP29 @ 0.15
0.024		HTP33 @ 0.25
0.78	Yes	HTP39 @ 0.20
0.32	Yes	HTP40 @ 0.20
0.11		HTP41 @ 0.1
0.054		HTP43 @ 0.2
0.01		HTP44 @ 0.7
0.01		HTP45 @ 0.4
0.01		HTP46 @ 0.7
0.5	Yes	TP5 @ 0.1
0.72	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Chrysene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

8 = GAC (critical conc.) (mg/kg)

20 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.78 = max. value

0.01 = laboratory reporting limit (RL)

0.19985 = mean

8 = no. samples at RL

0.260973 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-133.6664 = t_0	-133.666 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.300746 = 95% UCL (US_{95})	0.454279 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4542794 GAC = 8 (US95 = 0.057 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

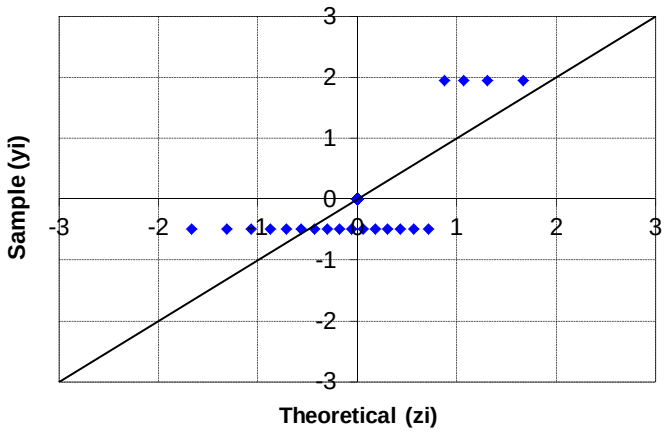
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

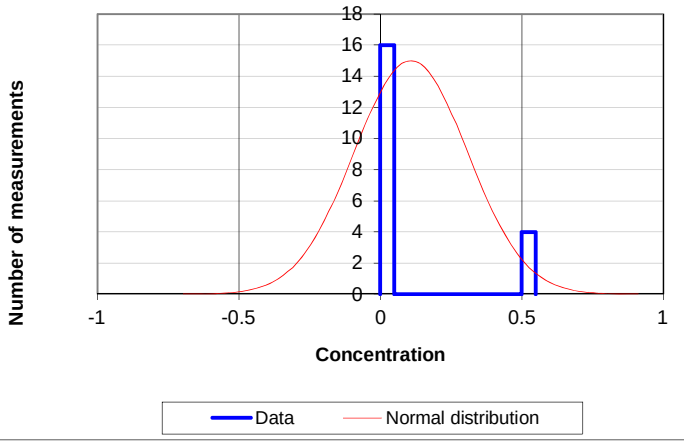
Dibenz(a,h)anthracene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.01	n/a	HTP41 @ 0.1
0.01	n/a	HTP43 @ 0.2
0.01	n/a	HTP44 @ 0.7
0.01	n/a	HTP45 @ 0.4
0.01	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Dibenz(a,h)anthracene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.86 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.108 = mean	16 = no. samples at RL
0.201092 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-16.72394 = t_0	-16.7239 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.185745 = 95% UCL (US_{95})	0.30405 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3040495 GAC = 0.86 (US95 = 0.354 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

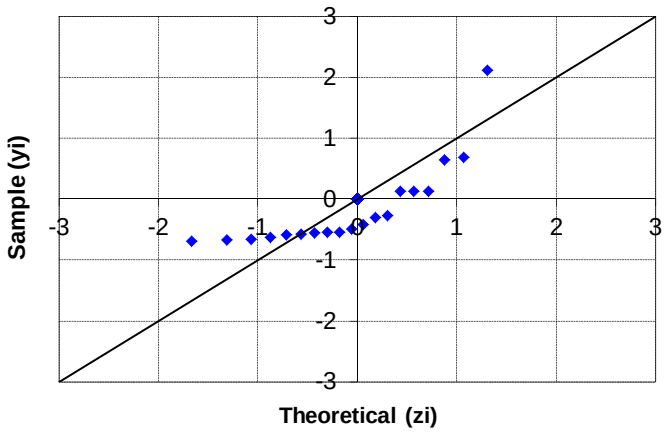
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

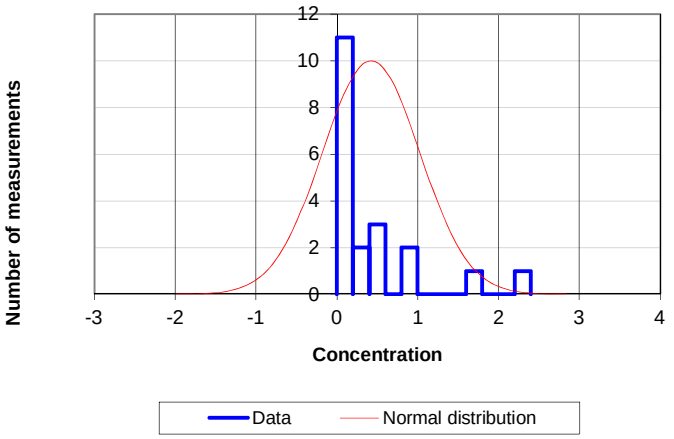
Fluoranthene	Potential Outlier?	Sample
0.096		HTP15 @ 0.25
0.019		HTP17 @ 0.15
0.81	Yes	HTP20 @ 0.15
0.043		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.028		HTP25 @ 0.15
0.13		HTP26 @ 0.10
0.26		HTP29 @ 0.15
0.076		HTP33 @ 0.25
1.7	Yes	HTP39 @ 0.20
0.84	Yes	HTP40 @ 0.20
0.24		HTP41 @ 0.1
0.17		HTP43 @ 0.2
0.091		HTP44 @ 0.7
0.071		HTP45 @ 0.4
0.096		HTP46 @ 0.7
0.5		TP5 @ 0.1
2.3	Yes	TP8 @ 0.4
0.5		TP8 @ 2.8
0.5		TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Fluoranthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

460 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
2.3 = max. value	0.01 = laboratory reporting limit (RL)
0.424 = mean	1 = no. samples at RL
0.602967 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-3408.624 = t_0	-3408.62 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.657117 = 95% UCL (US_{95})	1.011848 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.0118475 GAC = 460 (US95 = 0.002 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

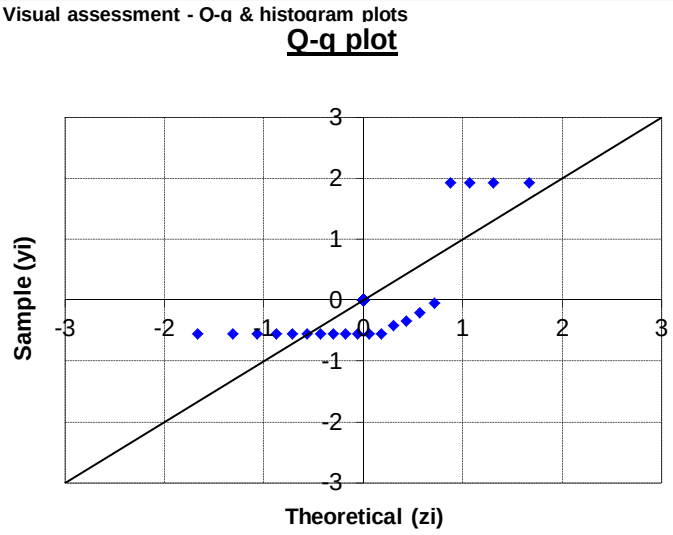
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

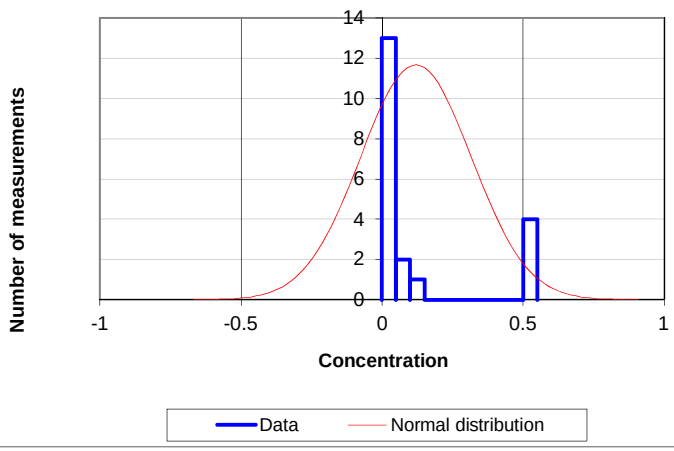
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Fluorene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.01	n/a	HTP41 @ 0.1
0.08	n/a	HTP43 @ 0.2
0.038	n/a	HTP44 @ 0.7
0.053	n/a	HTP45 @ 0.4
0.11	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

380 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.12005 = mean	12 = no. samples at RL
0.196778 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8633.442 = t_0	-8633.44 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.196128 = 95% UCL (US_{95})	0.311894 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3118943 GAC = 380 (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

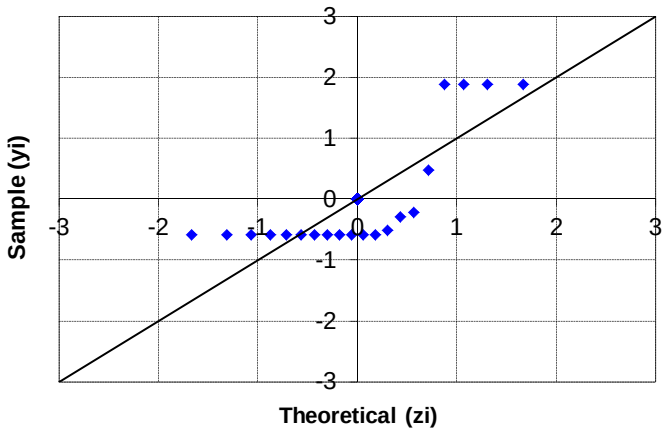
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

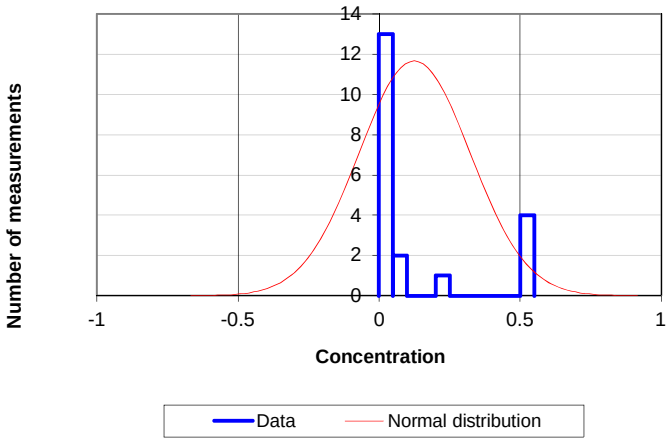
Indeno(1,2,3,cd)pyrene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.083	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.22	n/a	HTP39 @ 0.20
0.069	n/a	HTP40 @ 0.20
0.025	n/a	HTP41 @ 0.1
0.01	n/a	HTP43 @ 0.2
0.01	n/a	HTP44 @ 0.7
0.01	n/a	HTP45 @ 0.4
0.01	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Indeno(1,2,3,cd)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.9 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.12585 = mean	12 = no. samples at RL
0.198031 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-85.23159 = t_0	-85.2316 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.202412 = 95% UCL (US_{95})	0.318916 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3189157 GAC = 3.9 (US95 = 0.082 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

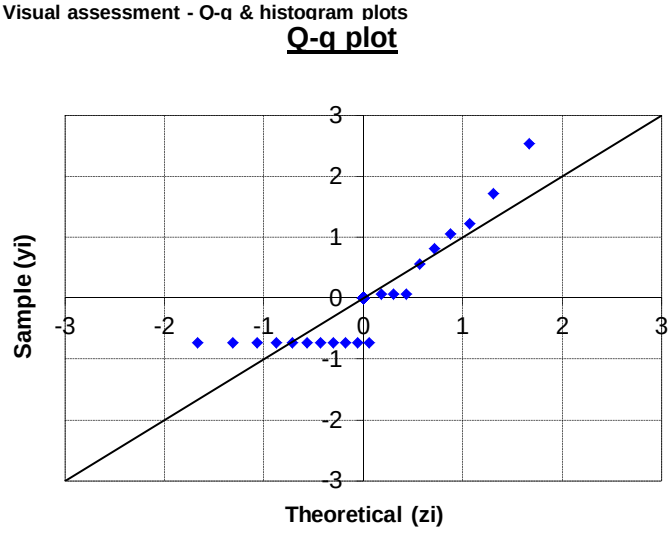
Mean Absolute Deviation for potential outliers

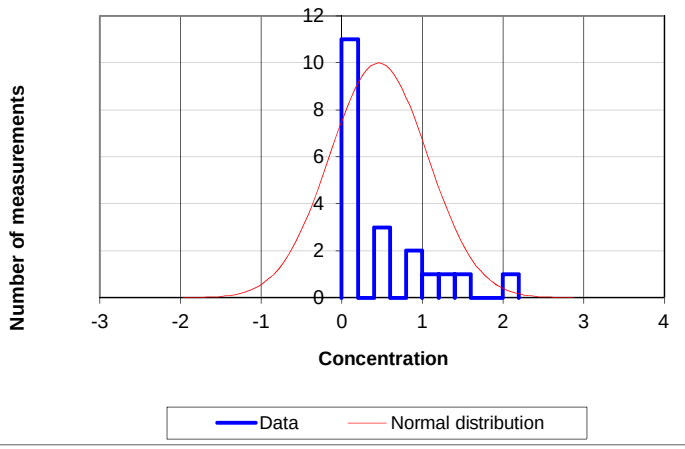
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Naphthalene		
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.8	n/a	HTP41 @ 0.1
1.5	n/a	HTP43 @ 0.2
0.95	n/a	HTP44 @ 0.7
1.2	n/a	HTP45 @ 0.4
2	n/a	HTP46 @ 0.7
0.5	n/a	TP5 @ 0.1
1.1	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.7 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
2 = max. value	0.01 = laboratory reporting limit (RL)
0.458 = mean	11 = no. samples at RL
0.606904 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-23.88955 = t_0	-23.8895 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.692639 = 95% UCL (US_{95})	1.049686 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.0496864 GAC = 3.7 (US95 = 0.284 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

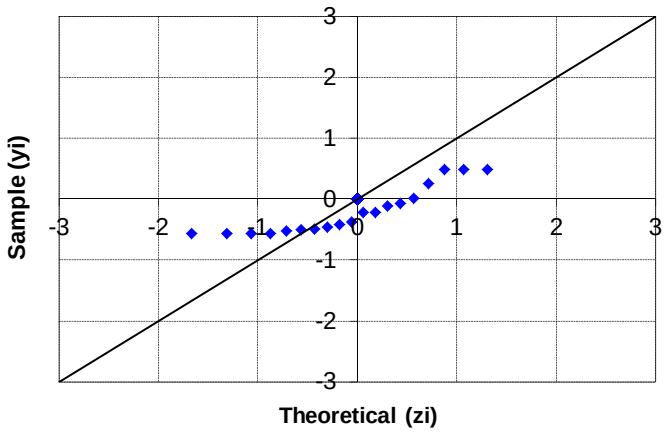
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

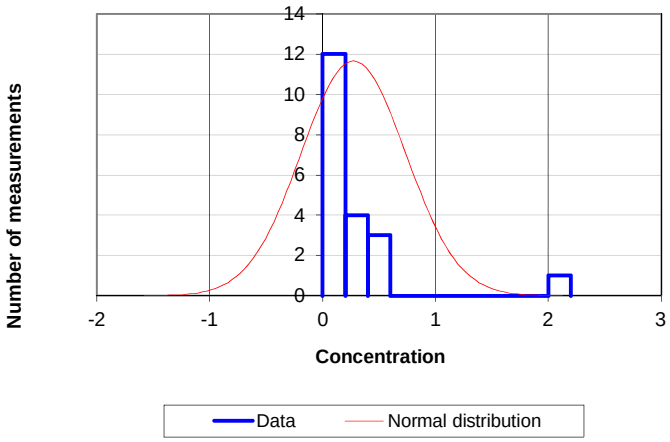
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Phenanthrene		
0.039		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.39		HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.043		HTP26 @ 0.10
0.059		HTP29 @ 0.15
0.029		HTP33 @ 0.25
0.28		HTP39 @ 0.20
0.17		HTP40 @ 0.20
0.22		HTP41 @ 0.1
0.17		HTP43 @ 0.2
0.1		HTP44 @ 0.7
0.08		HTP45 @ 0.4
0.24		HTP46 @ 0.7
0.5		TP5 @ 0.1
2.1	Yes	TP8 @ 0.4
0.5		TP8 @ 2.8
0.5		TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Phenanthrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

200 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
2.1 = max. value	0.01 = laboratory reporting limit (RL)
0.273 = mean	4 = no. samples at RL
0.463863 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1925.581 = t_0	-1925.58 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.452337 = 95% UCL (US_{95})	0.725232 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.7252321 GAC = 200 (US95 = 0.004 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

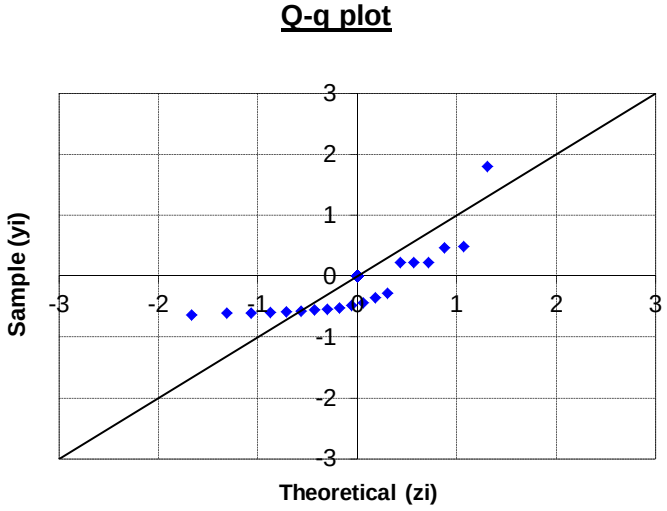
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

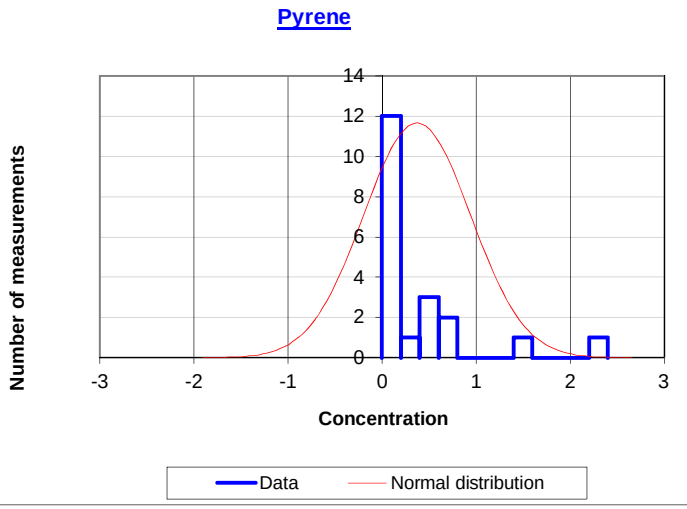
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Pyrene		
0.037		HTP15 @ 0.25
0.028		HTP17 @ 0.15
0.64	Yes	HTP20 @ 0.15
0.03		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.024		HTP25 @ 0.15
0.1		HTP26 @ 0.10
0.21		HTP29 @ 0.15
0.056		HTP33 @ 0.25
1.4	Yes	HTP39 @ 0.20
0.65	Yes	HTP40 @ 0.20
0.17		HTP41 @ 0.1
0.12		HTP43 @ 0.2
0.072		HTP44 @ 0.7
0.045		HTP45 @ 0.4
0.063		HTP46 @ 0.7
0.5		TP5 @ 0.1
2.3	Yes	TP8 @ 0.4
0.5		TP8 @ 2.8
0.5		TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

1000 = GAC (critical conc.) (mg/kg)

20 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
2.3 = max. value	0.01 = laboratory reporting limit (RL)
0.37275 = mean	1 = no. samples at RL
0.569796 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-7845.73 = t_0	-7845.73 = k_0
1.729 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.593043 = 95% UCL (US_{95})	0.928259 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.9282592 GAC = 1000 (US95 = 0.001 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

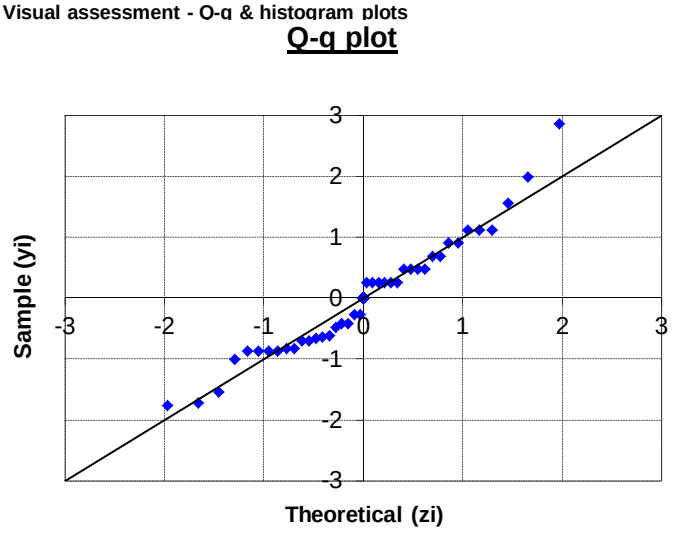
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

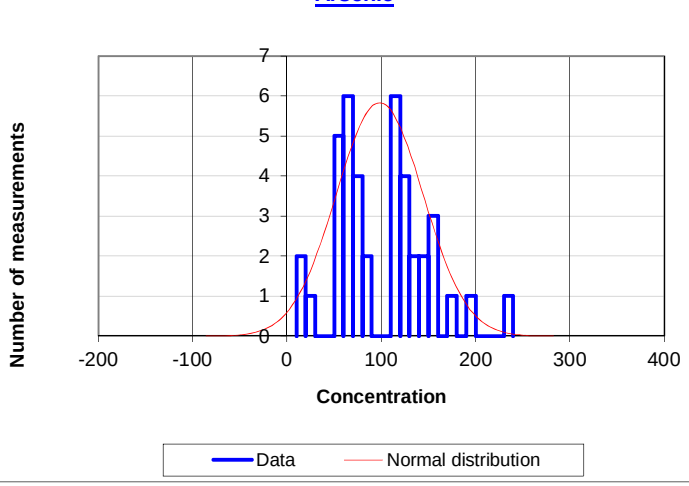
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Arsenic		
110		HTP15 @ 0.25
66		HTP17 @ 0.15
68		HTP20 @ 0.15
86		HTP22 @ 0.20
79		HTP24 @ 0.20
140		HTP25 @ 0.15
120		HTP26 @ 0.10
58		HTP29 @ 0.15
76		HTP33 @ 0.25
52		HTP39 @ 0.20
58		HTP40 @ 0.20
190		HTP41 @ 0.1
130		HTP43 @ 0.2
230		HTP44 @ 0.7
120		HTP45 @ 0.4
170		HTP46 @ 0.7
19		TP5 @ 0.1
58		TP8 @ 0.4
17		TP8 @ 2.8
27		TP9 @ 0.6
120		HS1 TS1 @ 0.21
140		HS1 TS2 @ 0.15
150		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
60		HS3 TS1 @ 0.24
66		HS3 TS2 @ 0.25
86		HS3 TS2 @ No depth
58		HS3SS1 @ 0.4
79		HS4 TS1 @ 0.22
60		HS4TS2 @ 0.19
70		HS4 SS1 @ 0.38
130		HS5 TS1 @ 0.16
110		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
150		WAHS1 @ No depth
120		WAHS2 @ No depth
69		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter: **Plant life pH 7**

250 = **GAC (critical conc.) (mg/kg)**

40 = no. samples

17 = min. value

230 = max. value

98.3 = mean

46.09644 = standard deviation

0 = no. samples > or = GAC

2 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-20.81365 = t_0	-20.8136 = k_0
1.685 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
110.5811 = 95% UCL (US_{95})	130.0778 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 130.07781 GAC = 250 (US95 = 0.52 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

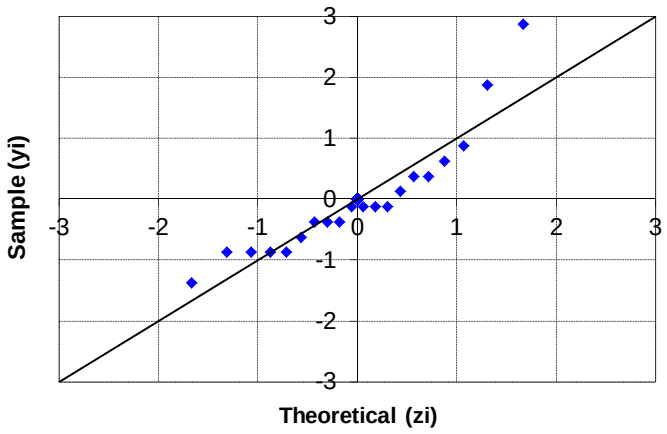
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

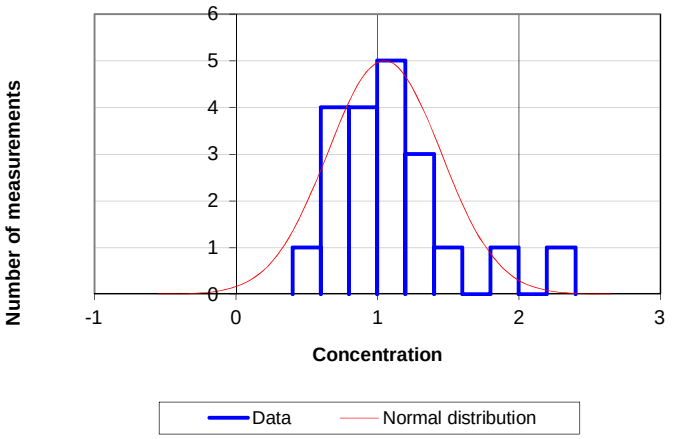
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Boron		
0.8		HTP15 @ 0.25
0.9		HTP17 @ 0.15
1.4		HTP20 @ 0.15
0.7		HTP22 @ 0.20
0.9		HTP24 @ 0.20
0.5		HTP25 @ 0.15
1.1		HTP26 @ 0.10
1.3		HTP29 @ 0.15
1.2		HTP33 @ 0.25
0.7		HTP39 @ 0.20
0.9		HTP40 @ 0.20
1		HTP41 @ 0.1
1		HTP43 @ 0.2
0.7		HTP44 @ 0.7
1		HTP45 @ 0.4
1.2		HTP46 @ 0.7
1.8		TP5 @ 0.1
1		TP8 @ 0.4
2.2	Yes	TP8 @ 2.8
0.7		TP9 @ 0.6

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data

Risk parameter: **Plant life pH 7**

3 = **GAC (critical conc.) (mg/kg)**

20 = no. samples

0 = no. samples > or = GAC

0.5 = min. value

2.2 = max. value

0.4 = laboratory reporting limit (RL)

1.05 = mean

0 = no. samples at RL

0.400657 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-21.76589	= t_0	-21.7659	= k_0
1.729	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.204901	= 95% UCL (US_{95})	1.440611	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.4406111 GAC = 3 (US95 = 0.48 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

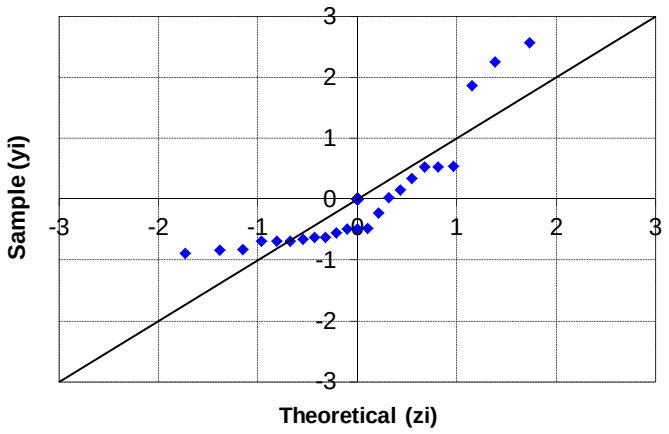
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

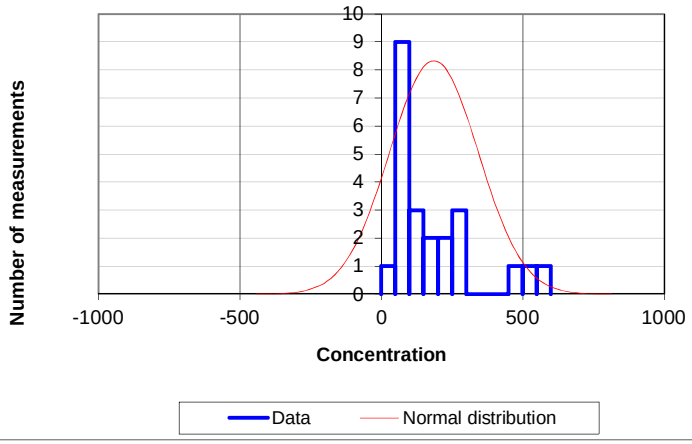
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC) Chromium (III)	Potential Outlier?	Sample
269.5		HTP15 @ 0.25
77.5		HTP17 @ 0.15
87.5		HTP20 @ 0.15
109.5		HTP22 @ 0.20
109.5		HTP24 @ 0.20
269.5		HTP25 @ 0.15
239.5		HTP26 @ 0.10
77.5		HTP29 @ 0.15
99.5		HTP33 @ 0.25
77.5		HTP39 @ 0.20
81.5		HTP40 @ 0.20
479.5	Yes	HTP41 @ 0.1
209.5		HTP43 @ 0.2
539.5	Yes	HTP44 @ 0.7
189.5		HTP45 @ 0.4
589.5	Yes	HTP46 @ 0.7
55.57		TP5 @ 0.1
109.8		TP8 @ 0.4
53.8		TP8 @ 2.8
46.6		TP9 @ 0.6
270		WAHS1 @ No depth
150		WAHS2 @ No depth
87		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (III)



Basic data Risk parameter

Plant life pH 7

400 = GAC (critical conc.) (mg/kg)

23 = no. samples

46.6 = min. value

589.5 = max. value

186.0335 = mean

157.2917 = standard deviation

3 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-6.523852 = t_0	-6.52385 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
242.3469 = 95% UCL (US_{95})	329.0309 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 329.03091 GAC = 400 (US95 = 0.823 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

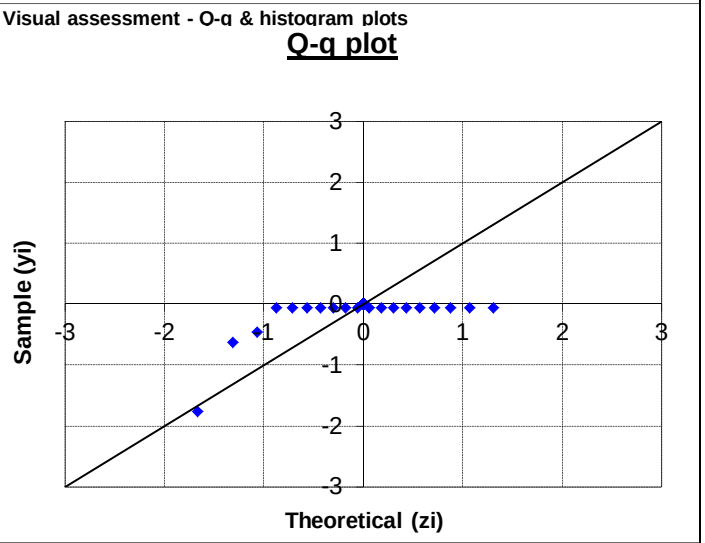
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

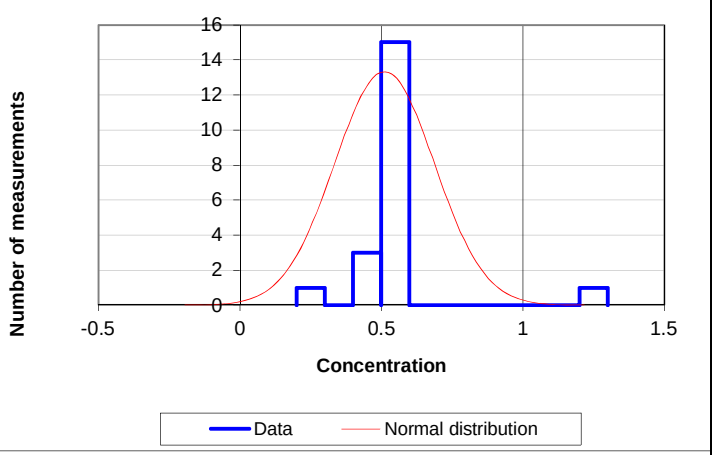
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chromium (VI)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
0.5	n/a	HTP41 @ 0.1
0.5	n/a	HTP43 @ 0.2
0.5	n/a	HTP44 @ 0.7
0.5	n/a	HTP45 @ 0.4
0.5	n/a	HTP46 @ 0.7
0.43	n/a	TP5 @ 0.1
0.2	n/a	TP8 @ 0.4
1.2	n/a	TP8 @ 2.8
0.4	n/a	TP9 @ 0.6

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter
Plant life pH 7

25 = GAC (critical conc.) (mg/kg)
20 = no. samples
0 = no. samples > or = GAC
0.2 = min. value
1.2 = max. value
0.5 = laboratory reporting limit (RL)
0.5115 = mean
19 = no. samples at RL
0.176554 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-620.2969	= t_0	-620.297	= k_0
1.729	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.579759	= 95% UCL (US_{95})	0.683627	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 0.683627 **GAC = 25** (US95 = 0.027 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

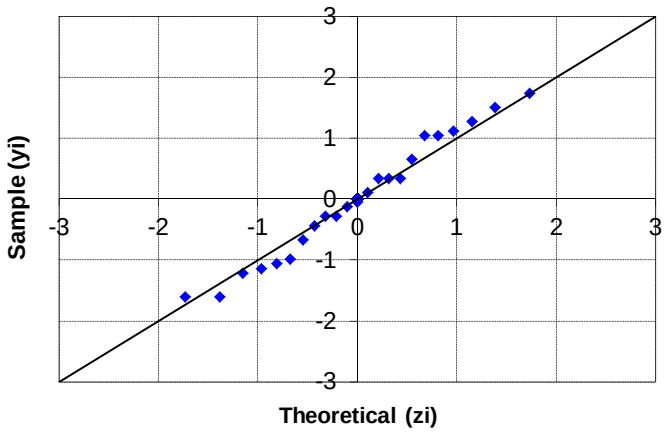
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

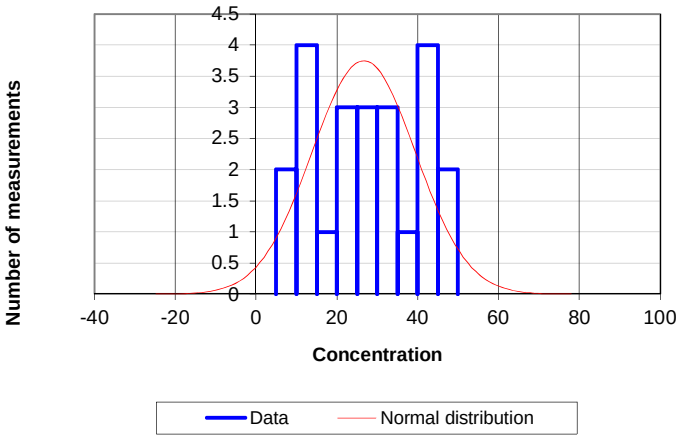
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Copper		
21		HTP15 @ 0.25
23		HTP17 @ 0.15
31		HTP20 @ 0.15
31		HTP22 @ 0.20
31		HTP24 @ 0.20
41		HTP25 @ 0.15
46		HTP26 @ 0.10
28		HTP29 @ 0.15
40		HTP33 @ 0.25
23		HTP39 @ 0.20
26		HTP40 @ 0.20
40		HTP41 @ 0.1
49		HTP43 @ 0.2
35		HTP44 @ 0.7
43		HTP45 @ 0.4
25		HTP46 @ 0.7
11		TP5 @ 0.1
18		TP8 @ 0.4
13		TP8 @ 2.8
12		TP9 @ 0.6
6		WAHS1 @ No depth
6		WAHS2 @ No depth
14		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data — Risk parameter: **Plant life pH 7**

135 = GAC (critical conc.) (mg/kg)	
23 = no. samples	0 = no. samples > or = GAC
6 = min. value	
49 = max. value	5 = laboratory reporting limit (RL)
26.65217 = mean	0 = no. samples at RL
12.84031 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-40.46771 = t_0	-40.4677 = k_0
1.717 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
31.24925 = 95% UCL (US_{95})	38.32559 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 38.325592 GAC = 135 (US95 = 0.284 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

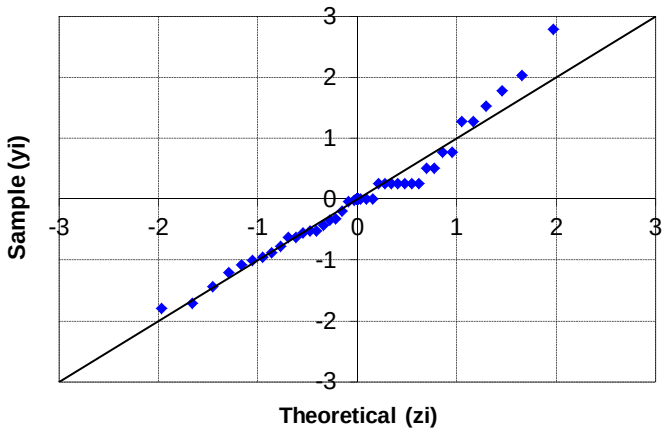
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

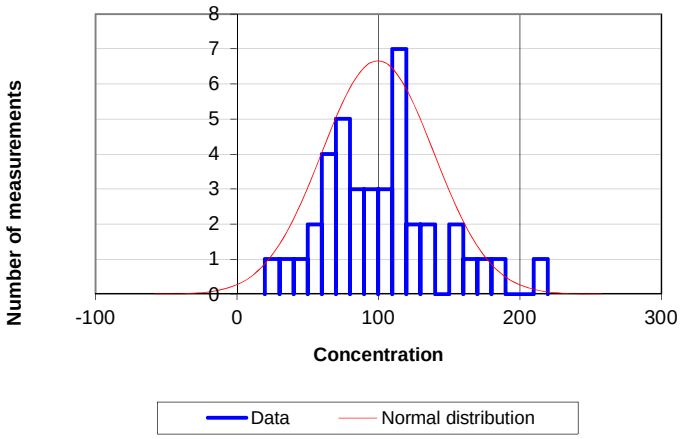
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
110		HTP15 @ 0.25
62		HTP17 @ 0.15
99		HTP20 @ 0.15
100		HTP22 @ 0.20
92		HTP24 @ 0.20
150		HTP25 @ 0.15
120		HTP26 @ 0.10
69		HTP29 @ 0.15
79		HTP33 @ 0.25
52		HTP39 @ 0.20
60		HTP40 @ 0.20
170		HTP41 @ 0.1
160		HTP43 @ 0.2
210	Yes	HTP44 @ 0.7
130		HTP45 @ 0.4
180		HTP46 @ 0.7
29		TP5 @ 0.1
57		TP8 @ 0.4
32		TP8 @ 2.8
43		TP9 @ 0.6
100		HS1 TS1 @ 0.21
100		HS1 TS2 @ 0.15
130		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
75		HS3 TS1 @ 0.24
75		HS3 TS2 @ 0.25
87		HS3 TS2 @ No depth
65		HS3SS1 @ 0.4
83		HS4 TS1 @ 0.22
78		HS4TS2 @ 0.19
86		HS4 SS1 @ 0.38
110		HS5 TS1 @ 0.16
120		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
110		WAHS1 @ No depth
98		WAHS2 @ No depth
79		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data — Risk parameter: **Plant life pH 7**

75 = GAC (critical conc.) (mg/kg)

40 = no. samples

29 = min. value

210 = max. value

99.75 = mean (mean>GAC)

39.52717 = standard deviation

31 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
3.96013 = t_0	3.96013 = k_0
1.685 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
110.2809 = 95% UCL (US_{95})	126.9991 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 126.99911 GAC = 75 (US95 = 1.693 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: MRB & WMF

Client: Bovis Barratt and Taylor Wimpy

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

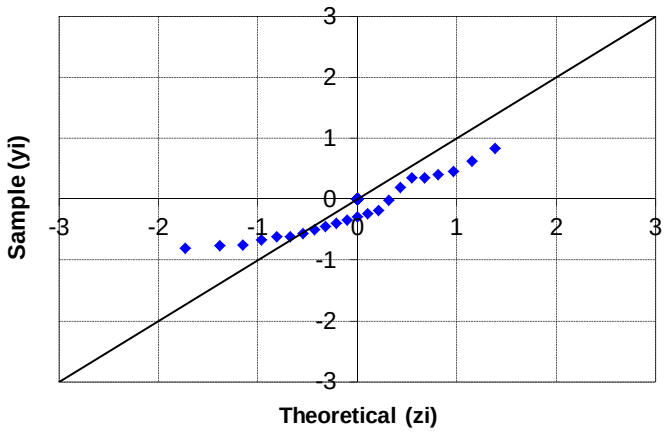
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

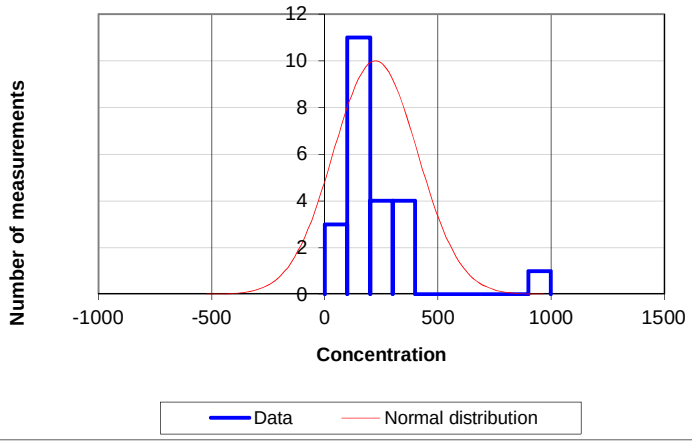
Zinc	Potential Outlier?	Sample
190		HTP15 @ 0.25
110		HTP17 @ 0.15
180		HTP20 @ 0.15
140		HTP22 @ 0.20
160		HTP24 @ 0.20
300		HTP25 @ 0.15
260		HTP26 @ 0.10
110		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
340		HTP41 @ 0.1
290		HTP43 @ 0.2
380		HTP44 @ 0.7
220		HTP45 @ 0.4
970	Yes	HTP46 @ 0.7
82		TP5 @ 0.1
130		TP8 @ 0.4
74		TP8 @ 2.8
84		TP9 @ 0.6
310		WAHS1 @ No depth
290		WAHS2 @ No depth
170		WAHS4 @ No depth

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data

Risk parameter
Plant life pH 7

300 = **GAC (critical conc.) (mg/kg)**
23 = no. samples
74 = min. value
970 = max. value
224.3478 = mean
186.2819 = standard deviation

5 = no. samples > or = GAC
10 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1.947666	= t_0	-1.94767	= k_0
1.717	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
291.0403	= 95% UCL (US_{95})	393.701	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC
US_{95} = 393.701 **GAC = 300** (US95 = 1.312 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: MRB & WMF
Client: Bovis Barratt and Taylor Wimpy
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	MG	NAT	MG	MG	MG																
								Location & Depth	HTP02	HTP03	HTP04	HTP05	HTP06	TP1	TP1	TP2	TP2	TP2	TP3	TP3	TP3	TP4	TP4	TP7	TP7	TP10	TP10	TP11	TP12	TP12
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.20**	**0.50**	**0.10**	**0.50**	**0.10**	**0.4**	**0.90m**	**0.2**	**0.5**	**1.5**	**0.1**	**0.5**	**1.8**	**0.6**	**1.5**	**0.2**	**0.7**	**0.3**	**0.9**	**0.3**	**0.2**	**0.4**
Arsenic	2	28	12	150	19	32	79.77682	FURTHER ASSESSMENT REQUIRED	28	84	56	33	48	150	76		26	22	42	40	78	27	22	72	72		45	49	69	66
Beryllium	1	7	0.5	2.1	0	51	2.260837	POTENTIALLY SUITABLE FOR USE	1	2.1	1.6	1.1	1.8	0.5	0.5															
Boron	0.4	28	0.6	3.8	0	290	2.162511	POTENTIALLY SUITABLE FOR USE	0.8	1	1	0.6	1.2	1.6	1.6		2.3	0.86	2.8	1.4	2.2	1.7	0.68	2.4	3.8		1	2.8	1.2	1.2
Cadmium	0.1	28	0.1	0.71	0	11	0.576684	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.1	0.1	0.23	0.61	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.52		0.5	0.71	0.5	0.5
Chromium (III)	5	28	31.9	410	0	630	159.8763	POTENTIALLY SUITABLE FOR USE	46.5	149.5	99.5	74.5	79.5	410	159.9		38.89	31.9	74.9	63	129.9	62.88	37.67	80	109.85		39	72.85	66	129.9
Chromium (VI)	0.5	19	0.1	0.5	0	4.3	0.41444	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5		0.1		0.11	0.1	0.1		0.1	0.12	0.33		0.15			0.15		0.1
Copper	5	28	7.3	230	0	2300	87.18576	POTENTIALLY SUITABLE FOR USE	18	36	26	18	150	7.3	33		23	13	180	23	16	21	19	25	110		24	230	25	17
Lead	5	28	17	1500	2	450	381.0785	POTENTIALLY SUITABLE FOR USE	39	230	52	30	480	40	75		62	17	410	24	33	51	20	64	360		29	1500	40	40
Mercury, inorganic	0.1	28	0.1	2.6	0	170	1.029042	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.1	0.1	0.71	0.27	0.92		0.65	0.24	2.1	0.2	0.39	0.21	0.2	0.27	2.6		0.2	2	0.2	0.25
Nickel	5	28	23	150	1	130	86.43294	POTENTIALLY SUITABLE FOR USE	25	64	67	45	53	150	80		23	28	52	80	59	31	33	81	64		70	77	110	65
Selenium	0.2	28	0.2	0.76	0	350	0.431448	POTENTIALLY SUITABLE FOR USE	0.2	0.2	0.2	0.2	0.2	0.3	0.38		0.3	0.3	0.49	0.3	0.33	0.32	0.3	0.3	0.76		0.3	0.59	0.43	0.3
Vanadium	5	7	0.5	230	4	74	230.1368	FURTHER ASSESSMENT REQUIRED	67	230	150	95	120	0.5	0.5															
Zinc	10	28	56	410	0	3700	229.6131	POTENTIALLY SUITABLE FOR USE	79	170	190	110	410	260	180		130	64	300	59	160	98	64	130	260		64	320	120	150
Cyanide (free)	0.5	28	0.5	5	0	750	4.775601	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	2	5		5	5	5	2	5	5	5	2	5		2	5	2	5
Phenol (total)	0.3	28	0.3	4.8	0	290	1.948196	POTENTIALLY SUITABLE FOR USE	0.3	0.3	0.3	0.3	0.3	0.5	4.3		0.5	0.5	3.7	0.5	0.5	0.5	0.5	0.5	4.8		0.5	2.1	0.5	0.5
Acenaphthene	0.01	19	0.01	11	0	480	3.549764	POTENTIALLY SUITABLE FOR USE	0.01	0.088	0.01	0.01	0.73		0.5		0.5	0.5	0.5		0.5	0.5	0.5		11			2.7		0.5
Acenaphthylene	0.01	19	0.01	5.4	0	400	2.106977	POTENTIALLY SUITABLE FOR USE	0.01	0.2	0.01	0.01	2.8		0.5		0.5	0.5	5.4		0.5	0.5	0.5		1.5			0.51		0.5
Anthracene	0.01	19	0.01	19	0	4900	8.456297	POTENTIALLY SUITABLE FOR USE	0.01	0.47	0.01	0.013	6		0.92		0.85	0.5	17		0.5	0.5	0.5		19			5.4		0.5
Benz(a)anthracene	0.01	19	0.031	36	4	4.7	16.01503	FURTHER ASSESSMENT REQUIRED	0.04	1.6	0.031	0.11	17		2		2.3	0.5	29		0.5	0.74	0.5		36			11		0.5
Benzo(a)pyrene	0.01	19	0.017	56	9	0.94	20.05253	FURTHER ASSESSMENT REQUIRED	0.021	1.3	0.017	0.087	14		2.3		2.8	0.5	25		0.5	1.1	0.5		56			13		0.5
Benzo(b)fluoranthene	0.01	19	0.047	40	4	6.5	16.18368	FURTHER ASSESSMENT REQUIRED	0.074	1.8	0.047	0.2	20		1.8		2.1	0.5	23		0.5	0.66	0.5		40			9.6		0.5
Benzo(ghi)perylene	0.01	19	0.01	45	0	46	15.13916	POTENTIALLY SUITABLE FOR USE	0.01	0.67	0.01	0.033	7.8		1.7		2.2	0.5	15		0.5	1	0.5		45			9.1		0.5
Benzo(k)fluoranthene	0.01	19	0.01	26	2	9.6	9.280907	POTENTIALLY SUITABLE FOR USE	0.01	0.64	0.012	0.026	5.7		0.93		1.1	0.5	11		0.5	0.5	0.5		26			6.8		0.5
Chrysene	0.01	19	0.027	40	4	8	18.44244	FURTHER ASSESSMENT REQUIRED	0.027	1.3	0.03	0.061	15		2.4		2.7	0.5	38		0.5	0.88	0.5		40			12		0.5
Dibenz(a,h)anthracene	0.01	19	0.01	4.5	4	0.86	1.832813	FURTHER ASSESSMENT REQUIRED	0.01	0.01	0.01	0.01	2		0.5		0.5	0.5	1.8		0.5	0.5	0.5		4.5			1.1		0.5
Fluoranthene	0.01	19	0.075	99	0	460	44.88063	POTENTIALLY SUITABLE FOR USE	0.17	3.6	0.075	0.2	36		4.9		6.2	0.5	91		0.5	2.2	0.5		99			31		0.5
Fluorene	0.01	19	0.01	18	0	380	6.306193	POTENTIALLY SUITABLE FOR USE	0.01	0.16	0.01	0.01	2.3		0.5		0.5	0.5	18		0.5	0.5	0.5		9.1			1.3		0.5
Indeno(1,2,3,cd)pyrene	0.01	19	0.01	43	4	3.9	14.60898	FURTHER ASSESSMENT REQUIRED	0.01	0.53	0.01	0.03	7.2		1.4		1.8	0.5	15		0.5	0.91	0.5		43			10		0.5
Naphthalene	0.01	19	0.01	42	3	3.7	13.63966	FURTHER ASSESSMENT REQUIRED	0.01	0.069	0.01	0.01	1.8		1.3		0.91	0.5	42		0.5	0.5	0.5		15			5.2		0.5
Phenanthrene	0.01	19	0.014	84	0	200	34.56433	POTENTIALLY SUITABLE FOR USE	0.088	2.7	0.014	0.049	27		3		2.6	0.5	84		0.5	1.3	0.5		64			19		0.5
Pyrene	0.01	19	0.066	95	0	1000	38.88174	POTENTIALLY SUITABLE FOR USE	0.11	2.9	0.066	0.16	29		4.1		4.7	0.5	69		0.5	1.8	0.5		95			27		0.5
	Mean																													
FOC (dimensionless)	0.018								0.015	0.0065	0.03	0.0093	0.12	0.004244		0.02093				0.004244				0.022674		0.023256	0.004244		0.006395	
SOM (calculated)	3.17%								2.59%	1.12%	5.17%	1.60%	20.69%	0.73%		3.61%				0.73%				3.91%		4.01%	0.73%		1.10%	
pH (su)	7.9								6.7	8.3	7.7	8.2	8	7.9	8.2	7.7	8.6	7.7	8.2	8.4	7.7	8	7.6	7.7	8.1	7.1	8.3	8.1	8.1	8.1

Risk parameter: Human health - residential with plant uptake (2.5%SOM)
Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

All values in mg/kg unless otherwise stated								Soil Type									
								Location & Depth	TP13	TP13	TP13	TP14	TP15	TP16	TP16	TP23	TP24
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.3**	**0.8**	**1**	**0.4**	**2.7**	**0.4**	**0.7**	**0.4**	**0.4**
Arsenic	2	28	12	150	19	32	79.77682	FURTHER ASSESSMENT REQUIRED	82	95		12	16	19	80	21	79
Beryllium	1	7	0.5	2.1	0	51	2.260837	POTENTIALLY SUITABLE FOR USE									
Boron	0.4	28	0.6	3.8	0	290	2.162511	POTENTIALLY SUITABLE FOR USE	2.2	2.1		0.94	1.3	0.89	1.2	0.88	0.81
Cadmium	0.1	28	0.1	0.71	0	11	0.576684	POTENTIALLY SUITABLE FOR USE	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5
Chromium (III)	5	28	31.9	410	0	630	159.8763	POTENTIALLY SUITABLE FOR USE	94	159.9		53.76	41.7	53	219.9	40	89
Chromium (VI)	0.5	19	0.1	0.5	0	4.3	0.41444	POTENTIALLY SUITABLE FOR USE		0.1		0.24	0.3		0.1		
Copper	5	28	7.3	230	0	2300	87.18576	POTENTIALLY SUITABLE FOR USE	30	30		21	15	18	14	9.5	10
Lead	5	28	17	1500	2	450	381.0785	POTENTIALLY SUITABLE FOR USE	74	81		23	22	21	22	19	25
Mercury, inorganic	0.1	28	0.1	2.6	0	170	1.029042	POTENTIALLY SUITABLE FOR USE	0.35	0.45		0.2	0.2	0.2	0.26	0.2	0.2
Nickel	5	28	23	150	1	130	86.43294	POTENTIALLY SUITABLE FOR USE	91	73		40	29	29	96	24	86
Selenium	0.2	28	0.2	0.76	0	350	0.431448	POTENTIALLY SUITABLE FOR USE	0.42	0.33		0.3	0.34	0.3	0.3	0.3	0.3
Vanadium	5	7	0.5	230	4	74	230.1368	FURTHER ASSESSMENT REQUIRED									
Zinc	10	28	56	410	0	3700	229.6131	POTENTIALLY SUITABLE FOR USE	170	180		120	56	110	150	62	220
Cyanide (free)	0.5	28	0.5	5	0	750	4.775601	POTENTIALLY SUITABLE FOR USE	2	5		5	5	2	5	2	2
Phenol (total)	0.3	28	0.3	4.8	0	290	1.948196	POTENTIALLY SUITABLE FOR USE	0.5	0.58		0.5	0.76	0.5	0.5	0.5	0.5
Acenaphthene	0.01	19	0.01	11	0	480	3.549764	POTENTIALLY SUITABLE FOR USE		0.5		0.5	0.5		0.5		
Acenaphthylene	0.01	19	0.01	5.4	0	400	2.106977	POTENTIALLY SUITABLE FOR USE		0.5		0.5	0.5		0.5		
Anthracene	0.01	19	0.01	19	0	4900	8.456297	POTENTIALLY SUITABLE FOR USE		0.58		0.5	0.5		0.5		
Benz(a)anthracene	0.01	19	0.031	36	4	4.7	16.01503	FURTHER ASSESSMENT REQUIRED		1.3		0.5	0.5		0.5		
Benzo(a)pyrene	0.01	19	0.017	56	9	0.94	20.05253	FURTHER ASSESSMENT REQUIRED		1.4		0.5	0.5		0.5		
Benzo(b)fluoranthene	0.01	19	0.047	40	4	6.5	16.18368	FURTHER ASSESSMENT REQUIRED		0.97		0.5	0.5		0.5		
Benzo(ghi)perylene	0.01	19	0.01	45	0	46	15.13916	POTENTIALLY SUITABLE FOR USE		0.91		0.5	0.5		0.5		
Benzo(k)fluoranthene	0.01	19	0.01	26	2	9.6	9.280907	POTENTIALLY SUITABLE FOR USE		0.77		0.5	0.5		0.5		
Chrysene	0.01	19	0.027	40	4	8	18.44244	FURTHER ASSESSMENT REQUIRED		1.4		0.5	0.5		0.5		
Dibenz(a,h)anthracene	0.01	19	0.01	4.5	4	0.86	1.832813	FURTHER ASSESSMENT REQUIRED		0.5		0.5	0.5		0.5		
Fluoranthene	0.01	19	0.075	99	0	460	44.88063	POTENTIALLY SUITABLE FOR USE		3.6		0.5	0.5		0.5		
Fluorene	0.01	19	0.01	18	0	380	6.306193	POTENTIALLY SUITABLE FOR USE		0.5		0.5	0.5		0.5		
Indeno(1,2,3,cd)pyrene	0.01	19	0.01	43	4	3.9	14.60898	FURTHER ASSESSMENT REQUIRED		0.98		0.5	0.5		0.5		
Naphthalene	0.01	19	0.01	42	3	3.7	13.63966	FURTHER ASSESSMENT REQUIRED		1.1		0.5	0.5		0.5		
Phenanthrene	0.01	19	0.014	84	0	200	34.56433	POTENTIALLY SUITABLE FOR USE		2.4		0.5	0.5		0.5		
Pyrene	0.01	19	0.066	95	0	1000	38.88174	POTENTIALLY SUITABLE FOR USE		3.1		0.5	0.5		0.5		
	Mean																
FOC (dimensionless)	0.018								0.027907		0.003895			0.003488		0.00814	0.001919
SOM (calculated)	3.17%								4.81%		0.67%			0.60%		1.40%	0.33%
pH (su)	7.9								8	8.3	8.3	7.3	7.9	7.9	8.2	7.8	8

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**
Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

All values in mg/kg unless otherwise stated

Chemical of Potential Concern	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC	US_{95}	Result of Significance Test														
Soil Type									MG	NAT	MG	MG	MG									
Location & Depth									HTP02	HTP03	HTP04	HTP05	HTP06	TP1	TP1	TP2	TP2	TP2	TP3	TP3	TP3	TP4	TP4
									0.20	0.50	0.10	0.50	0.10	0.4	0.90m	0.2	0.5	1.5	0.1	0.5	1.8	0.6	1.5
Arsenic	2	28	12	150	0	250	79.77682	POTENTIALLY SUITABLE FOR USE	28	84	56	33	48	150	76		26	22	42	40	78	27	22
Boron	0.4	28	0.6	3.8	1	3	2.162511	POTENTIALLY SUITABLE FOR USE	0.8	1	1	0.6	1.2	1.6	1.6		2.3	0.86	2.8	1.4	2.2	1.7	0.68
Chromium (III)	5	28	31.9	410	1	400	159.8763	POTENTIALLY SUITABLE FOR USE	46.5	149.5	99.5	74.5	79.5	410	159.9		38.89	31.9	74.9	63	129.9	62.88	37.67
Chromium (VI)	0.5	19	0.1	0.5	0	25	0.41444	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5		0.1		0.11	0.1	0.1		0.1	0.12	0.33
Copper	5	28	7.3	230	1	200	87.18576	POTENTIALLY SUITABLE FOR USE	18	36	26	18	150	7.3	33		23	13	180	23	16	21	19
Nickel	5	28	23	150	2	110	86.43294	POTENTIALLY SUITABLE FOR USE	25	64	67	45	53	150	80		23	28	52	80	59	31	33
Zinc	10	28	56	410	3	300	229.6131	POTENTIALLY SUITABLE FOR USE	79	170	190	110	410	260	180		130	64	300	59	160	98	64
	Mean																						
pH (su)	7.9								6.7	8.3	7.7	8.2	8	7.9	8.2	7.7	8.6	7.7	8.2	8.4	7.7	8	7.6

Risk parameter: **Plant life pH >7**
Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Plant Life

Hydrock

All values in mg/kg unless otherwise stated								Soil Type																	
								Location & Depth	TP7	TP7	TP10	TP10	TP11	TP12	TP12	TP13	TP13	TP13	TP14	TP15	TP16	TP16	TP23	TP24
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.2**	**0.7**	**0.3**	**0.9**	**0.3**	**0.2**	**0.4**	**0.3**	**0.8**	**1**	**0.4**	**2.7**	**0.4**	**0.7**	**0.4**	**0.4**
Arsenic	2	28	12	150	0	250	79.77682	POTENTIALLY SUITABLE FOR USE	72	72		45	49	69	66	82	95		12	16	19	80	21	79
Boron	0.4	28	0.6	3.8	1	3	2.162511	POTENTIALLY SUITABLE FOR USE	2.4	3.8		1	2.8	1.2	1.2	2.2	2.1		0.94	1.3	0.89	1.2	0.88	0.81
Chromium (III)	5	28	31.9	410	1	400	159.8763	POTENTIALLY SUITABLE FOR USE	80	109.85		39	72.85	66	129.9	94	159.9		53.76	41.7	53	219.9	40	89
Chromium (VI)	0.5	19	0.1	0.5	0	25	0.41444	POTENTIALLY SUITABLE FOR USE		0.15			0.15		0.1		0.1		0.24	0.3		0.1		
Copper	5	28	7.3	230	1	200	87.18576	POTENTIALLY SUITABLE FOR USE	25	110		24	230	25	17	30	30		21	15	18	14	9.5	10
Nickel	5	28	23	150	2	110	86.43294	POTENTIALLY SUITABLE FOR USE	81	64		70	77	110	65	91	73		40	29	29	96	24	86
Zinc	10	28	56	410	3	300	229.6131	POTENTIALLY SUITABLE FOR USE	130	260		64	320	120	150	170	180		120	56	110	150	62	220
	Mean																							
pH (su)	7.9								7.7	8.1	7.1	8.3	8.1	8.1	8.1	8	8.3	8.3	7.3	7.9	7.9	8.2	7.8	8

Risk parameter: **Plant life pH >7**
Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

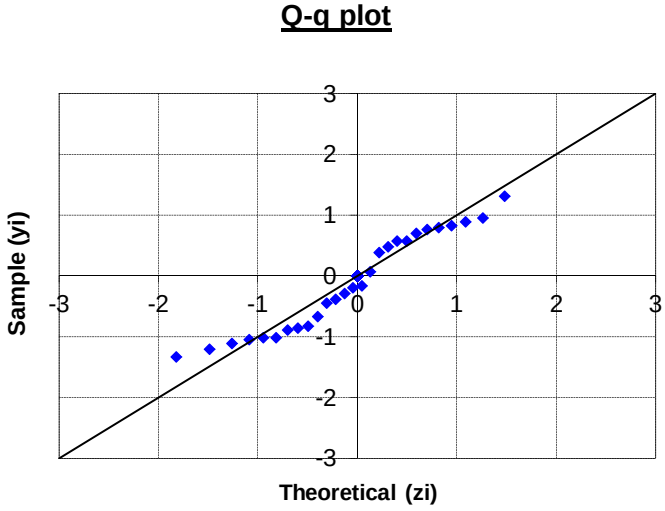
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

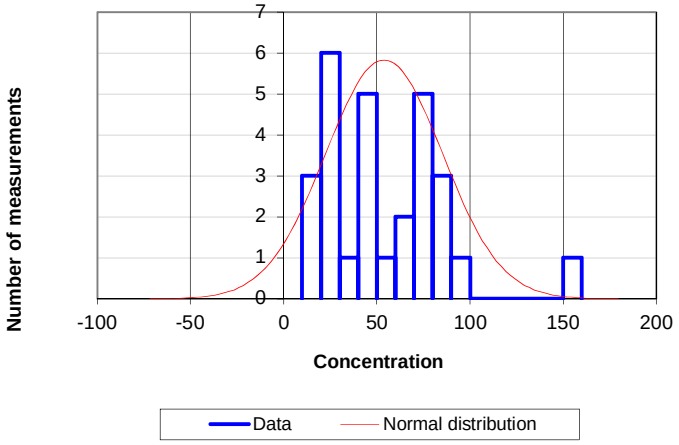
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Arsenic		
28		HTP02 @ 0.20
84		HTP03 @ 0.50
56		HTP04 @ 0.10
33		HTP05 @ 0.50
48		HTP06 @ 0.10
150		TP1 @ 0.4
76		TP1 @ 0.90m
26		TP2 @ 0.5
22		TP2 @ 1.5
42		TP3 @ 0.1
40		TP3 @ 0.5
78		TP3 @ 1.8
27		TP4 @ 0.6
22		TP4 @ 1.5
72		TP7 @ 0.2
72		TP7 @ 0.7
45		TP10 @ 0.9
49		TP11 @ 0.3
69		TP12 @ 0.2
66		TP12 @ 0.4
82		TP13 @ 0.3
95		TP13 @ 0.8
12		TP14 @ 0.4
16		TP15 @ 2.7
19		TP16 @ 0.4
80		TP16 @ 0.7
21		TP23 @ 0.4
79		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

32 = GAC (critical conc.) (mg/kg)

28 = no. samples — 19 = no. samples > or = GAC

12 = min. value

150 = max. value — 2 = laboratory reporting limit (RL)

53.89286 = mean (mean>GAC) — 0 = no. samples at RL

31.41401 = standard deviation — RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
3.687721 = t_0	3.687721 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
64.00304 = 95% UCL (US_{95})	79.77682 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 79.776824 GAC = 32 (US95 = 2.493 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

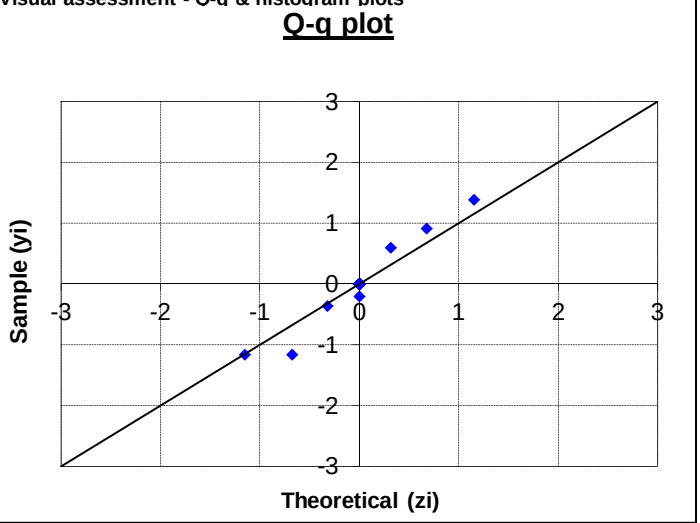
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

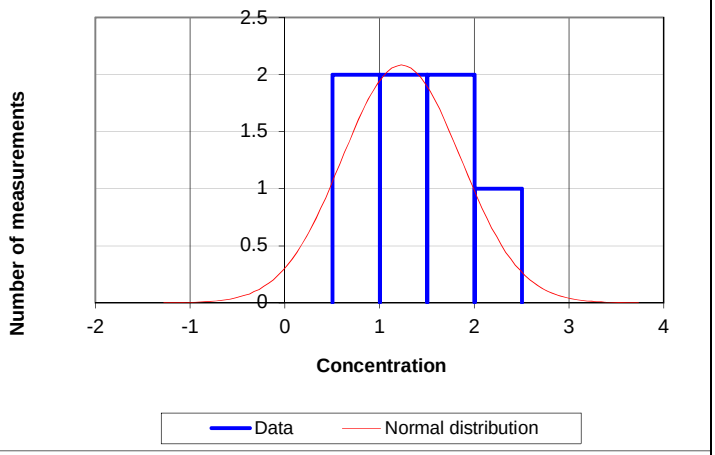
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Beryllium	Potential Outlier?	Sample
1		HTP02 @ 0.20
2.1		HTP03 @ 0.50
1.6		HTP04 @ 0.10
1.1		HTP05 @ 0.50
1.8		HTP06 @ 0.10
0.5		TP1 @ 0.4
0.5		TP1 @ 0.90m

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

51 = GAC (critical conc.) (mg/kg)

7 = no. samples	0 = no. samples > or = GAC
0.5 = min. value	
2.1 = max. value	1 = laboratory reporting limit (RL)
1.228571 = mean	3 = no. samples at RL
0.626403 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-210.2205 = t_0	-210.221 = k_0
1.943 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
1.688593 = 95% UCL (US_{95})	2.260837 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 2.260837 **GAC = 51** (US95 = 0.044 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

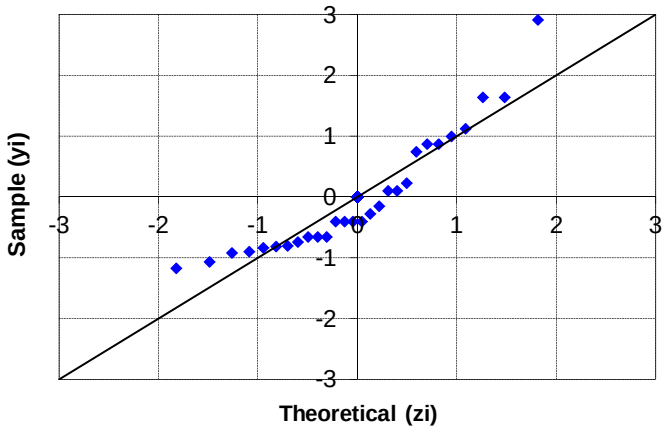
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Boron		
0.8		HTP02 @ 0.20
1		HTP03 @ 0.50
1		HTP04 @ 0.10
0.6		HTP05 @ 0.50
1.2		HTP06 @ 0.10
1.6		TP1 @ 0.4
1.6		TP1 @ 0.90m
2.3		TP2 @ 0.5
0.86		TP2 @ 1.5
2.8		TP3 @ 0.1
1.4		TP3 @ 0.5
2.2		TP3 @ 1.8
1.7		TP4 @ 0.6
0.68		TP4 @ 1.5
2.4		TP7 @ 0.2
3.8	Yes	TP7 @ 0.7
1		TP10 @ 0.9
2.8		TP11 @ 0.3
1.2		TP12 @ 0.2
1.2		TP12 @ 0.4
2.2		TP13 @ 0.3
2.1		TP13 @ 0.8
0.94		TP14 @ 0.4
1.3		TP15 @ 2.7
0.89		TP16 @ 0.4
1.2		TP16 @ 0.7
0.88		TP23 @ 0.4
0.81		TP24 @ 0.4

Mean Absolute Deviation for potential outliers

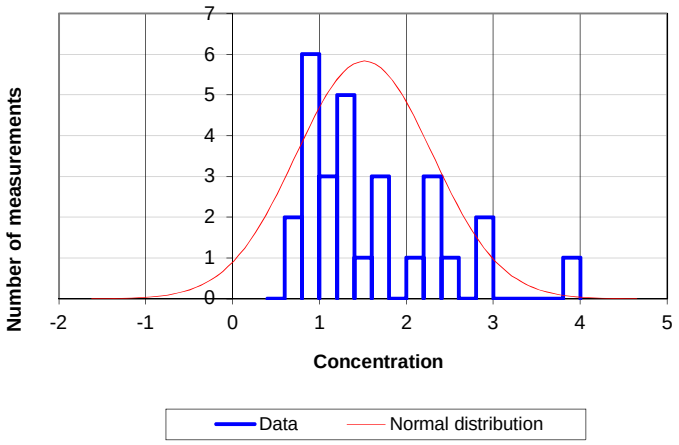
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

28 = no. samples

0.6 = min. value

3.8 = max. value

1.516429 = mean

0.784116 = standard deviation

0 = no. samples > or = GAC

0.4 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1946.792 = t_0	-1946.79 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
1.768786 = 95% UCL (US_{95})	2.162511 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 2.1625112 GAC = 290 (US95 = 0.007 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

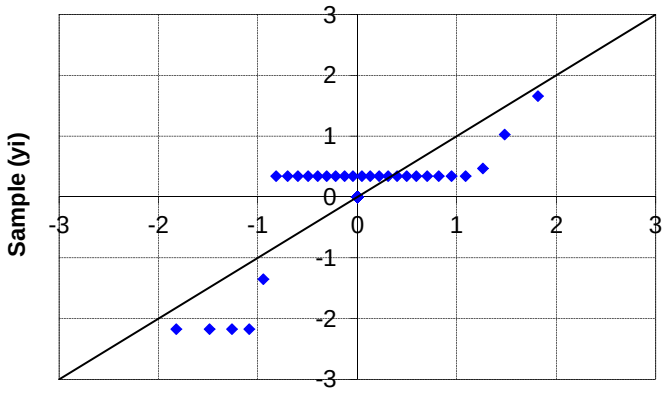
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

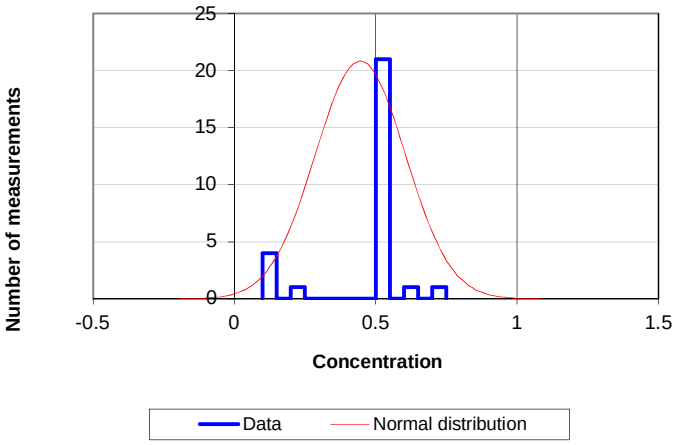
Cadmium	Potential Outlier?	Sample
0.1	n/a	HTP02 @ 0.20
0.1	n/a	HTP03 @ 0.50
0.1	n/a	HTP04 @ 0.10
0.1	n/a	HTP05 @ 0.50
0.23	n/a	HTP06 @ 0.10
0.61	n/a	TP1 @ 0.4
0.5	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
0.5	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 0.5
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
0.5	n/a	TP7 @ 0.2
0.52	n/a	TP7 @ 0.7
0.5	n/a	TP10 @ 0.9
0.71	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.2
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.3
0.5	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.5	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.4
0.5	n/a	TP16 @ 0.7
0.5	n/a	TP23 @ 0.4
0.5	n/a	TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Cadmium



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

11 = GAC (critical conc.) (mg/kg)

28 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
0.71 = max. value	0.1 = laboratory reporting limit (RL)
0.445357 = mean	4 = no. samples at RL
0.159385 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-350.4089 = t_0	-350.409 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.496653 = 95% UCL (US_{95})	0.576684 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5766844 GAC = 11 (US95 = 0.052 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

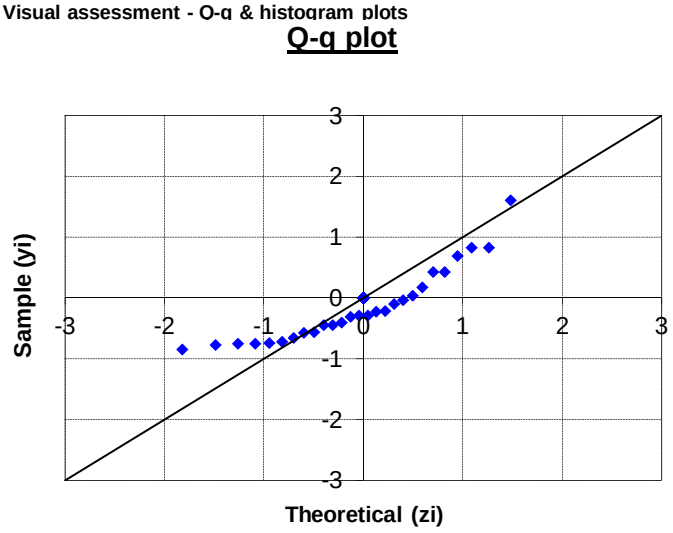
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

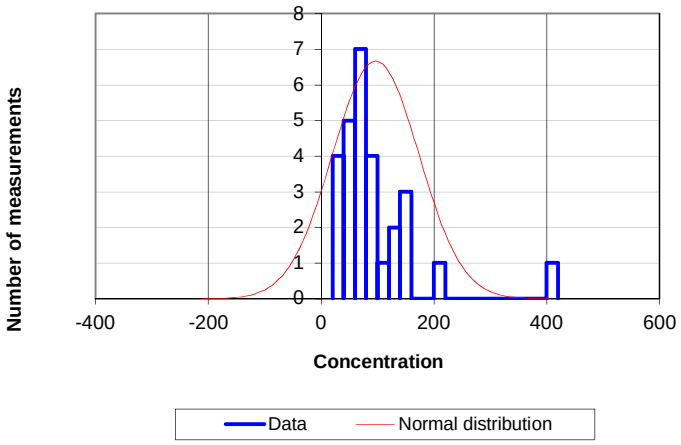
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC) Chromium (III)	Potential Outlier?	Sample
46.5		HTP02 @ 0.20
149.5		HTP03 @ 0.50
99.5		HTP04 @ 0.10
74.5		HTP05 @ 0.50
79.5		HTP06 @ 0.10
410	Yes	TP1 @ 0.4
159.9		TP1 @ 0.90m
38.89		TP2 @ 0.5
31.9		TP2 @ 1.5
74.9		TP3 @ 0.1
63		TP3 @ 0.5
129.9		TP3 @ 1.8
62.88		TP4 @ 0.6
37.67		TP4 @ 1.5
80		TP7 @ 0.2
109.85		TP7 @ 0.7
39		TP10 @ 0.9
72.85		TP11 @ 0.3
66		TP12 @ 0.2
129.9		TP12 @ 0.4
94		TP13 @ 0.3
159.9		TP13 @ 0.8
53.76		TP14 @ 0.4
41.7		TP15 @ 2.7
53		TP16 @ 0.4
219.9		TP16 @ 0.7
40		TP23 @ 0.4
89		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

630 = GAC (critical conc.) (mg/kg)

28 = no. samples

31.9 = min. value

410 = max. value

96.69286 = mean

76.68242 = standard deviation

0 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-36.80109 = t_0	-36.8011 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
121.3721 = 95% UCL (US_{95})	159.8763 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 159.8763 **GAC = 630** (US95 = 0.254 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

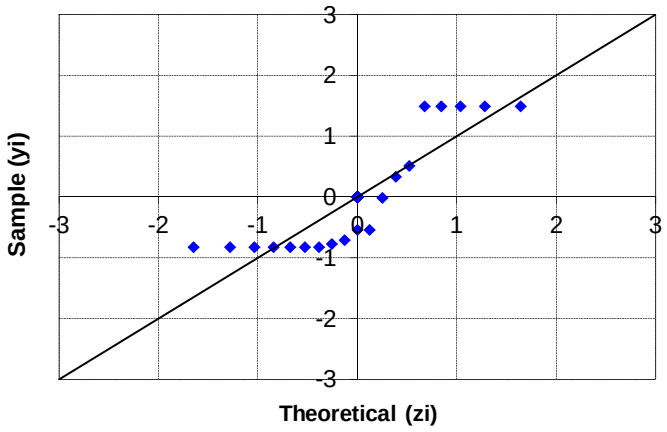
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

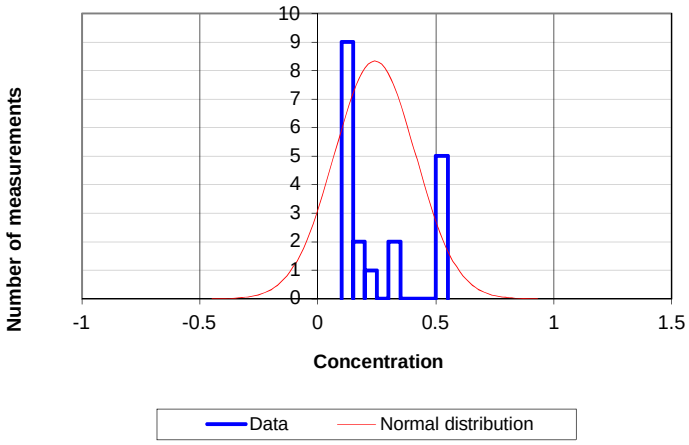
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (VI)		
0.5	Yes	HTP02 @ 0.20
0.5	Yes	HTP03 @ 0.50
0.5	Yes	HTP04 @ 0.10
0.5	Yes	HTP05 @ 0.50
0.5	Yes	HTP06 @ 0.10
0.1		TP1 @ 0.90m
0.11		TP2 @ 0.5
0.1		TP2 @ 1.5
0.1		TP3 @ 0.1
0.1		TP3 @ 1.8
0.12		TP4 @ 0.6
0.33		TP4 @ 1.5
0.15		TP7 @ 0.7
0.15		TP11 @ 0.3
0.1		TP12 @ 0.4
0.1		TP13 @ 0.8
0.24		TP14 @ 0.4
0.3		TP15 @ 2.7
0.1		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (VI)



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.3 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.1 = min. value

0.5 = max. value

0.5 = laboratory reporting limit (RL)

0.242105 = mean

19 = no. samples at RL

0.172291 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-102.6632	$= t_0$	-102.663	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
0.310644	= 95% UCL (US_{95})	0.41444	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4144398 GAC = 4.3 (US95 = 0.096 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

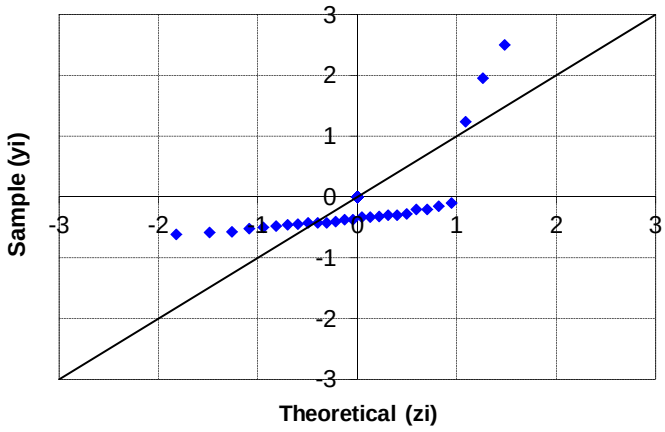
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

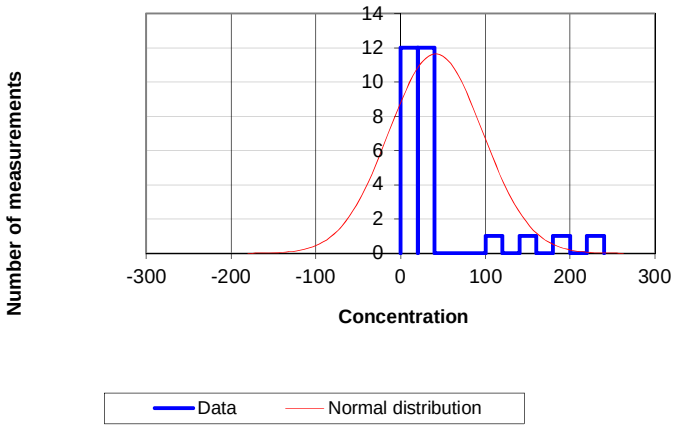
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Copper		
18		HTP02 @ 0.20
36		HTP03 @ 0.50
26		HTP04 @ 0.10
18		HTP05 @ 0.50
150	Yes	HTP06 @ 0.10
7.3		TP1 @ 0.4
33		TP1 @ 0.90m
23		TP2 @ 0.5
13		TP2 @ 1.5
180	Yes	TP3 @ 0.1
23		TP3 @ 0.5
16		TP3 @ 1.8
21		TP4 @ 0.6
19		TP4 @ 1.5
25		TP7 @ 0.2
110	Yes	TP7 @ 0.7
24		TP10 @ 0.9
230	Yes	TP11 @ 0.3
25		TP12 @ 0.2
17		TP12 @ 0.4
30		TP13 @ 0.3
30		TP13 @ 0.8
21		TP14 @ 0.4
15		TP15 @ 2.7
18		TP16 @ 0.4
14		TP16 @ 0.7
9.5		TP23 @ 0.4
10		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

2300 = GAC (critical conc.) (mg/kg)

28 = no. samples	0 = no. samples > or = GAC
7.3 = min. value	
230 = max. value	5 = laboratory reporting limit (RL)
41.49286 = mean	0 = no. samples at RL
55.45507 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-215.5059 = t_0	-215.506 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
59.34034 = 95% UCL (US_{95})	87.18576 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 87.185755 GAC = 2300 (US95 = 0.038 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

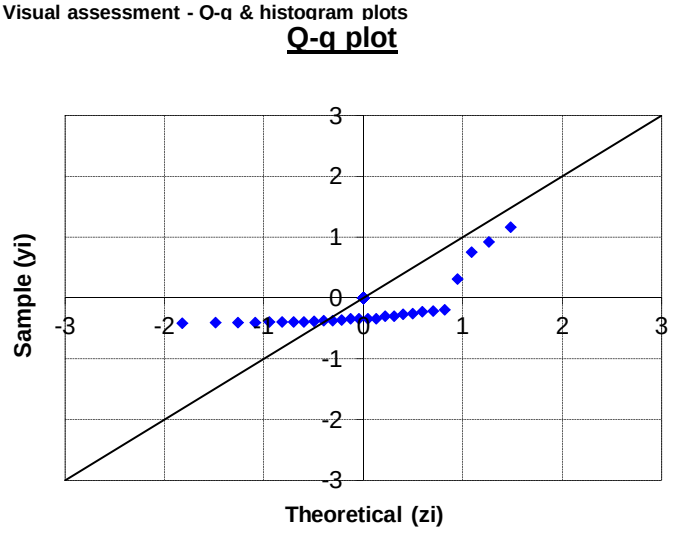
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

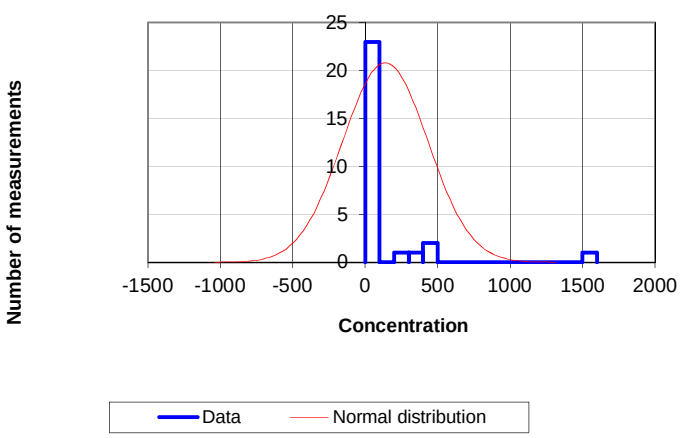
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Lead		
39		HTP02 @ 0.20
230	Yes	HTP03 @ 0.50
52		HTP04 @ 0.10
30		HTP05 @ 0.50
480	Yes	HTP06 @ 0.10
40		TP1 @ 0.4
75		TP1 @ 0.90m
62		TP2 @ 0.5
17		TP2 @ 1.5
410	Yes	TP3 @ 0.1
24		TP3 @ 0.5
33		TP3 @ 1.8
51		TP4 @ 0.6
20		TP4 @ 1.5
64		TP7 @ 0.2
360	Yes	TP7 @ 0.7
29		TP10 @ 0.9
1500	Yes	TP11 @ 0.3
40		TP12 @ 0.2
40		TP12 @ 0.4
74		TP13 @ 0.3
81		TP13 @ 0.8
23		TP14 @ 0.4
22		TP15 @ 2.7
21		TP16 @ 0.4
22		TP16 @ 0.7
19		TP23 @ 0.4
25		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

450 = GAC (critical conc.) (mg/kg)

28 = no. samples

17 = min. value

1500 = max. value

138.6786 = mean

294.188 = standard deviation

2 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-5.599678 = t_0	-5.59968 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
233.3591 = 95% UCL (US_{95})	381.0785 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 381.07849 GAC = 450 (US95 = 0.847 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

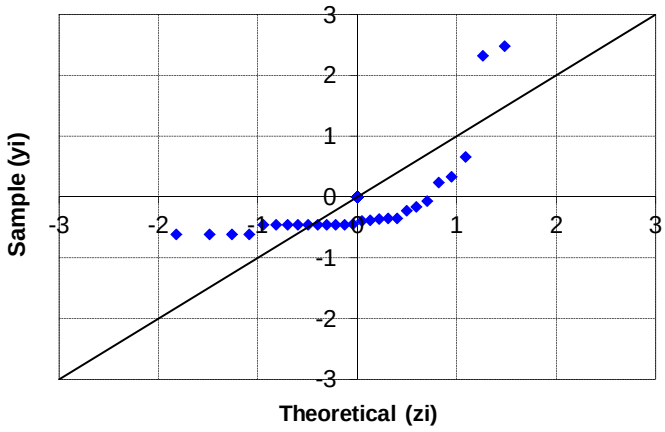
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

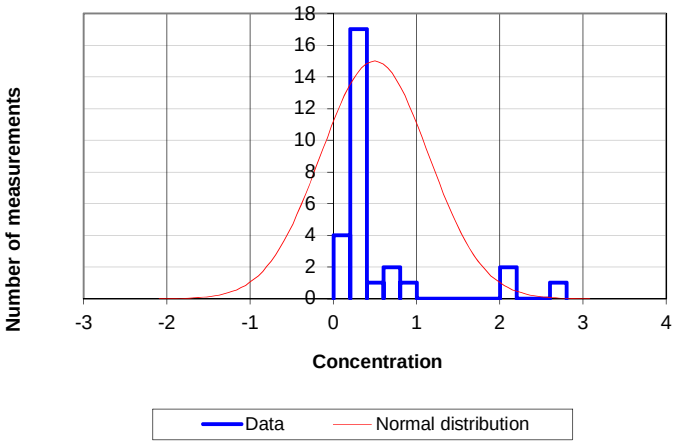
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Mercury, inorganic		
0.1		HTP02 @ 0.20
0.1		HTP03 @ 0.50
0.1		HTP04 @ 0.10
0.1		HTP05 @ 0.50
0.71	Yes	HTP06 @ 0.10
0.27		TP1 @ 0.4
0.92	Yes	TP1 @ 0.90m
0.65	Yes	TP2 @ 0.5
0.24		TP2 @ 1.5
2.1	Yes	TP3 @ 0.1
0.2		TP3 @ 0.5
0.39		TP3 @ 1.8
0.21		TP4 @ 0.6
0.2		TP4 @ 1.5
0.27		TP7 @ 0.2
2.6	Yes	TP7 @ 0.7
0.2		TP10 @ 0.9
2	Yes	TP11 @ 0.3
0.2		TP12 @ 0.2
0.25		TP12 @ 0.4
0.35		TP13 @ 0.3
0.45		TP13 @ 0.8
0.2		TP14 @ 0.4
0.2		TP15 @ 2.7
0.2		TP16 @ 0.4
0.26		TP16 @ 0.7
0.2		TP23 @ 0.4
0.2		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Mercury, inorganic



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

170 = GAC (critical conc.) (mg/kg)

28 = no. samples

0 = no. samples > or = GAC

0.1 = min. value

2.6 = max. value

0.1 = laboratory reporting limit (RL)

0.495357 = mean

4 = no. samples at RL

0.647705 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1384.788 = t_0	-1384.79 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.703812 = 95% UCL (US_{95})	1.029042 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.029042 **GAC = 170** (US95 = 0.006 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

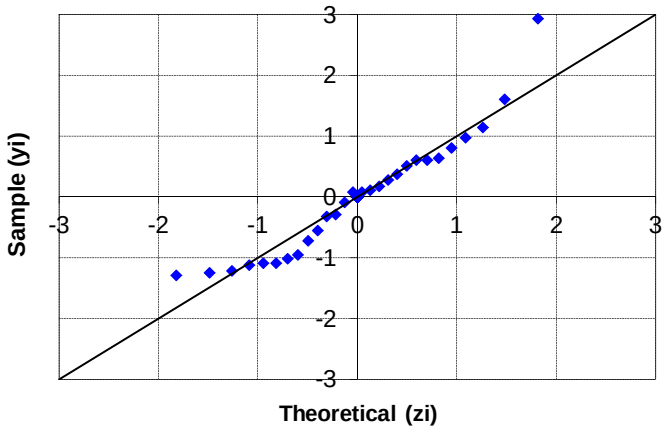
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

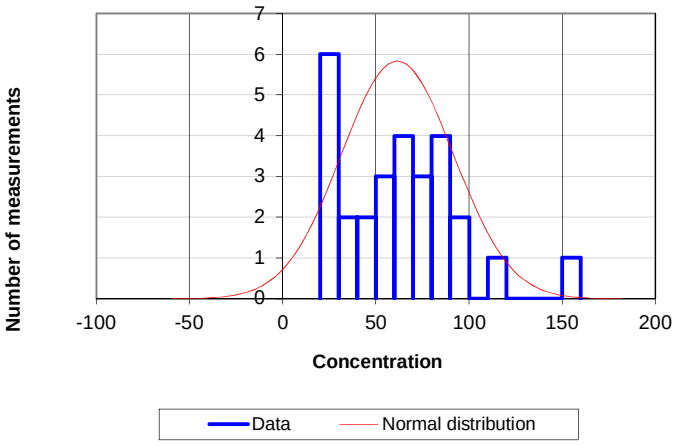
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
25		HTP02 @ 0.20
64		HTP03 @ 0.50
67		HTP04 @ 0.10
45		HTP05 @ 0.50
53		HTP06 @ 0.10
150		TP1 @ 0.4
80		TP1 @ 0.90m
23		TP2 @ 0.5
28		TP2 @ 1.5
52		TP3 @ 0.1
80		TP3 @ 0.5
59		TP3 @ 1.8
31		TP4 @ 0.6
33		TP4 @ 1.5
81		TP7 @ 0.2
64		TP7 @ 0.7
70		TP10 @ 0.9
77		TP11 @ 0.3
110		TP12 @ 0.2
65		TP12 @ 0.4
91		TP13 @ 0.3
73		TP13 @ 0.8
40		TP14 @ 0.4
29		TP15 @ 2.7
29		TP16 @ 0.4
96		TP16 @ 0.7
24		TP23 @ 0.4
86		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

130 = GAC (critical conc.) (mg/kg)

28 = no. samples
23 = min. value
150 = max. value
61.60714 = mean
30.12977 = standard deviation

1 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-12.01141 = t_0	-12.0114 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
71.30401 = 95% UCL (US_{95})	86.43294 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 86.432943 GAC = 130 (US95 = 0.665 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

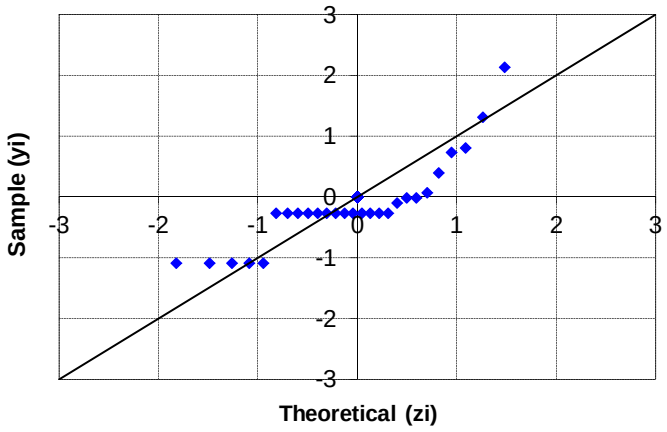
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

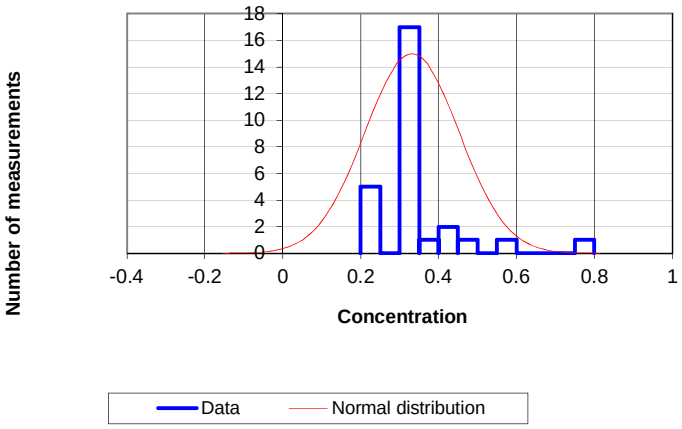
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Selenium		
0.2		HTP02 @ 0.20
0.2		HTP03 @ 0.50
0.2		HTP04 @ 0.10
0.2		HTP05 @ 0.50
0.2		HTP06 @ 0.10
0.3		TP1 @ 0.4
0.38		TP1 @ 0.90m
0.3		TP2 @ 0.5
0.3		TP2 @ 1.5
0.49	Yes	TP3 @ 0.1
0.3		TP3 @ 0.5
0.33		TP3 @ 1.8
0.32		TP4 @ 0.6
0.3		TP4 @ 1.5
0.3		TP7 @ 0.2
0.76	Yes	TP7 @ 0.7
0.3		TP10 @ 0.9
0.59	Yes	TP11 @ 0.3
0.43	Yes	TP12 @ 0.2
0.3		TP12 @ 0.4
0.42		TP13 @ 0.3
0.33		TP13 @ 0.8
0.3		TP14 @ 0.4
0.34		TP15 @ 2.7
0.3		TP16 @ 0.4
0.3		TP16 @ 0.7
0.3		TP23 @ 0.4
0.3		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Selenium



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

350 = GAC (critical conc.) (mg/kg)

28 = no. samples — 0 = no. samples > or = GAC

0.2 = min. value

0.76 = max. value — 0.2 = laboratory reporting limit (RL)

0.331786 = mean — 5 = no. samples at RL

0.120955 = standard deviation — RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-15297.22	$= t_0$	-15297.2	$= k_0$
1.703	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
0.370713	= 95% UCL (US_{95})	0.431448	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4314478 GAC = 350 (US95 = 0.001 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

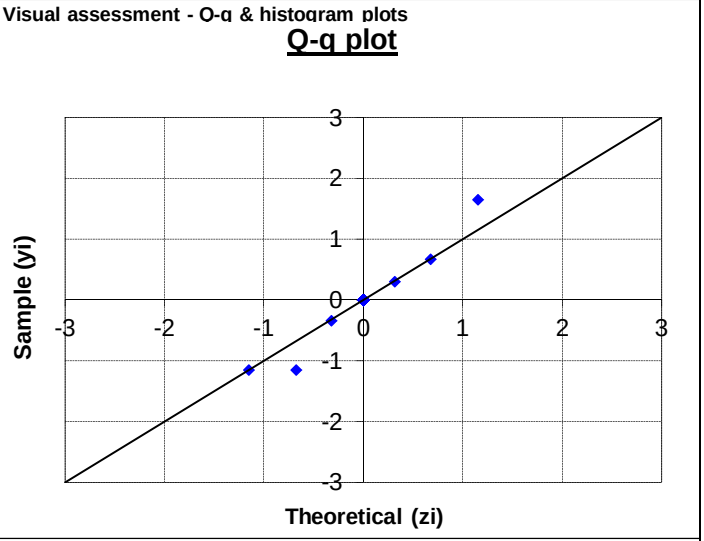
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

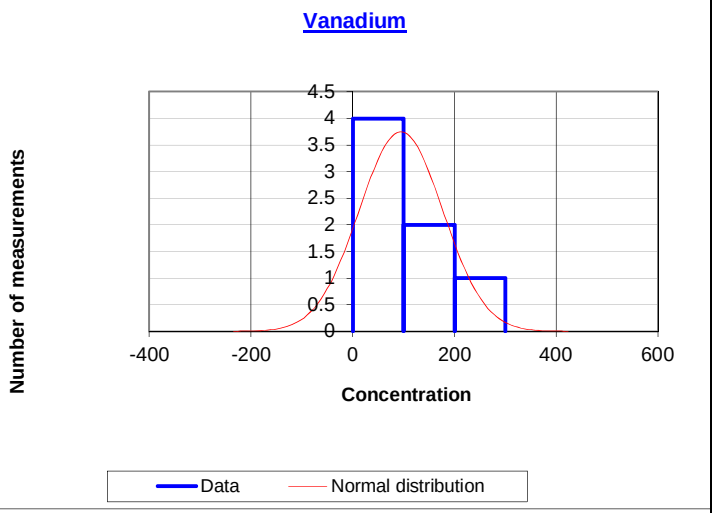
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Vanadium	Potential Outlier?	Sample
67		HTP02 @ 0.20
230		HTP03 @ 0.50
150		HTP04 @ 0.10
95		HTP05 @ 0.50
120		HTP06 @ 0.10
0.5		TP1 @ 0.4
0.5		TP1 @ 0.90m

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

74 = GAC (critical conc.) (mg/kg)

7 = no. samples
0.5 = min. value
230 = max. value
94.71429 = mean (mean>GAC)
82.17758 = standard deviation

4 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
2 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
0.666908 = t_0	0.666908 = k_0
1.943 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
155.0643 = 95% UCL (US_{95})	230.1368 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 230.13678 GAC = 74 (US95 = 3.11 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

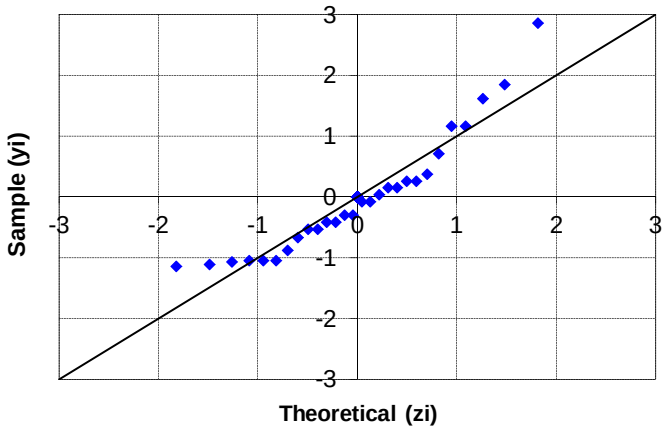
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

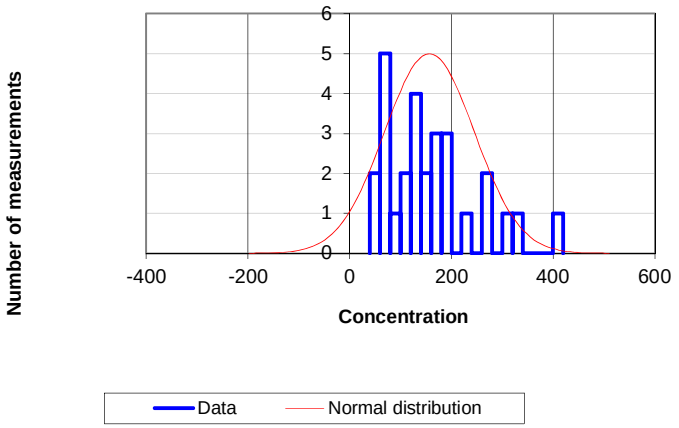
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Zinc		
79		HTP02 @ 0.20
170		HTP03 @ 0.50
190		HTP04 @ 0.10
110		HTP05 @ 0.50
410	Yes	HTP06 @ 0.10
260		TP1 @ 0.4
180		TP1 @ 0.90m
130		TP2 @ 0.5
64		TP2 @ 1.5
300		TP3 @ 0.1
59		TP3 @ 0.5
160		TP3 @ 1.8
98		TP4 @ 0.6
64		TP4 @ 1.5
130		TP7 @ 0.2
260		TP7 @ 0.7
64		TP10 @ 0.9
320		TP11 @ 0.3
120		TP12 @ 0.2
150		TP12 @ 0.4
170		TP13 @ 0.3
180		TP13 @ 0.8
120		TP14 @ 0.4
56		TP15 @ 2.7
110		TP16 @ 0.4
150		TP16 @ 0.7
62		TP23 @ 0.4
220		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3700 = GAC (critical conc.) (mg/kg)

28 = no. samples	0 = no. samples > or = GAC
56 = min. value	
410 = max. value	10 = laboratory reporting limit (RL)
156.6429 = mean	0 = no. samples at RL
88.56018 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-211.7169 = t_0	-211.717 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
185.1448 = 95% UCL (US_{95})	229.6131 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 229.61313 GAC = 3700 (US95 = 0.062 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

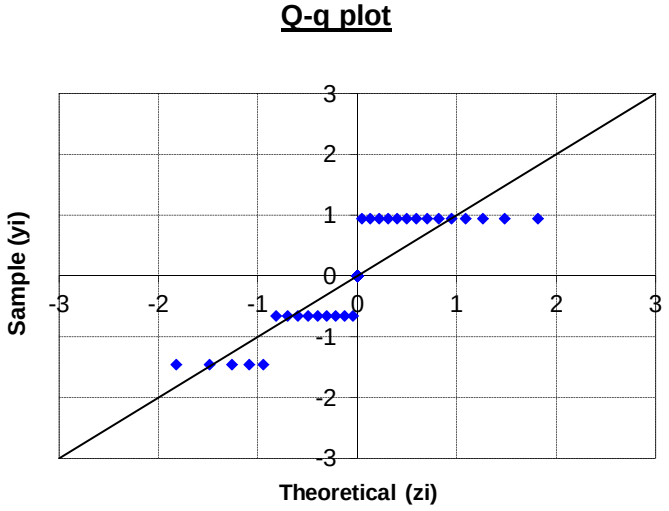
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

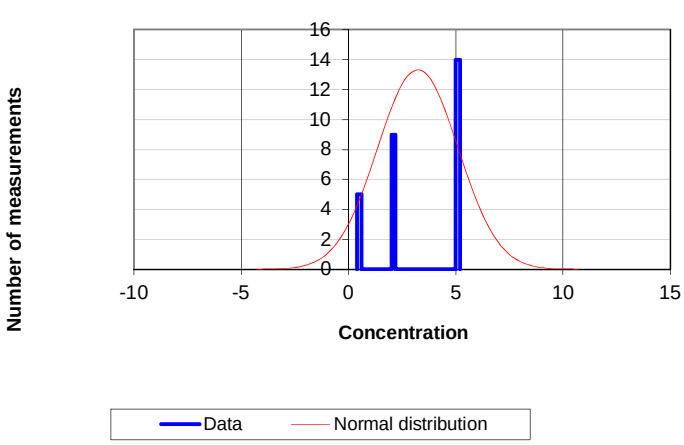
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Cyanide (free)		
0.5		HTP02 @ 0.20
0.5		HTP03 @ 0.50
0.5		HTP04 @ 0.10
0.5		HTP05 @ 0.50
0.5		HTP06 @ 0.10
2		TP1 @ 0.4
5		TP1 @ 0.90m
5		TP2 @ 0.5
5		TP2 @ 1.5
5		TP3 @ 0.1
2		TP3 @ 0.5
5		TP3 @ 1.8
5		TP4 @ 0.6
5		TP4 @ 1.5
2		TP7 @ 0.2
5		TP7 @ 0.7
2		TP10 @ 0.9
5		TP11 @ 0.3
2		TP12 @ 0.2
5		TP12 @ 0.4
2		TP13 @ 0.3
5		TP13 @ 0.8
5		TP14 @ 0.4
5		TP15 @ 2.7
2		TP16 @ 0.4
5		TP16 @ 0.7
2		TP23 @ 0.4
2		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

750 = GAC (critical conc.) (mg/kg)

28 = no. samples

0 = no. samples > or = GAC

0.5 = min. value

5 = max. value

0.5 = laboratory reporting limit (RL)

3.232143 = mean

5 = no. samples at RL

1.873213 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-2109.49 = t_0	-2109.49 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
3.835012 = 95% UCL (US_{95})	4.775601 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 4.7756006 GAC = 750 (US95 = 0.006 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

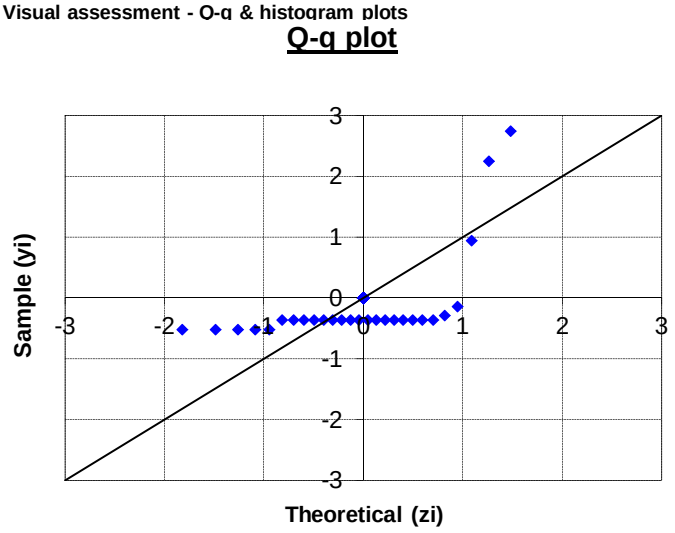
Mean Absolute Deviation for potential outliers

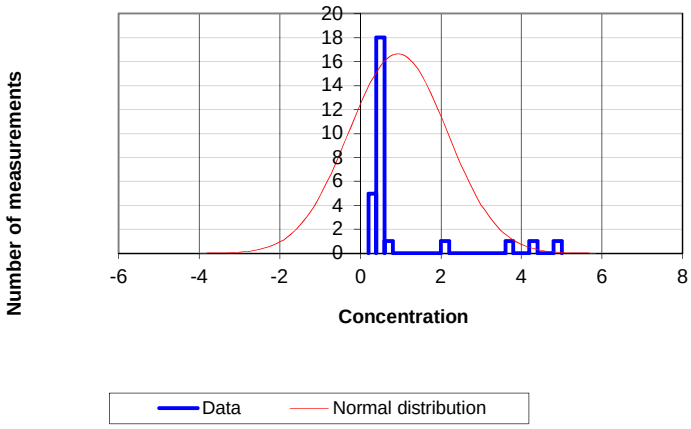
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Phenol (total)		
0.3	n/a	HTP02 @ 0.20
0.3	n/a	HTP03 @ 0.50
0.3	n/a	HTP04 @ 0.10
0.3	n/a	HTP05 @ 0.50
0.3	n/a	HTP06 @ 0.10
0.5	n/a	TP1 @ 0.4
4.3	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
3.7	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 0.5
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
0.5	n/a	TP7 @ 0.2
4.8	n/a	TP7 @ 0.7
0.5	n/a	TP10 @ 0.9
2.1	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.2
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.3
0.58	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.76	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.4
0.5	n/a	TP16 @ 0.7
0.5	n/a	TP23 @ 0.4
0.5	n/a	TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

28	= no. samples	0	= no. samples > or = GAC
0.3	= min. value		
4.8	= max. value	0.3	= laboratory reporting limit (RL)
0.937143	= mean	5	= no. samples at RL
1.227062	= standard deviation	RL is limit of detection of the method used	

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1246.536	= t_0	-1246.54	= k_0
1.703	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.332056	= 95% UCL (US_{95})	1.948196	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.9481957 GAC = 290 (US95 = 0.007 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

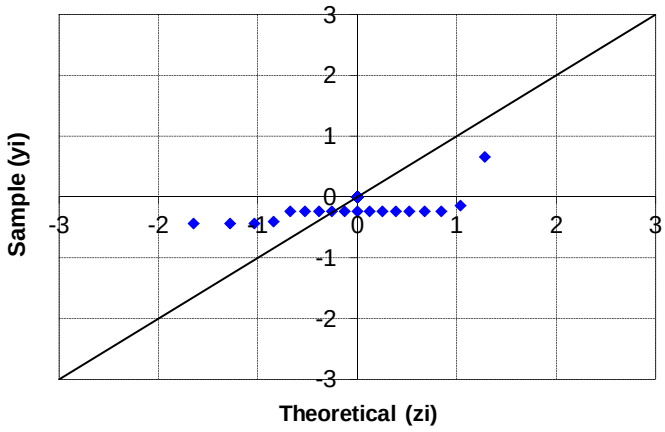
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

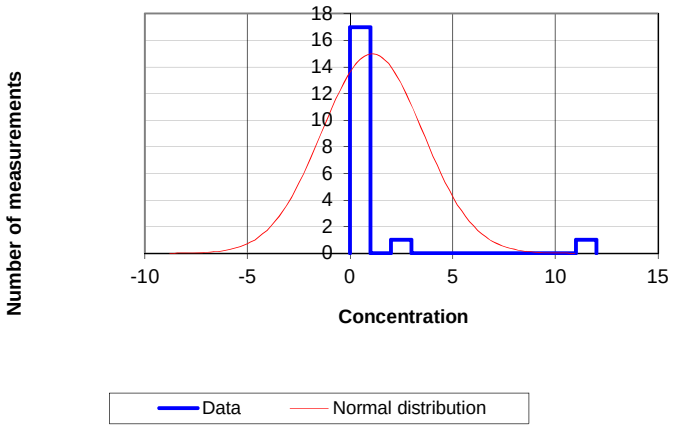
Acenaphthene	Potential Outlier?	Sample
0.01	n/a	HTP02 @ 0.20
0.088	n/a	HTP03 @ 0.50
0.01	n/a	HTP04 @ 0.10
0.01	n/a	HTP05 @ 0.50
0.73	n/a	HTP06 @ 0.10
0.5	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
0.5	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
11	n/a	TP7 @ 0.7
2.7	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.5	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Acenaphthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

480 = GAC (critical conc.) (mg/kg)

19 = no. samples
0 = no. samples > or = GAC
0.01 = min. value
11 = max. value
0.01 = laboratory reporting limit (RL)
1.081474 = mean
3 = no. samples at RL
2.467667 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-845.9641	= t_0	-845.964	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
2.063128	= 95% UCL (US_{95})	3.549764	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 3.5497637 GAC = 480 (US95 = 0.007 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

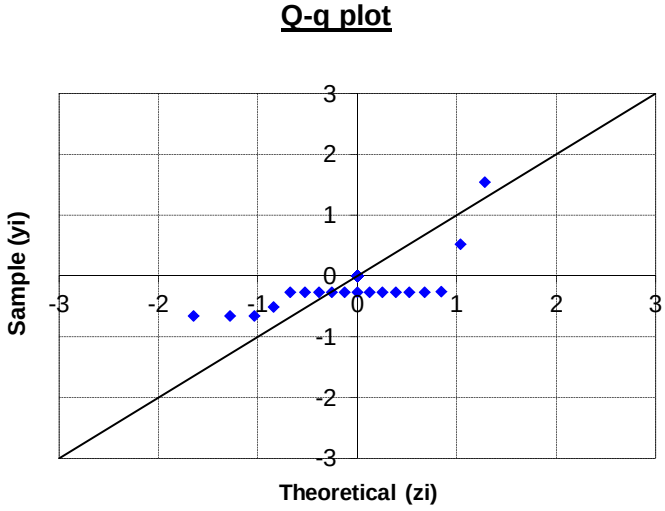
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

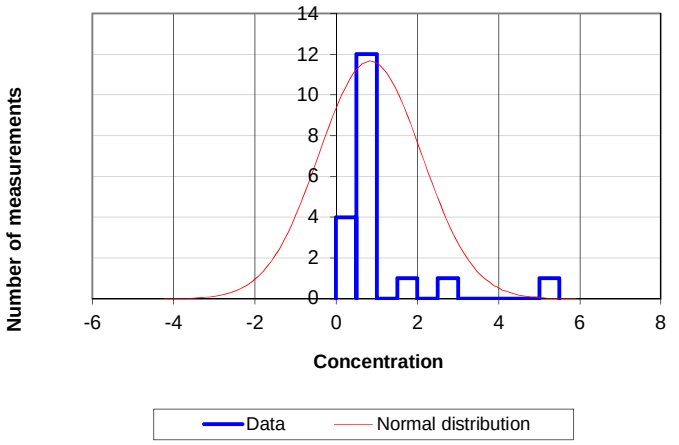
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Acenaphthylene	Potential Outlier?	Sample
0.01	n/a	HTP02 @ 0.20
0.2	n/a	HTP03 @ 0.50
0.01	n/a	HTP04 @ 0.10
0.01	n/a	HTP05 @ 0.50
2.8	n/a	HTP06 @ 0.10
0.5	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
5.4	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
1.5	n/a	TP7 @ 0.7
0.51	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.5	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.7

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

400 = GAC (critical conc.) (mg/kg)

19	= no. samples	0	= no. samples > or = GAC
0.01	= min. value		
5.4	= max. value	0.01	= laboratory reporting limit (RL)
0.838947	= mean	3	= no. samples at RL
1.26771	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1372.477	= t_0	-1372.48	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.343251	= 95% UCL (US_{95})	2.106977	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 2.1069772 GAC = 400 (US95 = 0.005 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

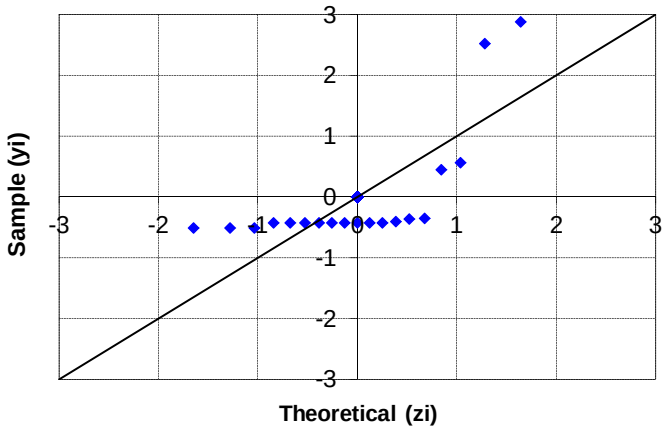
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Anthracene		
0.01	Yes	HTP02 @ 0.20
0.47		HTP03 @ 0.50
0.01	Yes	HTP04 @ 0.10
0.013	Yes	HTP05 @ 0.50
6	Yes	HTP06 @ 0.10
0.92	Yes	TP1 @ 0.90m
0.85		TP2 @ 0.5
0.5		TP2 @ 1.5
17	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.5		TP4 @ 0.6
0.5		TP4 @ 1.5
19	Yes	TP7 @ 0.7
5.4	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
0.58		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Mean Absolute Deviation for potential outliers

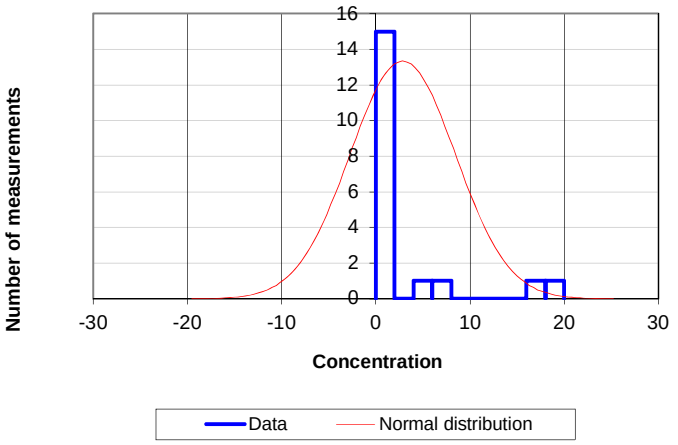
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Anthracene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4900 = GAC (critical conc.) (mg/kg)

19 = no. samples

0.01 = min. value

19 = max. value

2.855421 = mean

5.599461 = standard deviation

0 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

2 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-3812.181	t_0	-3812.18	k_0
1.734	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
5.082925	95% UCL (US_{95})	8.456297	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 8.4562968 GAC = 4900 (US95 = 0.002 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)		
Benz(a)anthracene	**Potential Outlier?**	**Sample**
0.04		HTP02 @ 0.20
1.6		HTP03 @ 0.50
0.031		HTP04 @ 0.10
0.11		HTP05 @ 0.50
17	Yes	HTP06 @ 0.10
2		TP1 @ 0.90m
2.3		TP2 @ 0.5
0.5		TP2 @ 1.5
29	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.74		TP4 @ 0.6
0.5		TP4 @ 1.5
36	Yes	TP7 @ 0.7
11	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
1.3		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

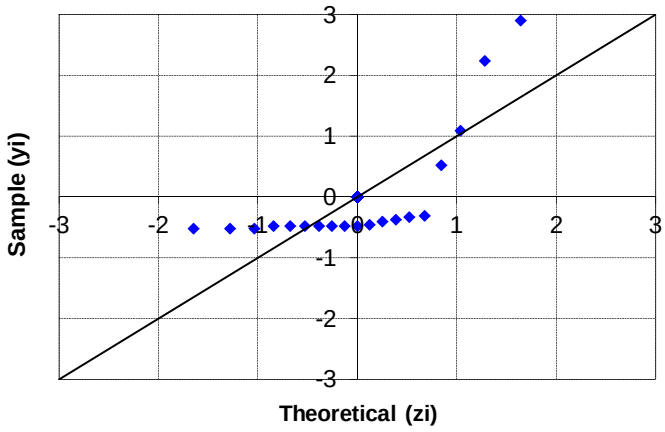
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Mean Absolute Deviation for potential outliers

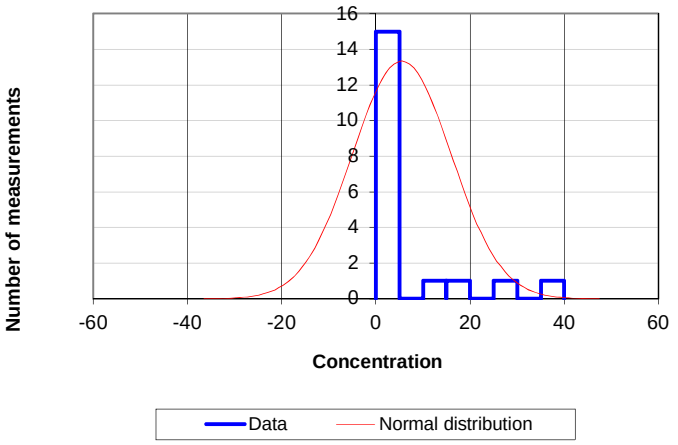
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Benz(a)anthracene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.7 = GAC (critical conc.) (mg/kg)

19 = no. samples

0.031 = min. value

36 = max. value

5.506368 = mean (mean>GAC)

10.506 = standard deviation

4 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	**One-sided Chebychev Theorem**
0.334559 = t_0	0.334559 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
9.685729 = 95% UCL (US_{95})	16.01503 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 16.015027 GAC = 4.7 (US95 = 3.407 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

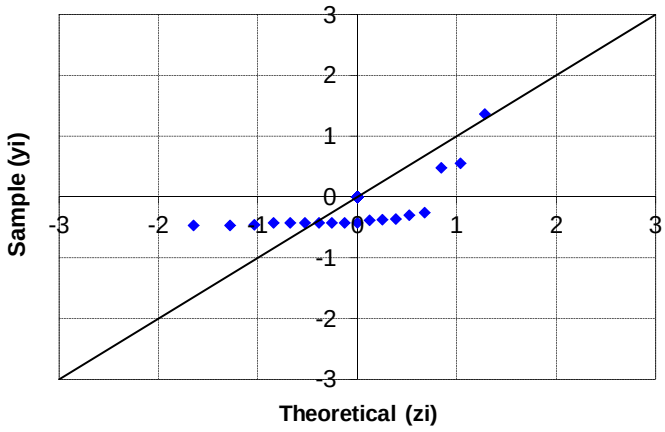
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

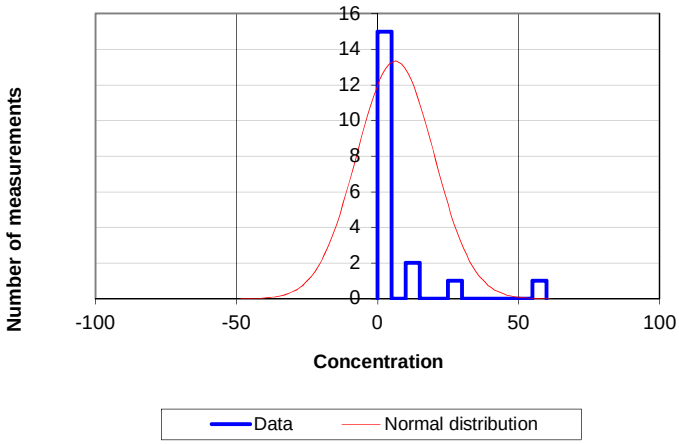
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(a)pyrene		
0.021		HTP02 @ 0.20
1.3		HTP03 @ 0.50
0.017		HTP04 @ 0.10
0.087		HTP05 @ 0.50
14	**Yes**	HTP06 @ 0.10
2.3		TP1 @ 0.90m
2.8		TP2 @ 0.5
0.5		TP2 @ 1.5
25	**Yes**	TP3 @ 0.1
0.5		TP3 @ 1.8
1.1		TP4 @ 0.6
0.5		TP4 @ 1.5
56	**Yes**	TP7 @ 0.7
13	**Yes**	TP11 @ 0.3
0.5		TP12 @ 0.4
1.4		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(a)pyrene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.94 = GAC (critical conc.) (mg/kg)

19 = no. samples

9 = no. samples > or = GAC

0.017 = min. value

56 = max. value

0.01 = laboratory reporting limit (RL)

6.343421 = mean (mean>GAC)

0 = no. samples at RL

13.70565 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
1.718486 = t_0	1.718486 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
11.79562 = 95% UCL (US_{95})	20.05253 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 20.052534 GAC = 0.94 (US95 = 21.332 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

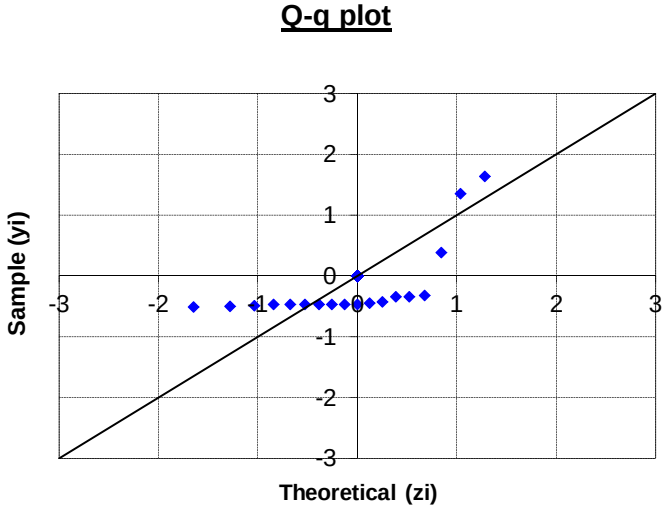
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

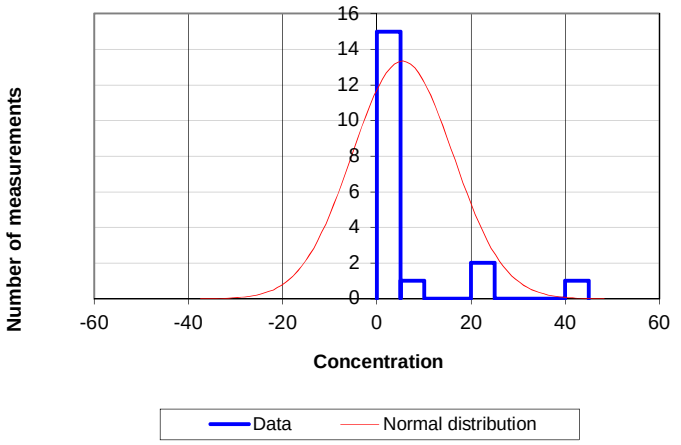
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(b)fluoranthene		
0.074		HTP02 @ 0.20
1.8		HTP03 @ 0.50
0.047		HTP04 @ 0.10
0.2		HTP05 @ 0.50
20	**Yes**	HTP06 @ 0.10
1.8		TP1 @ 0.90m
2.1		TP2 @ 0.5
0.5		TP2 @ 1.5
23	**Yes**	TP3 @ 0.1
0.5		TP3 @ 1.8
0.66		TP4 @ 0.6
0.5		TP4 @ 1.5
40	**Yes**	TP7 @ 0.7
9.6	**Yes**	TP11 @ 0.3
0.5		TP12 @ 0.4
0.97		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

6.5 = GAC (critical conc.) (mg/kg)

19	= no. samples	4	= no. samples > or = GAC
0.047	= min. value		
40	= max. value	0.01	= laboratory reporting limit (RL)
5.460579	= mean	0	= no. samples at RL
10.7204	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-0.422627	= t_0	-0.42263	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
9.725226	= 95% UCL (US_{95})	16.18368	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 16.183682 GAC = 6.5 (US95 = 2.49 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

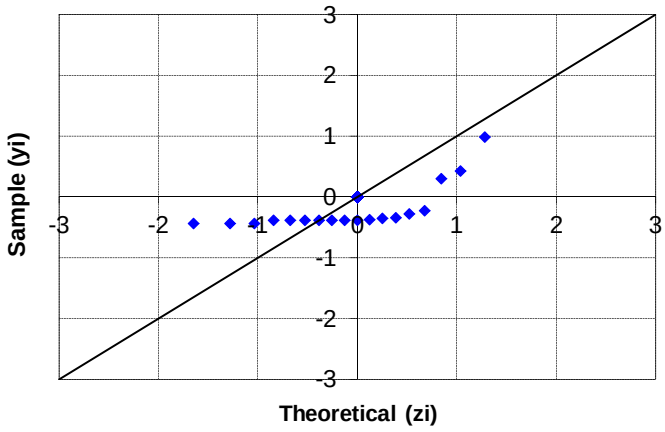
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(ghi)perylene		
0.01		HTP02 @ 0.20
0.67		HTP03 @ 0.50
0.01		HTP04 @ 0.10
0.033		HTP05 @ 0.50
7.8	Yes	HTP06 @ 0.10
1.7		TP1 @ 0.90m
2.2		TP2 @ 0.5
0.5		TP2 @ 1.5
15	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
1		TP4 @ 0.6
0.5		TP4 @ 1.5
45	Yes	TP7 @ 0.7
9.1	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
0.91		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Mean Absolute Deviation for potential outliers

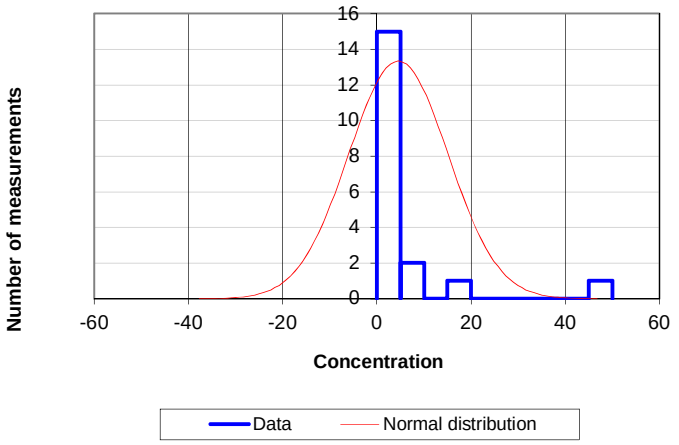
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(ghi)perylene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

46 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

45 = max. value

0.01 = laboratory reporting limit (RL)

4.575421 = mean

2 = no. samples at RL

10.56107 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-17.09727 = t_0	-17.0973 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
8.776689 = 95% UCL (US_{95})	15.13916 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 15.139163 GAC = 46 (US95 = 0.329 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

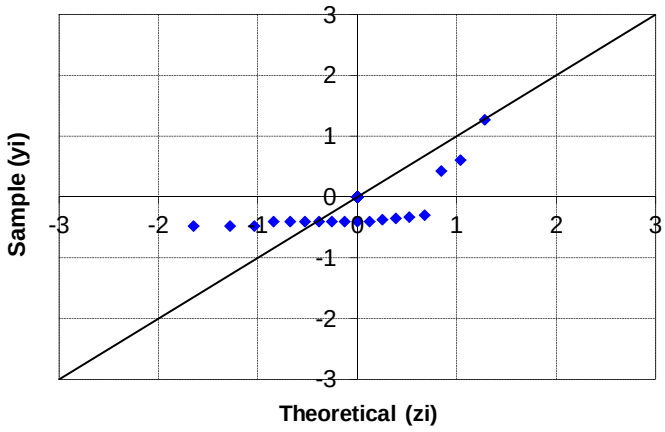
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

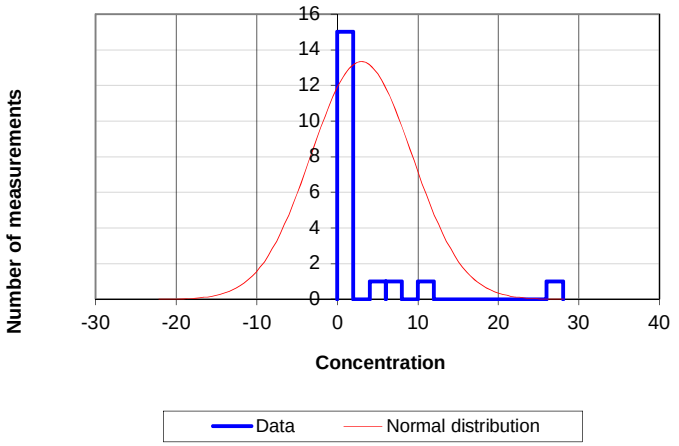
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(k)fluoranthene		
0.01		HTP02 @ 0.20
0.64		HTP03 @ 0.50
0.012		HTP04 @ 0.10
0.026		HTP05 @ 0.50
5.7	Yes	HTP06 @ 0.10
0.93		TP1 @ 0.90m
1.1		TP2 @ 0.5
0.5		TP2 @ 1.5
11	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.5		TP4 @ 0.6
0.5		TP4 @ 1.5
26	Yes	TP7 @ 0.7
6.8	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
0.77		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(k)fluoranthene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

9.6 = GAC (critical conc.) (mg/kg)

19 = no. samples

2 = no. samples > or = GAC

0.01 = min. value

26 = max. value

0.01 = laboratory reporting limit (RL)

2.999368 = mean

1 = no. samples at RL

6.279952 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-4.581482 = t_0	-4.58148 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
5.497576 = 95% UCL (US_{95})	9.280907 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 9.2809066 GAC = 9.6 (US95 = 0.967 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

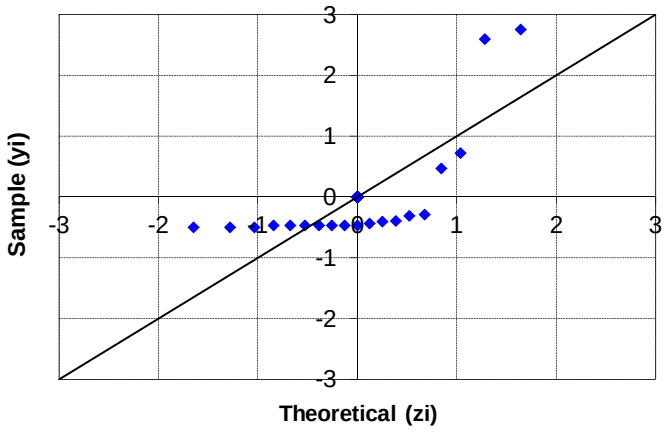
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

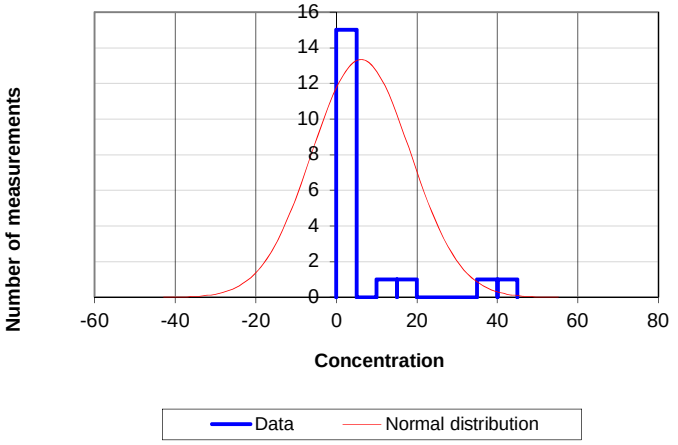
Chrysene	Potential Outlier?	Sample
0.027		HTP02 @ 0.20
1.3		HTP03 @ 0.50
0.03		HTP04 @ 0.10
0.061		HTP05 @ 0.50
15	Yes	HTP06 @ 0.10
2.4		TP1 @ 0.90m
2.7		TP2 @ 0.5
0.5		TP2 @ 1.5
38	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.88		TP4 @ 0.6
0.5		TP4 @ 1.5
40	Yes	TP7 @ 0.7
12	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
1.4		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Chrysene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

8 = GAC (critical conc.) (mg/kg)

19 = no. samples
4 = no. samples > or = GAC
0.027 = min. value
40 = max. value
0.01 = laboratory reporting limit (RL)
6.173579 = mean
0 = no. samples at RL
12.26576 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-0.649057	$= t_0$	-0.64906	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
11.05298	= 95% UCL (US_{95})	18.44244	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 18.442441 GAC = 8 (US95 = 2.305 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

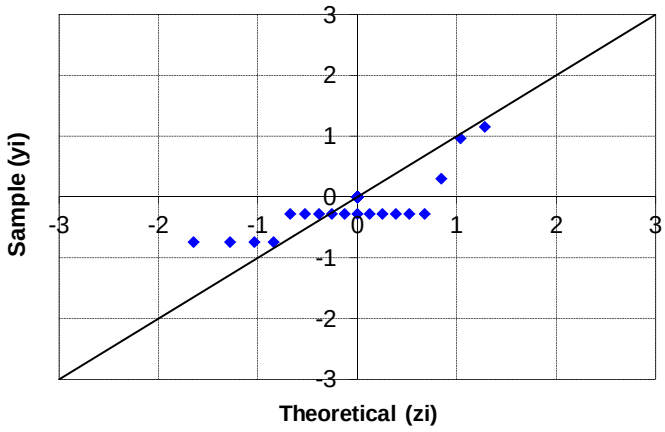
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

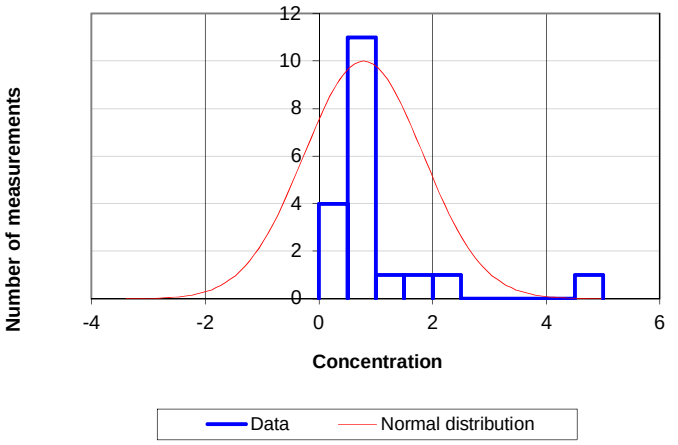
Dibenz(a,h)anthracene	Potential Outlier?	Sample
0.01	n/a	HTP02 @ 0.20
0.01	n/a	HTP03 @ 0.50
0.01	n/a	HTP04 @ 0.10
0.01	n/a	HTP05 @ 0.50
2	n/a	HTP06 @ 0.10
0.5	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
1.8	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
4.5	n/a	TP7 @ 0.7
1.1	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.5	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Dibenz(a,h)anthracene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.86 = GAC (critical conc.) (mg/kg)

19	= no. samples	4	= no. samples > or = GAC
0.01	= min. value		
4.5	= max. value	0.01	= laboratory reporting limit (RL)
0.786316	= mean	4	= no. samples at RL
1.046232	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-0.306989	= t_0	-0.30699	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.202514	= 95% UCL (US_{95})	1.832813	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 1.8328125 GAC = 0.86 (US95 = 2.131 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

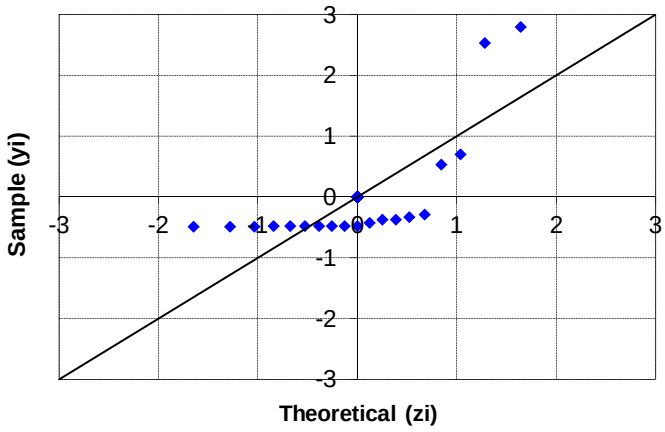
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

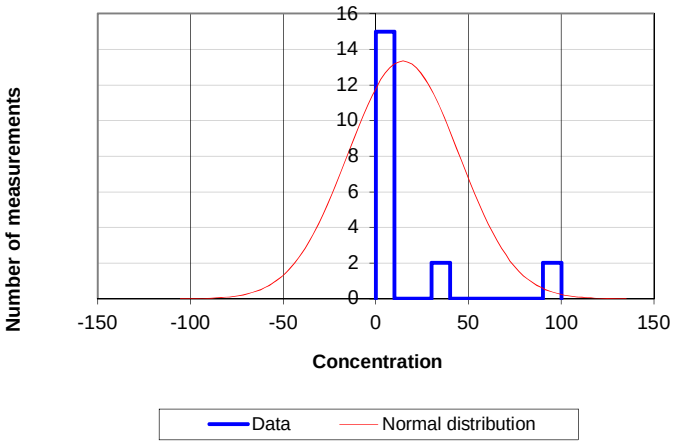
Fluoranthene	Potential Outlier?	Sample
0.17		HTP02 @ 0.20
3.6	Yes	HTP03 @ 0.50
0.075		HTP04 @ 0.10
0.2		HTP05 @ 0.50
36	Yes	HTP06 @ 0.10
4.9	Yes	TP1 @ 0.90m
6.2	Yes	TP2 @ 0.5
0.5		TP2 @ 1.5
91	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
2.2		TP4 @ 0.6
0.5		TP4 @ 1.5
99	Yes	TP7 @ 0.7
31	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
3.6	Yes	TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Fluoranthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

460 = GAC (critical conc.) (mg/kg)

19 = no. samples
0 = no. samples > or = GAC
0.075 = min. value
99 = max. value
0.01 = laboratory reporting limit (RL)
14.81289 = mean
0 = no. samples at RL
30.06014 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-64.55477 = t_0	-64.5548 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
26.77103 = 95% UCL (US_{95})	44.88063 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 44.880631 GAC = 460 (US95 = 0.098 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Fluorene		
0.01	n/a	HTP02 @ 0.20
0.16	n/a	HTP03 @ 0.50
0.01	n/a	HTP04 @ 0.10
0.01	n/a	HTP05 @ 0.50
2.3	n/a	HTP06 @ 0.10
0.5	n/a	TP1 @ 0.90m
0.5	n/a	TP2 @ 0.5
0.5	n/a	TP2 @ 1.5
18	n/a	TP3 @ 0.1
0.5	n/a	TP3 @ 1.8
0.5	n/a	TP4 @ 0.6
0.5	n/a	TP4 @ 1.5
9.1	n/a	TP7 @ 0.7
1.3	n/a	TP11 @ 0.3
0.5	n/a	TP12 @ 0.4
0.5	n/a	TP13 @ 0.8
0.5	n/a	TP14 @ 0.4
0.5	n/a	TP15 @ 2.7
0.5	n/a	TP16 @ 0.7

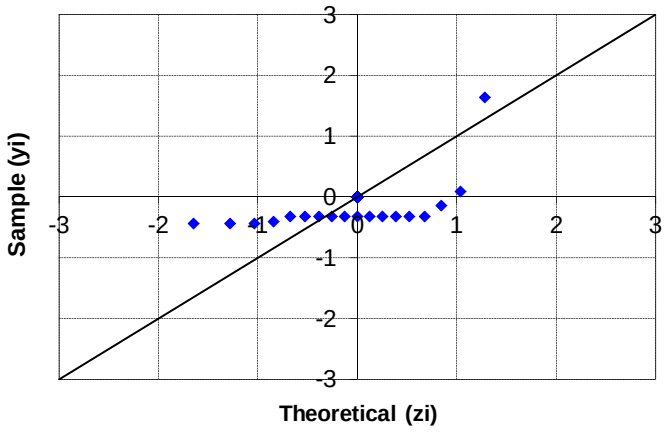
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

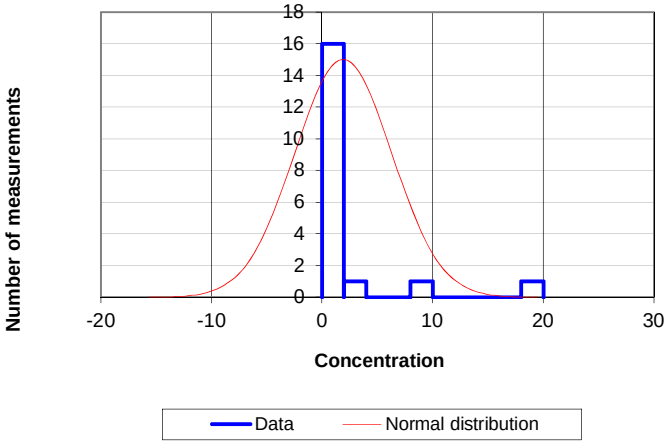
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Fluorene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

380 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

18 = max. value

0.01 = laboratory reporting limit (RL)

1.915263 = mean

3 = no. samples at RL

4.389821 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-375.4215	$= t_0$	-375.422	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
3.661564	= 95% UCL (US_{95})	6.306193	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 6.3061928 GAC = 380 (US95 = 0.017 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

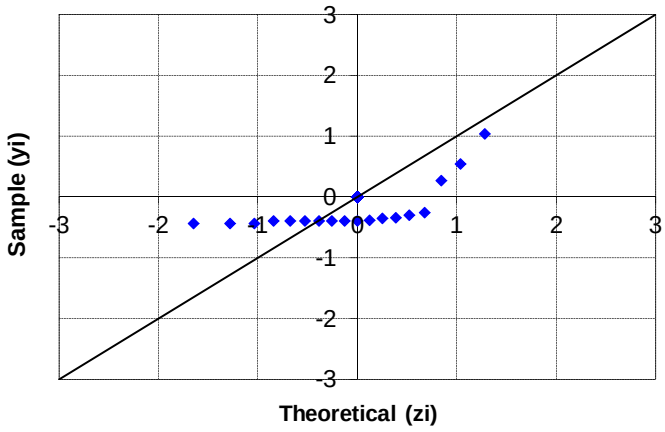
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

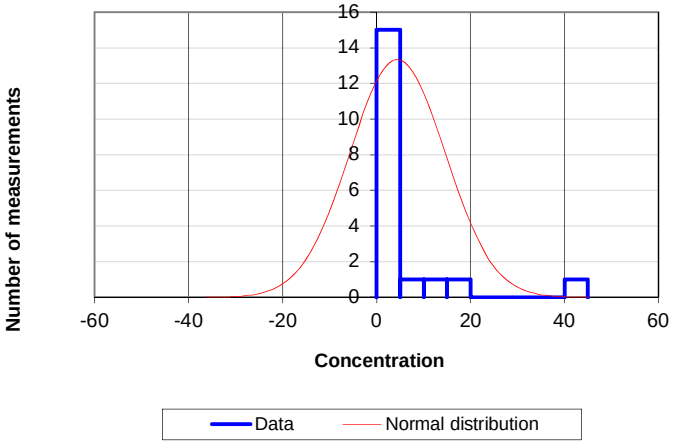
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Indeno(1,2,3,cd)pyrene		
0.01		HTP02 @ 0.20
0.53		HTP03 @ 0.50
0.01		HTP04 @ 0.10
0.03		HTP05 @ 0.50
7.2	Yes	HTP06 @ 0.10
1.4		TP1 @ 0.90m
1.8		TP2 @ 0.5
0.5		TP2 @ 1.5
15	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.91		TP4 @ 0.6
0.5		TP4 @ 1.5
43	Yes	TP7 @ 0.7
10	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
0.98		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Indeno(1,2,3,cd)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.9 = GAC (critical conc.) (mg/kg)

19 = no. samples

4 = no. samples > or = GAC

0.01 = min. value

43 = max. value

0.01 = laboratory reporting limit (RL)

4.440526 = mean (mean>GAC)

2 = no. samples at RL

10.16588 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
0.231765 = t_0	0.231765 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
8.484585 = 95% UCL (US_{95})	14.60898 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 14.608978 GAC = 3.9 (US95 = 3.746 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

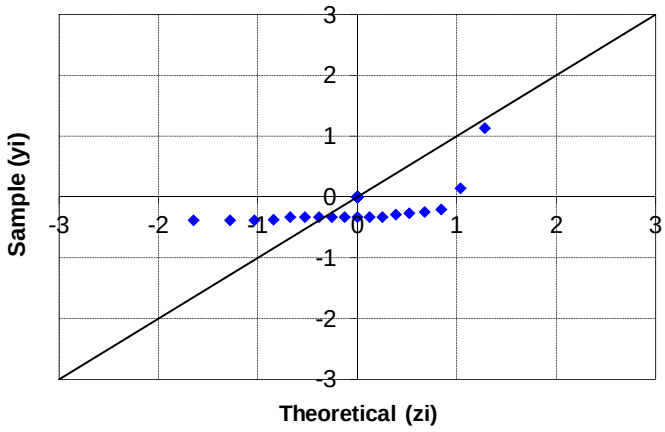
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

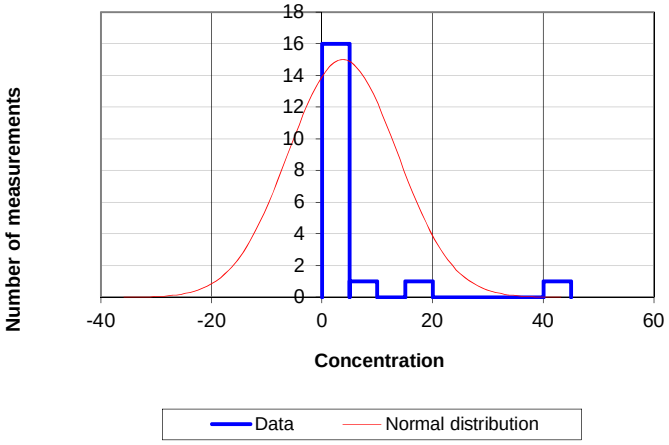
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Naphthalene		
0.01		HTP02 @ 0.20
0.069		HTP03 @ 0.50
0.01		HTP04 @ 0.10
0.01		HTP05 @ 0.50
1.8		HTP06 @ 0.10
1.3		TP1 @ 0.90m
0.91		TP2 @ 0.5
0.5		TP2 @ 1.5
42	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
0.5		TP4 @ 0.6
0.5		TP4 @ 1.5
15	Yes	TP7 @ 0.7
5.2	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
1.1		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Naphthalene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.7 = GAC (critical conc.) (mg/kg)

19 = no. samples — 3 = no. samples > or = GAC

0.01 = min. value

42 = max. value — 0.01 = laboratory reporting limit (RL)

3.758368 = mean (mean>GAC) — 3 = no. samples at RL

9.878798 = standard deviation — RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
0.025754 = t_0	0.025754 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
7.688222 = 95% UCL (US_{95})	13.63966 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 13.639662 GAC = 3.7 (US95 = 3.686 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

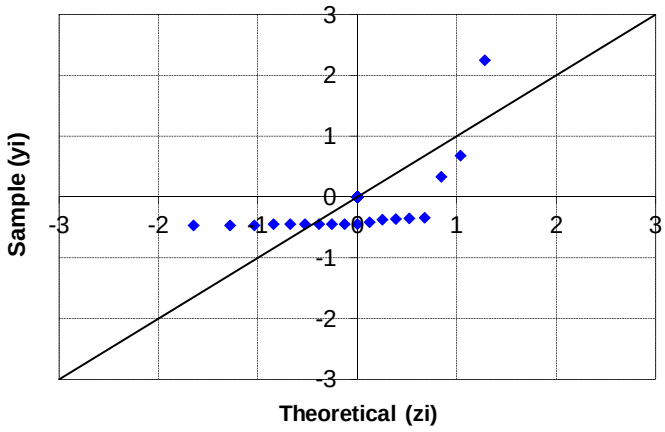
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

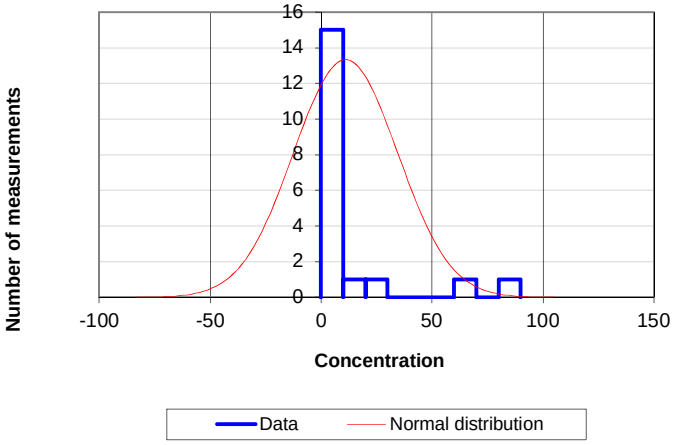
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Phenanthrene		
0.088		HTP02 @ 0.20
2.7		HTP03 @ 0.50
0.014		HTP04 @ 0.10
0.049		HTP05 @ 0.50
27	Yes	HTP06 @ 0.10
3		TP1 @ 0.90m
2.6		TP2 @ 0.5
0.5		TP2 @ 1.5
84	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
1.3		TP4 @ 0.6
0.5		TP4 @ 1.5
64	Yes	TP7 @ 0.7
19	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
2.4		TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Phenanthrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

200 = GAC (critical conc.) (mg/kg)

19 = no. samples

0.014 = min. value

84 = max. value

11.03426 = mean

23.52412 = standard deviation

0 = no. samples > or = GAC

0.01 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-35.01438 = t_0	-35.0144 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
20.39232 = 95% UCL (US_{95})	34.56433 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 34.564325 GAC = 200 (US95 = 0.173 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

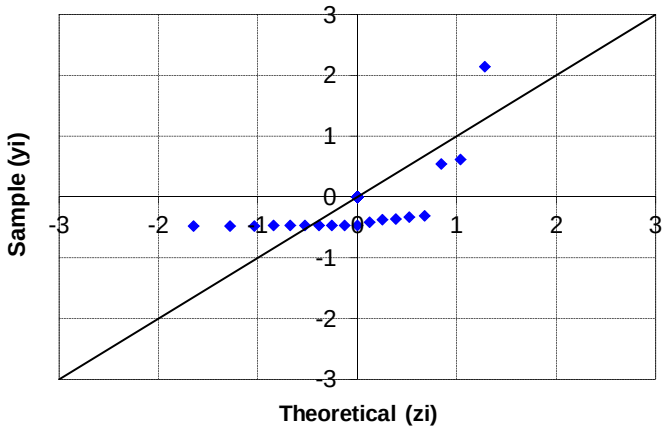
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)		
Pyrene	**Potential Outlier?**	**Sample**
0.11		HTP02 @ 0.20
2.9	Yes	HTP03 @ 0.50
0.066		HTP04 @ 0.10
0.16		HTP05 @ 0.50
29	Yes	HTP06 @ 0.10
4.1	Yes	TP1 @ 0.90m
4.7	Yes	TP2 @ 0.5
0.5		TP2 @ 1.5
69	Yes	TP3 @ 0.1
0.5		TP3 @ 1.8
1.8		TP4 @ 0.6
0.5		TP4 @ 1.5
95	Yes	TP7 @ 0.7
27	Yes	TP11 @ 0.3
0.5		TP12 @ 0.4
3.1	Yes	TP13 @ 0.8
0.5		TP14 @ 0.4
0.5		TP15 @ 2.7
0.5		TP16 @ 0.7

Mean Absolute Deviation for potential outliers

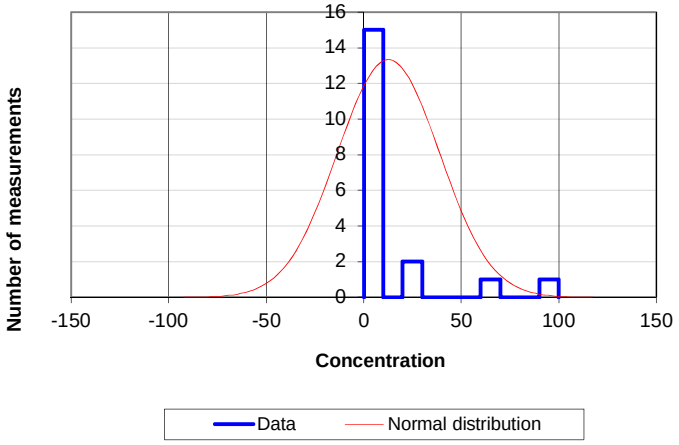
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Pyrene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

1000 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.066 = min. value

95 = max. value

0.01 = laboratory reporting limit (RL)

12.65453 = mean

0 = no. samples at RL

26.22059 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	**One-sided Chebychev Theorem**
-164.1359 = t_0	-164.136 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
23.08526 = 95% UCL (US_{95})	38.88174 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 38.88174 **GAC = 1000** (US95 = 0.039 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

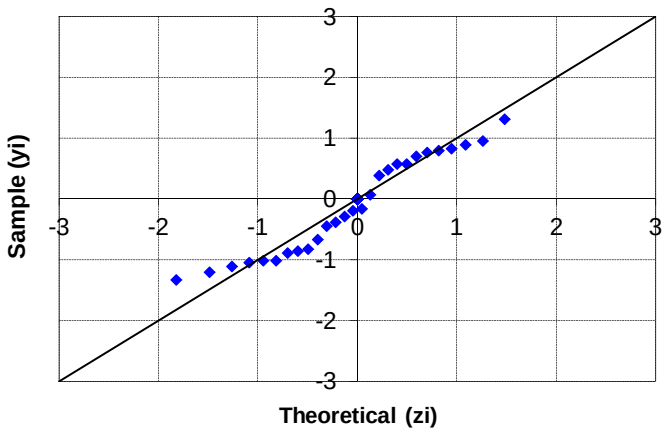
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

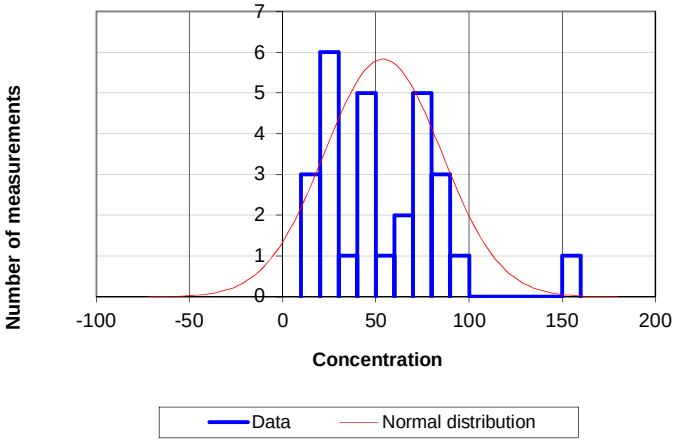
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Arsenic		
28		HTP02 @ 0.20
84		HTP03 @ 0.50
56		HTP04 @ 0.10
33		HTP05 @ 0.50
48		HTP06 @ 0.10
150		TP1 @ 0.4
76		TP1 @ 0.90m
26		TP2 @ 0.5
22		TP2 @ 1.5
42		TP3 @ 0.1
40		TP3 @ 0.5
78		TP3 @ 1.8
27		TP4 @ 0.6
22		TP4 @ 1.5
72		TP7 @ 0.2
72		TP7 @ 0.7
45		TP10 @ 0.9
49		TP11 @ 0.3
69		TP12 @ 0.2
66		TP12 @ 0.4
82		TP13 @ 0.3
95		TP13 @ 0.8
12		TP14 @ 0.4
16		TP15 @ 2.7
19		TP16 @ 0.4
80		TP16 @ 0.7
21		TP23 @ 0.4
79		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Arsenic



Basic data — Risk parameter: **Plant life pH >7**

250	= GAC (critical conc.) (mg/kg)	
28	= no. samples	0 = no. samples > or = GAC
12	= min. value	
150	= max. value	2 = laboratory reporting limit (RL)
53.89286	= mean	0 = no. samples at RL
31.41401	= standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-33.03308	= t_0	-33.0331	= k_0
1.703	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
64.00304	= 95% UCL (US_{95})	79.77682	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 79.776824 GAC = 250 (US95 = 0.319 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

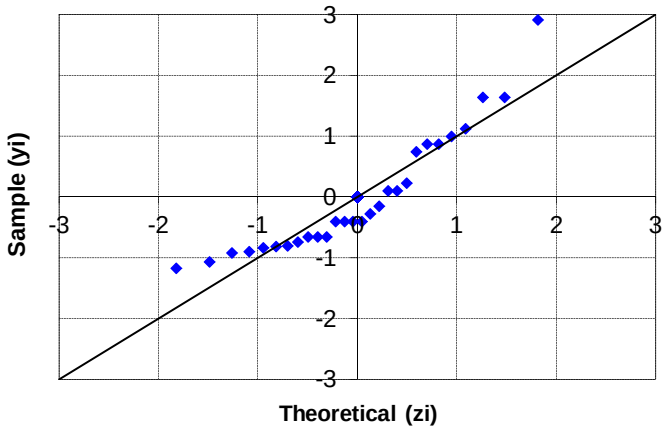
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

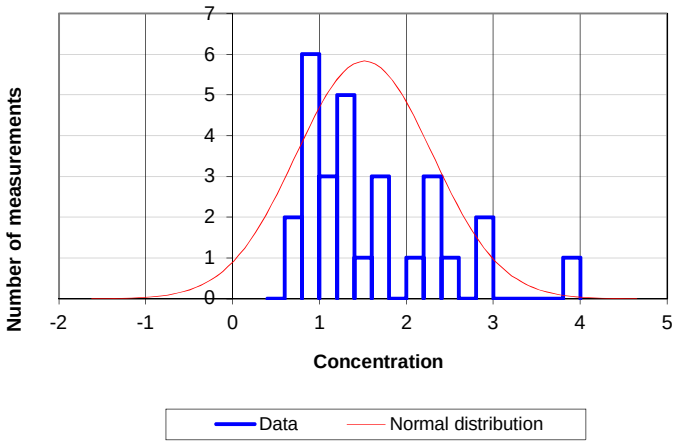
Boron	Potential Outlier?	Sample
0.8		HTP02 @ 0.20
1		HTP03 @ 0.50
1		HTP04 @ 0.10
0.6		HTP05 @ 0.50
1.2		HTP06 @ 0.10
1.6		TP1 @ 0.4
1.6		TP1 @ 0.90m
2.3		TP2 @ 0.5
0.86		TP2 @ 1.5
2.8		TP3 @ 0.1
1.4		TP3 @ 0.5
2.2		TP3 @ 1.8
1.7		TP4 @ 0.6
0.68		TP4 @ 1.5
2.4		TP7 @ 0.2
3.8	Yes	TP7 @ 0.7
1		TP10 @ 0.9
2.8		TP11 @ 0.3
1.2		TP12 @ 0.2
1.2		TP12 @ 0.4
2.2		TP13 @ 0.3
2.1		TP13 @ 0.8
0.94		TP14 @ 0.4
1.3		TP15 @ 2.7
0.89		TP16 @ 0.4
1.2		TP16 @ 0.7
0.88		TP23 @ 0.4
0.81		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data

Risk parameter
Plant life pH >7

3 = GAC (critical conc.) (mg/kg)

28 = no. samples	1 = no. samples > or = GAC
0.6 = min. value	
3.8 = max. value	0.4 = laboratory reporting limit (RL)
1.516429 = mean	0 = no. samples at RL
0.784116 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-10.01168 = t_0	-10.0117 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
1.768786 = 95% UCL (US_{95})	2.162511 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 2.1625112 GAC = 3 (US95 = 0.721 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

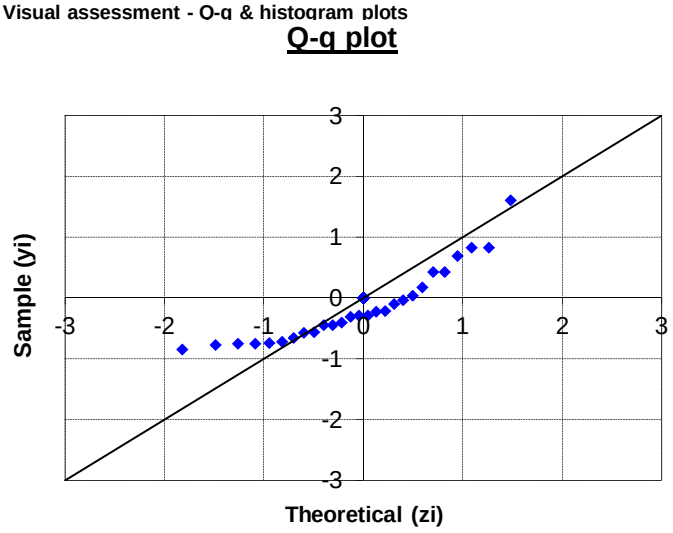
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

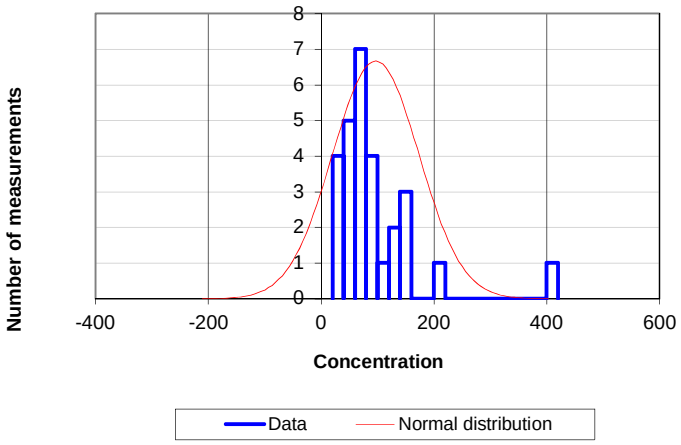
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (III)		
46.5		HTP02 @ 0.20
149.5		HTP03 @ 0.50
99.5		HTP04 @ 0.10
74.5		HTP05 @ 0.50
79.5		HTP06 @ 0.10
410	Yes	TP1 @ 0.4
159.9		TP1 @ 0.90m
38.89		TP2 @ 0.5
31.9		TP2 @ 1.5
74.9		TP3 @ 0.1
63		TP3 @ 0.5
129.9		TP3 @ 1.8
62.88		TP4 @ 0.6
37.67		TP4 @ 1.5
80		TP7 @ 0.2
109.85		TP7 @ 0.7
39		TP10 @ 0.9
72.85		TP11 @ 0.3
66		TP12 @ 0.2
129.9		TP12 @ 0.4
94		TP13 @ 0.3
159.9		TP13 @ 0.8
53.76		TP14 @ 0.4
41.7		TP15 @ 2.7
53		TP16 @ 0.4
219.9		TP16 @ 0.7
40		TP23 @ 0.4
89		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter: **Plant life pH >7**

400 = GAC (critical conc.) (mg/kg)

28 = no. samples

31.9 = min. value

410 = max. value

96.69286 = mean

76.68242 = standard deviation

1 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-20.92984 = t_0	-20.9298 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
121.3721 = 95% UCL (US_{95})	159.8763 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 159.8763 **GAC = 400** (US95 = 0.4 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

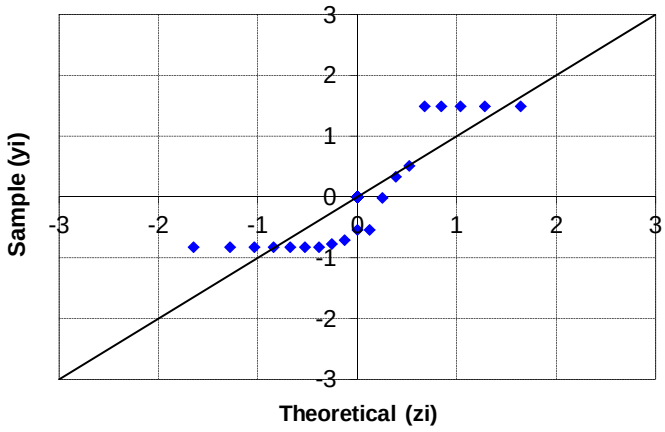
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

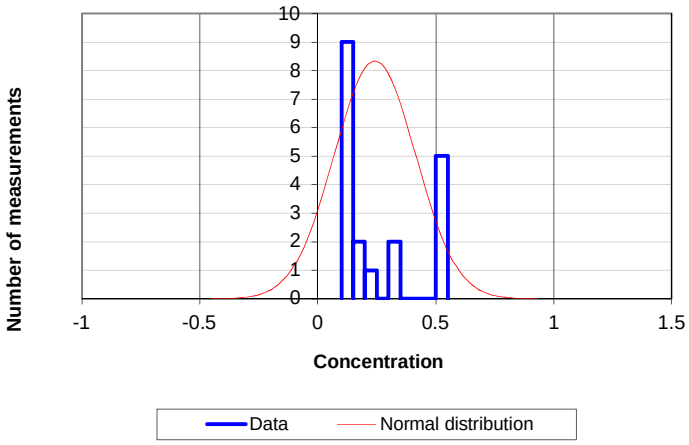
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (VI)		
0.5	Yes	HTP02 @ 0.20
0.5	Yes	HTP03 @ 0.50
0.5	Yes	HTP04 @ 0.10
0.5	Yes	HTP05 @ 0.50
0.5	Yes	HTP06 @ 0.10
0.1		TP1 @ 0.90m
0.11		TP2 @ 0.5
0.1		TP2 @ 1.5
0.1		TP3 @ 0.1
0.1		TP3 @ 1.8
0.12		TP4 @ 0.6
0.33		TP4 @ 1.5
0.15		TP7 @ 0.7
0.15		TP11 @ 0.3
0.1		TP12 @ 0.4
0.1		TP13 @ 0.8
0.24		TP14 @ 0.4
0.3		TP15 @ 2.7
0.1		TP16 @ 0.7

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (VI)



Basic data

Risk parameter

Plant life pH >7

25 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.1 = min. value

0.5 = max. value

0.5 = laboratory reporting limit (RL)

0.242105 = mean

19 = no. samples at RL

0.172291 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-626.3654	$= t_0$	-626.365	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
0.310644	= 95% UCL (US_{95})	0.41444	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4144398 GAC = 25 (US95 = 0.017 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

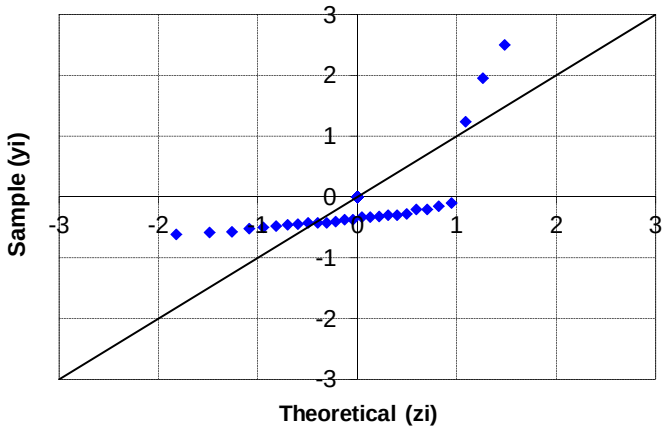
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

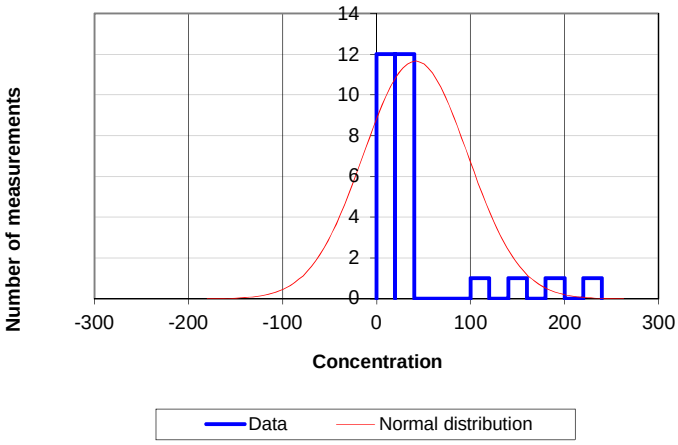
Copper	Potential Outlier?	Sample
18		HTP02 @ 0.20
36		HTP03 @ 0.50
26		HTP04 @ 0.10
18		HTP05 @ 0.50
150	Yes	HTP06 @ 0.10
7.3		TP1 @ 0.4
33		TP1 @ 0.90m
23		TP2 @ 0.5
13		TP2 @ 1.5
180	Yes	TP3 @ 0.1
23		TP3 @ 0.5
16		TP3 @ 1.8
21		TP4 @ 0.6
19		TP4 @ 1.5
25		TP7 @ 0.2
110	Yes	TP7 @ 0.7
24		TP10 @ 0.9
230	Yes	TP11 @ 0.3
25		TP12 @ 0.2
17		TP12 @ 0.4
30		TP13 @ 0.3
30		TP13 @ 0.8
21		TP14 @ 0.4
15		TP15 @ 2.7
18		TP16 @ 0.4
14		TP16 @ 0.7
9.5		TP23 @ 0.4
10		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data

Risk parameter
Plant life pH >7

200 = **GAC (critical conc.) (mg/kg)**
28 = no. samples
7.3 = min. value
230 = max. value
41.49286 = mean
55.45507 = standard deviation

1 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-15.12469	= t_0	-15.1247	= k_0
1.703	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
59.34034	= 95% UCL (US_{95})	87.18576	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 87.185755 GAC = 200 (US95 = 0.436 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

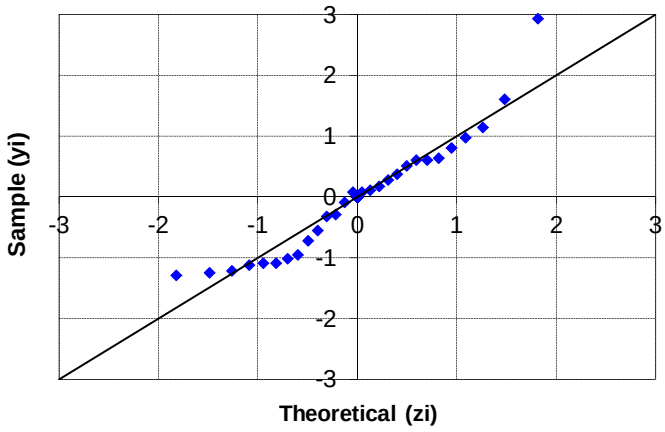
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

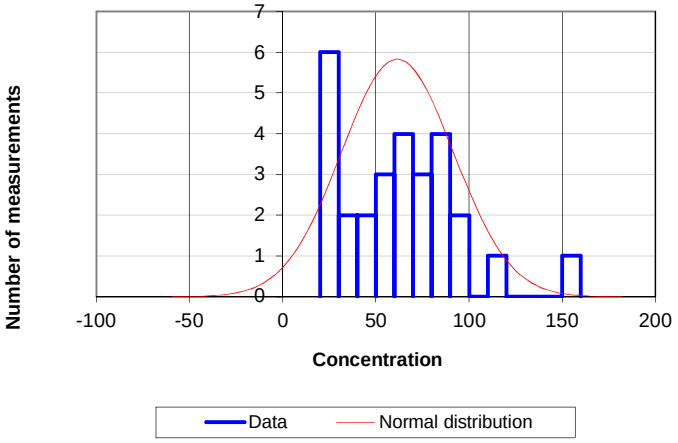
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
25		HTP02 @ 0.20
64		HTP03 @ 0.50
67		HTP04 @ 0.10
45		HTP05 @ 0.50
53		HTP06 @ 0.10
150		TP1 @ 0.4
80		TP1 @ 0.90m
23		TP2 @ 0.5
28		TP2 @ 1.5
52		TP3 @ 0.1
80		TP3 @ 0.5
59		TP3 @ 1.8
31		TP4 @ 0.6
33		TP4 @ 1.5
81		TP7 @ 0.2
64		TP7 @ 0.7
70		TP10 @ 0.9
77		TP11 @ 0.3
110		TP12 @ 0.2
65		TP12 @ 0.4
91		TP13 @ 0.3
73		TP13 @ 0.8
40		TP14 @ 0.4
29		TP15 @ 2.7
29		TP16 @ 0.4
96		TP16 @ 0.7
24		TP23 @ 0.4
86		TP24 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data

Risk parameter: **Plant life pH >7**

110 = **GAC (critical conc.) (mg/kg)**

28 = no. samples

23 = min. value

150 = max. value

61.60714 = mean

30.12977 = standard deviation

2 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8.498935 = t_0	-8.49893 = k_0
1.703 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
71.30401 = 95% UCL (US_{95})	86.43294 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 86.432943 GAC = 110 (US95 = 0.786 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Tip Area (COMBINED)

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

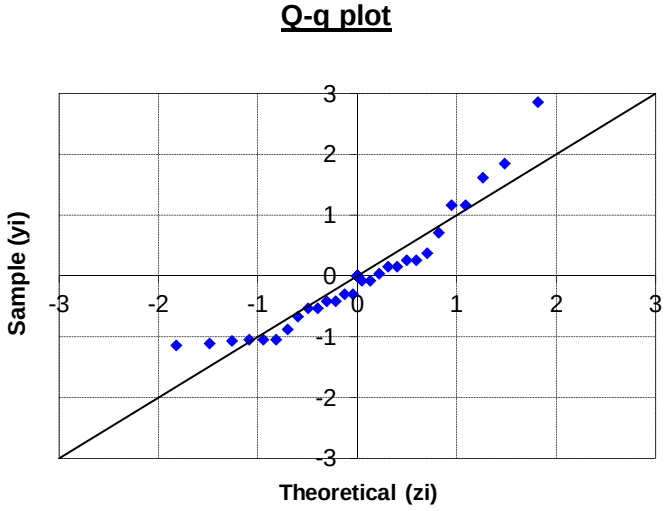
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

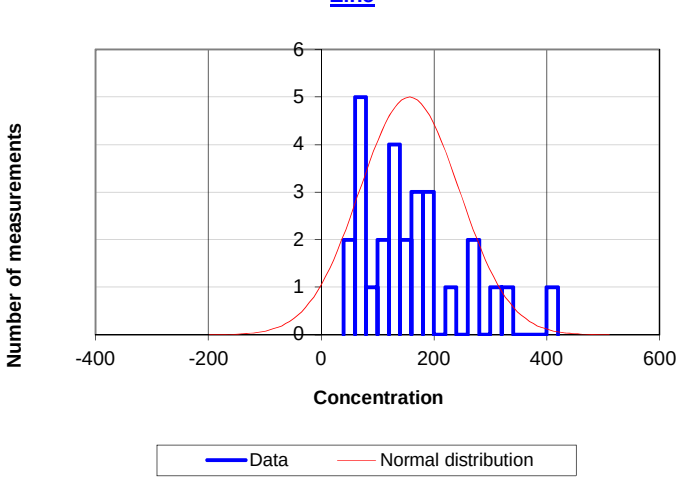
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Zinc	Potential Outlier?	Sample
79		HTP02 @ 0.20
170		HTP03 @ 0.50
190		HTP04 @ 0.10
110		HTP05 @ 0.50
410	Yes	HTP06 @ 0.10
260		TP1 @ 0.4
180		TP1 @ 0.90m
130		TP2 @ 0.5
64		TP2 @ 1.5
300		TP3 @ 0.1
59		TP3 @ 0.5
160		TP3 @ 1.8
98		TP4 @ 0.6
64		TP4 @ 1.5
130		TP7 @ 0.2
260		TP7 @ 0.7
64		TP10 @ 0.9
320		TP11 @ 0.3
120		TP12 @ 0.2
150		TP12 @ 0.4
170		TP13 @ 0.3
180		TP13 @ 0.8
120		TP14 @ 0.4
56		TP15 @ 2.7
110		TP16 @ 0.4
150		TP16 @ 0.7
62		TP23 @ 0.4
220		TP24 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter
Plant life pH >7

300 = **GAC (critical conc.) (mg/kg)**
28 = no. samples
56 = min. value
410 = max. value
156.6429 = mean
88.56018 = standard deviation
3 = no. samples > or = GAC
10 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-8.565641	t_0	-8.56564	k_0
1.703	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
185.1448	95% UCL (US_{95})	229.6131	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 229.61313 GAC = 300 (US95 = 0.765 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Tip Area (COMBINED)
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

Summary of Remedial Targets Methodology

Hydrock

RTM Level 1 - Soil Zone Assessment - leachate samples

Water body receptor(s): Surface water
Secondary receptor(s): Aquatic ecosystem
Data set: Tip Area
Client: Bovis, Barratt and Taylor Wimpey Homes
Site: Land at Bankside, Banbury
Job no: C12702

Chemicals of Potential Concern (concentrations in µg/l)	Summary of Sample Data					Value Being Compared to Target = Maximum Value	Water Quality Target (Exceeded if Red Text)		No. Samples Exceeding Water Quality Target		Notes
	No. of Samples	Limit of Detection	Minimum Value	Maximum Value	95-%ile Value		Inland Waters EQS		Inland Waters EQS		
Hardness as mg/l CaCO3	-	-	61	-	-	-	-				Used with some EQS.
Ag (dissolved)	2	0.5	0.5	0.5	0.5	0.5	0.05		2		EQS > LoD.
As (dissolved)	2	1	1	1.6	1.57	1.6	50		0		
B (dissolved)	2	20	20	20	20	20	2000		0		
Cd (dissolved)	2	0.08	0.08	0.08	0.08	0.08	0.09		0		
Co (dissolved)	2	1	1	1	1	1	3		0		
Cr (VI) (dissolved)	2	1	1	1	1	1	3.4		0		
Cr (III) (dissolved)	2	1	1	1	1	1	4.7		0		
Cu (dissolved)	2	1	1	6.3	6.035	6.3	6		1		
Fe (dissolved)	2	20	100	590	565.5	590	1000		0		
Hg (dissolved)	2	0.01	0.01	0.022	0.0214	0.022	0.05		0		
Ni (dissolved)	2	1	1	1	1	1	20		0		
Pb (dissolved)	2	1	1	2	1.95	2	7.2		0		
Sn (dissolved)	2	1	1	2.2	2.14	2.2	25		0		
V (dissolved)	2	1	1	2.6	2.52	2.6	20		0		
Zn (total)	2	1	3.5	3.8	3.785	3.8	50		0		
Cyanide (free)	2	5	5	5	5	5	1		2		EQS > LoD.
Chloride (Cl-)	2	1000	2500	2700	2690	2700	250000		0		
Fluoride (F-)	2	50	160	250	245.5	250	5000		0		
Sulfate (SO42-)	2	1000	3600	6800	6640	6800	400000		0		
pH (min.) (su)	2	0.1	8.2	8	8.19	8	6		0		Max & Min interchanged to compare min. value.
pH (max.) (su)	2	0.1	8	8.2	8.19	8.2	8.5		0		
Anthracene	2	0.01	0.01	0.01	0.01	0.01	0.1		0		
Benzo(a)pyrene	2	0.01	6.7	8.9	8.79	8.9	0.05		2		
PAH sum of benzo(b)fluoranthene benzo(k)fluoranthene	2	0.02	0.02	1.21	1.1505	1.21	0.03		1		
PAH sum of benzo(ghi)perylene indeno(1,2,3-cd)pyrene	2	0.02	0.02	0.02	0.02	0.02	0.002		2		EQS > LoD.
Fluoranthene	2	0.01	0.01	0.6	0.5705	0.6	0.1		1		
Naphthalene	2	0.01	2.6	3.3	3.265	3.3	2.4		2		
Phenol	2	0.2	0.2	0.2	0.2	0.2	7.7		0		
2,4,6-Trichlorophenol	2	0.2	0.2	0.2	0.2	0.2			0		
2-Chlorophenol	2	0.2	0.2	0.2	0.2	0.2	50		0		
2,4-Dichlorophenol	2	0.2	0.2	0.2	0.2	0.2	20		0		
4-Chloro, 3-methylphenol	2	0.2	0.2	0.2	0.2	0.2	40		0		

Summary of Remedial Targets Methodology

Hydrock

RTM Level 1 - Soil Zone Assessment - leachate samples

Water body receptor(s): Surface water
Secondary receptor(s): Aquatic ecosystem
Data set: Tip Area
Client: Bovis, Barratt and Taylor Wimpey Homes
Site: Land at Bankside, Banbury
Job no: C12702

Chemicals of Potential Concern (concentrations in µg/l)	Summary of Sample Data					Value Being Compared to Target = Maximum Value	Water Quality Target (Exceeded if Red Text)		No. Samples Exceeding Water Quality Target		Notes
	No. of Samples	Limit of Detection	Minimum Value	Maximum Value	95-%ile Value		Inland Waters EQS		Inland Waters EQS		
Pentachlorophenol	2	0.2	0.2	0.2	0.2	0.2	0.4		0		

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT									
								Location & Depth	HTP15	HTP17	HTP20	HTP22	HTP24	HTP25	HTP26	HTP29	HTP33	HTP39	HTP40	TP5	TP8	TP8	TP9	HS1 TS1	HS1 TS2	HS1 SS1	HS1 SS1	HS2 TS1
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.25**	**0.15**	**0.15**	**0.20**	**0.20**	**0.15**	**0.10**	**0.15**	**0.25**	**0.20**	**0.20**	**0.1**	**0.4**	**2.8**	**0.6**	**0.21**	**0.15**	**0.33**	**No depth**	**0.22**
Arsenic	2	41	10	150	32	32	107.0298	FURTHER ASSESSMENT REQUIRED	110	66	68	86	79	140	120	58	76	52	58	19	58	17	27	120	140	150	150	110
Beryllium	1	17	0.5	4.2	0	51	3.117389	POTENTIALLY SUITABLE FOR USE	4.1	1.6	2.3	2.5	2	4.2	3.7	1.6	2.1	1.4	1.6	0.5	0.5								
Boron	0.4	21	0.4	2.2	0	290	1.360029	POTENTIALLY SUITABLE FOR USE	0.8	0.9	1.4	0.7	0.9	0.5	1.1	1.3	1.2	0.7	0.9	1.8	1	2.2	0.7						
Cadmium	0.1	24	0.1	1.8	0	11	0.668047	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.28	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.5						
Chromium (III)	5	24	38.5	270	0	630	173.954	POTENTIALLY SUITABLE FOR USE	269.5	77.5	87.5	109.5	109.5	269.5	239.5	77.5	99.5	77.5	81.5	55.57	109.8	53.8	46.6						
Chromium (VI)	0.5	19	0.2	1.2	0	4.3	0.693522	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.43	0.2	1.2	0.4						
Copper	5	24	6	46	0	2300	32.31209	POTENTIALLY SUITABLE FOR USE	21	23	31	31	31	41	46	28	40	23	26	11	18	13	12						
Lead	5	24	0.1	120	0	450	69.66526	POTENTIALLY SUITABLE FOR USE	39	46	62	55	51	70	120	48	71	44	49	32	37	25	19						
Mercury, inorganic	0.1	24	0.1	33	0	170	16.92447	POTENTIALLY SUITABLE FOR USE	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.27	0.2	0.2						
Nickel	5	41	0.2	150	3	130	105.1742	POTENTIALLY SUITABLE FOR USE	110	62	99	100	92	150	120	69	79	52	60	29	57	32	43	100	100	130	150	110
Selenium	0.2	22	0.2	61	0	350	31.91766	POTENTIALLY SUITABLE FOR USE	0.2	0.2	0.2	0.2	0.2	0.22	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3						
Vanadium	5	19	0.5	410	12	74	250.7953	FURTHER ASSESSMENT REQUIRED	410	120	150	150	160	380	320	120	150	100	120	0.5	0.5								
Zinc	10	24	0.5	310	0	3700	210.8459	POTENTIALLY SUITABLE FOR USE	190	110	180	140	160	300	260	110	150	100	120	82	130	74	84						
Cyanide (free)	0.5	21	0.3	5	0	750	3.061391	POTENTIALLY SUITABLE FOR USE	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	5						
Phenol (total)	0.3	19	0.01	1.1	0	290	0.559154	POTENTIALLY SUITABLE FOR USE	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	1.1	0.5						
Acenaphthene	0.01	19	0.01	0.5	0	480	0.318448	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5						
Acenaphthylene	0.01	19	0.01	0.5	0	400	0.32092	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.073	0.026	0.5	0.5	0.5	0.5						
Anthracene	0.01	19	0.01	0.78	0	4900	0.380141	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.11	0.01	0.01	0.01	0.01	0.012	0.01	0.14	0.064	0.5	0.78	0.5	0.5						
Benz(a)anthracene	0.01	19	0.01	0.95	0	4.7	0.527448	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.36	0.01	0.01	0.01	0.047	0.099	0.023	0.95	0.48	0.5	0.76	0.5	0.5						
Benzo(a)pyrene	0.01	19	0.01	0.95	1	0.94	0.504142	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.38	0.01	0.01	0.01	0.01	0.07	0.018	0.69	0.33	0.5	0.95	0.5	0.5						
Benzo(b)fluoranthene	0.01	19	0.01	1.2	0	6.5	0.59584	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.5	0.01	0.01	0.01	0.046	0.12	0.021	1.2	0.62	0.5	0.7	0.5	0.5						
Benzo(ghi)perylene	0.01	19	0.01	0.5	0	46	0.334391	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.12	0.01	0.01	0.01	0.01	0.013	0.01	0.21	0.076	0.5	0.5	0.5	0.5						
Benzo(k)fluoranthene	0.01	19	0.01	0.5	0	9.6	0.348634	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.13	0.01	0.01	0.01	0.01	0.011	0.01	0.35	0.099	0.5	0.5	0.5	0.5						
Chrysene	0.01	19	0.01	0.78	0	8	0.471137	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.3	0.01	0.01	0.01	0.029	0.08	0.024	0.78	0.32	0.5	0.72	0.5	0.5						
Dibenz(a,h)anthracene	0.01	19	0.01	0.5	0	0.86	0.322724	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5						
Fluoranthene	0.01	19	0.01	2.3	0	460	1.043667	POTENTIALLY SUITABLE FOR USE	0.096	0.019	0.81	0.043	0.01	0.028	0.13	0.26	0.076	1.7	0.84	0.5	2.3	0.5	0.5						
Fluorene	0.01	19	0.01	0.5	0	380	0.318448	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.5	0.5	0.5	0.5						
Indeno(1,2,3,cd)pyrene	0.01	19	0.01	0.5	0	3.9	0.3332	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.083	0.01	0.01	0.01	0.01	0.01	0.01	0.22	0.069	0.5	0.5	0.5	0.5						
Naphthalene	0.01	19	0.01	1.1	0	3.7	0.439864	POTENTIALLY SUITABLE FOR USE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.5	1.1	0.5	0.5						
Phenanthrene	0.01	19	0.01	2.1	0	200	0.734343	POTENTIALLY SUITABLE FOR USE	0.039	0.01	0.39	0.01	0.01	0.01	0.043	0.059	0.029	0.28	0.17	0.5	2.1	0.5	0.5						
Pyrene	0.01	19	0.01	2.3	0	1000	0.963003	POTENTIALLY SUITABLE FOR USE	0.037	0.028	0.64	0.03	0.01	0.024	0.1	0.21	0.056	1.4	0.65	0.5	2.3	0.5	0.5						
	Mean																												
FOC (dimensionless)	0.019								0.0099	0.017	0.023	0.021	0.057	0.012	0.013	0.023	0.017	0.011	0.013					0.025	0.021512	0.012791		0.024419
SOM (calculated)	3.28%								1.71%	2.93%	3.97%	3.62%	9.83%	2.07%	2.24%	3.97%	2.93%	1.90%	2.24%					4.31%	3.71%	2.21%		4.21%
pH (su)	7.7								7.1	7.5	7.7	8.3	7.7	7.7	7.9	7.9	7.6	7.6	7.3	7.2	8.1	7.4	7.1	8.2	8.1	8.1		8.1

Risk parameter: Human health - residential with plant uptake (2.5%SOM)
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type														NAT	NAT	NAT	NAT	
								Location & Depth	HS2 TS2	HS2 SS1	HS3 TS1	HS3 TS2	HS3 TS2	HS3SS1	HS4 TS1	HS4TS2	HS4 SS1	HS5 TS1	HS5 TS1	HS5TS2	WAHS1	WAHS2	WAHS4	HTP07	HTP09	HTP10	HTP13	TP19
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.28**	**0.35**	**0.24**	**0.25**	**No depth**	**0.4**	**0.22**	**0.19**	**0.38**	**0.16**	**No depth**	**0.17**	**No depth**	**No depth**	**No depth**	**0.50**	**0.20**	**0.50**	**0.20**	**0.5**
Arsenic	2	41	10	150	32	32	107.0298	FURTHER ASSESSMENT REQUIRED	110	110	60	66	86	58	79	60	70	130	110	110	150	120	69	18	22	18	17	10
Beryllium	1	17	0.5	4.2	0	51	3.117389	POTENTIALLY SUITABLE FOR USE																1	1	1	1	
Boron	0.4	21	0.4	2.2	0	290	1.360029	POTENTIALLY SUITABLE FOR USE																0.5	0.4	0.5	0.7	0.65
Cadmium	0.1	24	0.1	1.8	0	11	0.668047	POTENTIALLY SUITABLE FOR USE													1.8	0.7	0.7	0.1	0.1	0.1	0.1	0.5
Chromium (III)	5	24	38.5	270	0	630	173.954	POTENTIALLY SUITABLE FOR USE													270	150	87	48.5	40.5	41.5	38.5	42
Chromium (VI)	0.5	19	0.2	1.2	0	4.3	0.693522	POTENTIALLY SUITABLE FOR USE																0.5	0.5	0.5	0.5	
Copper	5	24	6	46	0	2300	32.31209	POTENTIALLY SUITABLE FOR USE													6	6	14	26	16	24	29	14
Lead	5	24	0.1	120	0	450	69.66526	POTENTIALLY SUITABLE FOR USE													46	110	49	0.1	0.1	0.1	0.1	0.2
Mercury, inorganic	0.1	24	0.1	33	0	170	16.92447	POTENTIALLY SUITABLE FOR USE													0.6	0.6	0.6	33	22	22	21	31
Nickel	5	41	0.2	150	3	130	105.1742	POTENTIALLY SUITABLE FOR USE	110	110	75	75	87	65	83	78	86	110	120	110	110	98	79	0.2	0.2	0.2	0.2	0.3
Selenium	0.2	22	0.2	61	0	350	31.91766	POTENTIALLY SUITABLE FOR USE													3	3	3	61	58	58	53	
Vanadium	5	19	0.5	410	12	74	250.7953	FURTHER ASSESSMENT REQUIRED																85	59	66	61	60
Zinc	10	24	0.5	310	0	3700	210.8459	POTENTIALLY SUITABLE FOR USE													310	290	170	0.5	0.5	0.5	0.5	2
Cyanide (free)	0.5	21	0.3	5	0	750	3.061391	POTENTIALLY SUITABLE FOR USE																0.3	0.3	0.3	0.3	0.5
Phenol (total)	0.3	19	0.01	1.1	0	290	0.559154	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Acenaphthene	0.01	19	0.01	0.5	0	480	0.318448	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Acenaphthylene	0.01	19	0.01	0.5	0	400	0.32092	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Anthracene	0.01	19	0.01	0.78	0	4900	0.380141	POTENTIALLY SUITABLE FOR USE																0.023	0.01	0.012	0.021	
Benz(a)anthracene	0.01	19	0.01	0.95	0	4.7	0.527448	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Benzo(a)pyrene	0.01	19	0.01	0.95	1	0.94	0.504142	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Benzo(b)fluoranthene	0.01	19	0.01	1.2	0	6.5	0.59584	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Benzo(ghi)perylene	0.01	19	0.01	0.5	0	46	0.334391	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Benzo(k)fluoranthene	0.01	19	0.01	0.5	0	9.6	0.348634	POTENTIALLY SUITABLE FOR USE																0.013	0.01	0.01	0.012	
Chrysene	0.01	19	0.01	0.78	0	8	0.471137	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Dibenz(a,h)anthracene	0.01	19	0.01	0.5	0	0.86	0.322724	POTENTIALLY SUITABLE FOR USE																0.047	0.01	0.031	0.088	
Fluoranthene	0.01	19	0.01	2.3	0	460	1.043667	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Fluorene	0.01	19	0.01	0.5	0	380	0.318448	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Indeno(1,2,3,cd)pyrene	0.01	19	0.01	0.5	0	3.9	0.3332	POTENTIALLY SUITABLE FOR USE																0.01	0.01	0.01	0.01	
Naphthalene	0.01	19	0.01	1.1	0	3.7	0.439864	POTENTIALLY SUITABLE FOR USE																0.018	0.01	0.01	0.014	
Phenanthrene	0.01	19	0.01	2.1	0	200	0.734343	POTENTIALLY SUITABLE FOR USE																0.018	0.01	0.01	0.014	
Pyrene	0.01	19	0.01	2.3	0	1000	0.963003	POTENTIALLY SUITABLE FOR USE																0.035	0.01	0.017	0.061	
	Mean																											
FOC (dimensionless)	0.019									0.026744	0.026163	0.024419		0.013372	0.025581	0.026744	0.025581	0.024419		0.023256	0.009884	0.012209	0.012209	0.023	0.0046	0.019	0.018	0.003081
SOM (calculated)	3.28%									4.61%	4.51%	4.21%		2.31%	4.41%	4.61%	4.41%	4.21%		4.01%	1.70%	2.10%	2.10%	3.97%	0.79%	3.28%	3.10%	0.53%
pH (su)	7.7								8.1	8.1	8	8		8	7.9	7.6	7.7	7.7		7.8	7.45	7.58	6.88	7.1	6.9	7.3	7.3	7.6

Risk parameter: Human health - residential with plant uptake (2.5%SOM)
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	
								Location & Depth	TP21
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.4**
Arsenic	2	41	10	150	32	32	107.0298	FURTHER ASSESSMENT REQUIRED	21
Beryllium	1	17	0.5	4.2	0	51	3.117389	POTENTIALLY SUITABLE FOR USE	
Boron	0.4	21	0.4	2.2	0	290	1.360029	POTENTIALLY SUITABLE FOR USE	0.77
Cadmium	0.1	24	0.1	1.8	0	11	0.668047	POTENTIALLY SUITABLE FOR USE	0.5
Chromium (III)	5	24	38.5	270	0	630	173.954	POTENTIALLY SUITABLE FOR USE	45
Chromium (VI)	0.5	19	0.2	1.2	0	4.3	0.693522	POTENTIALLY SUITABLE FOR USE	
Copper	5	24	6	46	0	2300	32.31209	POTENTIALLY SUITABLE FOR USE	17
Lead	5	24	0.1	120	0	450	69.66526	POTENTIALLY SUITABLE FOR USE	0.2
Mercury, inorganic	0.1	24	0.1	33	0	170	16.92447	POTENTIALLY SUITABLE FOR USE	26
Nickel	5	41	0.2	150	3	130	105.1742	POTENTIALLY SUITABLE FOR USE	0.3
Selenium	0.2	22	0.2	61	0	350	31.91766	POTENTIALLY SUITABLE FOR USE	
Vanadium	5	19	0.5	410	12	74	250.7953	FURTHER ASSESSMENT REQUIRED	69
Zinc	10	24	0.5	310	0	3700	210.8459	POTENTIALLY SUITABLE FOR USE	2
Cyanide (free)	0.5	21	0.3	5	0	750	3.061391	POTENTIALLY SUITABLE FOR USE	0.5
Phenol (total)	0.3	19	0.01	1.1	0	290	0.559154	POTENTIALLY SUITABLE FOR USE	
Acenaphthene	0.01	19	0.01	0.5	0	480	0.318448	POTENTIALLY SUITABLE FOR USE	
Acenaphthylene	0.01	19	0.01	0.5	0	400	0.32092	POTENTIALLY SUITABLE FOR USE	
Anthracene	0.01	19	0.01	0.78	0	4900	0.380141	POTENTIALLY SUITABLE FOR USE	
Benz(a)anthracene	0.01	19	0.01	0.95	0	4.7	0.527448	POTENTIALLY SUITABLE FOR USE	
Benzo(a)pyrene	0.01	19	0.01	0.95	1	0.94	0.504142	POTENTIALLY SUITABLE FOR USE	
Benzo(b)fluoranthene	0.01	19	0.01	1.2	0	6.5	0.59584	POTENTIALLY SUITABLE FOR USE	
Benzo(ghi)perylene	0.01	19	0.01	0.5	0	46	0.334391	POTENTIALLY SUITABLE FOR USE	
Benzo(k)fluoranthene	0.01	19	0.01	0.5	0	9.6	0.348634	POTENTIALLY SUITABLE FOR USE	
Chrysene	0.01	19	0.01	0.78	0	8	0.471137	POTENTIALLY SUITABLE FOR USE	
Dibenz(a,h)anthracene	0.01	19	0.01	0.5	0	0.86	0.322724	POTENTIALLY SUITABLE FOR USE	
Fluoranthene	0.01	19	0.01	2.3	0	460	1.043667	POTENTIALLY SUITABLE FOR USE	
Fluorene	0.01	19	0.01	0.5	0	380	0.318448	POTENTIALLY SUITABLE FOR USE	
Indeno(1,2,3,cd)pyrene	0.01	19	0.01	0.5	0	3.9	0.3332	POTENTIALLY SUITABLE FOR USE	
Naphthalene	0.01	19	0.01	1.1	0	3.7	0.439864	POTENTIALLY SUITABLE FOR USE	
Phenanthrene	0.01	19	0.01	2.1	0	200	0.734343	POTENTIALLY SUITABLE FOR USE	
Pyrene	0.01	19	0.01	2.3	0	1000	0.963003	POTENTIALLY SUITABLE FOR USE	
	Mean								
FOC (dimensionless)	0.019								0.00814
SOM (calculated)	3.28%								1.40%
pH (su)	7.7								7.5

Risk parameter: **Human health - residential with plant uptake (2.5%SOM)**
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated

Chemical of Potential Concern	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC	US_{95}	Result of Significance Test	Soil Type	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT	NAT									
									Location & Depth	HTP15	HTP17	HTP20	HTP22	HTP24	HTP25	HTP26	HTP29	HTP33	HTP39	HTP40	TP5	TP8	TP8	TP9	HS1 TS1	HS1 TS2	HS1 SS1	HS1 SS1	HS2 TS1
										0.25	0.15	0.15	0.20	0.20	0.15	0.10	0.15	0.25	0.20	0.20	0.1	0.4	2.8	0.6	0.21	0.15	0.33	No depth	0.22
Arsenic	2	41	10	150	0	250	107.0298	POTENTIALLY SUITABLE FOR USE		110	66	68	86	79	140	120	58	76	52	58	19	58	17	27	120	140	150	150	110
Boron	0.4	21	0.4	2.2	0	3	1.360029	POTENTIALLY SUITABLE FOR USE		0.8	0.9	1.4	0.7	0.9	0.5	1.1	1.3	1.2	0.7	0.9	1.8	1	2.2	0.7					
Chromium (III)	5	24	38.5	270	0	400	173.954	POTENTIALLY SUITABLE FOR USE		269.5	77.5	87.5	109.5	109.5	269.5	239.5	77.5	99.5	77.5	81.5	55.57	109.8	53.8	46.6					
Chromium (VI)	0.5	19	0.2	1.2	0	25	0.693522	POTENTIALLY SUITABLE FOR USE		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.43	0.2	1.2	0.4					
Copper	5	24	6	46	0	200	32.31209	POTENTIALLY SUITABLE FOR USE		21	23	31	31	31	41	46	28	40	23	26	11	18	13	12					
Nickel	5	41	0.2	150	12	110	105.1742	POTENTIALLY SUITABLE FOR USE		110	62	99	100	92	150	120	69	79	52	60	29	57	32	43	100	100	130	150	110
Zinc	10	24	0.5	310	2	300	210.8459	POTENTIALLY SUITABLE FOR USE		190	110	180	140	160	300	260	110	150	100	120	82	130	74	84					
	Mean																												
pH (su)	7.7									7.1	7.5	7.7	8.3	7.7	7.7	7.9	7.9	7.6	7.6	7.3	7.2	8.1	7.4	7.1	8.2	8.1	8.1		8.1

Risk parameter: Plant life pH >7
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.
Values in red are equal to, or greater than, the generic assessment criterion (GAC).
MG denotes Made Ground
NAT denotes natural ground

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type														NAT	NAT	NAT	NAT	
								Location & Depth	HS2 TS2	HS2 SS1	HS3 TS1	HS3 TS2	HS3 TS2	HS3SS1	HS4 TS1	HS4TS2	HS4 SS1	HS5 TS1	HS5 TS1	HS5TS2	WAHS1	WAHS2	WAHS4	HTP07	HTP09	HTP10	HTP13	TP19
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.28**	**0.35**	**0.24**	**0.25**	**No depth**	**0.4**	**0.22**	**0.19**	**0.38**	**0.16**	**No depth**	**0.17**	**No depth**	**No depth**	**No depth**	**0.50**	**0.20**	**0.50**	**0.20**	**0.5**
Arsenic	2	41	10	150	0	250	107.0298	POTENTIALLY SUITABLE FOR USE	110	110	60	66	86	58	79	60	70	130	110	110	150	120	69	18	22	18	17	10
Boron	0.4	21	0.4	2.2	0	3	1.360029	POTENTIALLY SUITABLE FOR USE																0.5	0.4	0.5	0.7	0.65
Chromium (III)	5	24	38.5	270	0	400	173.954	POTENTIALLY SUITABLE FOR USE													270	150	87	48.5	40.5	41.5	38.5	42
Chromium (VI)	0.5	19	0.2	1.2	0	25	0.693522	POTENTIALLY SUITABLE FOR USE																0.5	0.5	0.5	0.5	
Copper	5	24	6	46	0	200	32.31209	POTENTIALLY SUITABLE FOR USE													6	6	14	26	16	24	29	14
Nickel	5	41	0.2	150	12	110	105.1742	POTENTIALLY SUITABLE FOR USE	110	110	75	75	87	65	83	78	86	110	120	110	110	98	79	0.2	0.2	0.2	0.2	0.3
Zinc	10	24	0.5	310	2	300	210.8459	POTENTIALLY SUITABLE FOR USE													310	290	170	0.5	0.5	0.5	0.5	2
	Mean																											
pH (su)	7.7								8.1	8.1	8	8		8	7.9	7.6	7.7	7.7		7.8	7.45	7.58	6.88	7.1	6.9	7.3	7.3	7.6

Risk parameter: **Plant life pH >7**
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Assessment of Chemicals of Potential Concern to Human Health

Hydrock

All values in mg/kg unless otherwise stated								Soil Type	
								Location & Depth	TP21
Chemical of Potential Concern	**Lab. RL**	**No. Samples**	**Min. Value**	**Max. Value**	**No. Samples > or = GAC**	**GAC**	**US_{95}**	**Result of Significance Test**	**0.4**
Arsenic	2	41	10	150	0	250	107.0298	POTENTIALLY SUITABLE FOR USE	21
Boron	0.4	21	0.4	2.2	0	3	1.360029	POTENTIALLY SUITABLE FOR USE	0.77
Chromium (III)	5	24	38.5	270	0	400	173.954	POTENTIALLY SUITABLE FOR USE	45
Chromium (VI)	0.5	19	0.2	1.2	0	25	0.693522	POTENTIALLY SUITABLE FOR USE	
Copper	5	24	6	46	0	200	32.31209	POTENTIALLY SUITABLE FOR USE	17
Nickel	5	41	0.2	150	12	110	105.1742	POTENTIALLY SUITABLE FOR USE	0.3
Zinc	10	24	0.5	310	2	300	210.8459	POTENTIALLY SUITABLE FOR USE	2
	Mean								
pH (su)	7.7								7.5

Risk parameter: **Plant life pH >7**
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

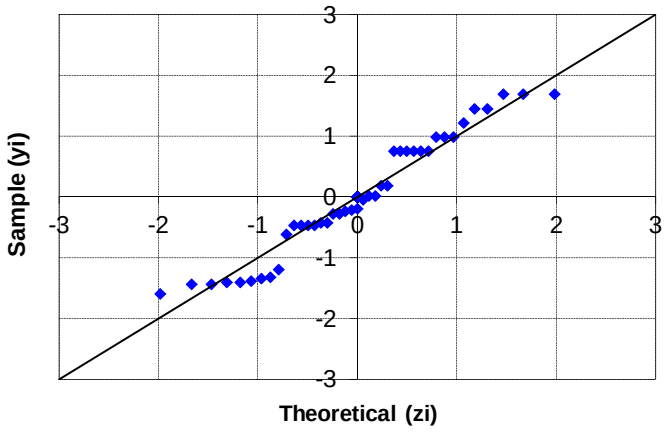
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

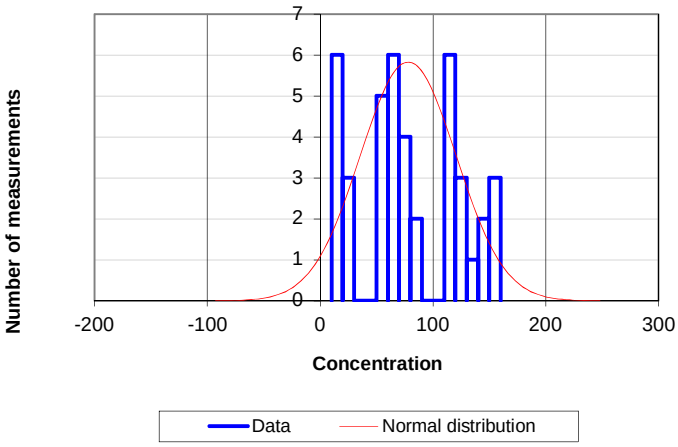
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Arsenic		
110		HTP15 @ 0.25
66		HTP17 @ 0.15
68		HTP20 @ 0.15
86		HTP22 @ 0.20
79		HTP24 @ 0.20
140		HTP25 @ 0.15
120		HTP26 @ 0.10
58		HTP29 @ 0.15
76		HTP33 @ 0.25
52		HTP39 @ 0.20
58		HTP40 @ 0.20
19		TP5 @ 0.1
58		TP8 @ 0.4
17		TP8 @ 2.8
27		TP9 @ 0.6
120		HS1 TS1 @ 0.21
140		HS1 TS2 @ 0.15
150		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
60		HS3 TS1 @ 0.24
66		HS3 TS2 @ 0.25
86		HS3 TS2 @ No depth
58		HS3SS1 @ 0.4
79		HS4 TS1 @ 0.22
60		HS4TS2 @ 0.19
70		HS4 SS1 @ 0.38
130		HS5 TS1 @ 0.16
110		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
150		WAHS1 @ No depth
120		WAHS2 @ No depth
69		WAHS4 @ No depth
18		HTP07 @ 0.50
22		HTP09 @ 0.20
18		HTP10 @ 0.50
17		HTP13 @ 0.20
10		TP19 @ 0.5
21		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Arsenic



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

32 = GAC (critical conc.) (mg/kg)

41 = no. samples

10 = min. value

150 = max. value

78 = mean (mean>GAC)

42.63332 = standard deviation

32 = no. samples > or = GAC

2 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
6.908768 = t_0	6.908768 = k_0
1.684 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
89.21242 = 95% UCL (US_{95})	107.0298 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho accepted, true mean >GAC

US_{95} = 107.02978 GAC = 32 (US95 = 3.345 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

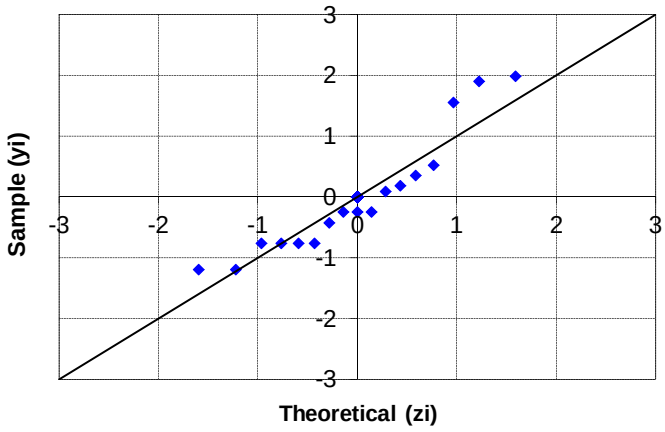
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

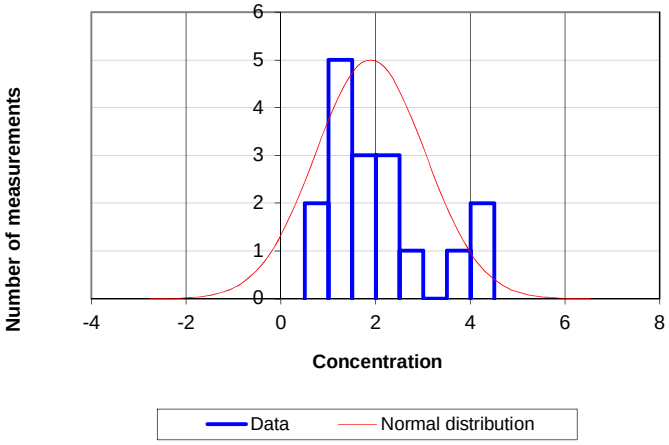
Beryllium	Potential Outlier?	Sample
4.1		HTP15 @ 0.25
1.6		HTP17 @ 0.15
2.3		HTP20 @ 0.15
2.5		HTP22 @ 0.20
2		HTP24 @ 0.20
4.2		HTP25 @ 0.15
3.7		HTP26 @ 0.10
1.6		HTP29 @ 0.15
2.1		HTP33 @ 0.25
1.4		HTP39 @ 0.20
1.6		HTP40 @ 0.20
0.5		TP5 @ 0.1
0.5		TP8 @ 0.4
1		HTP07 @ 0.50
1		HTP09 @ 0.20
1		HTP10 @ 0.50
1		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Beryllium



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

51 = GAC (critical conc.) (mg/kg)

17 = no. samples
0 = no. samples > or = GAC
0.5 = min. value
4.2 = max. value
1 = laboratory reporting limit (RL)
1.888235 = mean
6 = no. samples at RL
1.16237 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-174.2071	= t_0	-174.207	= k_0
1.746	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
2.380461	= 95% UCL (US_{95})	3.117389	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 3.1173892 GAC = 51 (US95 = 0.061 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

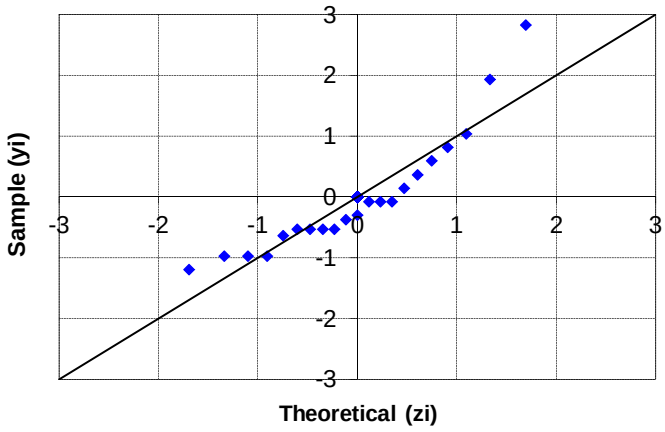
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

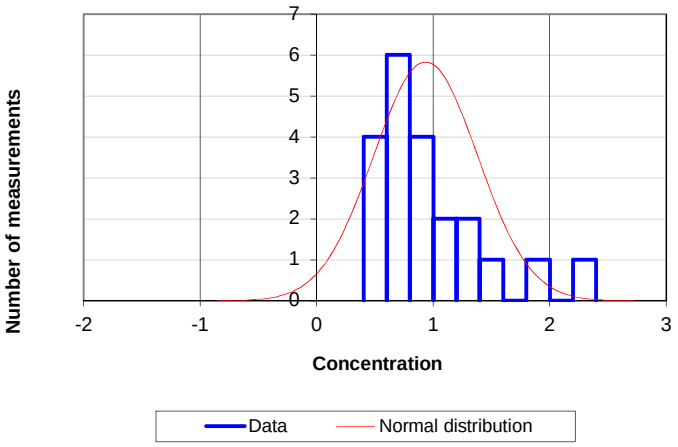
Boron	Potential Outlier?	Sample
0.8		HTP15 @ 0.25
0.9		HTP17 @ 0.15
1.4		HTP20 @ 0.15
0.7		HTP22 @ 0.20
0.9		HTP24 @ 0.20
0.5		HTP25 @ 0.15
1.1		HTP26 @ 0.10
1.3		HTP29 @ 0.15
1.2		HTP33 @ 0.25
0.7		HTP39 @ 0.20
0.9		HTP40 @ 0.20
1.8		TP5 @ 0.1
1		TP8 @ 0.4
2.2	Yes	TP8 @ 2.8
0.7		TP9 @ 0.6
0.5		HTP07 @ 0.50
0.4		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.7		HTP13 @ 0.20
0.65		TP19 @ 0.5
0.77		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

21 = no. samples	0 = no. samples > or = GAC
0.4 = min. value	
2.2 = max. value	0.4 = laboratory reporting limit (RL)
0.934286 = mean	1 = no. samples at RL
0.447477 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-2960.298 = t_0	-2960.3 = k_0
1.725 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
1.102728 = 95% UCL (US_{95})	1.360029 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.3600288 GAC = 290 (US95 = 0.005 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

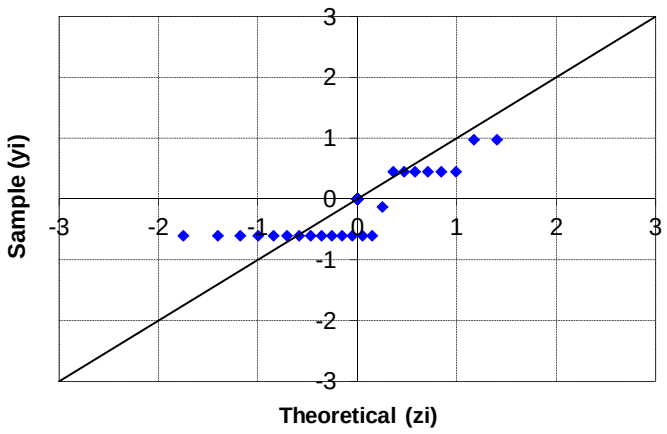
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

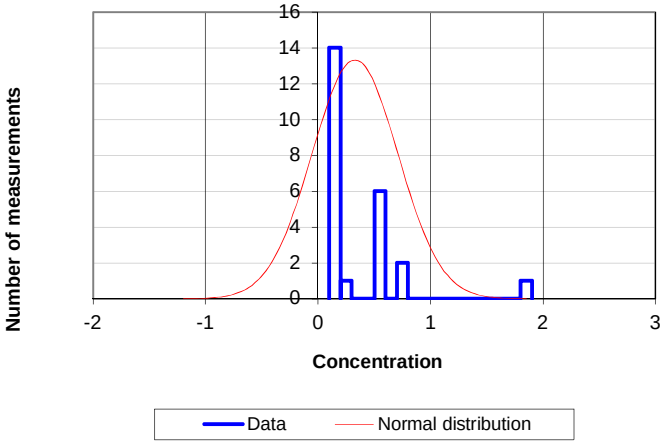
Cadmium	Potential Outlier?	Sample
0.1	n/a	HTP15 @ 0.25
0.1	n/a	HTP17 @ 0.15
0.28	n/a	HTP20 @ 0.15
0.1	n/a	HTP22 @ 0.20
0.1	n/a	HTP24 @ 0.20
0.1	n/a	HTP25 @ 0.15
0.1	n/a	HTP26 @ 0.10
0.1	n/a	HTP29 @ 0.15
0.1	n/a	HTP33 @ 0.25
0.1	n/a	HTP39 @ 0.20
0.1	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
1.8	n/a	WAHS1 @ No depth
0.7	n/a	WAHS2 @ No depth
0.7	n/a	WAHS4 @ No depth
0.1	n/a	HTP07 @ 0.50
0.1	n/a	HTP09 @ 0.20
0.1	n/a	HTP10 @ 0.50
0.1	n/a	HTP13 @ 0.20
0.5	n/a	TP19 @ 0.5
0.5	n/a	TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Cadmium



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

11 = GAC (critical conc.) (mg/kg)

24 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
1.8 = max. value	0.1 = laboratory reporting limit (RL)
0.328333 = mean	14 = no. samples at RL
0.381709 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-136.9638 = t_0	-136.964 = k_0
1.714 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.461881 = 95% UCL (US_{95})	0.668047 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.6680468 GAC = 11 (US95 = 0.061 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

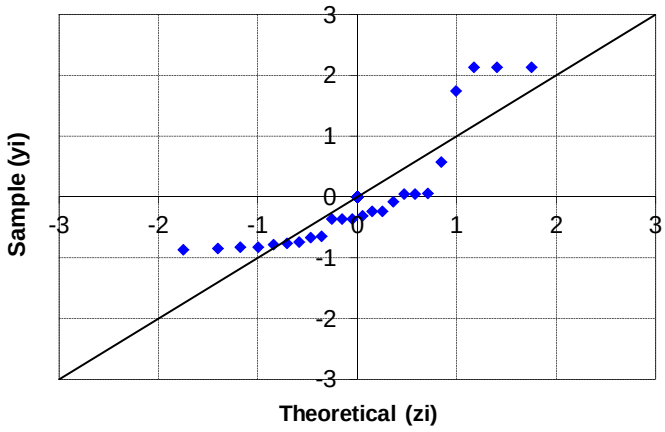
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (III)		
269.5	Yes	HTP15 @ 0.25
77.5		HTP17 @ 0.15
87.5		HTP20 @ 0.15
109.5		HTP22 @ 0.20
109.5		HTP24 @ 0.20
269.5	Yes	HTP25 @ 0.15
239.5	Yes	HTP26 @ 0.10
77.5		HTP29 @ 0.15
99.5		HTP33 @ 0.25
77.5		HTP39 @ 0.20
81.5		HTP40 @ 0.20
55.57		TP5 @ 0.1
109.8		TP8 @ 0.4
53.8		TP8 @ 2.8
46.6		TP9 @ 0.6
270	Yes	WAHS1 @ No depth
150		WAHS2 @ No depth
87		WAHS4 @ No depth
48.5		HTP07 @ 0.50
40.5		HTP09 @ 0.20
41.5		HTP10 @ 0.50
38.5		HTP13 @ 0.20
42		TP19 @ 0.5
45		TP21 @ 0.4

Mean Absolute Deviation for potential outliers

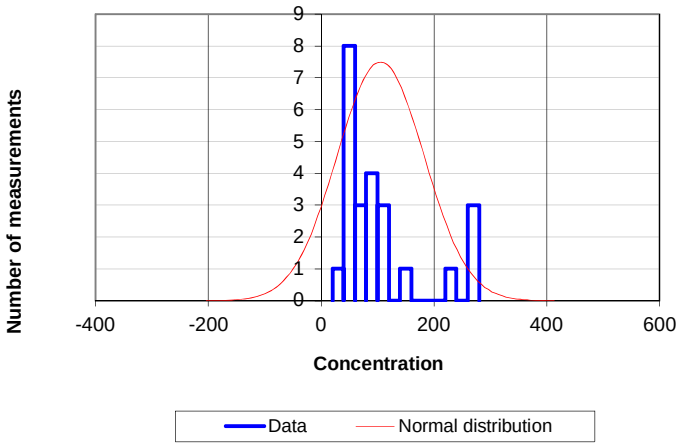
3.5 = critical value of test statistic

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (III)



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

630 = GAC (critical conc.) (mg/kg)

24 = no. samples

38.5 = min. value

270 = max. value

105.3029 = mean

77.13763 = standard deviation

0 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-33.3233	t_0	-33.3233	k_0
1.714	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
132.291	95% UCL (US_{95})	173.954	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 173.95396 GAC = 630 (US95 = 0.276 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

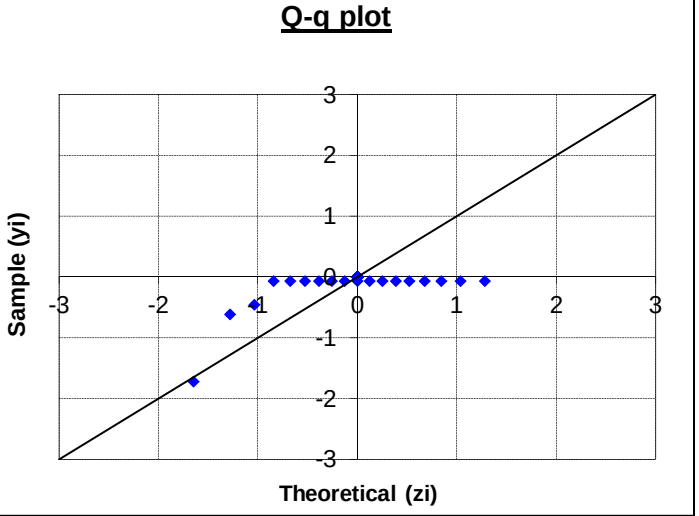
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

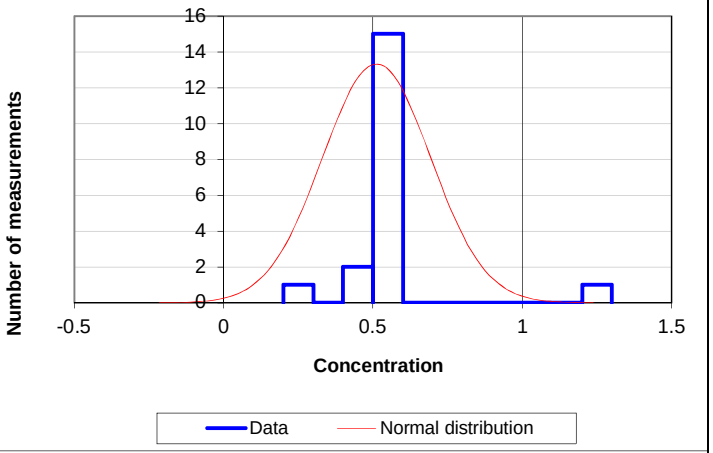
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chromium (VI)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
0.43	n/a	TP5 @ 0.1
0.2	n/a	TP8 @ 0.4
1.2	n/a	TP8 @ 2.8
0.4	n/a	TP9 @ 0.6
0.5	n/a	HTP07 @ 0.50
0.5	n/a	HTP09 @ 0.20
0.5	n/a	HTP10 @ 0.50
0.5	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.3 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.2 = min. value	
1.2 = max. value	0.5 = laboratory reporting limit (RL)
0.512105 = mean	18 = no. samples at RL
0.181371 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-91.03484 = t_0	-91.0348 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.584256 = 95% UCL (US_{95})	0.693522 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.6935218 GAC = 4.3 (US95 = 0.161 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

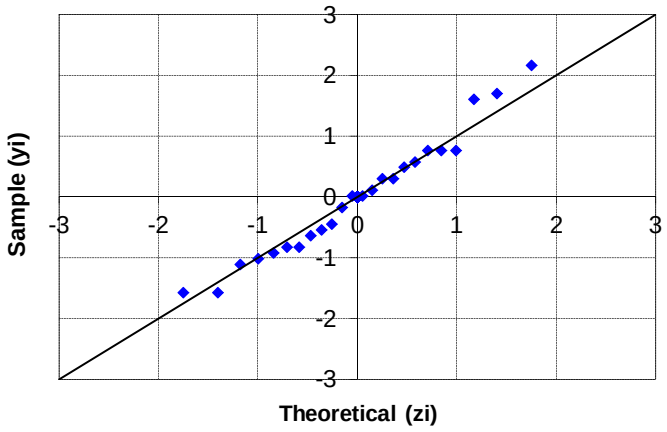
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

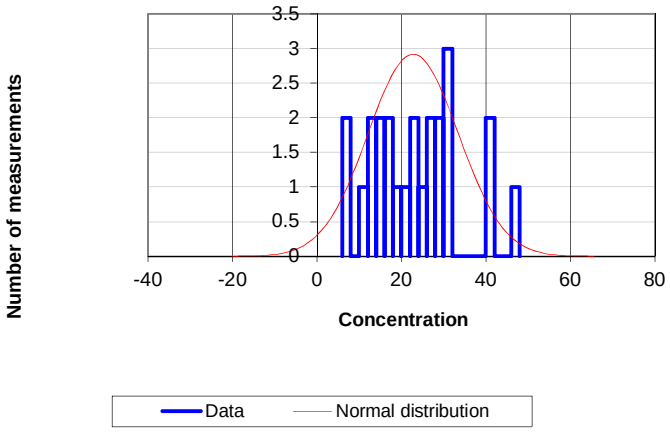
Copper	Potential Outlier?	Sample
21		HTP15 @ 0.25
23		HTP17 @ 0.15
31		HTP20 @ 0.15
31		HTP22 @ 0.20
31		HTP24 @ 0.20
41		HTP25 @ 0.15
46		HTP26 @ 0.10
28		HTP29 @ 0.15
40		HTP33 @ 0.25
23		HTP39 @ 0.20
26		HTP40 @ 0.20
11		TP5 @ 0.1
18		TP8 @ 0.4
13		TP8 @ 2.8
12		TP9 @ 0.6
6		WAHS1 @ No depth
6		WAHS2 @ No depth
14		WAHS4 @ No depth
26		HTP07 @ 0.50
16		HTP09 @ 0.20
24		HTP10 @ 0.50
29		HTP13 @ 0.20
14		TP19 @ 0.5
17		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

2300 = GAC (critical conc.) (mg/kg)

24 = no. samples	0 = no. samples > or = GAC
6 = min. value	
46 = max. value	5 = laboratory reporting limit (RL)
22.79167 = mean	0 = no. samples at RL
10.69733 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1042.876 = t_0	-1042.88 = k_0
1.714 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
26.53433 = 95% UCL (US_{95})	32.31209 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 32.312094 GAC = 2300 (US95 = 0.014 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

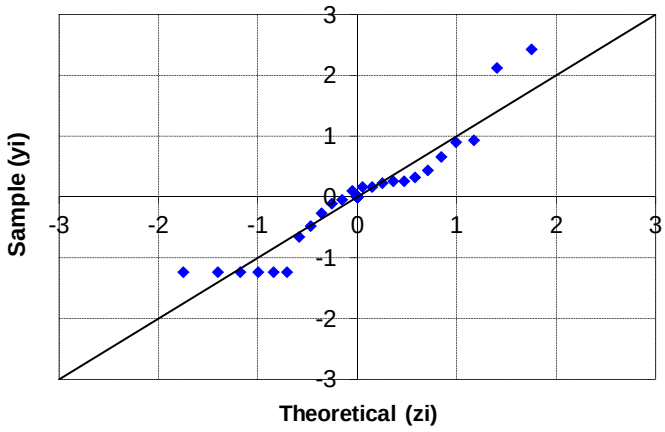
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

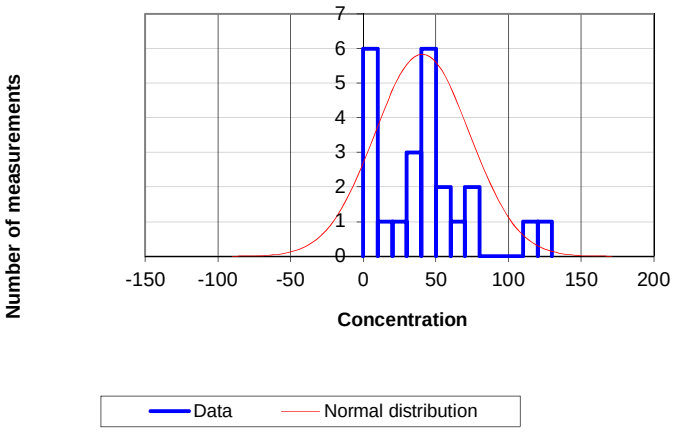
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Lead		
39		HTP15 @ 0.25
46		HTP17 @ 0.15
62		HTP20 @ 0.15
55		HTP22 @ 0.20
51		HTP24 @ 0.20
70		HTP25 @ 0.15
120		HTP26 @ 0.10
48		HTP29 @ 0.15
71		HTP33 @ 0.25
44		HTP39 @ 0.20
49		HTP40 @ 0.20
32		TP5 @ 0.1
37		TP8 @ 0.4
25		TP8 @ 2.8
19		TP9 @ 0.6
46		WAHS1 @ No depth
110		WAHS2 @ No depth
49		WAHS4 @ No depth
0.1		HTP07 @ 0.50
0.1		HTP09 @ 0.20
0.1		HTP10 @ 0.50
0.1		HTP13 @ 0.20
0.2		TP19 @ 0.5
0.2		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Lead



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

450 = GAC (critical conc.) (mg/kg)

24 = no. samples	0 = no. samples > or = GAC
0.1 = min. value	
120 = max. value	5 = laboratory reporting limit (RL)
40.575 = mean	6 = no. samples at RL
32.68638 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-61.36393 = t_0	-61.3639 = k_0
1.714 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
52.01094 = 95% UCL (US_{95})	69.66526 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 69.665265 GAC = 450 (US95 = 0.155 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

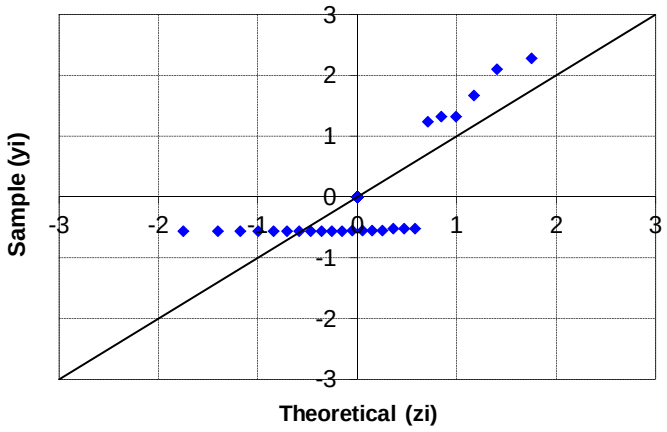
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

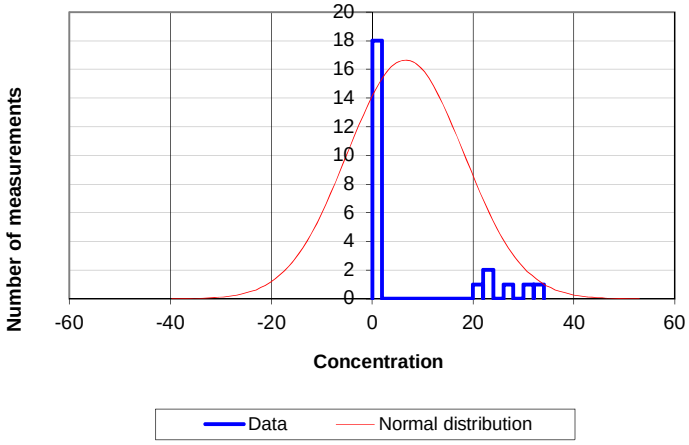
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Mercury, inorganic		
0.1		HTP15 @ 0.25
0.1		HTP17 @ 0.15
0.1		HTP20 @ 0.15
0.1		HTP22 @ 0.20
0.1		HTP24 @ 0.20
0.1		HTP25 @ 0.15
0.1		HTP26 @ 0.10
0.1		HTP29 @ 0.15
0.1		HTP33 @ 0.25
0.1		HTP39 @ 0.20
0.1		HTP40 @ 0.20
0.2		TP5 @ 0.1
0.27		TP8 @ 0.4
0.2		TP8 @ 2.8
0.2		TP9 @ 0.6
0.6		WAHS1 @ No depth
0.6		WAHS2 @ No depth
0.6		WAHS4 @ No depth
33	Yes	HTP07 @ 0.50
22	Yes	HTP09 @ 0.20
22	Yes	HTP10 @ 0.50
21	Yes	HTP13 @ 0.20
31	Yes	TP19 @ 0.5
26	Yes	TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Mercury, inorganic



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

170 = GAC (critical conc.) (mg/kg)

24 = no. samples

0.1 = min. value

33 = max. value

6.615417 = mean

11.58345 = standard deviation

0 = no. samples > or = GAC

0.1 = laboratory reporting limit (RL)

11 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-69.10014	= t_0	-69.1001	= k_0
1.714	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
10.6681	= 95% UCL (US_{95})	16.92447	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 16.924467 GAC = 170 (US95 = 0.1 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

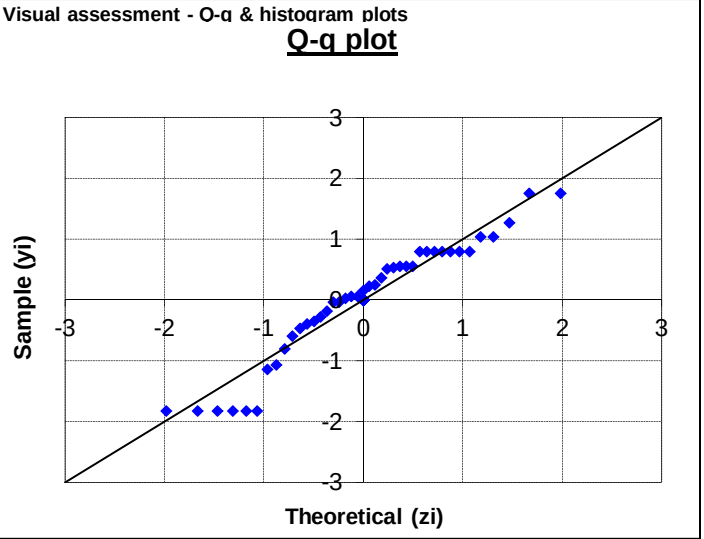
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

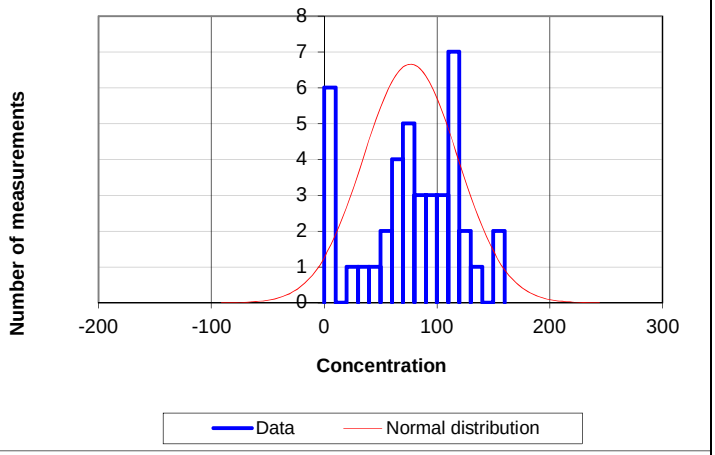
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
110		HTP15 @ 0.25
62		HTP17 @ 0.15
99		HTP20 @ 0.15
100		HTP22 @ 0.20
92		HTP24 @ 0.20
150		HTP25 @ 0.15
120		HTP26 @ 0.10
69		HTP29 @ 0.15
79		HTP33 @ 0.25
52		HTP39 @ 0.20
60		HTP40 @ 0.20
29		TP5 @ 0.1
57		TP8 @ 0.4
32		TP8 @ 2.8
43		TP9 @ 0.6
100		HS1 TS1 @ 0.21
100		HS1 TS2 @ 0.15
130		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
75		HS3 TS1 @ 0.24
75		HS3 TS2 @ 0.25
87		HS3 TS2 @ No depth
65		HS3SS1 @ 0.4
83		HS4 TS1 @ 0.22
78		HS4TS2 @ 0.19
86		HS4 SS1 @ 0.38
110		HS5 TS1 @ 0.16
120		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
110		WAHS1 @ No depth
98		WAHS2 @ No depth
79		WAHS4 @ No depth
0.2		HTP07 @ 0.50
0.2		HTP09 @ 0.20
0.2		HTP10 @ 0.50
0.2		HTP13 @ 0.20
0.3		TP19 @ 0.5
0.3		TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

130 = GAC (critical conc.) (mg/kg)

41 = no. samples

0.2 = min. value

150 = max. value

76.61951 = mean

41.93561 = standard deviation

3 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

6 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	**One-sided Chebychev Theorem**
-8.150637 = t_0	-8.15064 = k_0
1.684 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
87.64843 = 95% UCL (US_{95})	105.1742 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 105.1742 GAC = 130 (US95 = 0.809 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

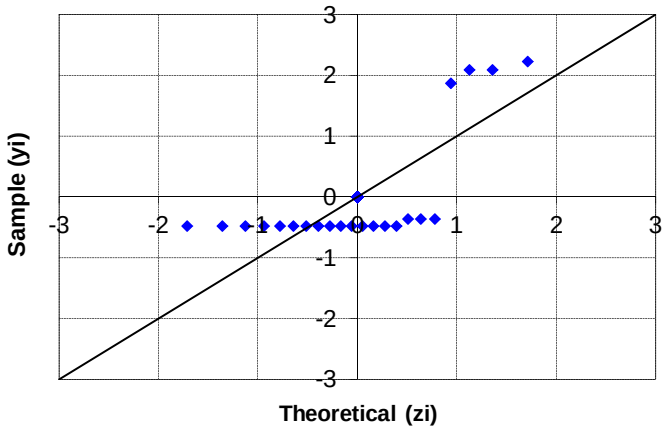
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

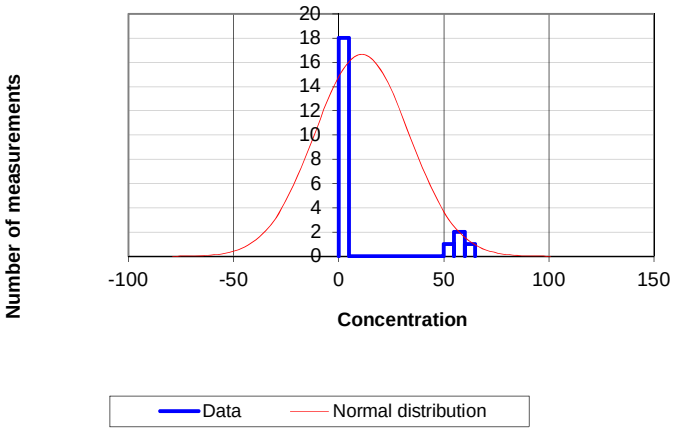
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Selenium		
0.2		HTP15 @ 0.25
0.2		HTP17 @ 0.15
0.2		HTP20 @ 0.15
0.2		HTP22 @ 0.20
0.2		HTP24 @ 0.20
0.22		HTP25 @ 0.15
0.2		HTP26 @ 0.10
0.2		HTP29 @ 0.15
0.2		HTP33 @ 0.25
0.2		HTP39 @ 0.20
0.2		HTP40 @ 0.20
0.3		TP5 @ 0.1
0.3		TP8 @ 0.4
0.3		TP8 @ 2.8
0.3		TP9 @ 0.6
3	Yes	WAHS1 @ No depth
3	Yes	WAHS2 @ No depth
3	Yes	WAHS4 @ No depth
61	Yes	HTP07 @ 0.50
58	Yes	HTP09 @ 0.20
58	Yes	HTP10 @ 0.50
53	Yes	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Selenium



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

350 = GAC (critical conc.) (mg/kg)

22 = no. samples

0.2 = min. value

61 = max. value

11.01909 = mean

22.48233 = standard deviation

0 = no. samples > or = GAC

0.2 = laboratory reporting limit (RL)

10 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-70.72048 = t_0	-70.7205 = k_0
1.721 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
19.26827 = 95% UCL (US_{95})	31.91766 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 31.917658 GAC = 350 (US95 = 0.091 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

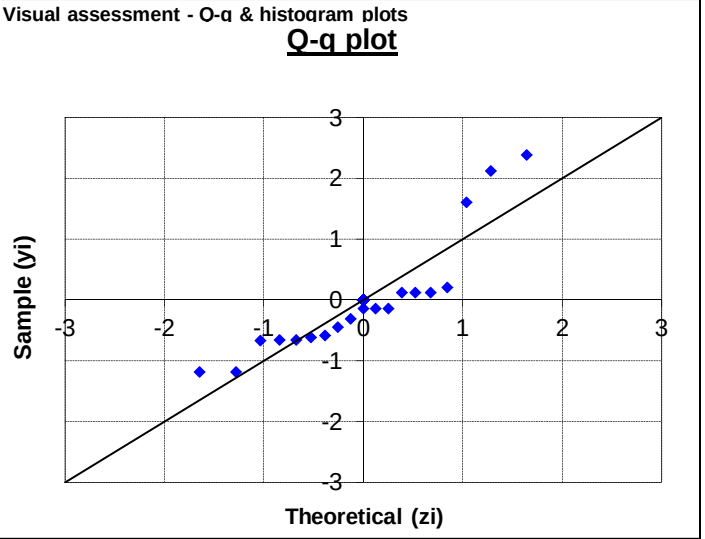
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

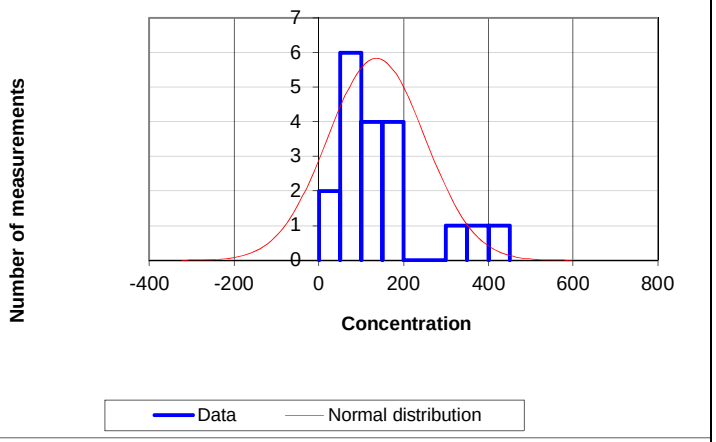
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Vanadium	Potential Outlier?	Sample
410	Yes	HTP15 @ 0.25
120		HTP17 @ 0.15
150		HTP20 @ 0.15
150		HTP22 @ 0.20
160		HTP24 @ 0.20
380		HTP25 @ 0.15
320		HTP26 @ 0.10
120		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
0.5		TP5 @ 0.1
0.5		TP8 @ 0.4
85		HTP07 @ 0.50
59		HTP09 @ 0.20
66		HTP10 @ 0.50
61		HTP13 @ 0.20
60		TP19 @ 0.5
69		TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

74 = GAC (critical conc.) (mg/kg)
19 = no. samples
0.5 = min. value
410 = max. value
135.8421 = mean (mean>GAC)
114.9241 = standard deviation
12 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
2 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
2.345578 = t_0	2.345578 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
181.5597 = 95% UCL (US_{95})	250.7953 = 95% UCL (US_{95})

Results of significance test at 95% confidence level
Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC
Data set treated as **non-normally distributed**
Therefore:
Use Chebychev Theorem - Ho accepted, true mean >GAC
US_{95} = 250.79527 GAC = 74 (US95 = 3.389 x GAC)

FURTHER ASSESSMENT REQUIRED

Site reference
Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

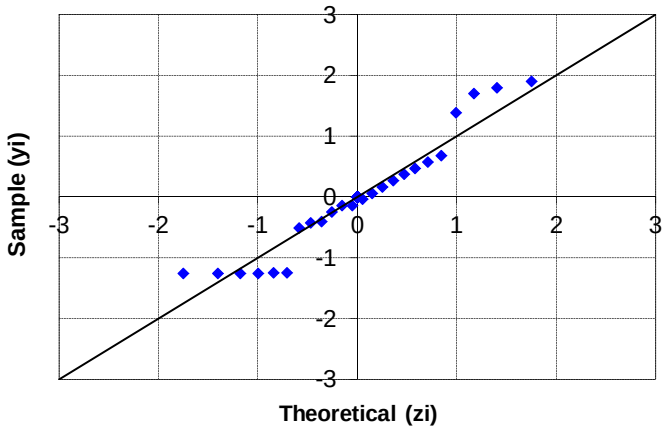
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

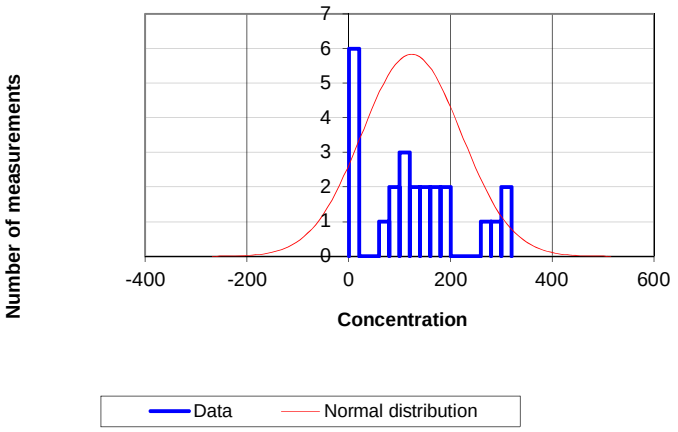
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Zinc		
190		HTP15 @ 0.25
110		HTP17 @ 0.15
180		HTP20 @ 0.15
140		HTP22 @ 0.20
160		HTP24 @ 0.20
300		HTP25 @ 0.15
260		HTP26 @ 0.10
110		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
82		TP5 @ 0.1
130		TP8 @ 0.4
74		TP8 @ 2.8
84		TP9 @ 0.6
310		WAHS1 @ No depth
290		WAHS2 @ No depth
170		WAHS4 @ No depth
0.5		HTP07 @ 0.50
0.5		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.5		HTP13 @ 0.20
2		TP19 @ 0.5
2		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3700 = GAC (critical conc.) (mg/kg)

24 = no. samples

0.5 = min. value

310 = max. value

123.5833 = mean

98.04986 = standard deviation

0 = no. samples > or = GAC

10 = laboratory reporting limit (RL)

6 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-178.6927	$= t_0$	-178.693	$= k_0$
1.714	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
157.8879	= 95% UCL (US_{95})	210.8459	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 210.84587 GAC = 3700 (US95 = 0.057 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

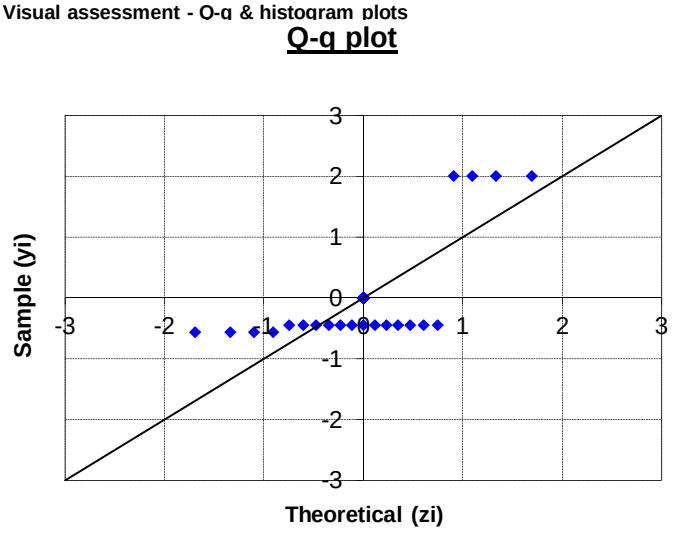
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

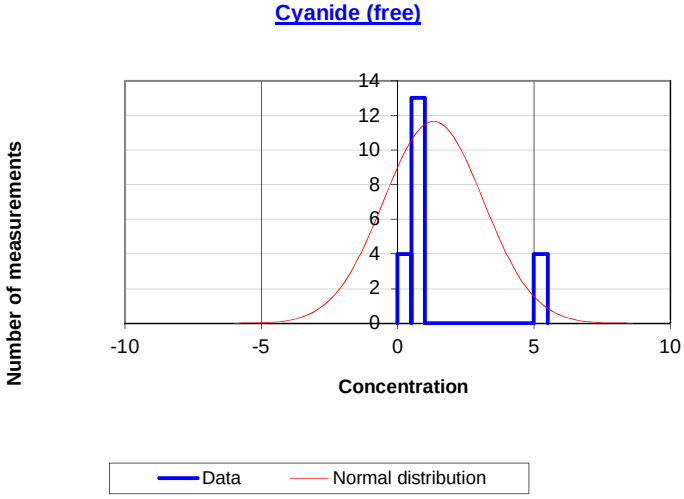
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Cyanide (free)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
5	n/a	TP5 @ 0.1
5	n/a	TP8 @ 0.4
5	n/a	TP8 @ 2.8
5	n/a	TP9 @ 0.6
0.3	n/a	HTP07 @ 0.50
0.3	n/a	HTP09 @ 0.20
0.3	n/a	HTP10 @ 0.50
0.3	n/a	HTP13 @ 0.20
0.5	n/a	TP19 @ 0.5
0.5	n/a	TP21 @ 0.4

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

750 = GAC (critical conc.) (mg/kg)

21 = no. samples
0 = no. samples > or = GAC
0.3 = min. value
5 = max. value
0.5 = laboratory reporting limit (RL)
1.319048 = mean
17 = no. samples at RL
1.831289 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-1873.482	$= t_0$	-1873.48	$= k_0$
1.725	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
2.008392	= 95% UCL (US_{95})	3.061391	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 3.0613908 GAC = 750 (US95 = 0.004 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

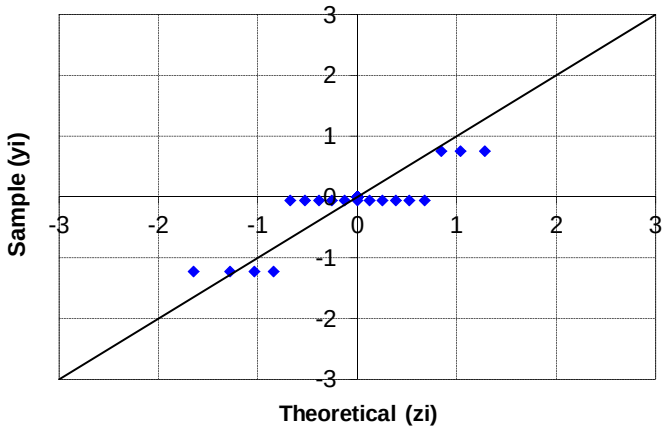
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

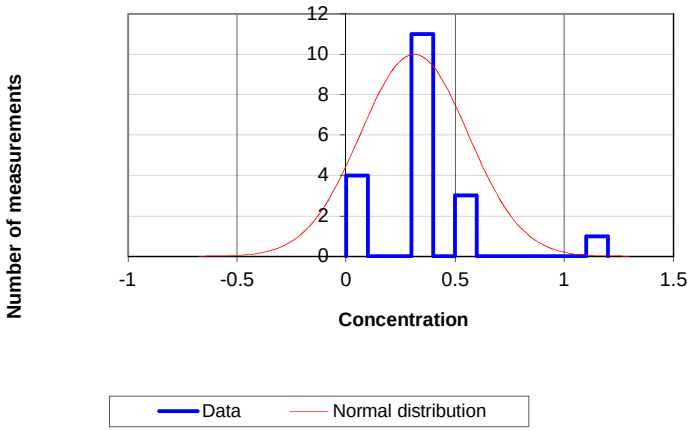
Phenol (total)	Potential Outlier?	Sample
0.3	n/a	HTP15 @ 0.25
0.3	n/a	HTP17 @ 0.15
0.3	n/a	HTP20 @ 0.15
0.3	n/a	HTP22 @ 0.20
0.3	n/a	HTP24 @ 0.20
0.3	n/a	HTP25 @ 0.15
0.3	n/a	HTP26 @ 0.10
0.3	n/a	HTP29 @ 0.15
0.3	n/a	HTP33 @ 0.25
0.3	n/a	HTP39 @ 0.20
0.3	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
1.1	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Phenol (total)



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

290 = GAC (critical conc.) (mg/kg)

19	= no. samples	0	= no. samples > or = GAC
0.01	= min. value		
1.1	= max. value	0.3	= laboratory reporting limit (RL)
0.312632	= mean	15	= no. samples at RL
0.24646	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-5123.413	= t_0	-5123.41	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.410675	= 95% UCL (US_{95})	0.559154	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5591542 GAC = 290 (US95 = 0.002 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

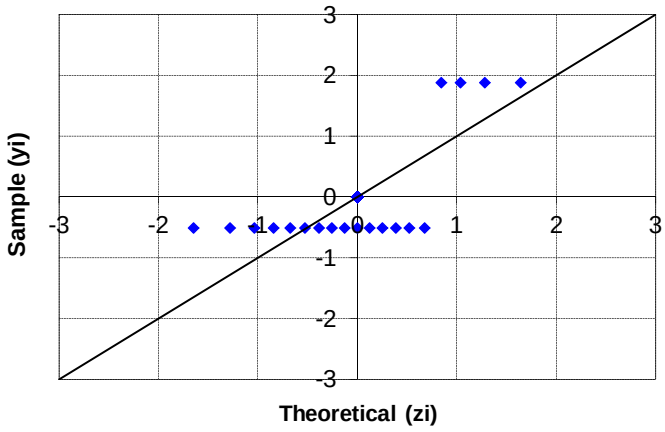
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

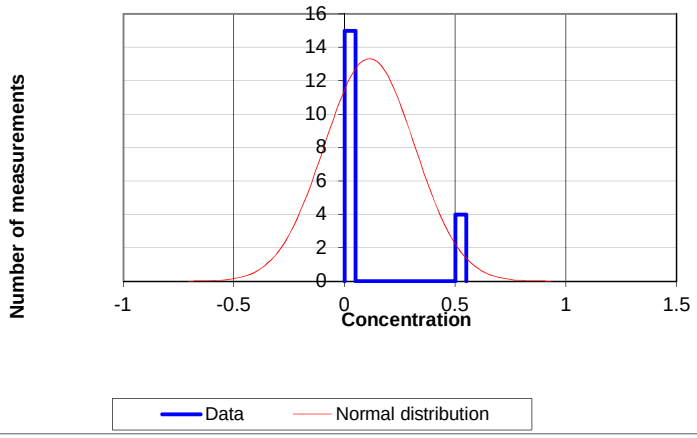
Acenaphthene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Acenaphthene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

480 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.113158 = mean	15 = no. samples at RL
0.205238 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-10191.94 = t_0	-10191.9 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.194803 = 95% UCL (US_{95})	0.318448 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3184482 GAC = 480 (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

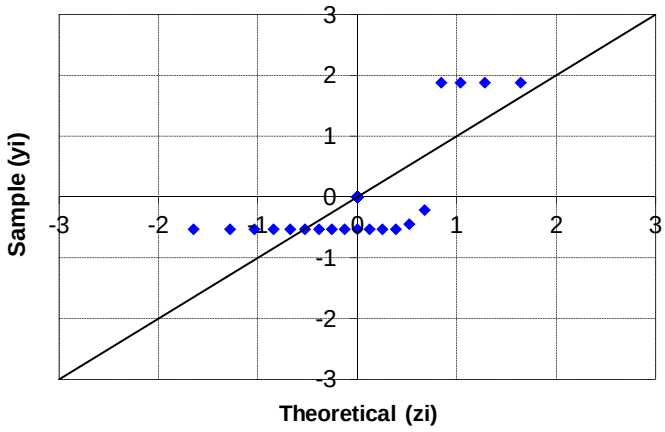
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

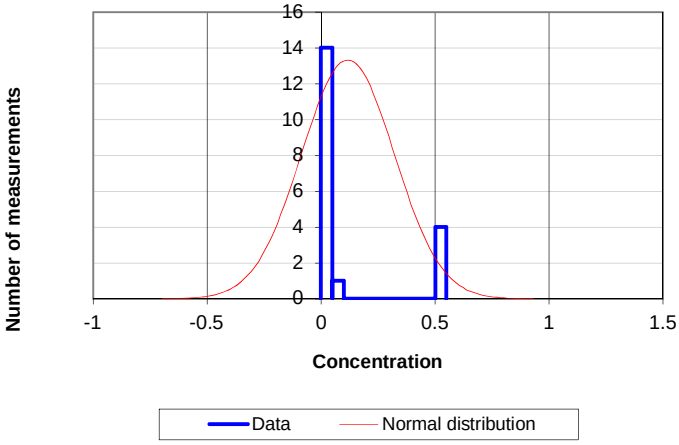
Acenaphthylene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.073	n/a	HTP39 @ 0.20
0.026	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Acenaphthylene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

400 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.117316 = mean	13 = no. samples at RL
0.203553 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8563.121 = t_0	-8563.12 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.198291 = 95% UCL (US_{95})	0.32092 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3209201 GAC = 400 (US95 = 0.001 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

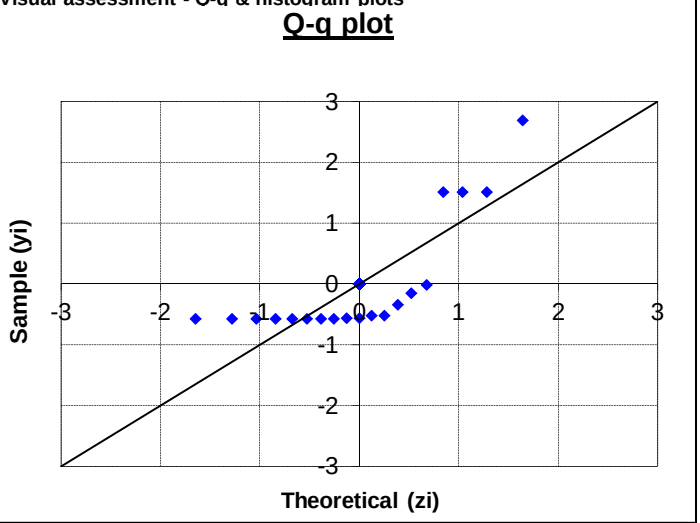
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

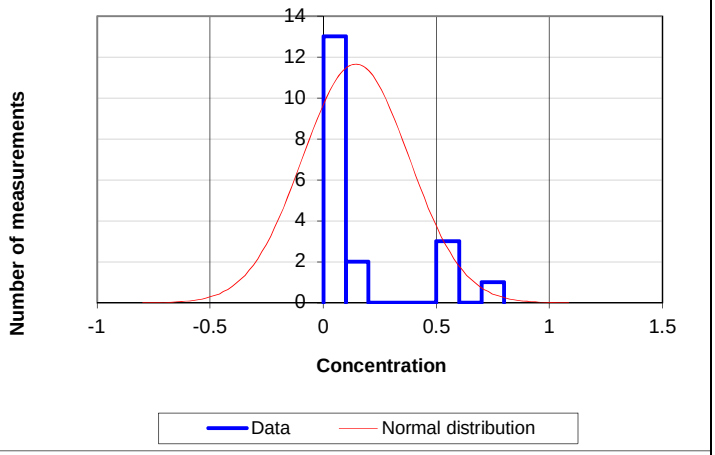
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Anthracene	Potential Outlier?	Sample
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.11	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.01		HTP26 @ 0.10
0.012		HTP29 @ 0.15
0.01		HTP33 @ 0.25
0.14	Yes	HTP39 @ 0.20
0.064	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
0.78	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.023	Yes	HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.012		HTP10 @ 0.50
0.021		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4900 = GAC (critical conc.) (mg/kg)

19	= no. samples	0 = no. samples > or = GAC
0.01	= min. value	
0.78	= max. value	0.01 = laboratory reporting limit (RL)
0.144316	= mean	8 = no. samples at RL
0.235766	= standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-90589.76 = t_0	-90589.8 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.238105 = 95% UCL (US_{95})	0.380141 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3801412 GAC = 4900 (US95 = 0 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

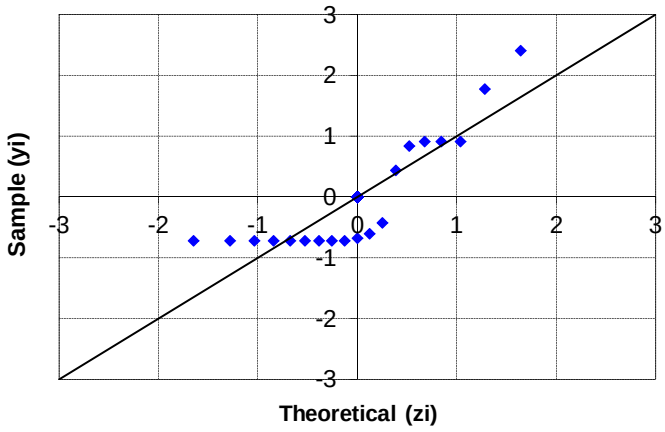
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

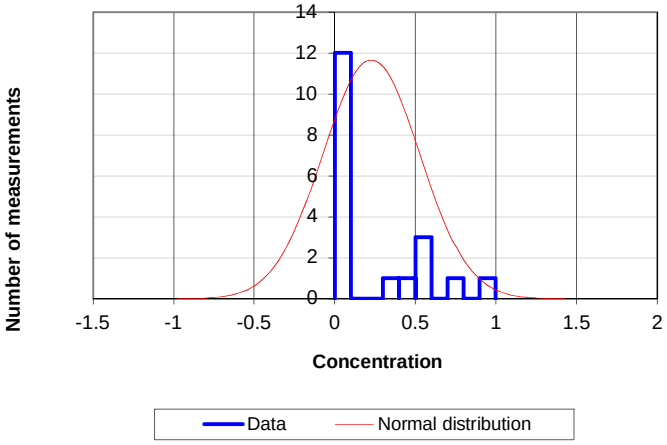
Benz(a)anthracene	Potential Outlier?	Sample
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.36	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.047		HTP26 @ 0.10
0.099	Yes	HTP29 @ 0.15
0.023		HTP33 @ 0.25
0.95	Yes	HTP39 @ 0.20
0.48	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
0.76	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.01		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.01		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Benz(a)anthracene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

4.7 = GAC (critical conc.) (mg/kg)

19	= no. samples	0	= no. samples > or = GAC
0.01	= min. value		
0.95	= max. value	0.01	= laboratory reporting limit (RL)
0.226789	= mean	9	= no. samples at RL
0.300583	= standard deviation	RL is limit of detection of the method used	

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-64.86817	= t_0	-64.8682	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.346363	= 95% UCL (US_{95})	0.527448	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5274485 GAC = 4.7 (US95 = 0.112 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

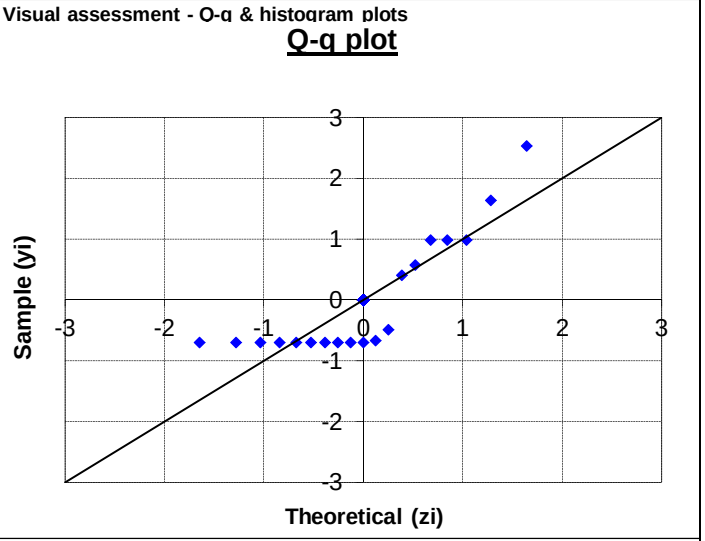
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

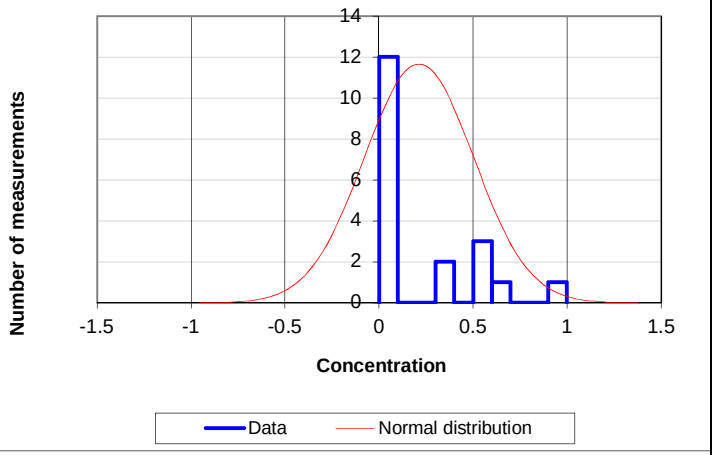
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Benzo(a)pyrene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.38	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.07	n/a	HTP29 @ 0.15
0.018	n/a	HTP33 @ 0.25
0.69	n/a	HTP39 @ 0.20
0.33	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.95	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.94 = GAC (critical conc.) (mg/kg)

19 = no. samples	1 = no. samples > or = GAC
0.01 = min. value	
0.95 = max. value	0.01 = laboratory reporting limit (RL)
0.212526 = mean	10 = no. samples at RL
0.291542 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-10.87659 = t_0	-10.8766 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.328504 = 95% UCL (US_{95})	0.504142 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5041421 GAC = 0.94 (US95 = 0.536 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

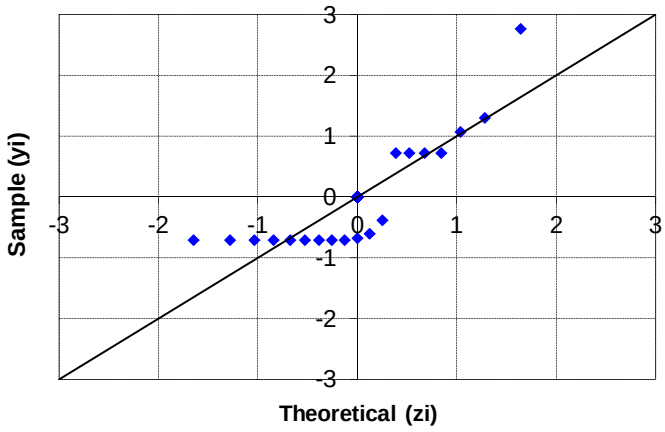
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

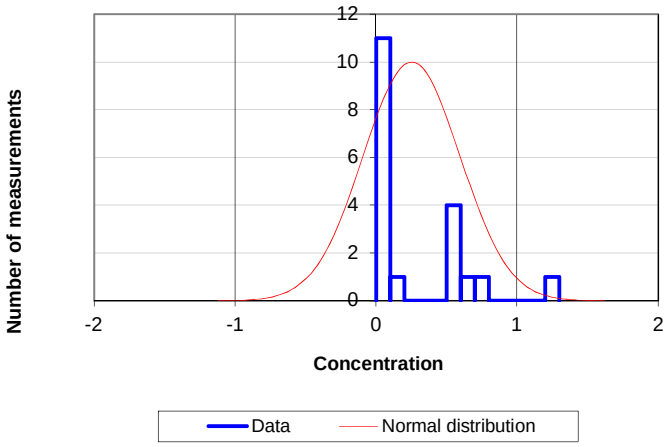
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(b)fluoranthene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.5	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.046		HTP26 @ 0.10
0.12	Yes	HTP29 @ 0.15
0.021		HTP33 @ 0.25
1.2	Yes	HTP39 @ 0.20
0.62	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
0.7	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.01		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.01		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Benzo(b)fluoranthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

6.5 = GAC (critical conc.) (mg/kg)

19	= no. samples	0	= no. samples > or = GAC
0.01	= min. value		
1.2	= max. value	0.01	= laboratory reporting limit (RL)
0.252474	= mean	9	= no. samples at RL
0.34328	= standard deviation		RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-79.32981	= t_0	-79.3298	= k_0
1.734	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
0.389033	= 95% UCL (US_{95})	0.59584	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.5958404 GAC = 6.5 (US95 = 0.092 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

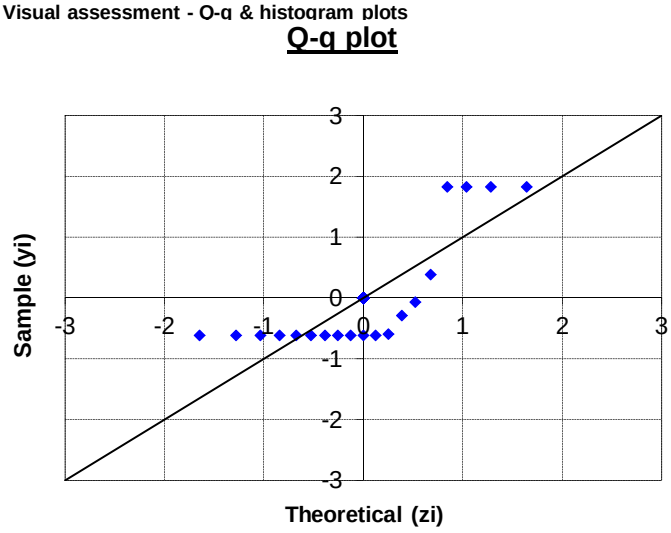
Mean Absolute Deviation for potential outliers

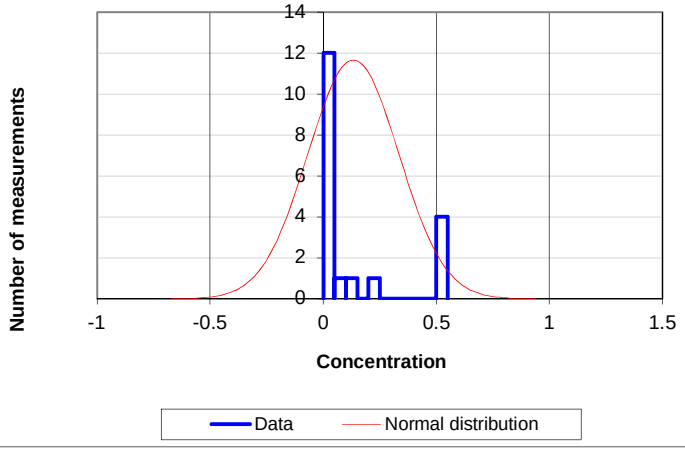
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(ghi)perylene		
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.12	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.013	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.21	n/a	HTP39 @ 0.20
0.076	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

46 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.5 = max. value

0.01 = laboratory reporting limit (RL)

0.133105 = mean

11 = no. samples at RL

0.201235 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-993.5093 = t_0	-993.509 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.213158 = 95% UCL (US_{95})	0.334391 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3343914 GAC = 46 (US95 = 0.007 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

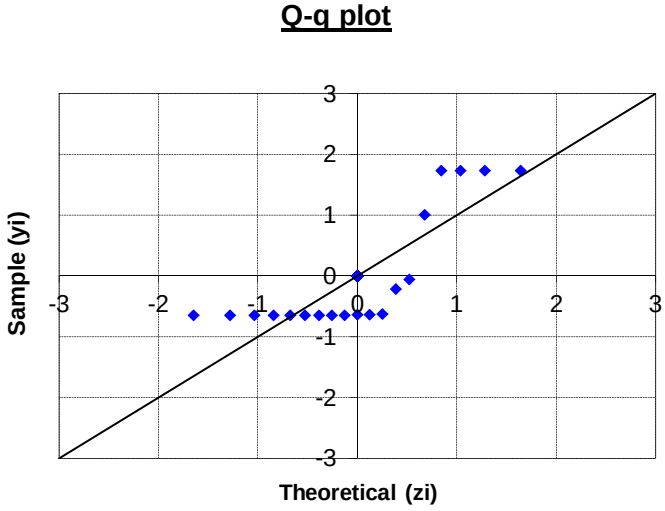
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

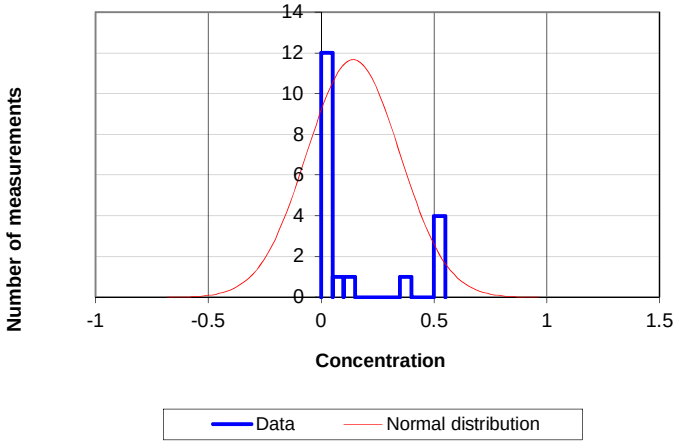
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Benzo(k)fluoranthene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.13	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.01		HTP26 @ 0.10
0.011		HTP29 @ 0.15
0.01		HTP33 @ 0.25
0.35	Yes	HTP39 @ 0.20
0.099	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
0.5	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.013		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.012		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

9.6 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.5 = max. value

0.01 = laboratory reporting limit (RL)

0.142368 = mean

9 = no. samples at RL

0.206213 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-199.914 = t_0	-199.914 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.224401 = 95% UCL (US_{95})	0.348634 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3486335 GAC = 9.6 (US95 = 0.036 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

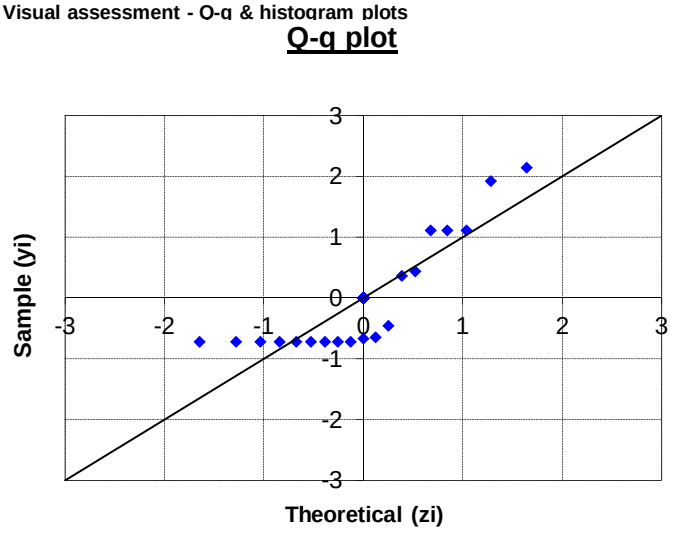
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

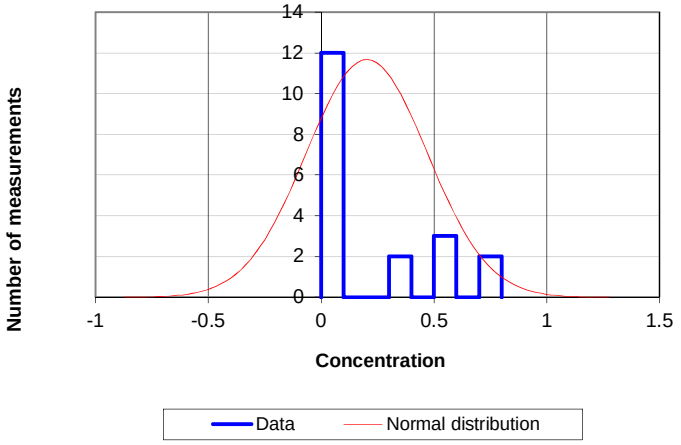
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chrysene		
0.01		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.3	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.029		HTP26 @ 0.10
0.08		HTP29 @ 0.15
0.024		HTP33 @ 0.25
0.78	Yes	HTP39 @ 0.20
0.32	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
0.72	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.01		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.01		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

8 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.78 = max. value	0.01 = laboratory reporting limit (RL)
0.202263 = mean	9 = no. samples at RL
0.268806 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-126.4464 = t_0	-126.446 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.309196 = 95% UCL (US_{95})	0.471137 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.471137 GAC = 8 (US95 = 0.059 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

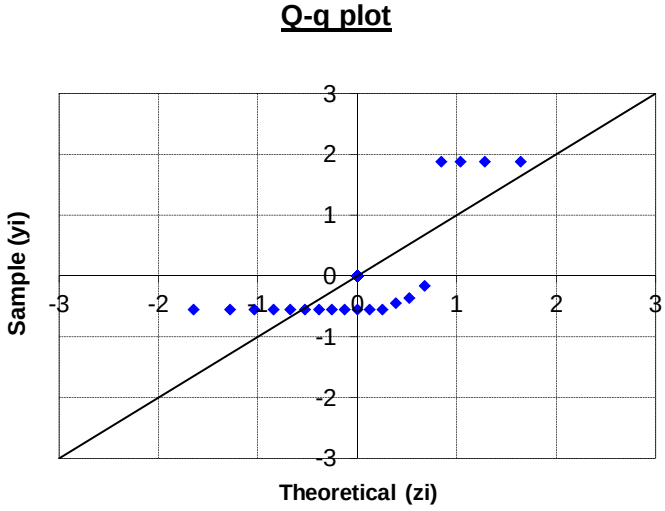
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

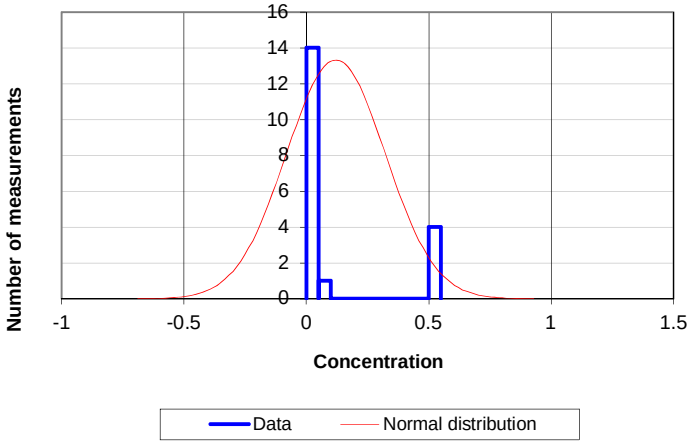
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Dibenz(a,h)anthracene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.047	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.031	n/a	HTP10 @ 0.50
0.088	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

0.86 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
0.5 = max. value	0.01 = laboratory reporting limit (RL)
0.120316 = mean	12 = no. samples at RL
0.202357 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-15.93325 = t_0	-15.9333 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.200815 = 95% UCL (US_{95})	0.322724 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3227241 GAC = 0.86 (US95 = 0.375 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

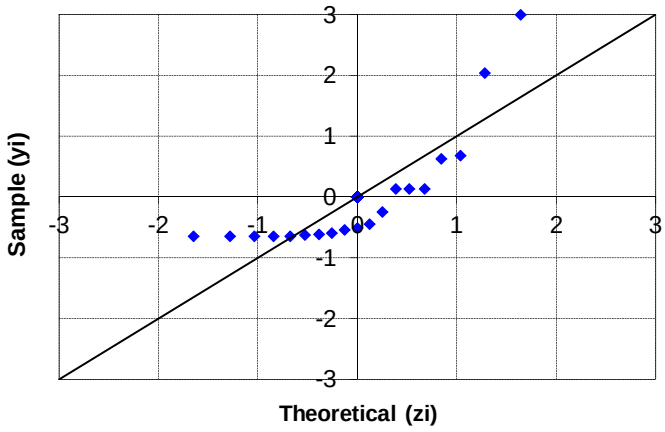
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

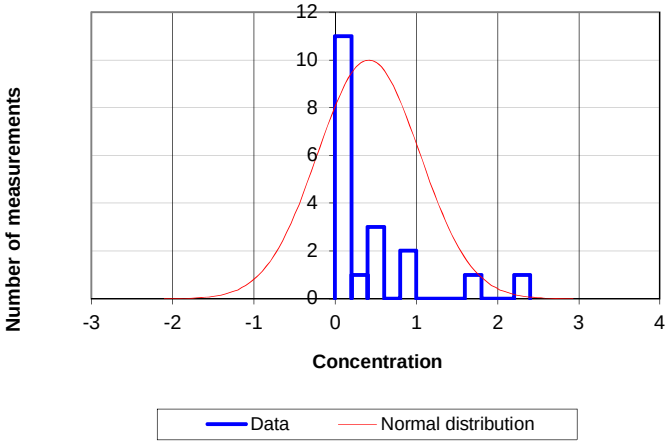
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Fluoranthene		
0.096		HTP15 @ 0.25
0.019		HTP17 @ 0.15
0.81	Yes	HTP20 @ 0.15
0.043		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.028		HTP25 @ 0.15
0.13		HTP26 @ 0.10
0.26		HTP29 @ 0.15
0.076		HTP33 @ 0.25
1.7	Yes	HTP39 @ 0.20
0.84	Yes	HTP40 @ 0.20
0.5		TP5 @ 0.1
2.3	Yes	TP8 @ 0.4
0.5		TP8 @ 2.8
0.5		TP9 @ 0.6
0.01		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.01		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Fluoranthene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

460 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

2.3 = max. value

0.01 = laboratory reporting limit (RL)

0.413263 = mean

5 = no. samples at RL

0.630244 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-3178.596 = t_0	-3178.6 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.663979 = 95% UCL (US_{95})	1.043667 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.0436667 GAC = 460 (US95 = 0.002 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

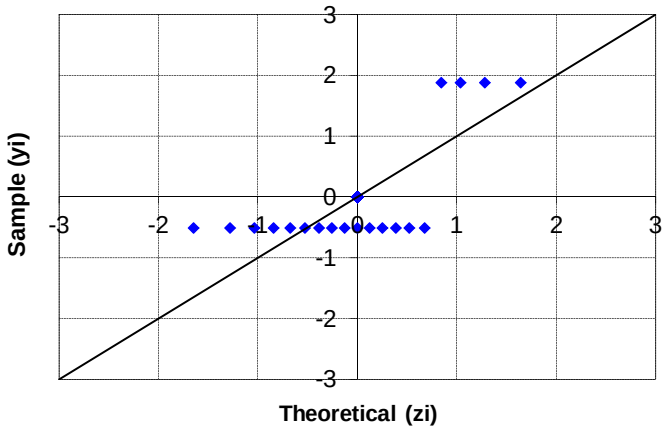
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

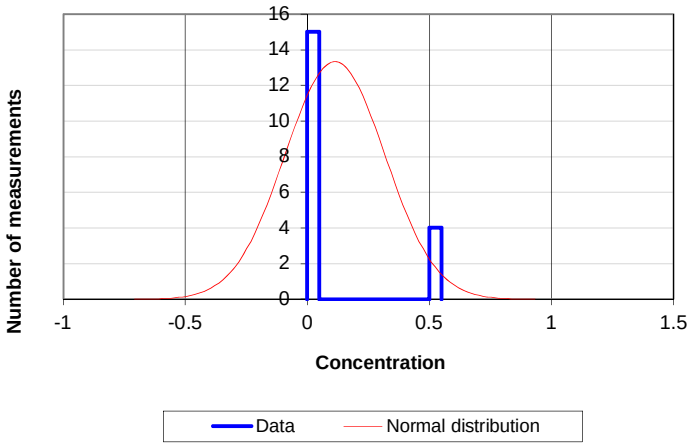
Fluorene	Potential Outlier?	Sample
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Fluorene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

380 = GAC (critical conc.) (mg/kg)

19 = no. samples
0 = no. samples > or = GAC
0.01 = min. value
0.5 = max. value
0.01 = laboratory reporting limit (RL)
0.113158 = mean
15 = no. samples at RL
0.205238 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8068.121 = t_0	-8068.12 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.194803 = 95% UCL (US_{95})	0.318448 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3184482 GAC = 380 (US95 = 0.001 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Mean Absolute Deviation for potential outliers

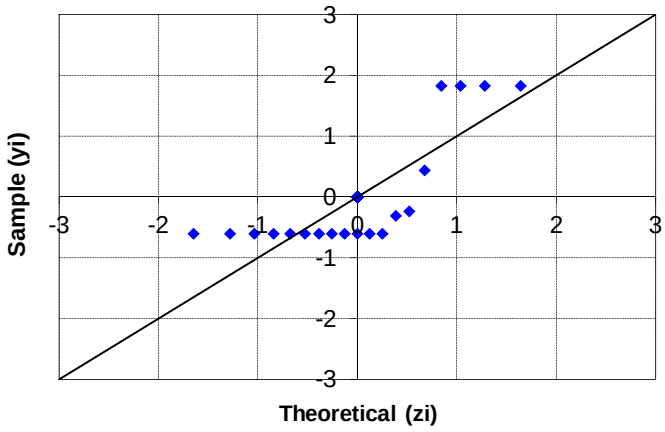
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

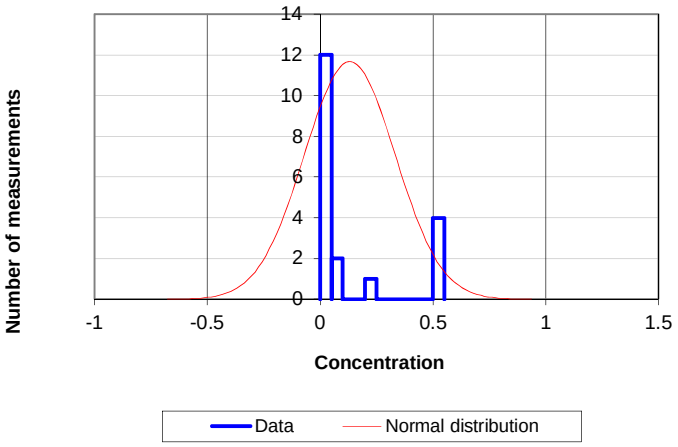
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Indeno(1,2,3,cd)pyrene		
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.083	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.22	n/a	HTP39 @ 0.20
0.069	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
0.5	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.01	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.01	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Indeno(1,2,3,cd)pyrene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.9 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

0.5 = max. value

0.01 = laboratory reporting limit (RL)

0.131158 = mean

12 = no. samples at RL

0.201991 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-81.33048	$= t_0$	-81.3305	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
0.211511	= 95% UCL (US_{95})	0.3332	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.3331996 GAC = 3.9 (US95 = 0.085 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Naphthalene		
0.01	n/a	HTP15 @ 0.25
0.01	n/a	HTP17 @ 0.15
0.01	n/a	HTP20 @ 0.15
0.01	n/a	HTP22 @ 0.20
0.01	n/a	HTP24 @ 0.20
0.01	n/a	HTP25 @ 0.15
0.01	n/a	HTP26 @ 0.10
0.01	n/a	HTP29 @ 0.15
0.01	n/a	HTP33 @ 0.25
0.01	n/a	HTP39 @ 0.20
0.01	n/a	HTP40 @ 0.20
0.5	n/a	TP5 @ 0.1
1.1	n/a	TP8 @ 0.4
0.5	n/a	TP8 @ 2.8
0.5	n/a	TP9 @ 0.6
0.018	n/a	HTP07 @ 0.50
0.01	n/a	HTP09 @ 0.20
0.01	n/a	HTP10 @ 0.50
0.014	n/a	HTP13 @ 0.20

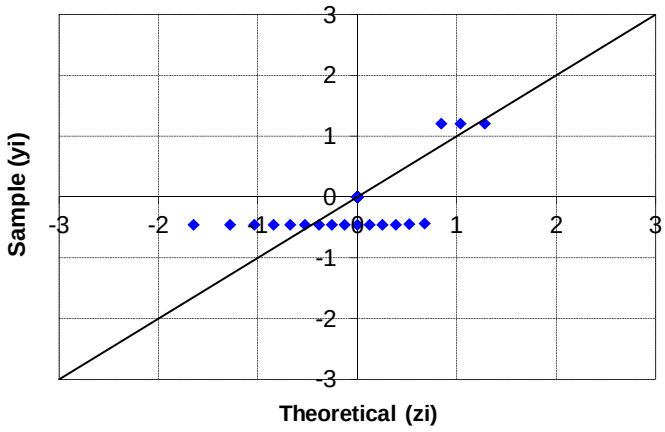
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

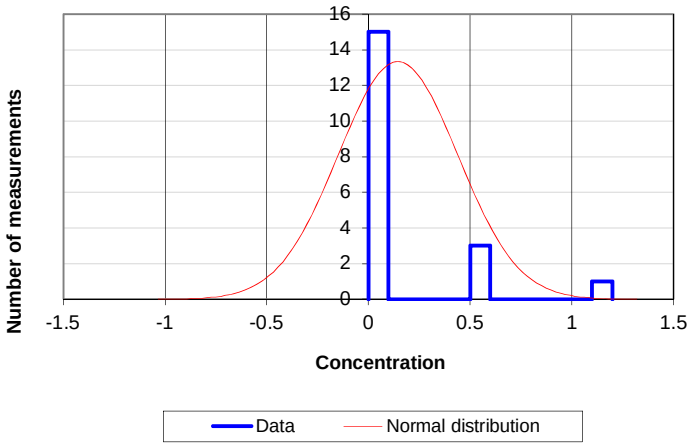
Note - MAD not applicable as 50% or more of values are the same.

Visual assessment - Q-q & histogram plots

Q-q plot



Naphthalene



Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

3.7 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
1.1 = max. value	0.01 = laboratory reporting limit (RL)
0.145368 = mean	13 = no. samples at RL
0.294422 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-52.62618 = t_0	-52.6262 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.262491 = 95% UCL (US_{95})	0.439864 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.4398643 GAC = 3.7 (US95 = 0.119 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

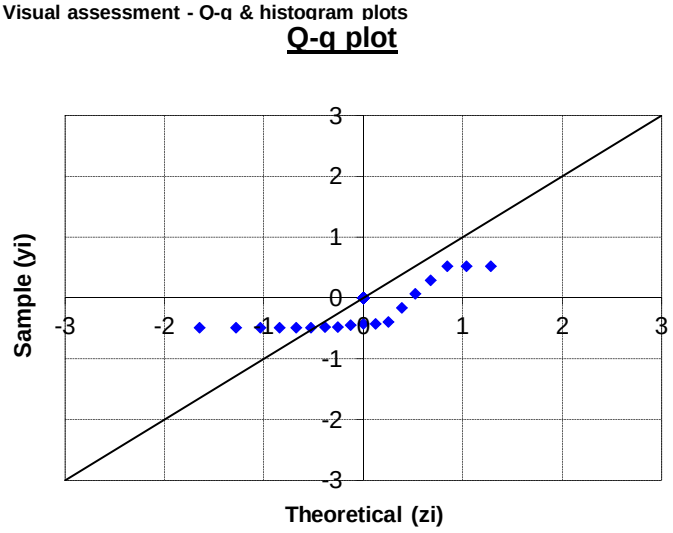
STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

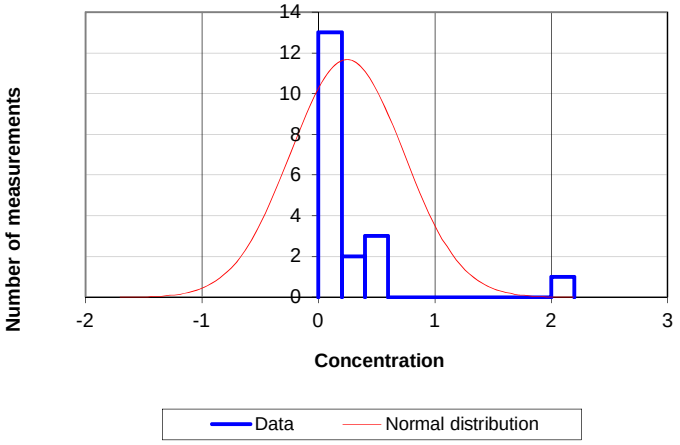
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Phenanthrene		
0.039		HTP15 @ 0.25
0.01		HTP17 @ 0.15
0.39	Yes	HTP20 @ 0.15
0.01		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.01		HTP25 @ 0.15
0.043		HTP26 @ 0.10
0.059		HTP29 @ 0.15
0.029		HTP33 @ 0.25
0.28	Yes	HTP39 @ 0.20
0.17		HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
2.1	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.018		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.01		HTP10 @ 0.50
0.014		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data — Risk parameter

Human health - residential with plant uptake (2.5%SOM)

200 = GAC (critical conc.) (mg/kg)

19 = no. samples

0 = no. samples > or = GAC

0.01 = min. value

2.1 = max. value

0.01 = laboratory reporting limit (RL)

0.247474 = mean

6 = no. samples at RL

0.486746 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-1788.82 = t_0	-1788.82 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.441105 = 95% UCL (US_{95})	0.734343 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.7343427 GAC = 200 (US95 = 0.004 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

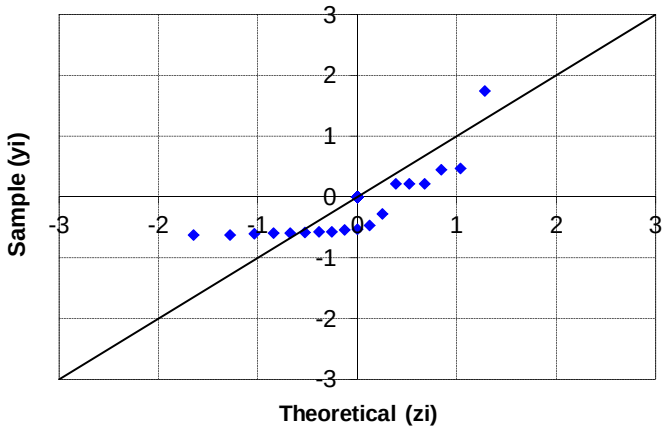
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

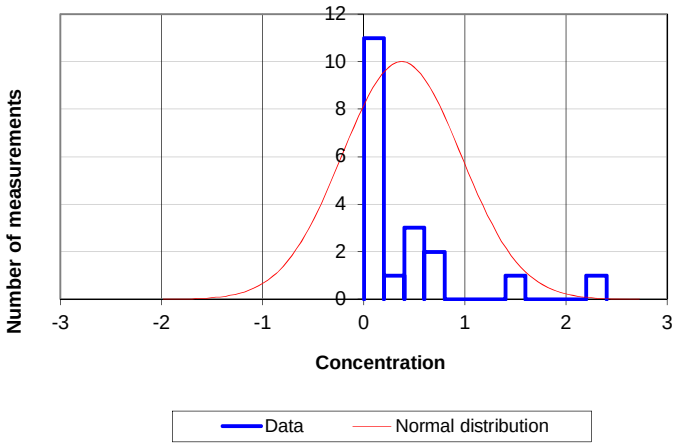
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Pyrene		
0.037		HTP15 @ 0.25
0.028		HTP17 @ 0.15
0.64	Yes	HTP20 @ 0.15
0.03		HTP22 @ 0.20
0.01		HTP24 @ 0.20
0.024		HTP25 @ 0.15
0.1		HTP26 @ 0.10
0.21		HTP29 @ 0.15
0.056		HTP33 @ 0.25
1.4	Yes	HTP39 @ 0.20
0.65	Yes	HTP40 @ 0.20
0.5	Yes	TP5 @ 0.1
2.3	Yes	TP8 @ 0.4
0.5	Yes	TP8 @ 2.8
0.5	Yes	TP9 @ 0.6
0.035		HTP07 @ 0.50
0.01		HTP09 @ 0.20
0.017		HTP10 @ 0.50
0.061		HTP13 @ 0.20

Visual assessment - Q-q & histogram plots

Q-q plot



Pyrene



Basic data Risk parameter

Human health - residential with plant uptake (2.5%SOM)

1000 = GAC (critical conc.) (mg/kg)

19 = no. samples	0 = no. samples > or = GAC
0.01 = min. value	
2.3 = max. value	0.01 = laboratory reporting limit (RL)
0.374105 = mean	2 = no. samples at RL
0.588749 = standard deviation	RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-7400.891 = t_0	-7400.89 = k_0
1.734 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
0.608314 = 95% UCL (US_{95})	0.963003 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.9630031 GAC = 1000 (US95 = 0.001 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

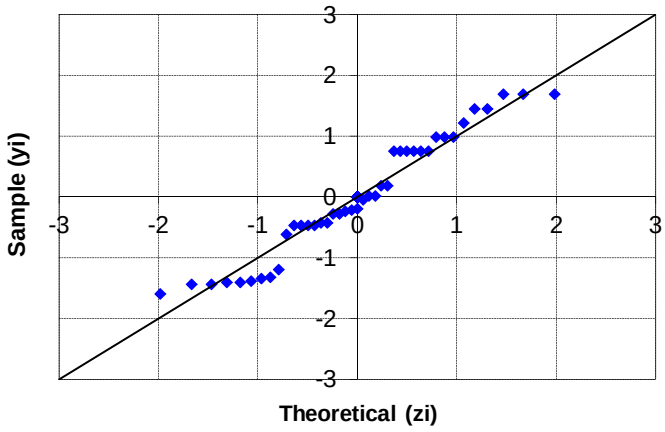
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

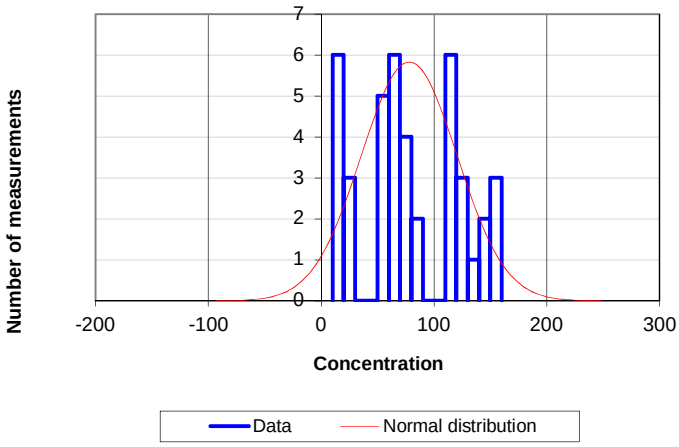
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Arsenic		
110		HTP15 @ 0.25
66		HTP17 @ 0.15
68		HTP20 @ 0.15
86		HTP22 @ 0.20
79		HTP24 @ 0.20
140		HTP25 @ 0.15
120		HTP26 @ 0.10
58		HTP29 @ 0.15
76		HTP33 @ 0.25
52		HTP39 @ 0.20
58		HTP40 @ 0.20
19		TP5 @ 0.1
58		TP8 @ 0.4
17		TP8 @ 2.8
27		TP9 @ 0.6
120		HS1 TS1 @ 0.21
140		HS1 TS2 @ 0.15
150		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
60		HS3 TS1 @ 0.24
66		HS3 TS2 @ 0.25
86		HS3 TS2 @ No depth
58		HS3SS1 @ 0.4
79		HS4 TS1 @ 0.22
60		HS4TS2 @ 0.19
70		HS4 SS1 @ 0.38
130		HS5 TS1 @ 0.16
110		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
150		WAHS1 @ No depth
120		WAHS2 @ No depth
69		WAHS4 @ No depth
18		HTP07 @ 0.50
22		HTP09 @ 0.20
18		HTP10 @ 0.50
17		HTP13 @ 0.20
10		TP19 @ 0.5
21		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Arsenic



Basic data

Risk parameter: **Plant life pH >7**

250 = GAC (critical conc.) (mg/kg)

41 = no. samples

10 = min. value

150 = max. value

78 = mean

42.63332 = standard deviation

0 = no. samples > or = GAC

2 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-25.83278 = t_0	-25.8328 = k_0
1.684 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
89.21242 = 95% UCL (US_{95})	107.0298 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 107.02978 GAC = 250 (US95 = 0.428 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

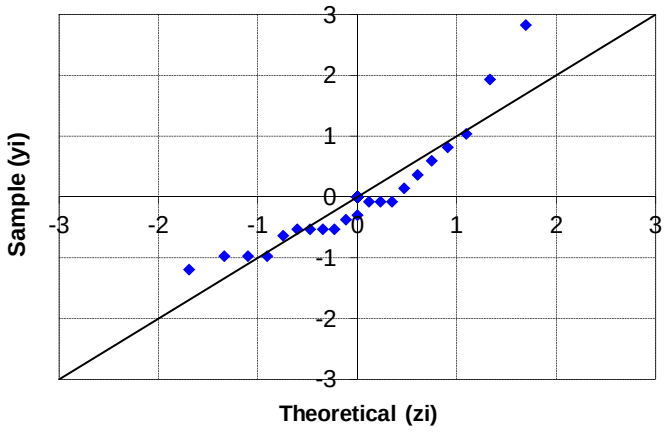
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

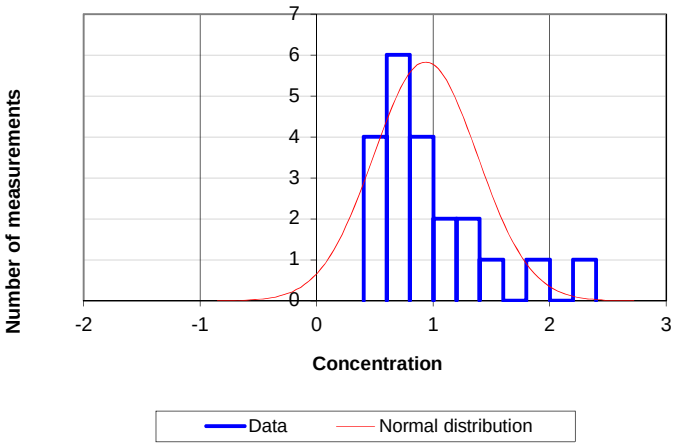
Boron	Potential Outlier?	Sample
0.8		HTP15 @ 0.25
0.9		HTP17 @ 0.15
1.4		HTP20 @ 0.15
0.7		HTP22 @ 0.20
0.9		HTP24 @ 0.20
0.5		HTP25 @ 0.15
1.1		HTP26 @ 0.10
1.3		HTP29 @ 0.15
1.2		HTP33 @ 0.25
0.7		HTP39 @ 0.20
0.9		HTP40 @ 0.20
1.8		TP5 @ 0.1
1		TP8 @ 0.4
2.2	Yes	TP8 @ 2.8
0.7		TP9 @ 0.6
0.5		HTP07 @ 0.50
0.4		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.7		HTP13 @ 0.20
0.65		TP19 @ 0.5
0.77		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Boron



Basic data

Risk parameter
Plant life pH >7

3 = GAC (critical conc.) (mg/kg)

21 = no. samples
0 = no. samples > or = GAC
0.4 = min. value
2.2 = max. value
0.4 = laboratory reporting limit (RL)
0.934286 = mean
1 = no. samples at RL
0.447477 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-21.15481	= t_0	-21.1548	= k_0
1.725	= $t_{(n-1,0.95)}$	4.36	= $k_{0.05}$
1.102728	= 95% UCL (US_{95})	1.360029	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 1.3600288 GAC = 3 (US95 = 0.453 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

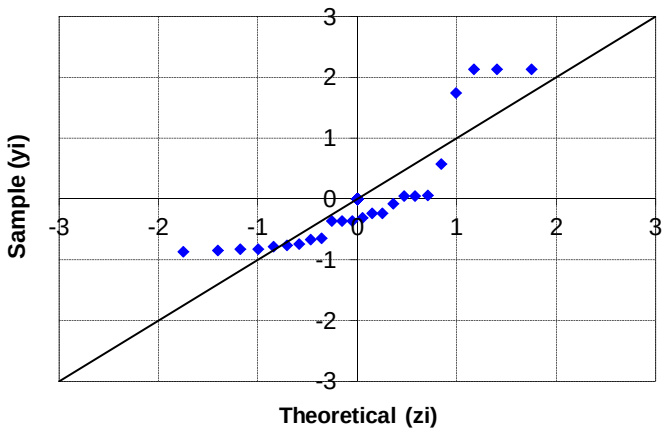
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

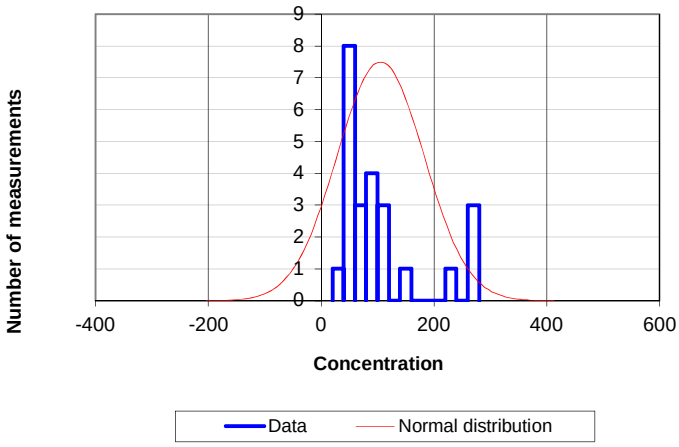
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Chromium (III)		
269.5	Yes	HTP15 @ 0.25
77.5		HTP17 @ 0.15
87.5		HTP20 @ 0.15
109.5		HTP22 @ 0.20
109.5		HTP24 @ 0.20
269.5	Yes	HTP25 @ 0.15
239.5	Yes	HTP26 @ 0.10
77.5		HTP29 @ 0.15
99.5		HTP33 @ 0.25
77.5		HTP39 @ 0.20
81.5		HTP40 @ 0.20
55.57		TP5 @ 0.1
109.8		TP8 @ 0.4
53.8		TP8 @ 2.8
46.6		TP9 @ 0.6
270	Yes	WAHS1 @ No depth
150		WAHS2 @ No depth
87		WAHS4 @ No depth
48.5		HTP07 @ 0.50
40.5		HTP09 @ 0.20
41.5		HTP10 @ 0.50
38.5		HTP13 @ 0.20
42		TP19 @ 0.5
45		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Chromium (III)



Basic data

Risk parameter

Plant life pH >7

400 = GAC (critical conc.) (mg/kg)

24 = no. samples

38.5 = min. value

270 = max. value

105.3029 = mean

77.13763 = standard deviation

0 = no. samples > or = GAC

5 = laboratory reporting limit (RL)

0 = no. samples at RL

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-18.71609 = t_0	-18.7161 = k_0
1.714 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
132.291 = 95% UCL (US_{95})	173.954 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 173.95396 GAC = 400 (US95 = 0.435 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

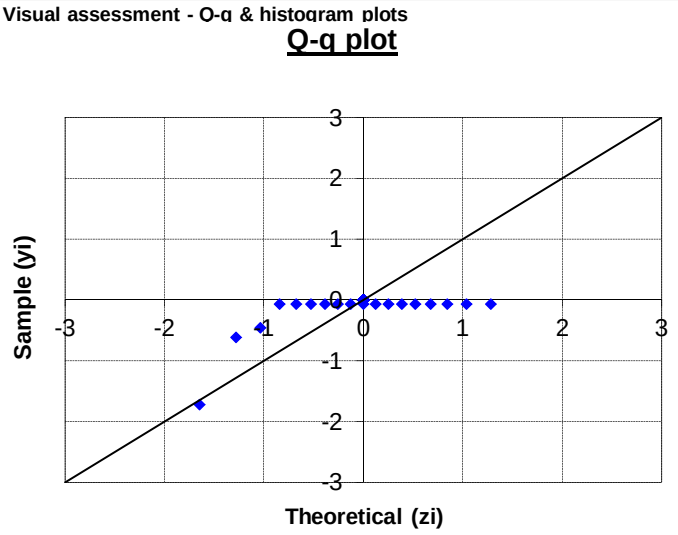
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

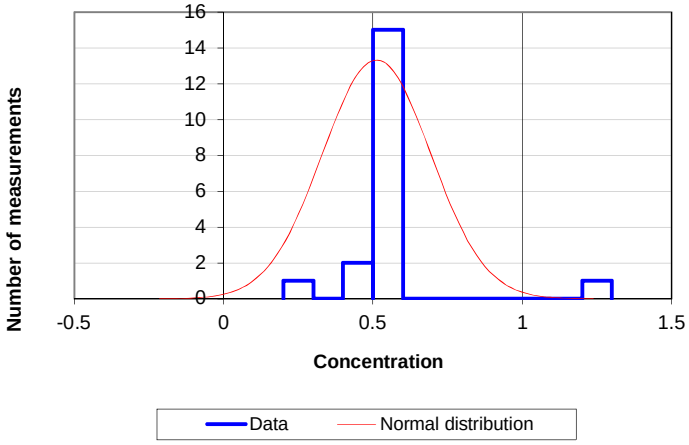
Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

Note - MAD not applicable as 50% or more of values are the same.

Chromium (VI)	Potential Outlier?	Sample
0.5	n/a	HTP15 @ 0.25
0.5	n/a	HTP17 @ 0.15
0.5	n/a	HTP20 @ 0.15
0.5	n/a	HTP22 @ 0.20
0.5	n/a	HTP24 @ 0.20
0.5	n/a	HTP25 @ 0.15
0.5	n/a	HTP26 @ 0.10
0.5	n/a	HTP29 @ 0.15
0.5	n/a	HTP33 @ 0.25
0.5	n/a	HTP39 @ 0.20
0.5	n/a	HTP40 @ 0.20
0.43	n/a	TP5 @ 0.1
0.2	n/a	TP8 @ 0.4
1.2	n/a	TP8 @ 2.8
0.4	n/a	TP9 @ 0.6
0.5	n/a	HTP07 @ 0.50
0.5	n/a	HTP09 @ 0.20
0.5	n/a	HTP10 @ 0.50
0.5	n/a	HTP13 @ 0.20

Visual assessment - Q-q & histogram plots





Basic data

Risk parameter
Plant life pH >7

25 = GAC (critical conc.) (mg/kg)
19 = no. samples
0 = no. samples > or = GAC
0.2 = min. value
1.2 = max. value
0.5 = laboratory reporting limit (RL)
0.512105 = mean
18 = no. samples at RL
0.181371 = standard deviation
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-588.5199	$= t_0$	-588.52	$= k_0$
1.734	$= t_{(n-1,0.95)}$	4.36	$= k_{0.05}$
0.584256	= 95% UCL (US_{95})	0.693522	= 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 0.6935218 GAC = 25 (US95 = 0.028 x GAC)

Site reference **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

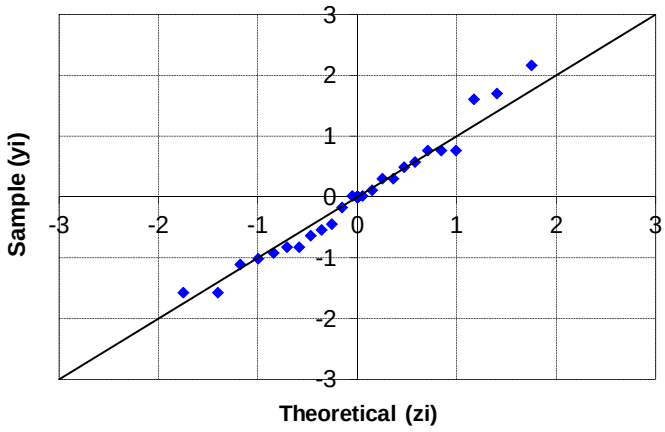
Chemical and data (mg/kg)
(blue denotes <= RL)
(red denotes >= GAC)

Mean Absolute Deviation for potential outliers
3.5 = critical value of test statistic

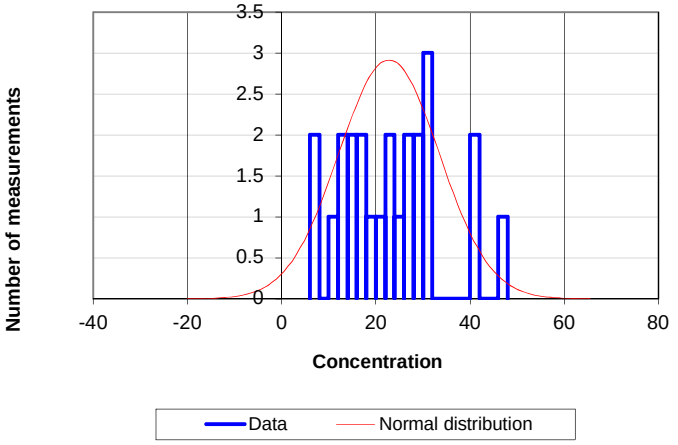
Copper	Potential Outlier?	Sample
21		HTP15 @ 0.25
23		HTP17 @ 0.15
31		HTP20 @ 0.15
31		HTP22 @ 0.20
31		HTP24 @ 0.20
41		HTP25 @ 0.15
46		HTP26 @ 0.10
28		HTP29 @ 0.15
40		HTP33 @ 0.25
23		HTP39 @ 0.20
26		HTP40 @ 0.20
11		TP5 @ 0.1
18		TP8 @ 0.4
13		TP8 @ 2.8
12		TP9 @ 0.6
6		WAHS1 @ No depth
6		WAHS2 @ No depth
14		WAHS4 @ No depth
26		HTP07 @ 0.50
16		HTP09 @ 0.20
24		HTP10 @ 0.50
29		HTP13 @ 0.20
14		TP19 @ 0.5
17		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Copper



Basic data

Risk parameter
Plant life pH >7

200 = GAC (critical conc.) (mg/kg)
24 = no. samples
6 = min. value
46 = max. value
22.79167 = mean
10.69733 = standard deviation

0 = no. samples > or = GAC
5 = laboratory reporting limit (RL)
0 = no. samples at RL
RL is limit of detection of the method used

Statistical tests

One-sample t-test		One-sided Chebychev Theorem	
-81.15479	t_0	-81.1548	k_0
1.714	$t_{(n-1,0.95)}$	4.36	$k_{0.05}$
26.53433	95% UCL (US_{95})	32.31209	95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC
Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC
US_{95} = 32.312094 GAC = 200 (US95 = 0.162 x GAC)

Site reference

POTENTIALLY SUITABLE FOR USE

Data set: Wider Site Area
Client: Bovis Barratt and Taylor Wimpey
Site: Land at Bankside, Banbury
Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

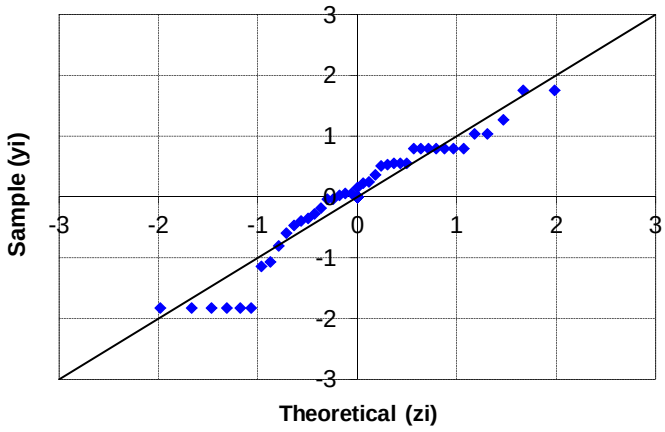
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

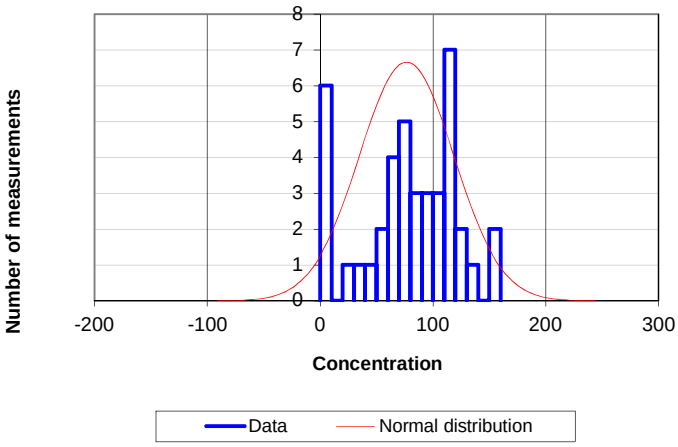
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Nickel		
110		HTP15 @ 0.25
62		HTP17 @ 0.15
99		HTP20 @ 0.15
100		HTP22 @ 0.20
92		HTP24 @ 0.20
150		HTP25 @ 0.15
120		HTP26 @ 0.10
69		HTP29 @ 0.15
79		HTP33 @ 0.25
52		HTP39 @ 0.20
60		HTP40 @ 0.20
29		TP5 @ 0.1
57		TP8 @ 0.4
32		TP8 @ 2.8
43		TP9 @ 0.6
100		HS1 TS1 @ 0.21
100		HS1 TS2 @ 0.15
130		HS1 SS1 @ 0.33
150		HS1 SS1 @ No depth
110		HS2 TS1 @ 0.22
110		HS2 TS2 @ 0.28
110		HS2 SS1 @ 0.35
75		HS3 TS1 @ 0.24
75		HS3 TS2 @ 0.25
87		HS3 TS2 @ No depth
65		HS3SS1 @ 0.4
83		HS4 TS1 @ 0.22
78		HS4TS2 @ 0.19
86		HS4 SS1 @ 0.38
110		HS5 TS1 @ 0.16
120		HS5 TS1 @ No depth
110		HS5TS2 @ 0.17
110		WAHS1 @ No depth
98		WAHS2 @ No depth
79		WAHS4 @ No depth
0.2		HTP07 @ 0.50
0.2		HTP09 @ 0.20
0.2		HTP10 @ 0.50
0.2		HTP13 @ 0.20
0.3		TP19 @ 0.5
0.3		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Nickel



Basic data — Risk parameter: **Plant life pH >7**

110 = GAC (critical conc.) (mg/kg)

41 = no. samples; 12 = no. samples > or = GAC

0.2 = min. value

150 = max. value; 5 = laboratory reporting limit (RL)

76.61951 = mean; 6 = no. samples at RL

41.93561 = standard deviation; RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-5.096848 = t_0	-5.09685 = k_0
1.684 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
87.64843 = 95% UCL (US_{95})	105.1742 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 105.1742 **GAC = 110** (US95 = 0.956 x GAC)

Site reference — **POTENTIALLY SUITABLE FOR USE**

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

STATISTICAL ASSESSMENT OF GEO-ENVIRONMENTAL SOIL DATA

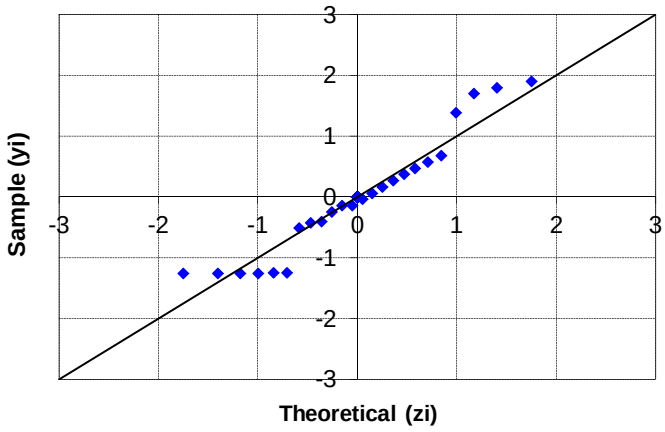
Mean Absolute Deviation for potential outliers

3.5 = critical value of test statistic

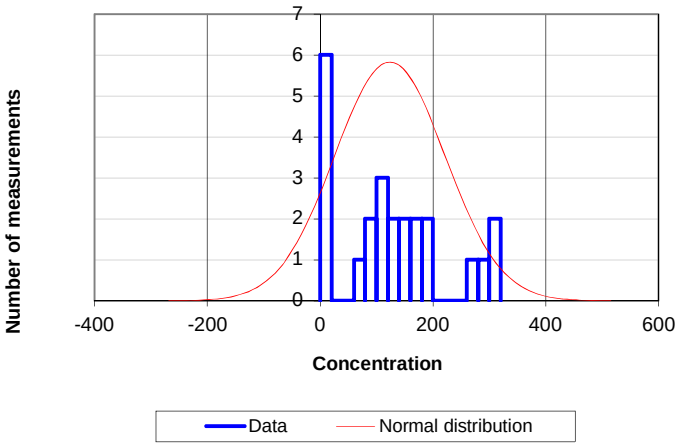
Chemical and data (mg/kg) (blue denotes <= RL) (red denotes >= GAC)	Potential Outlier?	Sample
Zinc		
190		HTP15 @ 0.25
110		HTP17 @ 0.15
180		HTP20 @ 0.15
140		HTP22 @ 0.20
160		HTP24 @ 0.20
300		HTP25 @ 0.15
260		HTP26 @ 0.10
110		HTP29 @ 0.15
150		HTP33 @ 0.25
100		HTP39 @ 0.20
120		HTP40 @ 0.20
82		TP5 @ 0.1
130		TP8 @ 0.4
74		TP8 @ 2.8
84		TP9 @ 0.6
310		WAHS1 @ No depth
290		WAHS2 @ No depth
170		WAHS4 @ No depth
0.5		HTP07 @ 0.50
0.5		HTP09 @ 0.20
0.5		HTP10 @ 0.50
0.5		HTP13 @ 0.20
2		TP19 @ 0.5
2		TP21 @ 0.4

Visual assessment - Q-q & histogram plots

Q-q plot



Zinc



Basic data

Risk parameter

Plant life pH >7

300 = GAC (critical conc.) (mg/kg)

24 = no. samples

2 = no. samples > or = GAC

0.5 = min. value

310 = max. value

10 = laboratory reporting limit (RL)

123.5833 = mean

6 = no. samples at RL

98.04986 = standard deviation

RL is limit of detection of the method used

Statistical tests

One-sample t-test	One-sided Chebychev Theorem
-8.814511 = t_0	-8.81451 = k_0
1.714 = $t_{(n-1,0.95)}$	4.36 = $k_{0.05}$
157.8879 = 95% UCL (US_{95})	210.8459 = 95% UCL (US_{95})

Results of significance test at 95% confidence level

Null hypothesis (H_0) = level of contamination is the same as, or higher than, the GAC

Alternative hypotheses (H_1) = level of contamination is lower than the GAC

Data set treated as **non-normally distributed**

Therefore:

Use Chebychev Theorem - Ho rejected, true mean <=GAC

US_{95} = 210.84587 GAC = 300 (US95 = 0.703 x GAC)

POTENTIALLY SUITABLE FOR USE

Site reference

Data set: Wider Site Area

Client: Bovis Barratt and Taylor Wimpey

Site: Land at Bankside, Banbury

Job no: C12702

Reference: CL:AIRE & CIEH. May 2008.Guidance on comparing soil contamination with a critical concentration.

Summary of Remedial Targets Methodology

Hydrock

RTM Level 1 - Soil Zone Assessment - leachate samples

Water body receptor(s): Groundwater and surface water
Secondary receptor(s): Aquatic ecosystem
Data set: Wider site area (combined)
Client: Bovis, Barratt and Taylor Wimpey Homes
Site: Land at Bankside, Banbury
Job no: C12702

Chemicals of Potential Concern (concentrations in µg/l)	Summary of Sample Data					Value Being Compared to Target = Maximum Value	Water Quality Target (Exceeded if Red Text)		No. Samples Exceeding Water Quality Target		Notes General comment: where more than one LoD applies because several labs are involved, the highest is quoted.
	No. of Samples	Limit of Detection	Minimum Value	Maximum Value	95-%ile Value		Inland Waters EQS		Inland Waters EQS		
Ag (dissolved)	2	0.5	0.5	0.5	0.5	0.5	0.05		2		EQS < LoD.
As (dissolved)	21	1	1	4	3	4	50		0		
B (dissolved)	21	50	10	66	65	66	2000		0		
Cd (dissolved)	21	0.5	0.08	0.5	0.5	0.5	0.08		19		EQS < higher LoD.
Co (dissolved)	2	1	1	1	1	1	3		0		
Cr (VI) (dissolved)	12	2	1	2	2	2	3.4		0		
Cr (III) (dissolved)	15	2	1	8	5.9	8	4.7		2		
Cu (dissolved)	21	5	1	100	28	100	1		20		EQS < higher LoD, but some values are > EQS.
Fe (dissolved)	21	20	1	1200	220	1200	1000		1		
Hg (dissolved)	20	0.2	0.01	0.2	0.2	0.2	0.05		16		EQS <higher LoD.
Ni (dissolved)	21	2	1	20	3.2	20	20		0		
Pb (dissolved)	2	1	1	1	1	1	7.2		0		
Sn (dissolved)	2	1	1	1	1	1	25		0		
V (dissolved)	2	1	1	1.8	1.76	1.8	20		0		
Zn (total)	21	5	1	27	10	27	8		4		
Cyanide (free)	12	5	5	5	5	5	1		12		EQS < LoD.
Chloride (Cl-)	2	1000	1400	2900	2825	2900	250000		0		
Fluoride (F-)	2	50	340	620	606	620	1000		0		
Sulfate (SO42-)	2	1000	1600	6700	6445	6700	400000		0		
pH (min.) (su)	12	0.1	8.5	7.1	8.28	7.1	6		0		Max & Min interchanged to compare min. value.
pH (max.) (su)	12	0.1	7.1	8.5	8.28	8.5	8.5		0		
Anthracene	12	0.01	0.01	0.036	0.02995	0.036	0.1		0		
Benzo(a)pyrene	12	0.01	0.02	7.1	6.055	7.1	0.05		2		
PAH sum of benzo(b)fluoranthene benzo(k)fluoranthene	12	0.04	0.02	0.04	0.04	0.04	0.03		10		EQS < higher LoD.
PAH sum of benzo(ghi)perylene indeno(1,2,3-cd)pyrene	12	0.04	0.02	0.04	0.04	0.04	0.002		12		EQS < LoD.
Fluoranthene	12	0.02	0.01	1	0.4951	1	0.1		1		
Naphthalene	12	0.02	0.01	2.2	1.0835	2.2	2.4		0		
Phenol	12	0.5	0.2	0.5	0.5	0.5	7.7		0		

Summary of Remedial Targets Methodology

Notes to Remedial Targets Methodology Table(s)

1 Data from the Environment Agency Chemical Standards web site at http://87.84.223.229/ChemicalStandards/Home.aspx
2 Substances in **bold** are defined in 2008/105/EC Annex II as priority substances in the field of water policy and those in ***bold italic*** as priority hazardous substances.
3 EQS for inland waters applies to freshwater rivers, lakes etc. EQS for other waters refers to marine and transitional (eg estuarine) waters.
4 Inland waters EQS for Cd, Cu and Zn depend on water hardness (mg/l as $CaCO_3$). Where applicable, water hardness is measured, otherwise it has been estimated by reference to the map at http://dwi.defra.gov.uk/consumers/advice-leaflets/hardness_map.pdf. If hardness cannot be determined, a worst case is assumed by setting it to 10mg/l.