



# Remediation Strategy Report

Site: Proposed Residential Development,  
Neath Workingman's Club, Neath

Prepared For: Castell Construction Ltd

Issue Date: July 2023

Job No: 17464

**REPORT TITLE** : **Remediation Strategy Report: Proposed Residential Development, Neath Workingman's Club, High Street, Neath**

**JOB NUMBER** : **17464**

**DATE** : **July 2023**

**REPORT REFERENCE** : **JA-050723-17464-01**

### Document Revision Record

| Issue Number | Date     | Revision Details |
|--------------|----------|------------------|
| 1            | 05/07/23 | Draft            |
|              |          |                  |
|              |          |                  |
|              |          |                  |

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## TABLE OF CONTENTS

|                                                                                                  |           |
|--------------------------------------------------------------------------------------------------|-----------|
| <b>SECTION 1 Introduction and Proposed Development</b>                                           | <b>1</b>  |
| 1.1 Introduction                                                                                 | 1         |
| 1.2 Objectives                                                                                   | 1         |
| 1.3 Previous Investigations and Assessments                                                      | 2         |
| 1.4 Roles and Responsibilities                                                                   | 2         |
| 1.5 Limitations and Exceptions of Investigation                                                  | 2         |
| 1.6 Quality Assurance                                                                            | 2         |
| <b>SECTION 2 Site Characteristics</b>                                                            | <b>3</b>  |
| 2.1 Site Location and Description                                                                | 3         |
| 2.2 Site History Summary                                                                         | 3         |
| 2.3 Geology and Ground Conditions                                                                | 4         |
| 2.4 Radon                                                                                        | 5         |
| 2.5 Hydrogeology and Hydrology                                                                   | 5         |
| 2.6 Identified Contamination                                                                     | 5         |
| <b>SECTION 3 Sources of Contamination Requiring Remediation</b>                                  | <b>6</b>  |
| <b>SECTION 4 Proposed Remedial and Mitigating Measures</b>                                       | <b>7</b>  |
| 4.1 General                                                                                      | 7         |
| 4.2 Contaminated Soils                                                                           | 7         |
| 4.2.1 Protection of Future Site Users (Residents)                                                | 7         |
| 4.2.2 Protection of Construction & Maintenance Workers and Passers-by or Neighbouring Site Users | 7         |
| 4.2.3 Protection of Construction Materials (Potable Water Supply Pipes)                          | 7         |
| 4.2.4 Surface Waters                                                                             | 8         |
| <b>SECTION 5 Validation of Remedial and Mitigating Measures</b>                                  | <b>9</b>  |
| 5.1 Capping System                                                                               | 9         |
| 5.1.1 Imported Soil Validation                                                                   | 9         |
| <b>SECTION 6 Working Practices</b>                                                               | <b>12</b> |
| 6.1 Protection of Construction Workers                                                           | 12        |
| 6.2 Protection of the Environment                                                                | 12        |
| 6.3 Management & Disposal of Soils                                                               | 13        |

### Tables

|                                                     |    |
|-----------------------------------------------------|----|
| Table 1.1 Roles and Responsibilities                | 2  |
| Table 2.1 Summary of Typical Ground Conditions      | 4  |
| Table 2.2 Contamination of Concern                  | 5  |
| Table 3.1 Summary of Significant Pollutant Linkages | 6  |
| Table 5.1 Validation Criteria                       | 11 |

### Figures

|                                 |   |
|---------------------------------|---|
| Figure 1.1 Proposed Site Layout | 1 |
| Figure 2.1 Site Location        | 3 |

## SECTION 1 Introduction and Proposed Development

### 1.1 Introduction

Castell Construction Ltd (the Client) is proposing the demolition of the current building on site and development of a four-story block of apartments at Neath Workingman's and Social Club in Neath. The proposed development can be seen in **Figure 1.1**.



**Figure 1.1 Proposed Site Layout**

The development site is irregular in shape and locates between High Street and Wind Street in the centre of Neath. The site centres on an approximate National Grid Reference of 275430, 197700, occupying a plan area of approximately 0.13 Hectares.

The site is currently occupied by Neath Workingmen's and Social Club, a large building with access from High Street.

### 1.2 Objectives

The objective of the Remediation Strategy is to detail the remedial steps that are required to render the site fit for its intended use.

In summary, the following remediation requirements have been identified and are covered in detail in this report.

- Installation of capping system across the site. Capping soils to be underlain by double no-dig barrier comprising a geotextile membrane.

### 1.3 Previous Investigations and Assessments

The Remediation Strategy is based on the findings of previous investigations and assessments. This report shall be read in conjunction with the relevant documents.

TFW Group Limited prepared Geo-environmental and Geotechnical Ground Investigation Report (post demolition) for the site, dated March 2023 (Job No. 17646/3).

### 1.4 Roles and Responsibilities

**Table 1.1 Roles and Responsibilities**

| Role                        | Organisation                             |
|-----------------------------|------------------------------------------|
| Client                      | Castell Construction Ltd                 |
| Local Authority             | Neath Port Talbot County Borough Council |
| Geoenvironmental Consultant | TFW Group Ltd                            |
| Validator                   | TFW Group Ltd                            |

### 1.5 Limitations and Exceptions of Investigation

This report has been prepared for the sole internal reliance of the Client and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of TFW Group Ltd. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geo-environmental and geotechnical consultants. TFW Group Ltd does not provide legal advice and the advice of lawyers may be required.

It is not within the scope of Terra Firma to:

- Provide Method Statements and Risk Assessments for the site remediation, preparation and development.

### 1.6 Quality Assurance

The quality and environmental aspects of the assessment and investigation comply with UKAS Accredited ISO 9001:2015 and ISO 14001:2015 standards.

## SECTION 2 Site Characteristics

The following subsection information has been summarised from previous investigation and assessments.

### 2.1 Site Location and Description

The development site is irregular in shape and locates between High Street and Wind Street in the centre of Neath. The site centres on an approximate National Grid Reference of 275430, 197700, occupying a plan area of approximately 0.13 Hectares.

The site is currently occupied by Neath Workingmen's and Social Club, a large building with access from High Street.

Site boundaries are defined by High Street to the north, Wind Steet to the south, a car park to the east and commercial buildings to the west.

The site elevation is approximately 9m AOD.

The site location can be seen on **Figure 2.1**.



**Figure 2.1 Site Location**

### 2.2 Site History Summary

The earliest historic map, circa 1877, shows the site to have a road, Mackworth Lane, running through the centre, trending north-south. The rest of the site is occupied by 19 residential houses. By 1970 the residential houses have been demolished and a large building now occupies the centre of the site. Mackworth Lane has been demolished, with a small section of High Street left undeveloped for the access to the new building. In 1993 the building was extended to occupy the entire site and fronting onto High Street and Wind Street. The site remains unchanged to this day.

## 2.3 Geology and Ground Conditions

The 1:10560 and 1:50,000 scale British Geological Map of the area (Sheets SS79NE & 247) were consulted for geology underlying the site. The site is shown to be underlain by the Brithdir Member which is Carboniferous in age and consists of sandstone with conglomerate lenses at bases of units with thin mudstone/siltstone and seatearth interbeds and mainly thin coal seams.

Strata are typically dipping 9° to the south in the local area.

Superficial deposits are recorded as Glaciofluvial Sheet Deposits.

Made ground is anticipated at the site associated with its past use.

The Neath Disturbance fault, a strike-slip fault, is located approximately 200m southeast of the site trending northwest to southwest. The Rhydding Fault is located approximately 340m to the west, trending north to south with the downthrow to the west.

The nearest coal seam to the site is the Hughes or Wenallt seam, located approximately 630m northwest. The Hughes or Wenallt seam is recorded as 3ft to 4ft.

The geotechnical and geoenvironmental site investigation comprising six window sample boreholes and two trial pits for soakaway testing were undertaken between the 26/09/2022 and 27/10/2022.

The ground conditions encountered by the exploratory holes in this investigation can in general be summarised as shown in **Table 2.1**.

**Table 2.1 Summary of Typical Ground Conditions**

| Depth (m)  |   |            | Thickness (m) | Stratum                                                                                                                                                                                        |
|------------|---|------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0.00       | - | 0.20/1.20  | 0.20-1.20     | <b>MADE GROUND</b> soft dark brown very cobbly <b>CLAY</b> . With varying content of bricks, plastic, concrete, occasional ACM, sandstone building blocks frequently seen throughout the site. |
| 0.50/0.80  | - | 1.60/2.10  | 1.10-1.60     | Firm occasionally soft in places yellowish brown silty sandy <b>CLAY</b> with varying cobble content. and rare boulders. (SA1, SA2, TP1)                                                       |
| 0.50/1.50  | - | 1.60/2.80  | 1.00-1.30     | Firm/Stiff yellowish brown silty very sandy <b>CLAY</b> with gravels and frequent cobbles, sand content variable, with rare boulders. (SA1, SA2, TP1 and TP4)                                  |
| 0.20/2.80  | - | 8.40/10.80 | 8.20-8.80     | Dense orangish brown/brown cobbly boulder <b>SAND / GRAVEL</b>                                                                                                                                 |
| 8.40/10.80 |   | >15.00     | -             | <b>MUDSTONE</b>                                                                                                                                                                                |

## 2.4 Radon

Radon protective measures are not required for new developments on the investigation site.

## 2.5 Hydrogeology and Hydrology

Superficial deposits beneath the site have an aquifer designation of secondary aquifer – A.

The bedrock deposits beneath the site have an aquifer designation of secondary aquifer – A.

Deeper groundwater flow within the underlying bedrock will be controlled by the strata dip and any fractures or bedding planes within the rock units.

The hydraulic gradient will be at its steepest during periods of heavy rainfall and aquifer recharge.

It is anticipated that the groundwater is in hydrological continuity with the River Neath to the northeast.

The site does not locate within a groundwater source protection zone.

There are no groundwater abstraction points within 1000m of the site boundary.

## 2.6 Identified Contamination

As part of the site investigation samples of site soils were retrieved and submitted for laboratory analysis for a range of heavy metals, inorganics and organics, as well as asbestos and petroleum hydrocarbons.

All substances were found to be at concentrations below their respective residential soil threshold levels with the exception of the substances listed in **Table 2.2**.

**Table 2.2 Contamination of Concern**

| Location | Depth       | Contaminant                                 | Source           |
|----------|-------------|---------------------------------------------|------------------|
| WS02     | 0.40        | Lead                                        | S1 – Made ground |
| WS03     | 0.20        | Lead, Benzo(a)pyrene, Dibenz(a,h)Anthracene | S1 – Made ground |
| WS04     | 0.30        | Arsenic, Lead                               | S1 – Made ground |
| WS05     | 1.20 - 1.40 | Lead, Dibenz(a,h)Anthracene                 | S1 – Made ground |
| WS06     | 0.40 - 0.60 | Arsenic, Lead, Sulphate                     | S1 – Made ground |
| TP01     | 0.60        | Lead, Dibenz(a,h)Anthracene                 | S1 – Made ground |
| TP01     | 1.00        | Benzo(b)Fluoranthene, Dibenz(a,h)Anthracene | Natural Soil     |

### SECTION 3 Sources of Contamination Requiring Remediation

The summary of the refined conceptual site model is presented in **Table 3.1** and based on findings of investigations and assessments, detailing significant pollutant linkages requiring remediation or mitigation.

**Table 3.1 Summary of Significant Pollutant Linkages**

| Source                              | Pathway                                                                                           | Receptor                                                                                                                      |
|-------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| S1 - Contaminated Made Ground Soils | P1 - Direct soil and dust ingestion<br>P3 - Dermal contact<br>P4 - Inhalation of dust and vapours | R1 - Construction and maintenance workers<br>R3 - Passers-by or neighbouring site users<br>R2 - Future site users (residents) |

## **SECTION 4 Proposed Remedial and Mitigating Measures**

### **4.1 General**

Based on the finding of the investigations and assessments and the identified pollutant linkages the following remedial measures have been devised for the site. Specific validation requirements for the proposed remedial measures are discussed in the following section.

### **4.2 Contaminated Soils**

#### **4.2.1 Protection of Future Site Users (Residents)**

Future site users will be potentially at risk from direct soil and dust ingestion, dermal contact, inhalation of dust.

Complete removal of the contaminant source would prove to be uneconomical given the low level of risk identified and the volume of affected soils therefore the installation of a capping system is proposed to interrupt the link between the source and receptor.

The capping system should be installed above made ground soils in soft landscaped areas, private and communal garden areas and comprise 600mm thick capping layer of imported clean soils. All capping soils should be directly underlain by a double no-dig barrier comprising a geotextile membrane. The soils should also be physically suitable and contain no 'sharps' as defined in BS8332:2015 Specification for Topsoil and BS8601:2013 Specification for Subsoil and Requirements for Use. Any soils failing verification will need to be removed and replaced.

Beneath areas of the site due to be covered by hard-standing or buildings, the made ground will be suitably capped so no further action is required.

**Validation of the capping system and imported materials will be required.**

#### **4.2.2 Protection of Construction & Maintenance Workers and Passers-by or Neighbouring Site Users**

The potential production of soil dust containing contaminants during construction works presents a risk to construction and maintenance workers as well as passers-by or adjacent site users through, direct soil and dust ingestion, dermal contact, inhalation of dust.

It is therefore essential that the contractor puts in place adequate measures to ensure the safety of all workers.

**Safety measures should be detailed in the contractor's Risk Assessment and Method Statements as well as the contractor's Construction Management Plan.**

#### **4.2.3 Protection of Construction Materials (Potable Water Supply Pipes)**

Potable water supply pipes are potentially at risk of degradation when in contact with certain organic contaminants identified made ground soils containing.

In accordance with the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' it may be prudent to adopt the use of PE-AL-PE Barrier pipe in lieu of undertaking a full UKWIR assessment. Reference should be made to the above publication for exact product specification.

**Verification of the Water Supply Pipe installation may be required.**

#### **4.2.4 Surface Waters**

During the construction period, there is a risk to surface waters from surface runoff derived from digging foundations, moving contaminated soil, and/or exposed ground and wheel washings.

**Control measures should be detailed in the contractor's Risk Assessment and Method Statements as well as the contractor's Construction Management Plan.**

## SECTION 5 Validation of Remedial and Mitigating Measures

A refurbishment and demolition survey has been completed and the ACMs identified in the building are to be removed by a licenced contractor. Precautions should be in place to prevent any contamination of the soils on site during the removal process. The building should then be demolished including all foundations and removed from site.

The following remedial measure will require verification and inclusion within a Validation Report:

- Capping system (importation of soils and installation)

### 5.1 Capping System

Following the importation and placement of 600mm of clean inert material in the soft landscaped areas, private and communal gardens of all plots, verification of the capping thickness should be undertaken by the **Geoenvironmental Consultant**. As previously stated, capping soils should be directly underlain by a no dig geotextile membrane.

Validation of the capping system will comprise photographic evidence clearly showing the thickness and depth of individual strata and layout of the garden area. In addition, samples will be obtained at this point for validation testing of imported soils in accordance with **Section 5.1.1**.

A Validation Report including a description of the works undertaken, validation photographs and chemical validation test results shall be presented upon completion.

#### 5.1.1 Imported Soil Validation

Importation of soils will be required to provide a capping layer of clean inert material in soft landscaped areas, private and communal gardens.

All imported soils, aggregate or stone that are not virgin quarry stone should be validated as suitable for use. Imported materials exempt from validation testing should be accompanied by a transfer note. Transfer notes should be retained by the **Client** and submitted to the **Geoenvironmental Consultant** for inclusion within the Validation Report upon completion of the works. Imported soils should be accompanied by an appropriate permit/exemption/declaration to legitimise the import.

The provider should supply a laboratory analysis report to confirm that the soil/aggregate/stone is suitable for use. Depending on the source and available test data, it may be prudent to independently sample and analyse the materials (if practical) prior to being brought to site.

Sampling and analysis of the soil/aggregate/stone once imported will be required in addition to any taken at source. Soil sampling and analysis will need to be carried out by a **Geoenvironmental Consultant** and the result included in the Validation Report.

In accordance with publication 'Requirements for the Chemical testing of Imported Materials for Various End Uses and Validation of Cover Systems' the number of representative samples required for analysis is dependent on the volume of each source soil. For a volume between 20m<sup>3</sup> and 250m<sup>3</sup> four samples should be taken. For a volume greater than 250m<sup>3</sup>, 4 samples per 250m<sup>3</sup> should be taken. Where quantities exceed 1000m<sup>3</sup> the CLO/EHO should be contacted to agree a sampling scheme.

All samples should be analysed for the determinants listed in **Table 5.1**.

Any soils failing to meet the required criteria will need to be removed, replaced and the testing and verification undertaken once again.

**Table 5.1 Validation Criteria**

| Determinant                                                     | Units | Guideline Value (Residential) | Source |
|-----------------------------------------------------------------|-------|-------------------------------|--------|
| <b>Inorganic</b>                                                |       |                               |        |
| Arsenic                                                         | mg/kg | 37                            | 1      |
| Boron                                                           | mg/kg | 290                           | 1      |
| Cadmium                                                         | mg/kg | 11                            | 1      |
| Chromium III                                                    | mg/kg | 910                           | 1      |
| Chromium VI                                                     | mg/kg | 6                             | 1      |
| Copper                                                          | mg/kg | 2400                          | 1      |
| Lead                                                            | mg/kg | 200                           | 2      |
| Mercury                                                         | mg/kg | 40                            | 1      |
| Nickel                                                          | mg/kg | 180                           | 1      |
| Selenium                                                        | mg/kg | 250                           | 1      |
| Zinc                                                            | mg/kg | 3700                          | 1      |
| Cyanide                                                         | mg/kg | 8                             | 3      |
| Asbestos                                                        | %     | Non Detected                  | -      |
| <b>Organics – Phenol &amp; PAH</b>                              |       |                               |        |
| Phenol                                                          | mg/kg | 120                           | 1      |
| Naphthalene                                                     | mg/kg | 2.3                           | 4      |
| Acenaphthylene                                                  | mg/kg | 170                           | 4      |
| Acenaphthene                                                    | mg/kg | 210                           | 4      |
| Flourene                                                        | mg/kg | 170                           | 4      |
| Phenanthrene                                                    | mg/kg | 95                            | 4      |
| Anthracene                                                      | mg/kg | 2400                          | 4      |
| Fluoranthene                                                    | mg/kg | 280                           | 4      |
| Pyrene                                                          | mg/kg | 620                           | 4      |
| Benzo(a)anthracene                                              | mg/kg | 7.2                           | 4      |
| Chrysene                                                        | mg/kg | 15                            | 4      |
| Benzo(b)fluoranthene                                            | mg/kg | 2.6                           | 4      |
| Benzo(k)fluoranthene                                            | mg/kg | 77                            | 4      |
| Benzo(a)pyrene                                                  | mg/kg | 2.2                           | 4      |
| Indeno(123cd)pyrene                                             | mg/kg | 27                            | 4      |
| Dibenzo(ah)anthracene                                           | mg/kg | 0.24                          | 4      |
| Benzo(ghi)perylene                                              | mg/kg | 320                           | 4      |
| <b>Organics – TPH</b>                                           |       |                               |        |
| PH C5 – C6 Aliphatic                                            | mg/kg | 42                            | 4      |
| PH C6 – C8 Aliphatic                                            | mg/kg | 100                           | 4      |
| PH C8 – C10 Aliphatic                                           | mg/kg | 27                            | 4      |
| PH C10 – C12 Aliphatic                                          | mg/kg | 130                           | 4      |
| PH C12 – C16 Aliphatic                                          | mg/kg | 1100                          | 4      |
| PH C16 – C21 Aliphatic                                          | mg/kg | 65000                         | 4      |
| PH C21 – C35 Aliphatic                                          | mg/kg | 65000                         | 4      |
| PH C5 – C7 Aromatic                                             | mg/kg | 70                            | 4      |
| PH C7 – C8 Aromatic                                             | mg/kg | 130                           | 4      |
| PH C8 – C10 Aromatic                                            | mg/kg | 34                            | 4      |
| PH C10 – C12 Aromatic                                           | mg/kg | 74                            | 4      |
| PH C12 – C16 Aromatic                                           | mg/kg | 140                           | 4      |
| PH C16 – C21 Aromatic                                           | mg/kg | 260                           | 4      |
| PH C21 – C35 Aromatic                                           | mg/kg | 1100                          | 4      |
| 1 - LQM/CIEH Suitable For Use Level (S4UL) 2015                 |       |                               |        |
| 2 - Defra Category 4 Screening Level (Provisional value)        |       |                               |        |
| 3 - Environment Agency CLEA v1.06 Derived Value (Now withdrawn) |       |                               |        |
| 4 - S4UL threshold based on 1% soil organic matter              |       |                               |        |

## **SECTION 6 Working Practices**

### **6.1 Protection of Construction Workers**

In order that construction workers are protected during site works across the site the following should be adhered to:

1. Compliance with health and safety regulations
2. Provision of Method Statements and Risk Assessments
3. Compliance with Control of Substances Hazardous to Health (COSHH) Assessment
4. Good level of Personal Protection Equipment (PPE)
5. Good level of hygiene by site workers
6. Dust suppression measures
7. Emergency contingencies should be defined prior to commencement of site works

### **6.2 Protection of the Environment**

During the remediation and construction periods, there is a risk to the environment and adjacent sites from de-watering, excavations, moving contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washing and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

The contractor(s) must also strictly adhere to the Pollution Prevention Guidelines for Working at Construction and Demolition Sites (PPG6). This publication gives both advice and guidelines which should be followed with regards to the planning and preparation of site works, site drainage, delivery and storage of construction materials, the management of waste, good housekeeping in particular to prevent runoff of silt and other fines into nearby water courses, refuelling, concrete and what to do in the event of an emergency.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description
- Key participants/contractor(s)
- Technical procedures
- Phasing of works and approximate timescales
- Site plans to scale
- Details of consents or license needed
- Health and Safety, COSHH Assessment, Method Statements and Risk Assessments
- Emergency contingencies

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in the site risk assessment and the details provided to all site employees.
- Any potential pollutant materials or chemicals/detergents used on site should be adequately stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.

- All delivery drivers should be informed of procedures and restrictions.
- Any materials on delivery should be covered to ensure there is no spillage.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses.
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

### **6.3 Management & Disposal of Soils**

During site works excavations of the made ground are anticipated.

All materials excavated should be managed and stored appropriately in a controlled manner to ensure protection of site construction workers and neighbouring site users, and to prevent the transfer of contamination to other areas of the site.

If possible, and if levels allow, and excavated made ground should be retained on site and relocated beneath areas of hardstanding. This would provide the most sustainable approach and avoid landfill and haulage fees, disruption and aggravation of local residents caused by haulage lorries, and would avoid unnecessary CO<sub>2</sub> emissions.

Any movement and transfer of materials on site should be documented in materials management plan, in accordance with 'CL:AIRE Definition of Waste: Development Industry Code of Practice (DoW CoP)'.

Alternatively, excavated made ground may be disposed of at landfill. Prior to disposal classification of the material will need to be completed in accordance with Environment Agency protocol detailed in 'Technical Guidance WM3 – Waste Classification - Guidance on the Classification and Assessment of Waste'.

A contaminated land specialist should supervise and document any earthworks on site.

Waste transfer and disposal must be undertaken by an authorised person. A waste transfer note must accompany each load and records should be maintained for inspection if required.



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