



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Detailed Contamination Assessment

Proposed Commercial Development
3 Murray Rose Avenue, Sydney Olympic Park

Prepared for
Lend Lease

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.



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Report on Detailed Contamination Assessment

Proposed Commercial Development

3 Murray Rose Avenue, Sydney Olympic Park

1. Introduction

This report presents the results of a detailed contamination assessment undertaken for a proposed commercial development at 3 Murray Rose Avenue, Sydney Olympic Park. The work was commissioned by Lend Lease Project Management & Construction (Australia).

The project involves the construction of a five-storey commercial office building over a three to four-level basement. The remainder of an existing commercial building, partially demolished during development works on an adjacent site, will be demolished as part of the project.

The detailed contamination assessment was undertaken to:

- Assess the general levels of soil contamination resulting from past and present activities on the site;
- Assess the potential for contaminant migration by examining the groundwater quality on the site;
- Assess the suitability of the site for the proposed commercial development;
- Provide recommendations for remediation works, if required; and
- Provide information on waste classification for the materials that are to be removed from the site during bulk earthworks activities.

The overall approach for the detailed contamination assessment included a review of available historical information, the installation of groundwater monitoring wells, excavation of test pits, soil and groundwater sampling, laboratory analysis and interpretation of the results. Details of the site history, field work and laboratory testing programme are given in this report, as well as comments on the issues outlined above.

A geotechnical investigation was undertaken at the same time as the detailed contamination assessment and is reported separately.

2. Previous Investigations

Douglas Partners Pty Ltd has previously undertaken a detailed contamination assessment of 5 Murray Rose Avenue, which is immediately to the south of the current development site. The details of the previous assessment are provided in the *Report on Supplementary Contamination Assessment* for Project 45153.01 dated 7 October 2010.

3. Site Description

The site is approximately rectangular and about 4,000 m² in area. It is bounded by Brickpit Park to the north, grassed and sealed carpark areas to the east, a partially demolished commercial building to the south, and a recently constructed commercial building (5 Murray Rose Avenue) to the west. The ground surface on the site currently slopes downwards to the south with an overall difference in levels of about 4 m between the northern and southern boundaries. The western side of the site has a relatively level filled bench which slopes steeply down to the lower level; the eastern side of the site has a relatively consistent grade.

The site is part of Lot 88 in Deposited Plan 870992 in the Parish of Concord, County of Cumberland. A site location plan is shown in Drawing E1 in Appendix B.

4. Regional Geology and Hydrogeology

Reference to the *Sydney 1:100 000 Geological Series Sheet* indicates that the site is underlain by Ashfield Shale of the Wianamatta Group. Ashfield Shale typically comprises black to dark grey shale and laminite. The site is also known to be underlain by up to 4 m of man-placed filling.

The site is located near the top of a spur that has been created by excavation of the adjacent brick pit. Groundwater is likely to have historically flowed to the east, into the wetlands at the southern end of Homebush Bay. However, the brick pit may also act as a sump drawing groundwater from the site in a north-westerly direction.

5. Scope of Works

The scope of the detailed contamination assessment was as follows:

- Review various historical documents including title deeds, aerial photographs, WorkCover Dangerous Goods Licences, EPA Remediation Notices and groundwater bore licences to determine the nature of previous activities that may have occurred on the site;
- Install four groundwater monitoring wells (G1, G2, G4 and G5) in the four corners of the proposed excavation to allow assessment of groundwater quality at the up-gradient and down-gradient site boundaries;
- Collect groundwater samples from the wells for analysis at a NATA accredited laboratory for a range of potential contaminants;
- Excavate eleven (11) test pits on the site to a depth of at least 0.5 m into natural soil, or prior refusal, to assess the depth and condition of filling materials for the site generally. These pits are the 'G-series' and 'C-series' pits;
- Excavate an additional four (4) test pits along the western boundary of the site in an attempt to expose a former roadway which was identified on 5 Murray Rose Avenue and was thought to possibly extend onto the current development site. These pits are the 'T-series' pits;

- Collect soil samples from the pits for analysis at a NATA accredited laboratory for a range of potential contaminants;
- Screen soil samples with a calibrated Photoionisation Detector (PID) to assess the presence of volatile organic compounds;
- Provide a detailed contamination assessment report which comments on the recorded levels of contamination in the soils and groundwater on the site, the suitability of the site for the proposed development, recommended follow up action, and provides provisional waste classification advice; and
- Store remaining soil and groundwater samples not analysed for a period of one month pending the need for further analysis.

6. Site History

6.1 Historical Land Uses

The title deed records indicate that the parcel of land was owned by the Metropolitan Meat Industry Board from 1905. This organisation was responsible for operating an abattoir and meat works in the Homebush Bay area. The title deeds do not indicate whether the actual abattoir was on the current development site or elsewhere. The site was then owned by the Olympic Coordination Authority from 1993 and the registered owners as of 2007, Sydney Olympic Park Authority, from 2002. The site is now owned by GPT under a 99 year lease. A summary of the title deed records is provided in Appendix C.

6.2 Aerial Photographs

A review of available aerial photographs from 1949, 1951, 1961, 1965, 1970, 1982, 1991, 1998 and 2012 was undertaken to evaluate the changes in land-use patterns on the site during this period. The site was occupied by several large commercial-type buildings in the 1949 photograph. The area to the west of the site appears to have been used as holding-pens for livestock in preparation for slaughter. Additional commercial buildings were constructed since 1949 and exist up to at least 1982 as shown in the 1982 photograph. The commercial buildings have a distinctive 'saw-tooth' pattern which was typical of buildings clad with asbestos-cement sheeting.

The buildings had been demolished by 1991 and the site was vacant and grassed at this time. The partially demolished building that exists on site today appear in the 1998 photograph. The now-decommissioned brick pit to the north-west of the development site is clearly seen in all photographs that were reviewed.

Scanned images of the aerial photographs are provided in Appendix C.

6.3 Contaminated Land Public Register

A search undertaken on 3 August 2012 indicated that the development site is not on the Public Register of Notices issued under the *Contaminated Land Management Act 1997*. There are numerous current and former notices relating to sites in the Sydney Olympic Park precinct although the development site is not the subject of any current notices. The search results for the Auburn Council area are attached in Appendix C as confirmation of this status.

6.4 WorkCover Dangerous Goods Licences

A search of the WorkCover Dangerous Goods Licences database did not return any evidence of licences having been issued for the development site. A letter from WorkCover is attached in Appendix C.

6.5 Groundwater Bore Licences

A search of licensed groundwater bores within the Sydney Olympic Park area indicated that no licensed groundwater wells are located within the development site. The nearest wells are located within Bicentennial Park approximately 300 m to the east and south-east of the site and are listed as monitoring wells, presumably part of a monitoring programme for the landfill that underlies the park. Production wells were not listed in the database. The search information is attached in Appendix C.

7. Selected Comparative Guidelines

The proposed development is for commercial purposes. The relevant soil assessment criteria for the site are the Health-based Investigation Levels (Column 4) as specified in *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*, (Department of Environment and Conservation NSW, 2006). The provisional Phytotoxicity-based Investigation Levels (PPIL, Column 5) are only relevant in areas where grass and gardens are proposed to be supported by the existing filling and soil materials on the site.

Assessment criteria for petroleum hydrocarbons, where not covered in the HILs, are the Threshold Concentration for Sensitive Site Land Use – Soils, specified in *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994).

Assessment criteria for groundwater contamination are the 95% level of protection of species values for freshwater outlined in *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000* produced by the Australian and New Zealand Environment and Conservation Council (ANZECC).

The quantitative site assessment criteria are shown in the relevant tables in Appendix E.

8. Data Quality Objectives

The investigation procedures have been devised in general accordance with the seven-step data quality objective (DQO) process outlined in Australian Standard AS 4482.1 – 2005 *Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds*. The DQO process is outlined below.

State the Problem

The site is to be redeveloped for commercial purposes. The aim of the current assessment is to confirm the suitability of the site for the proposed development and, on the basis of the investigation findings, provide advice on what future works may be required.

Identify the Decision

Four groundwater monitoring wells were installed on the site to allow groundwater sampling to be undertaken.

Eleven test pits were excavated as part of the general contamination assessment and an additional four test pits were excavated as part of a targeted assessment. This number of sampling points meets the requirements of *Contaminated Sites: Sampling Design Guidelines* (EPA NSW, 1995) which suggests a minimum of eleven sampling points for a site with an area of 4,000 m².

The suite of contaminants was devised to detect the presence of heavy metals, hydrocarbons, polychlorinated biphenyls and phenol which could be present due to the activities on the site. Analysis for pesticides was undertaken due to the presence of filling and the possible use of such chemicals on the site in the past. Analysis for asbestos was undertaken due to the presence of filling and the possibility of asbestos debris remaining on the site from previous site activities and demolition works.

The comparative guidelines were selected on the basis of the proposed land use and are outlined in Section 7 of this report.

Identify Inputs to the Decision

The primary inputs in assessing the presence of contamination in the areas of interest are:

- Available historical information;
- Field observations;
- Laboratory test results; and
- Published guidelines appropriate for the proposed land use.

Define the Boundary of the Assessment

The boundary of the assessment is defined as the development site at 3 Murray Rose Avenue, Sydney Olympic Park. The site is shown on Drawing E1 in Appendix B.

Develop a Decision Rule

The decision rule is primarily based on the Department of Environment and Climate Change (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (Column 4 – Health-based investigation levels for commercial/industrial sites (NEHF F)). The PPIL criteria may also be relevant for areas of this site in which vegetation is proposed. The decision rule for TRH and BTEX, where not covered in the auditor guidelines, is based on the threshold concentrations for sensitive land use outlined in *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994).

Specify Acceptable Limits on Decision Errors

Appropriate field sampling techniques, as outlined in the *Douglas Partners Field Procedures Manual*, were used in the assessment. Quality assurance and quality control measures were incorporated into the laboratory testing regime to ensure the quality of the assessment data. These measures are outlined in the detailed laboratory test results in Appendix F. The analysis of duplicate soil samples, trip blank and spike samples, and a rinsate sample was undertaken as a QA/QC check on sampling precision as described in Appendix G.

Optimise the Design for Obtaining Data

The sampling locations were selected on the basis of a visual assessment of the site and are considered appropriate for the detailed assessment. The procedures for collecting samples were in general accordance with EPA guidelines and industry best-practice. A NATA accredited analytical laboratory was used to analyse soil samples.

A number of data quality indicators (DQIs) were established to verify that the quality of the investigation data is acceptable. Table 1 summarises how the DQIs are assessed.

Table 1: Data Quality Indicators and Evaluation Procedures

| Data Quality Indicator | Evaluation Procedure |
|--|---|
| Documentation completeness | Completion of field and laboratory documentation including chain of custody sheets, test pit logs and groundwater sampling sheets. |
| Data completeness | Analysis of appropriate contaminants. Analysis of appropriate soil horizons. |
| Data comparability | Use of NATA accredited analytical methods. Use of consistent sampling techniques. Use of disposable/decontaminated sampling equipment. Use of suitable field sample storage techniques. |
| Data representativeness | Sampling from locations across the site which is considered suitable for detailed contamination assessment. |
| Precision and accuracy for sampling and analysis | Use of NATA accredited analytical methods. Achievement of suitable results in QA/QC criteria. |

The DQIs for sampling and analysis were achieved and the quality of the data satisfactorily meets the objectives of the current additional assessment.

9. Field Work Procedures

9.1 Groundwater Assessment

The field work for the groundwater assessment included the installation of four groundwater monitoring wells (G1, G2, G4 and G5) in 15.0 m to 15.1 m deep boreholes drilled as part of the geotechnical investigation on the site. This involved placing Class 18 uPVC screen and solid casing in each borehole. A gravel pack was placed around the screen and a bentonite plug was placed above the gravel. The remainder of the void was backfilled with drill cuttings and the top of the wells were finished with a steel cover mounted flush with the surface.

The ground surface levels at the wells were determined to Australian Height Datum (AHD) using an automatic level, relative to a benchmark (SS 87238) which was listed at RL 11.03 m on the Department of Lands survey database.

Groundwater sampling was performed in general accordance with the standard sampling procedures outlined in the *DP Field Procedures Manual*. All sampling data were recorded on chain-of-custody information sheets. The sampling generally included:

- Development of the wells by pumping the wells practically dry;
- Groundwater sampling using a low-flow pump that had been decontaminated using Decon90 phosphate-free detergent and demineralised water;
- Placement of samples into laboratory prepared and preserved bottles and immediate capping;
- Labelling of sample containers with individual and unique markings including project number, sample location and date of sampling; and
- Storage of sample containers in a cooled, insulated and sealed container for transport to the laboratory.

Groundwater sampling was undertaken on two occasions (10 July 2012 and 30 July 2012). The field sampling details are provided in Appendix D.

9.2 Soils Assessment

The field work for the soils assessment included the excavation of nine test pits and the drilling of two augered boreholes for general contamination assessment purposes (G1A to G5A and C1 to C6). Testing was undertaken to depths of 0.9 m to 3.1 m using a 4 t hydraulic excavator for the pits and a DT100 drilling rig for the bores. The 'G-series' pits were excavated adjacent to the groundwater wells which had previously been installed. Four test pits for the assessment of a possible buried roadway (T1 to T4) were excavated to depths of 2.1 m to 3.5 m using the excavator. The pits/bores were backfilled at the completion of the field work.

Soil sampling for contamination assessment purposes was performed in general accordance with the standard sampling procedures outlined in the *DP Field Procedures Manual*. All sampling data were recorded on chain-of-custody information sheets. The sampling generally included:

- Soil sampling using disposable equipment;
- Placement of samples into laboratory prepared jars and immediate capping;
- Labelling of sample containers with individual and unique markings including project number, sample location, sample depth and date of sampling; and
- Storage of sample containers in a cooled, insulated container for transport to the laboratory.

The ground surface levels at the pits were determined at the same time as the levelling works for the groundwater monitoring wells.

10. Results of Assessment

10.1 Field Work Results

The subsurface conditions encountered in the test pits/bores are presented in the logs in Appendix D. Notes defining descriptive terms and classification methods are included in Appendix A. Testing for the general assessment encountered:

- FILLING – sandy and silty clay filling with shale, sandstone, bricks, rootlets, concrete and steel to depths of 0.4 m to 3.0 m;
- NATURAL MATERIALS – silty clay, shaly clay and shale with ironstone gravels from depths of 0.4 m to 3.0 m, to the base of the pits at 0.9 m to 3.1 m depth.

The test pits for the targeted assessment encountered:

- FILLING – sandy, silty and clayey filling with shale, sandstone, bricks, rootlets, concrete and steel to depths of 1.5 m to 2.2 m;
- NATURAL MATERIALS – silty clay and shale with ironstone gravels from depths of 1.5 m to 2.2 m, to the base of the pits at 2.1 m to 2.5 m depth.

Free groundwater was not observed during the field work. The water levels measured in the monitoring wells are provided in Table 2.

Table 2: Groundwater Observations in Monitoring Wells (m, AHD)

| Date | G1 | G2 | G4 | G5 |
|--------------|-----|----|-----|------|
| 10 July 2012 | 8.1 | NM | 7.1 | 10.2 |
| 30 July 2012 | 5.9 | NM | 4.9 | 6.1 |

Notes: NM = not measured as monitoring well was inaccessible

10.2 Total Photoionisable Compounds Results

Replicate soil samples collected from the test pits were stored under ambient temperatures before screening for Total Photoionisable Compounds (TOPIC) using a calibrated Photoionisation Detector (PID). The results of the screening are shown on the test pit/bore logs in Appendix D. The PID readings were all very low. A calibration certificate for the PID is included in Appendix H.

10.3 Analytical Results for Soil and Groundwater Samples

EnviroLab Services Pty Ltd was commissioned to undertake analysis of the soil and groundwater samples. A tabulated summary of the results of the soil analysis is provided in Tables E1, E2 and E6 in Appendix E. A summary of the results of the groundwater analysis is shown in Table E7.

The detailed analytical results, sample receipts and chain of custody documentation are included in Appendix F.

10.4 Field and Laboratory Quality Control Procedures

The field and laboratory QA/QC procedures adopted for the current assessment are described in Appendix G.

11. Discussion of Results

11.1 Soil Contamination

Twenty-eight (28) soil samples (excluding QA/QC samples) were selectively analysed from fifteen (15) test pits/bores on the site. Twenty-three (23) of these samples were obtained from the filling profile and five (5) samples from the natural soils. This testing frequency is considered sufficient for characterising the site. The rationale for selecting the test locations is provided in Section 8 of this report.

Two samples of the filling (G2A/0.5 m and T2/1.0-1.1 m) exhibited Benzo(a)pyrene concentrations of 5.0 mg/kg and 9.3 mg/kg, which are above the HIL adopted for the site (4 mg/kg). Both of these sampling locations are within the proposed basement footprint. All other contaminants identified in the soil samples were below the HILs.

Twelve samples of the filling exhibited arsenic concentrations of between 27 mg/kg and 260 mg/kg. One of these samples also exhibited a zinc concentration of 280 mg/kg. These concentrations are above the PPILs for arsenic (20 mg/kg) and zinc (200 mg/kg). The majority of these sampling locations are within the proposed basement footprint. All other contaminants identified in the soil samples were below the PPILs.

Asbestos was not observed in the test pits/bores and was not detected in the samples analysed in the laboratory.

A buried road, as such, was not observed in the T-series pits although bricks were encountered and PAH-impacted soils were present. Apart from one sample from T2/1.0-1.1 m, all locations in the area of the site thought to be underlain by a buried road were below the HILs.

Leachability analysis was undertaken on thirteen (13) of the soil samples using the toxicity characteristics leaching procedure (TCLP). Eleven of these samples were tested for PAHs, one of the samples was tested for arsenic and one for lead. The results for the PAHs were all below the laboratory detection limits and the PAHs are therefore considered to be non-leachable. The result for arsenic was very low (0.06 mg/L) and the result for lead was below the laboratory detection limit.

11.2 Groundwater Contamination

Groundwater sampling from the monitoring wells was initially undertaken on 10 July 2012. Well G2 could not be located and it was thought that a vehicle was parked over this location. Samples were obtained from the other three wells. It appears from the groundwater levels in the bores that the groundwater flows in a southerly direction, although the topography of the site would suggest it should flow either eastwards towards Bicentennial Park or westwards towards the brick pit. The apparent flow direction suggests that the wells have intercepted seepage water rather than the regional groundwater table which may be well below the bedrock surface.

The initial samples from G4 and G5 contained several volatile organic compounds (VOCs) including chloroform (up to 4 µg/L), toluene (up to 2 µg/L), ethylbenzene (up to 4 µg/L), m+p xylene (up to 45 µg/L), o xylene (up to 19 µg/L), and several benzene compounds (up to 29 µg/L). The samples also contained volatile TRH fractions up to 180 µg/L and semi-volatile TRH fractions up to 120 µg/L. The PAH, OCP, OPP and PCB concentrations were all below the laboratory detection limits.

The samples from G1 and G5 also exhibited zinc concentrations above the adopted hardness-adjusted levels. All other metal concentrations were below the adopted hardness-adjusted levels.

The detected concentrations of the various contaminants appeared highest in well G4 and reduced in G5. None of the organic contaminants were detected in well G1. A source of these contaminants was not apparent and therefore an additional round of testing for VOC and vTRH was undertaken to confirm the initial laboratory test results.

Additional groundwater sampling was undertaken on 30 July 2012. Once again, the samples from G4 and G5 contained several VOCs and vTRH but the concentrations were much lower than the initial round of testing. Again, none of the contaminants were detected in well G1.

It is possible that the contaminants detected in the groundwater are representative of regional groundwater quality in the Sydney Olympic Park area. Investigations on the adjacent site (5 Murray Rose Avenue) encountered much higher concentrations of hydrocarbon-related products and the source of these readings was not apparent at the time of the previous assessment either. It is understood that specific sources of hydrocarbons (e.g. underground storage tanks, buried drums etc.) were not encountered on the adjacent site, which also supports the regional groundwater argument that there are diffuse sources of these contaminants located within Sydney Olympic Park.

If specific sources are located on the development site then they will be removed during basement excavation works and therefore the groundwater quality should improve. If the source of the contamination is not on the site then the concentrations are obviously indicative of more 'regional' levels.

The presence of various contaminants in groundwater should not affect the proposed commercial land use for the site as groundwater will not be harvested for use. Seepage into the basement would be expected to occur and will probably be handled using a subfloor drainage and collection system in a similar manner to 5 Murray Rose Avenue. The quality of groundwater requiring discharge from the site, either during construction or in the longer term, may need assessing to determine appropriate disposal options. If discharge to stormwater is not permitted by the appropriate regulatory authority then a trade waste agreement with Sydney Water may need to be sought.

12. Conclusions and Recommendations

12.1 Soils

The site history information indicates the site was used for commercial or industrial purposes in the past. No specific contaminating activities were identified although industrial processes undertaken on the site may have included the use of selected chemicals such as hydrocarbons. Several buildings constructed in the mid-20th century have also been demolished on the site which indicates the possibility of asbestos being present.

The 28 soil samples analysed from the 15 test locations exhibited contaminant concentrations within the adopted assessment criteria for the site, apart from two samples which exhibited excessive concentrations of Benzo(a)pyrene. The materials in which these samples were collected will be removed as part of the bulk excavation works for the basement and will therefore to affect the long-term land use on the site.

Asbestos was not observed in the test pits nor detected in the laboratory samples analysed, although the possibility of asbestos being present on the site should not be discounted due to previous demolition activities that have been undertaken.

On the basis of the results of this detailed contamination assessment, the soils that will remain on the site following bulk excavation works are considered suitable for the proposed commercial land-use.

12.2 Removal of Excavated Materials

The analytical programme was undertaken with the aim of providing preliminary waste classification advice as well as a contamination assessment. Waste classification is required for materials to be removed from a site in accordance with *Waste Classification Guidelines* (DECCW NSW, 2990). These guidelines outline a six-step process for determining an appropriate waste classification for soil materials.

In accordance with the process outlined in the guidelines, the existing filling requires chemical assessment to confirm a waste classification. This includes both a specific contaminant concentration (SCC) assessment and a leachability (TCLP) assessment. The results of this testing are outlined in Appendix E and Appendix F of this report.

On the basis of both the SCC and TCLP results, the filling materials analysed could be classified as General Solid Waste (non-putrescible) and would need to be disposed of at an appropriately licensed landfill. This includes the materials in the location in which the buried road was thought to be present.

Preliminary testing was undertaken to determine whether the filling may meet the requirements for excavated natural material (ENM) as outlined in *The excavated natural material exemption 2008* issued under the *Protection of the Environment Operations (Waste) Regulation 2005*. The criteria under this exemption are provided in Table E5 in Appendix E. The criteria are based on a maximum average concentration and an absolute maximum concentration of a series of 10 composite samples obtained for every 4,000 t (or part thereof) of material assessed.

The current assessment indicates that numerous arsenic concentrations exceeded the absolute maximum concentration allowed under the ENM exemption. It is therefore unlikely that a proper assessment at the time of excavation would be able to classify all of the existing filling as ENM on this basis, and the older filling material would have to be disposed of at a landfill facility as outlined above. However, the filling imported to the site as VENM to create the grass mound adjacent to 5 Murray Rose Avenue could be assessed under the ENM exemption as this material is more likely to meet the criteria. The VENM certificates for this material are included in Appendix C for information.

The natural soils and bedrock underlying the site should be able to be disposed of as virgin excavated natural material (VENM) providing they are no cross-contaminated prior to, during or following excavation. Confirmation of VENM status will be required during construction.

12.3 Groundwater

Groundwater samples were collected from three monitoring wells on the site and analysed for a range of potential contaminants. The samples contained elevated concentrations of several organic compounds and zinc, although a specific source of the contaminants is not apparent. If the source is found to be on the site (e.g. underground storage tanks, buried drums etc.) then it will be removed as part of the basement excavation works. If the source is not on the site then the quality of the groundwater in the wells is likely to be indicative of regional groundwater quality.

On the basis of the results of this detailed contamination assessment, the quality of the groundwater should not hinder the proposed redevelopment of the site for commercial purposes provided that disposal of seepage water is undertaken in accordance with regulatory requirements.

13. References

Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Australian and New Zealand Environment and Conservation Council (ANZECC, 2000).

Australian Standard AS 4482.1 – 2005 *Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

Contaminated Sites: Guidelines for Assessing Service Station Sites (NSW EPA, 1994)

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (DECC NSW, 2006)

Contaminated Sites: Sampling Design Guidelines (NSW EPA, 1995)

Sydney 1:100 000 Geological Series Sheet 9130, NSW Department of Mineral Resources, 1983.

Waste Classification Guidelines, Department of Environment, Climate Change and Water NSW, 2009.

14. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for a project at 3 Murray Rose Avenue, Sydney Olympic Park in accordance with DP's proposal dated 5 March 2012 and subsequent acceptance received from Lend Lease. The report is provided for the use of Lend Lease for this project only and for the purpose(s) described in the report. It should not be used for other projects or by a third party.

The results provided in the report are indicative of the sub-surface conditions only at the specific sampling or testing locations, and then only to the depths investigated and at the time the work was carried out. Subsurface conditions can change abruptly due to variable geological processes and also as a result of anthropogenic influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be limited by undetected variations in ground conditions between sampling locations. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion given in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

About this Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

| Type | Particle size (mm) |
|---------|--------------------|
| Boulder | >200 |
| Cobble | 63 - 200 |
| Gravel | 2.36 - 63 |
| Sand | 0.075 - 2.36 |
| Silt | 0.002 - 0.075 |
| Clay | <0.002 |

The sand and gravel sizes can be further subdivided as follows:

| Type | Particle size (mm) |
|---------------|--------------------|
| Coarse gravel | 20 - 63 |
| Medium gravel | 6 - 20 |
| Fine gravel | 2.36 - 6 |
| Coarse sand | 0.6 - 2.36 |
| Medium sand | 0.2 - 0.6 |
| Fine sand | 0.075 - 0.2 |

The proportions of secondary constituents of soils are described as:

| Term | Proportion | Example |
|-----------------|------------|---------------------------|
| And | Specify | Clay (60%) and Sand (40%) |
| Adjective | 20 - 35% | Sandy Clay |
| Slightly | 12 - 20% | Slightly Sandy Clay |
| With some | 5 - 12% | Clay with some sand |
| With a trace of | 0 - 5% | Clay with a trace of sand |

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

| Description | Abbreviation | Undrained shear strength (kPa) |
|-------------|--------------|--------------------------------|
| Very soft | vs | <12 |
| Soft | s | 12 - 25 |
| Firm | f | 25 - 50 |
| Stiff | st | 50 - 100 |
| Very stiff | vst | 100 - 200 |
| Hard | h | >200 |

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

| Relative Density | Abbreviation | SPT N value | CPT qc value (MPa) |
|------------------|--------------|-------------|--------------------|
| Very loose | vl | <4 | <2 |
| Loose | l | 4 - 10 | 2 - 5 |
| Medium dense | md | 10 - 30 | 5 - 15 |
| Dense | d | 30 - 50 | 15 - 25 |
| Very dense | vd | >50 | >25 |

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Douglas Partners



Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

| | |
|------|--------------------------|
| C | Core Drilling |
| R | Rotary drilling |
| SFA | Spiral flight augers |
| NMLC | Diamond core - 52 mm dia |
| NQ | Diamond core - 47 mm dia |
| HQ | Diamond core - 63 mm dia |
| PQ | Diamond core - 81 mm dia |

Water

| | |
|---|-------------|
| ▷ | Water seep |
| ▽ | Water level |

Sampling and Testing

| | |
|-----------------|--------------------------------|
| A | Auger sample |
| B | Bulk sample |
| D | Disturbed sample |
| E | Environmental sample |
| U ₅₀ | Undisturbed tube sample (50mm) |
| W | Water sample |
| pp | pocket penetrometer (kPa) |
| PID | Photo ionisation detector |
| PL | Point load strength Is(50) MPa |
| S | Standard Penetration Test |
| V | Shear vane (kPa) |

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

| | |
|-----|-----------------|
| B | Bedding plane |
| Cs | Clay seam |
| Cv | Cleavage |
| Cz | Crushed zone |
| Ds | Decomposed seam |
| F | Fault |
| J | Joint |
| Lam | lamination |
| Pt | Parting |
| Sz | Sheared Zone |
| V | Vein |

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

| | |
|----|----------------|
| h | horizontal |
| v | vertical |
| sh | sub-horizontal |
| sv | sub-vertical |

Coating or Infilling Term

| | |
|-----|----------|
| cln | clean |
| co | coating |
| he | healed |
| inf | infilled |
| stn | stained |
| ti | tight |
| vn | veneer |

Coating Descriptor

| | |
|-----|--------------|
| ca | calcite |
| cbs | carbonaceous |
| cly | clay |
| fe | iron oxide |
| mn | manganese |
| slt | silty |

Shape

| | |
|----|------------|
| cu | curved |
| ir | irregular |
| pl | planar |
| st | stepped |
| un | undulating |

Roughness

| | |
|----|--------------|
| po | polished |
| ro | rough |
| sl | slickensided |
| sm | smooth |
| vr | very rough |

Other

| | |
|-----|------------|
| fg | fragmented |
| bnd | band |
| qtz | quartz |

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General



Asphalt



Road base



Concrete



Filling

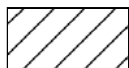
Soils



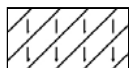
Topsoil



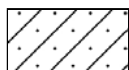
Peat



Clay



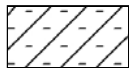
Silty clay



Sandy clay



Gravelly clay



Shaly clay



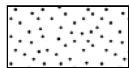
Silt



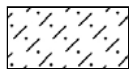
Clayey silt



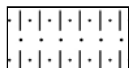
Sandy silt



Sand



Clayey sand



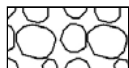
Silty sand



Gravel



Sandy gravel

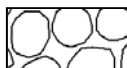


Cobbles, boulders



Talus

Sedimentary Rocks



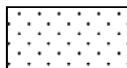
Boulder conglomerate



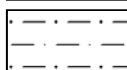
Conglomerate



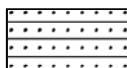
Conglomeratic sandstone



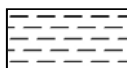
Sandstone



Siltstone



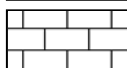
Laminite



Mudstone, claystone, shale

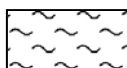


Coal

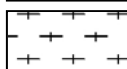


Limestone

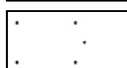
Metamorphic Rocks



Slate, phyllite, schist

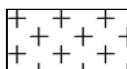


Gneiss

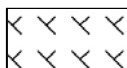


Quartzite

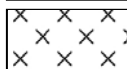
Igneous Rocks



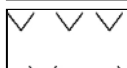
Granite



Dolerite, basalt, andesite



Dacite, epidote



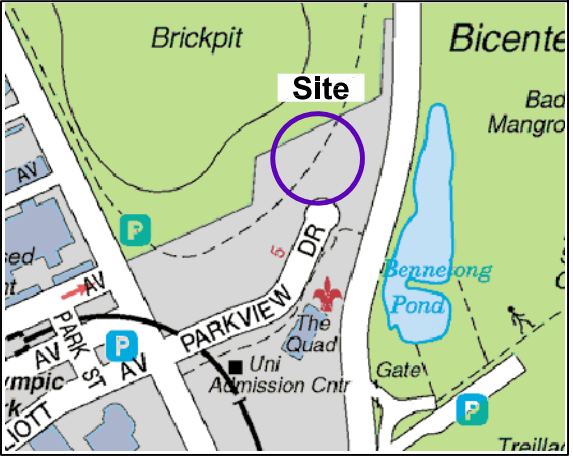
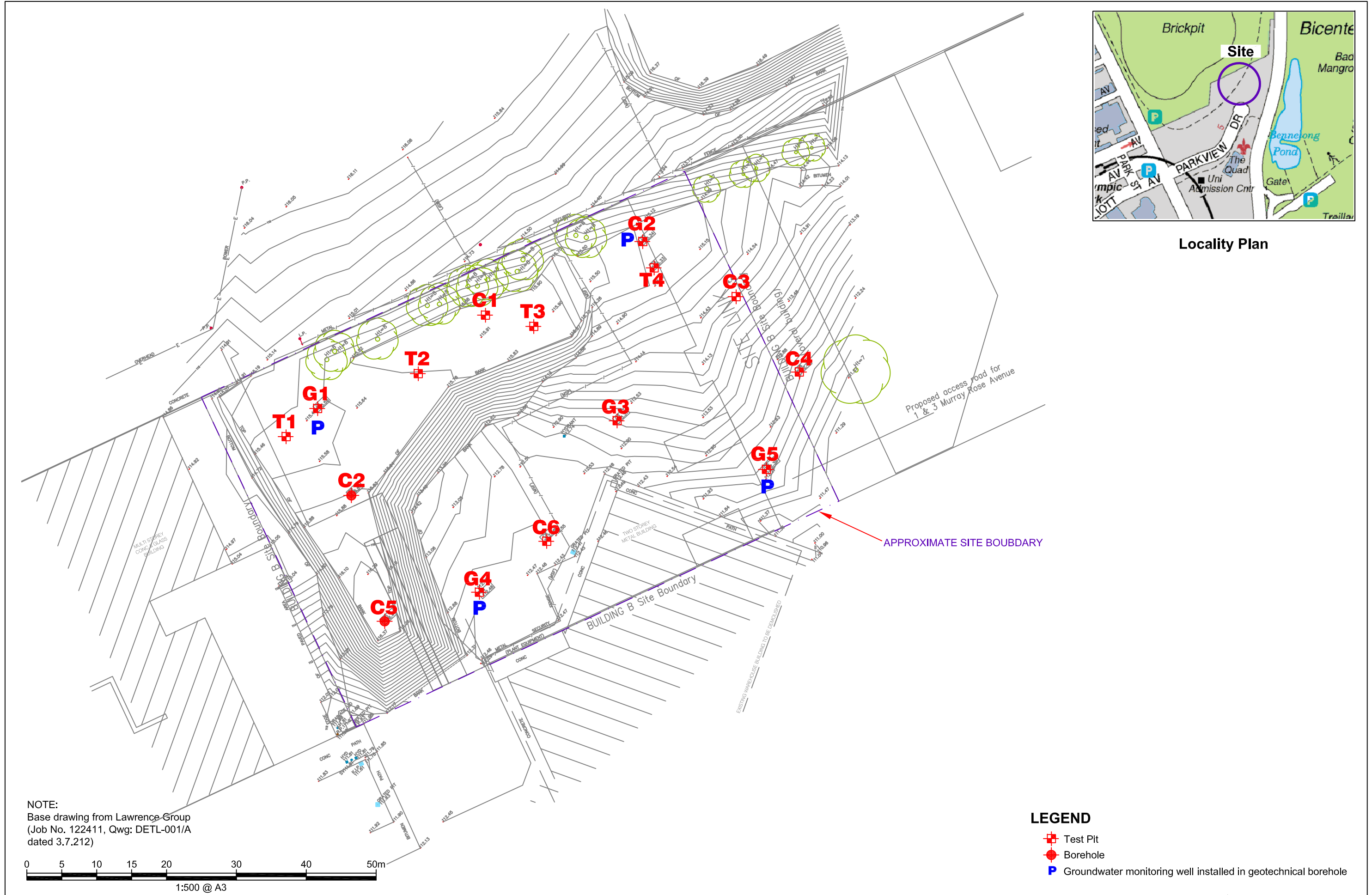
Tuff, breccia



Porphyry

Appendix B

Drawing



Locality Plan

| | | | | | |
|--|--------------------|------------------|---|--|----------------------|
| | CLIENT: Lend Lease | | TITLE: Test Locations for Contamination Assessment Proposed Commercial Development 3 Murray Rose Avenue, SYDNEY OLYMPIC PARK | | PROJECT No: 45153.02 |
| | OFFICE: Sydney | DRAWN BY: PSCH | | | DRAWING No: E1 |
| | SCALE: As shown | DATE: 23.09.2012 | | | REVISION: A |

Appendix C

Historical Information

ACN: 093 398 611
ABN: 61 093 412 474

Peter S. Hopley Pty Limited
Legal Searchers

1 Boronia Avenue
Mount Annan , NSW , 2567
Mobile: 0412 199 304
Fax 9233 4590 (Attn Box 29)

SUMMARY AS TO OWNERS.

Property: 7 Parkview Drive, Homebush Bay

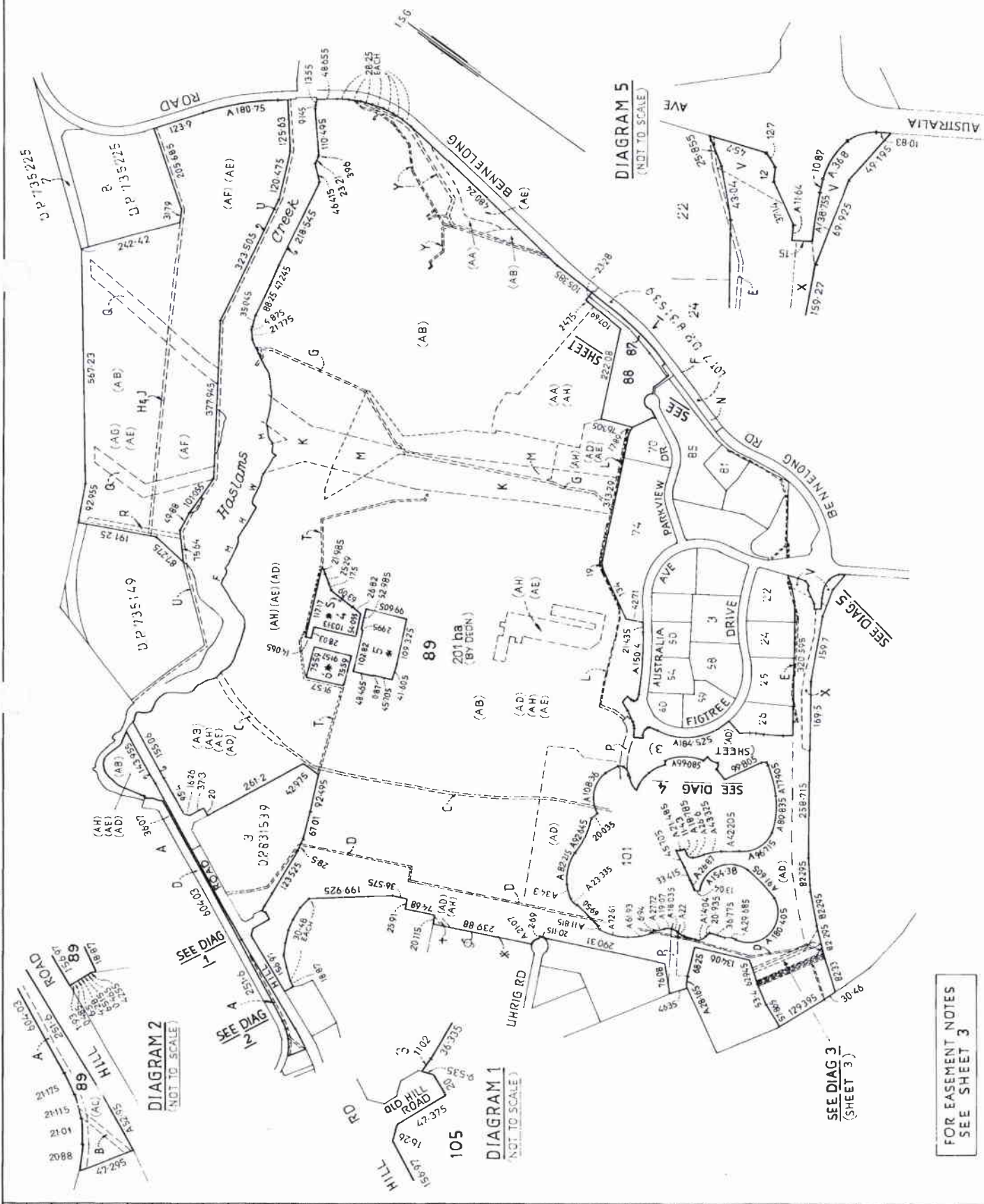
Description: - Lot 88 D.P. 870992

| | | |
|------------|--|---------------------------|
| 26.10.1905 | Metroplotian Meat Industry Board (Then Metroplotian Meat Industry Commissioner) (Then Metroplotian Meat Industry Board) (Now Homebush Abattoir Corporation) | 72/818981 & 102/849975 |
| 22.09.1993 | Olympic Co-Ordination Authority | 88/870992 |
| 25.01.2002 | # Sydney Olympic Park Authority | 88/870992 |

Current Registered Proprietor



DP 870992
Registered 29 08 1997
This is Form 2 of 3 sheets
Surveyor's name: *J. R. Smith*
Surveyor's registration number: *20118*
This is sheet 2 of 3 sheets
Date of issue: *7/8/97*
For use where shown in the relevant plan (or plan Form 2)



FOR EASEMENT NOTES
SEE SHEET 3

DP 870992

Reduce on Ratio: 6000
SURVEYORS REFERENCE: 34316(13)

DP831539

Registered

Total is sheet 13 of my plan in 13 sheets

George S. Small

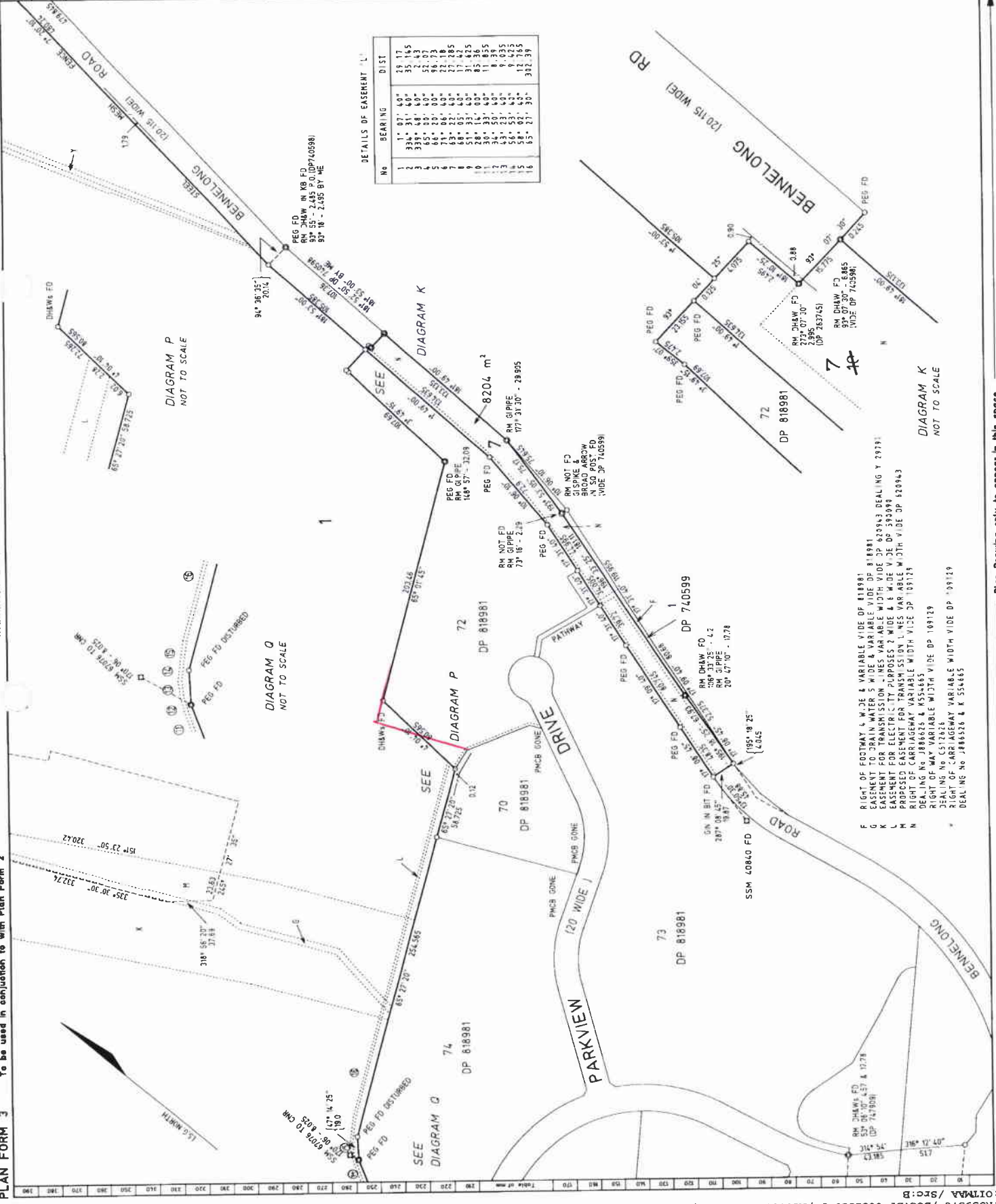
Surveyor registered under Surveyors Act 1924

This is sheet _____ of the plan of _____ sheets covered by my Certificate No. _____

Chemical Data

For use where space is insufficient in any panel on sign Form 2

| DETAILS OF EASEMENT "L" | | |
|-------------------------|-------------|-------|
| No | BEARING | DIST |
| 1 | 1° 07' 40" | 19.17 |
| 2 | 33° 34' 40" | 35.14 |
| 3 | 36° 34' 40" | 27.43 |
| 4 | 36° 34' 40" | 32.72 |
| 5 | 36° 34' 40" | 27.43 |
| 6 | 7° 22' 40" | 27.28 |
| 7 | 7° 22' 40" | 27.28 |
| 8 | 6° 53' 40" | 17.42 |
| 9 | 5° 33' 40" | 31.62 |
| 10 | 2° 01' 40" | 8.45 |
| 11 | 3° 53' 40" | 8.45 |
| 12 | 3° 53' 40" | 8.45 |
| 13 | 5° 33' 40" | 4.03 |
| 14 | 5° 33' 40" | 4.03 |
| 15 | 5° 33' 40" | 4.03 |
| 16 | 5° 33' 40" | 12.26 |
| 17 | 5° 33' 40" | 30.22 |
| 18 | 5° 33' 40" | 30.22 |



Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE: SB 51710

DP 831539

Registered 188 87/9/1997

This is sheet 2 of my plan in 13 sheets dated 1st APRIL 1993

Surveyor registered under Surveyors Act 1928

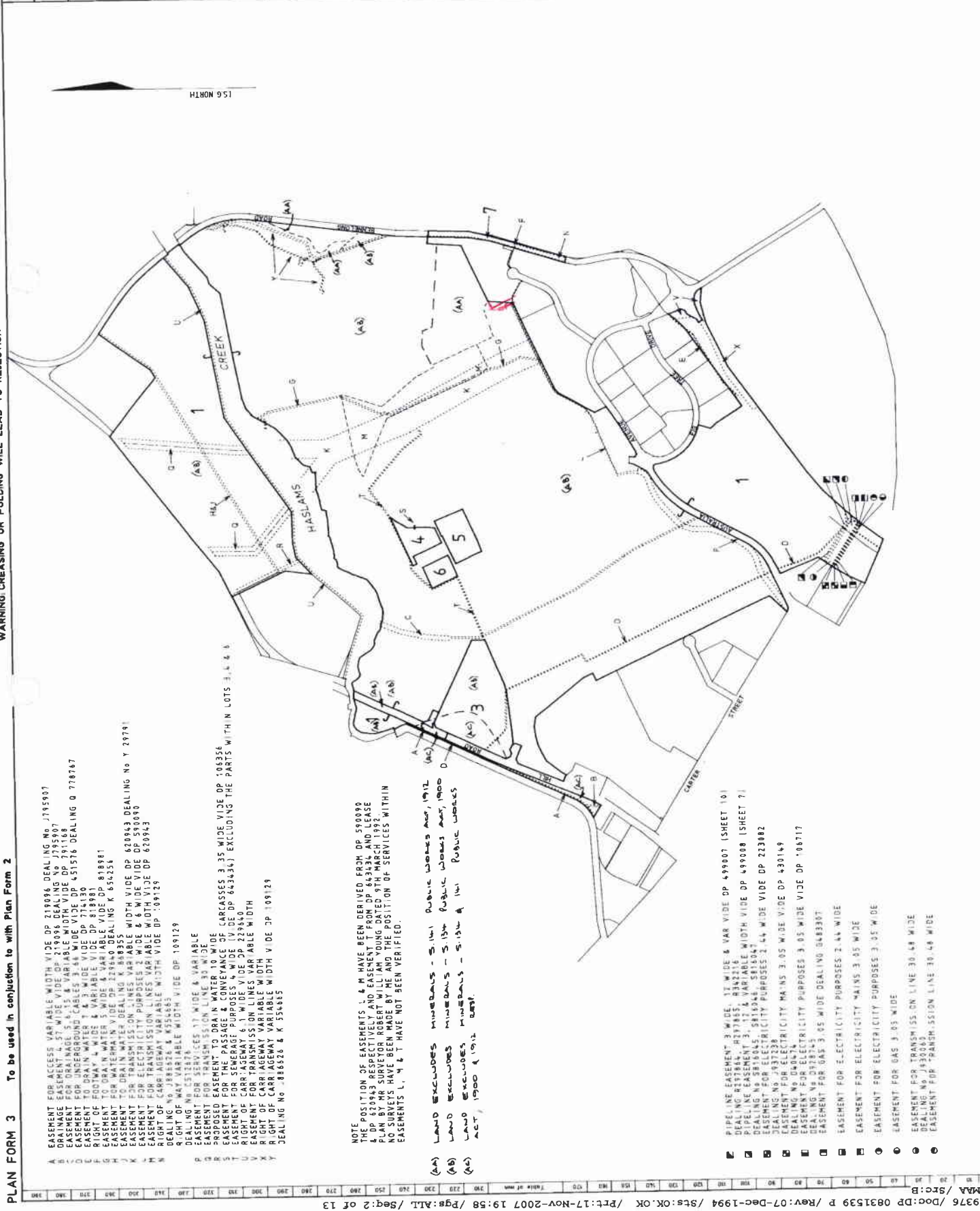
This is sheet of the plan of sheets covered by my Certificate No.

Capital Gains

Particulars where space is insufficient in any plan or plan pursuant to SEC. 88B OF THE CONVEYANCING ACT

IT IS INTENDED TO CREATE

- EASEMENT FOR ELECTRICITY PURPOSES - (I)
- EASEMENT FOR TRANSMISSION LINES VARIABLE WIDTH - (II)
- EASEMENT FOR SERVICES 11' WIDE & VARIABLE - (P)
- EASEMENT FOR TRANSMISSION LINES 30' WIDE - (Q)
- EASEMENT FOR SEWERAGE PURPOSES 4' WIDE - (T)
- EASEMENT FOR TRANSMISSION LINES VARIABLE WIDTH - (IV)
- RIGHT OF CARRIAGEWAY VARIABLE WIDTH - (X)
- EASEMENT FOR TRANSMISSION LINES 30.48' WIDE - (C)
- EASEMENT FOR ELECTRICITY PURPOSES 2.44' WIDE - (U)
- EASEMENT FOR ELECTRICITY MAINS 3.05' WIDE - (J)
- EASEMENT FOR ELECTRICITY PURPOSES 3.05' WIDE - (D)
- EASEMENT FOR GAS 3.05' WIDE - (O)



DP 831539

Registered 188 09/19/97

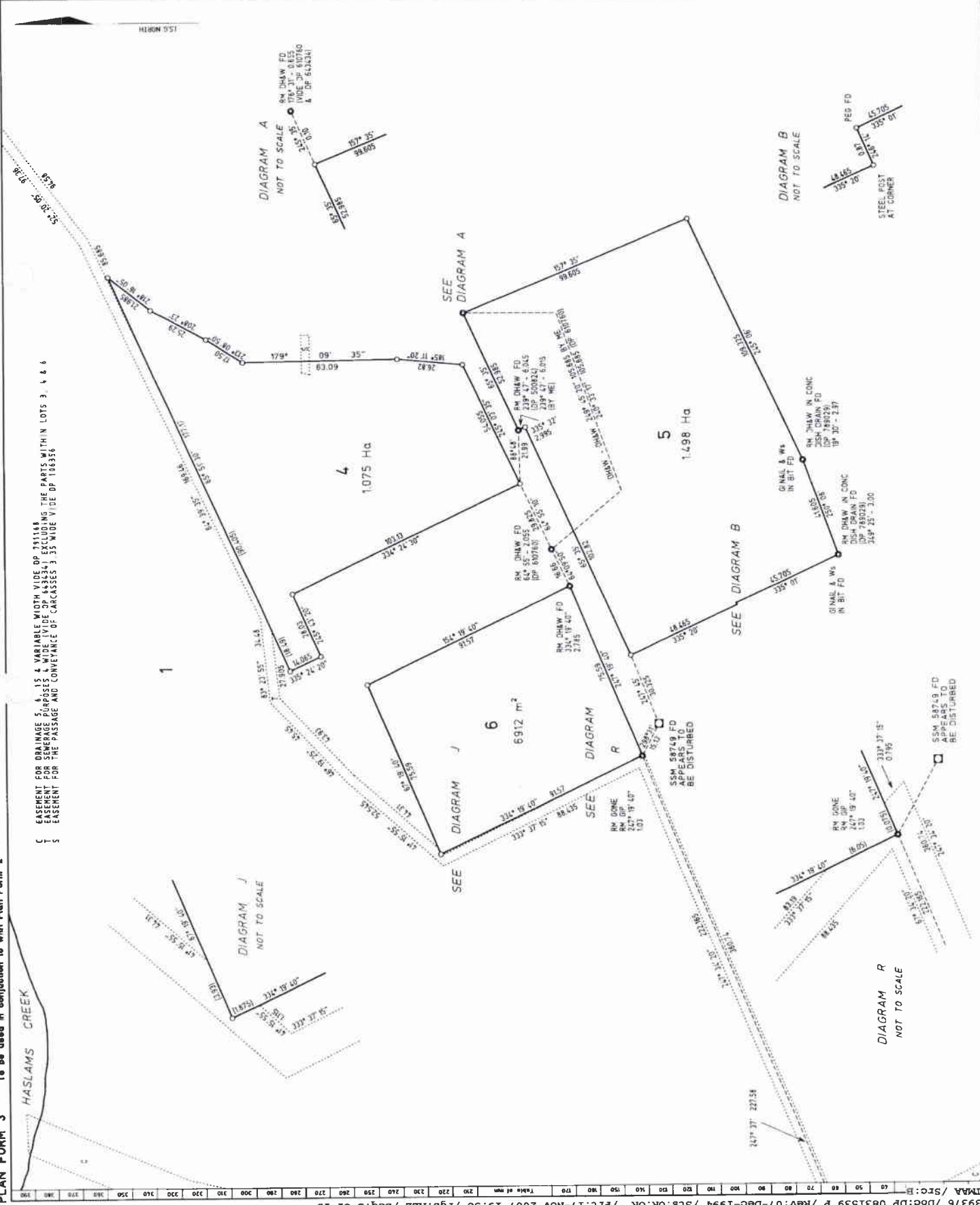
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Survey registered under Surveyors Act 1928.

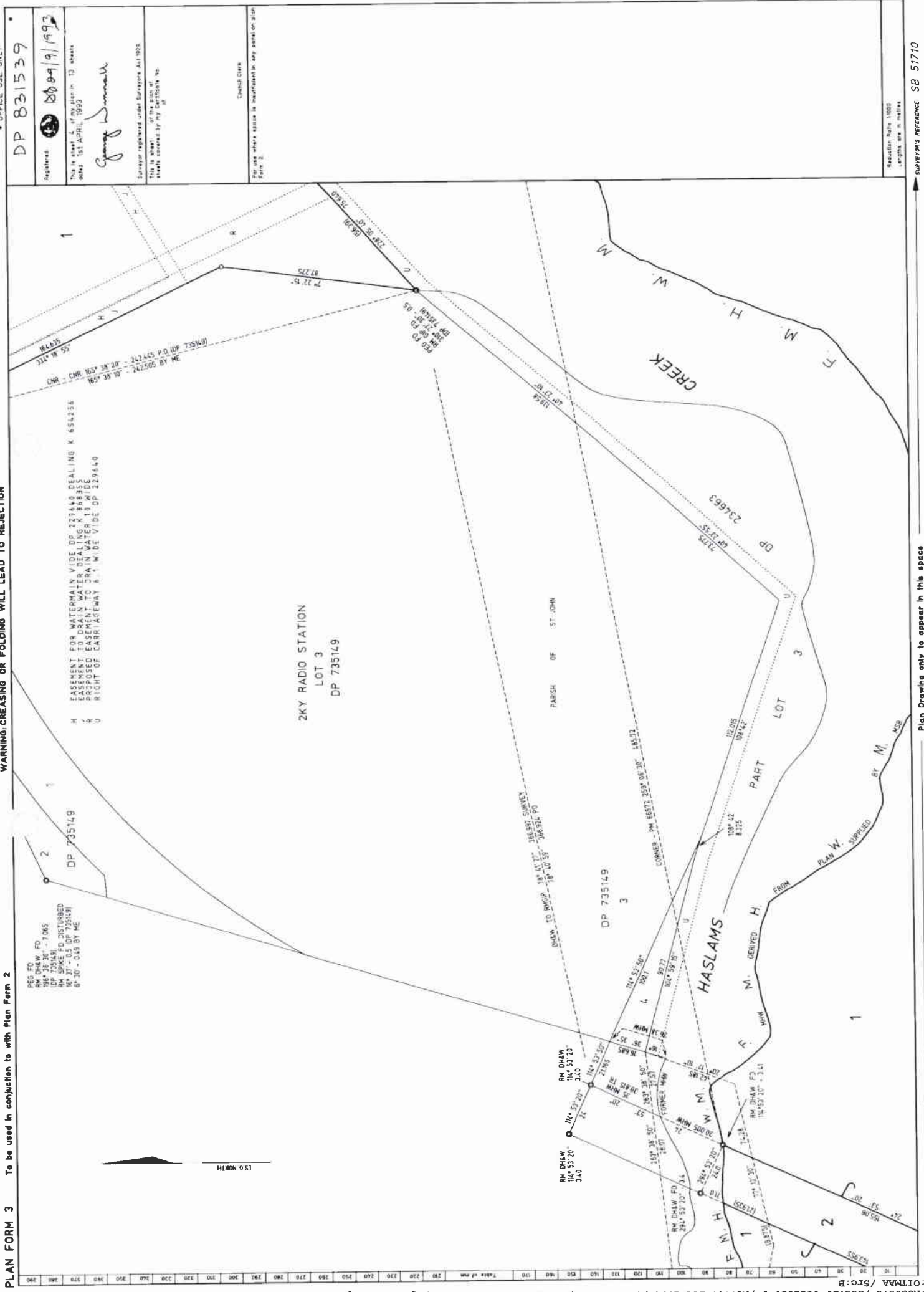
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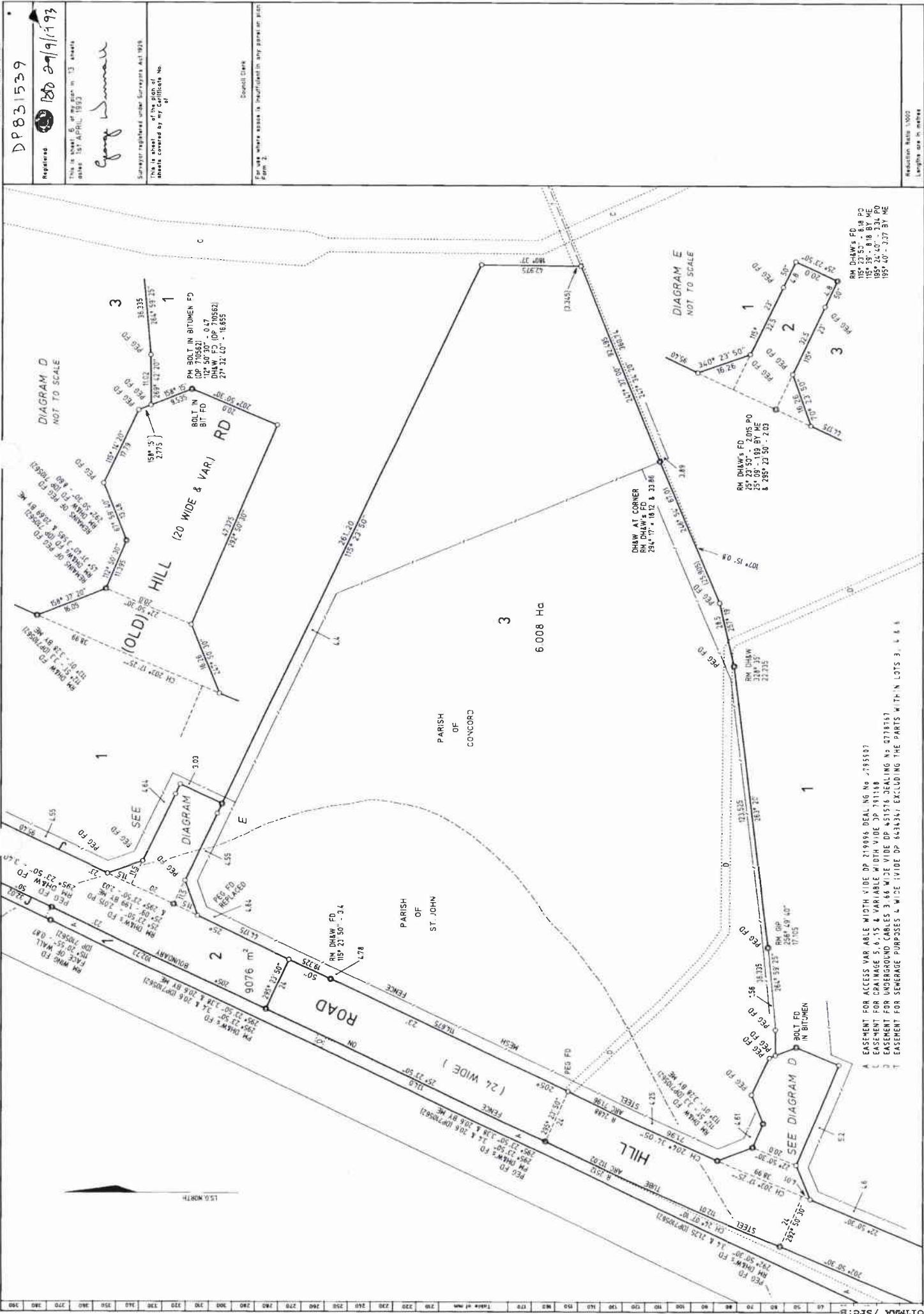
For use where space is insufficient in any plan on plan Form 2.

Control Data




Reg:R539376 /Doc:DP 0831539 P /Rev:07-Dec-1994 /Sts:OK:OK /Prt:17-Nov-2007 19:58 /Pg:ALL/Seq:4 of 13
Ref:OITMAA /Src:B





A EASEMENT FOR ACCESS VARIABLE WIDTH VIDE OP 219096 DEALING NO J795907
 DRAINAGE EASEMENT 4.57 WIDE VIDE DP 219096 DEALING NO J795907
 EASEMENT FOR UNDERGROUND CABLES 3.66 WIDE VIDE DP451576 DEALING Q 718767

DP 831539

 **University of Toronto**

This is about 7 at my place in 12 weeks
dated 1st APRIL 1993

George Sumrell

Surveyor registered under Surveyors Act 1929

Central Clerk

For use where space is insufficient for any panel in plan

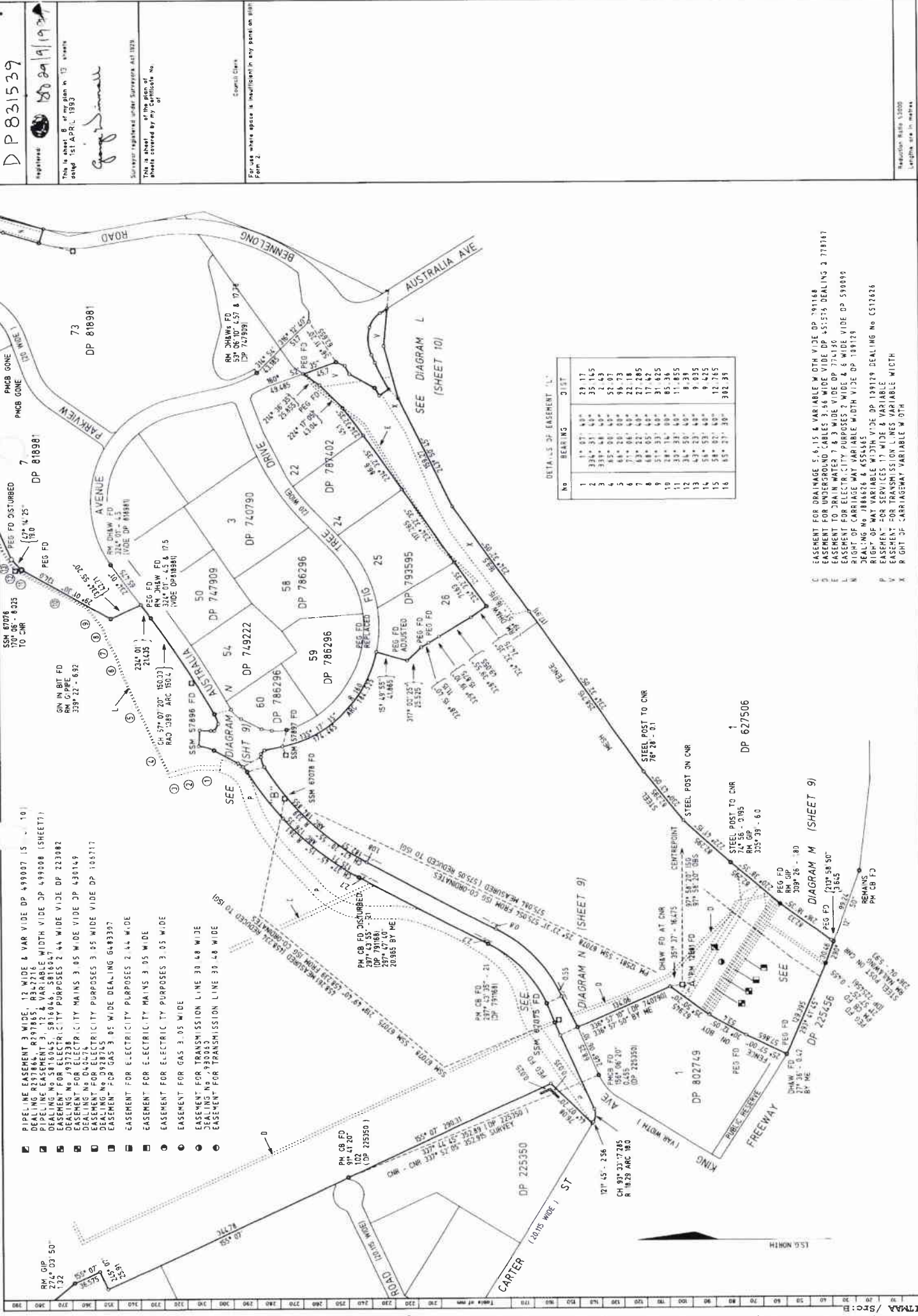
Reduction Rate 1000

SURVEYOR'S REFERENCE SB 51710

Plan Drawing only to appear in this space

SB 51710

- PIPELINE EASEMENT 3 WIDE, 12 WIDE & VAR WIDE DP 499007 (S 10)
- DEALING R97866, R297865, R342216
- PIPELINE EASEMENT 3 12 & VARIABLE WIDTH WIDE DP 499008 (SHEET 7)
- DEALING R97866, R297865, R342216
- EASEMENT FOR ELECTRICITY PURPOSES 2.44 WIDE VIDE DP 223082
- DEALING NO 1937238
- EASEMENT FOR ELECTRICITY PURPOSES 3.05 WIDE VIDE DP 430169
- DEALING NO 042474
- EASEMENT FOR ELECTRICITY PURPOSES 3.05 WIDE VIDE DP 105717
- DEALING NO 28745
- EASEMENT FOR GAS 3.05 WIDE DEALING 6643397
- EASEMENT FOR ELECTRICITY PURPOSES 2.44 WIDE
- EASEMENT FOR ELECTRICITY PURPOSES 3.05 WIDE
- EASEMENT FOR ELECTRICITY PURPOSES 3.05 WIDE
- EASEMENT FOR GAS 3.05 WIDE
- EASEMENT FOR TRANSMISSION LINE 30.48 WIDE
- DEALING NO 193083
- EASEMENT FOR TRANSMISSION LINE 30.48 WIDE



| DETAILS OF EASEMENT 'L' | |
|-------------------------|---------------------|
| No | BEARING DIST |
| 1 | 1° 07' 48" 29.17 |
| 2 | 334° 31' 48" 35.165 |
| 3 | 339° 48' 48" 2.43 |
| 4 | 85° 30' 48" 52.07 |
| 5 | 84° 30' 48" 78.13 |
| 6 | 43° 31' 48" 72.185 |
| 7 | 48° 55' 48" 17.62 |
| 8 | 51° 31' 48" 31.425 |
| 9 | 58° 14' 00" 85.36 |
| 10 | 58° 14' 00" 11.855 |
| 11 | 30° 31' 48" 8.38 |
| 12 | 34° 50' 48" 9.035 |
| 13 | 43° 31' 48" 9.425 |
| 14 | 58° 53' 48" 12.765 |
| 15 | 58° 02' 48" 382.35 |
| 16 | 65° 27' 30" 382.35 |

- EASEMENT FOR DRAINAGE 5.6, 15 & VARIABLE WIDTH WIDE DP 191168
- EASEMENT FOR UNDERGROUND CABLES 3.56 WIDE VIDE DP 451575 DEALING 2 778167
- EASEMENT FOR DRAIN WATER 7 & 3 WIDE VIDE DP 774130
- EASEMENT FOR ELECTRICITY PURPOSES 2 WIDE & 6 WIDE VIDE DP 539099
- RIGHT OF CARRIAGE WAY VARIABLE WIDTH WIDE DP 139179
- DEALING NO 188626 & 455465
- RIGHT OF WAY VARIABLE WIDTH WIDE DP 139179 DEALING NO 531826
- EASEMENT FOR SEWERAGE 11 WIDE & VARIABLE
- EASEMENT FOR TRANSMISSION LINES VARIABLE WIDTH
- R UNIT OF CARRIAGEWAY VARIABLE WIDTH

Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE: SB 51710

Headprint Date 13/08/2007
Length in metres

DP 831539

Registered: 29/9/993

This is sheet 9 of my plan in 13 sheets
dated 1st APRIL 1993

George S. Sennell

Surveyor Registered under Surveyors Act 1929

This is sheet of the plan of sheets covered by my Certificate No

Chinnell, Clark

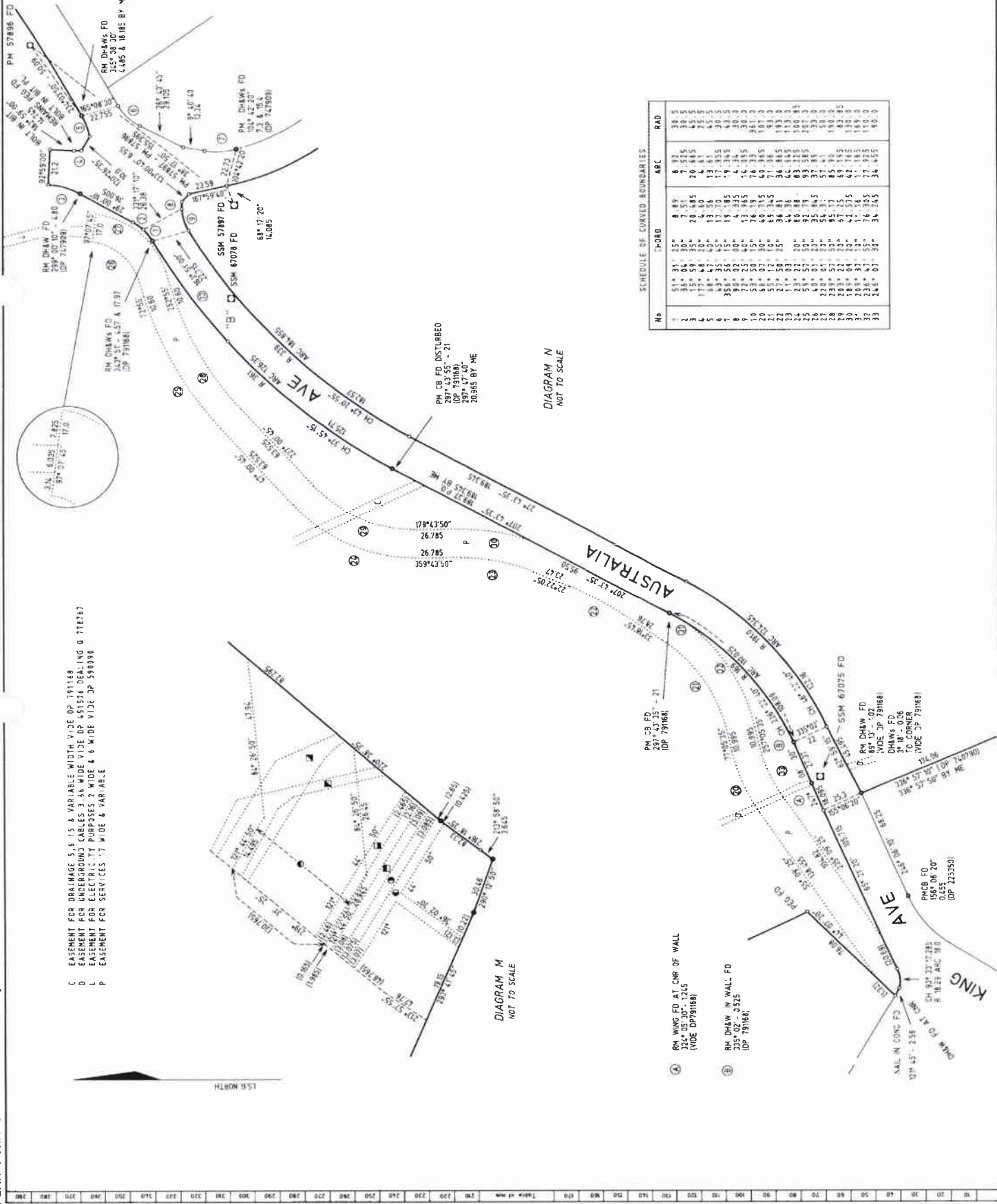
For use where space is insufficient in any pane on Form 2

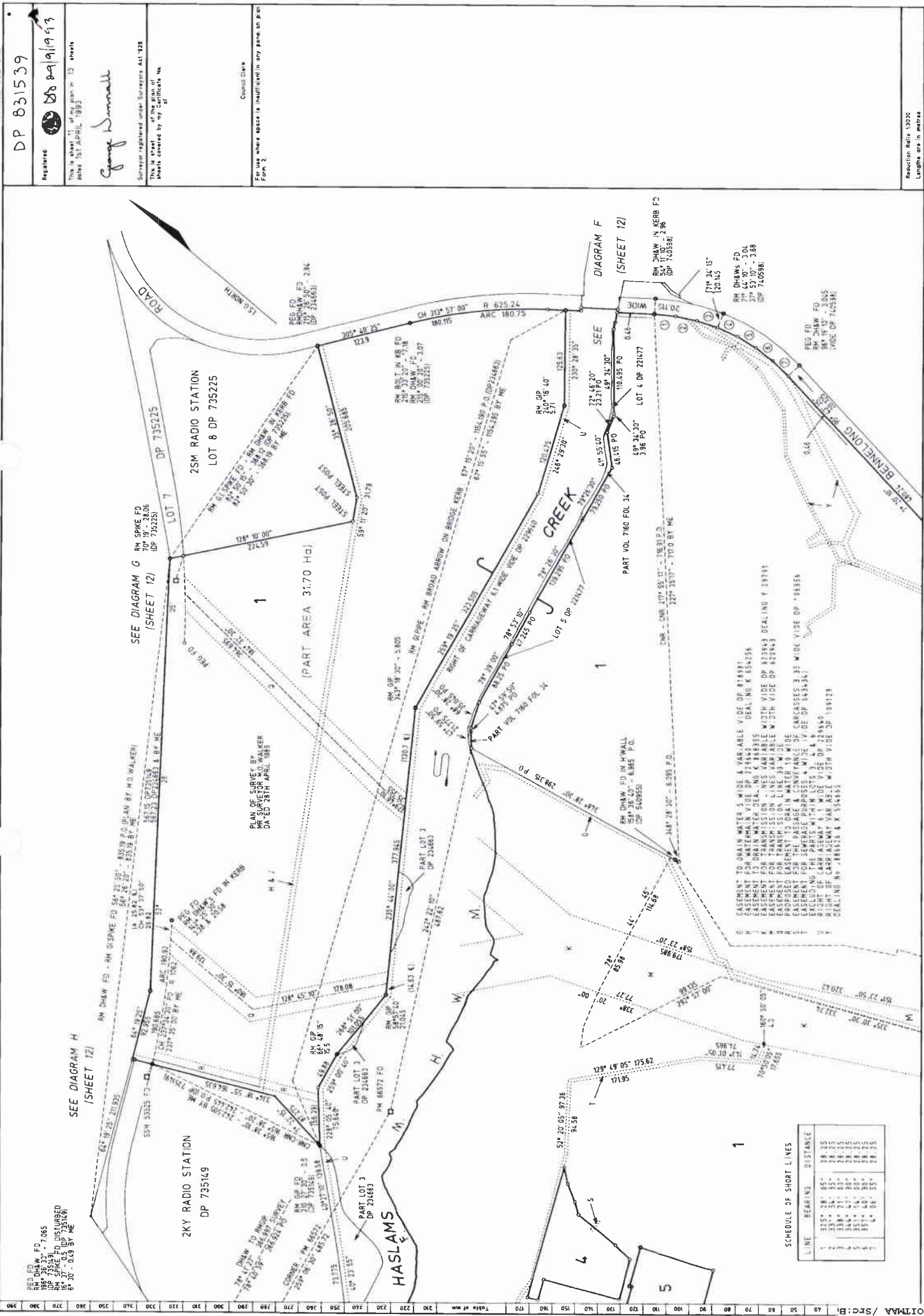
Reduction Ratio: 1
Leakage rate in m³/h

SUNSHINE'S REFERENCE. SB 51710

Plan Drawing only to appear in this space

3: 3
 4: 4





SCHEDULE OF SHORT LINES

| LINE | BEARING | DISTANCE |
|------|--------------|----------|
| 1 | 325° 20' 45" | 80.35 |
| 2 | 198° 35' 30" | 7.065 |
| 3 | 198° 35' 30" | 7.065 |
| 4 | 198° 35' 30" | 7.065 |
| 5 | 198° 35' 30" | 7.065 |
| 6 | 198° 35' 30" | 7.065 |
| 7 | 198° 35' 30" | 7.065 |
| 8 | 198° 35' 30" | 7.065 |
| 9 | 198° 35' 30" | 7.065 |
| 10 | 198° 35' 30" | 7.065 |
| 11 | 198° 35' 30" | 7.065 |
| 12 | 198° 35' 30" | 7.065 |
| 13 | 198° 35' 30" | 7.065 |
| 14 | 198° 35' 30" | 7.065 |
| 15 | 198° 35' 30" | 7.065 |
| 16 | 198° 35' 30" | 7.065 |
| 17 | 198° 35' 30" | 7.065 |
| 18 | 198° 35' 30" | 7.065 |
| 19 | 198° 35' 30" | 7.065 |
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| 21 | 198° 35' 30" | 7.065 |
| 22 | 198° 35' 30" | 7.065 |
| 23 | 198° 35' 30" | 7.065 |
| 24 | 198° 35' 30" | 7.065 |
| 25 | 198° 35' 30" | 7.065 |
| 26 | 198° 35' 30" | 7.065 |
| 27 | 198° 35' 30" | 7.065 |
| 28 | 198° 35' 30" | 7.065 |
| 29 | 198° 35' 30" | 7.065 |
| 30 | 198° 35' 30" | 7.065 |
| 31 | 198° 35' 30" | 7.065 |
| 32 | 198° 35' 30" | 7.065 |
| 33 | 198° 35' 30" | 7.065 |
| 34 | 198° 35' 30" | 7.065 |
| 35 | 198° 35' 30" | 7.065 |
| 36 | 198° 35' 30" | 7.065 |
| 37 | 198° 35' 30" | 7.065 |
| 38 | 198° 35' 30" | 7.065 |
| 39 | 198° 35' 30" | 7.065 |
| 40 | 198° 35' 30" | 7.065 |
| 41 | 198° 35' 30" | 7.065 |
| 42 | 198° 35' 30" | 7.065 |
| 43 | 198° 35' 30" | 7.065 |
| 44 | 198° 35' 30" | 7.065 |
| 45 | 198° 35' 30" | 7.065 |
| 46 | 198° 35' 30" | 7.065 |
| 47 | 198° 35' 30" | 7.065 |
| 48 | 198° 35' 30" | 7.065 |
| 49 | 198° 35' 30" | 7.065 |
| 50 | 198° 35' 30" | 7.065 |
| 51 | 198° 35' 30" | 7.065 |
| 52 | 198° 35' 30" | 7.065 |
| 53 | 198° 35' 30" | 7.065 |
| 54 | 198° 35' 30" | 7.065 |
| 55 | 198° 35' 30" | 7.065 |
| 56 | 198° 35' 30" | 7.065 |
| 57 | 198° 35' 30" | 7.065 |
| 58 | 198° 35' 30" | 7.065 |
| 59 | 198° 35' 30" | 7.065 |
| 60 | 198° 35' 30" | 7.065 |
| 61 | 198° 35' 30" | 7.065 |
| 62 | 198° 35' 30" | 7.065 |
| 63 | 198° 35' 30" | 7.065 |
| 64 | 198° 35' 30" | 7.065 |
| 65 | 198° 35' 30" | 7.065 |
| 66 | 198° 35' 30" | 7.065 |
| 67 | 198° 35' 30" | 7.065 |
| 68 | 198° 35' 30" | 7.065 |
| 69 | 198° 35' 30" | 7.065 |
| 70 | 198° 35' 30" | 7.065 |
| 71 | 198° 35' 30" | 7.065 |
| 72 | 198° 35' 30" | 7.065 |
| 73 | 198° 35' 30" | 7.065 |
| 74 | 198° 35' 30" | 7.065 |
| 75 | 198° 35' 30" | 7.065 |
| 76 | 198° 35' 30" | 7.065 |
| 77 | 198° 35' 30" | 7.065 |
| 78 | 198° 35' 30" | 7.065 |
| 79 | 198° 35' 30" | 7.065 |
| 80 | 198° 35' 30" | 7.065 |
| 81 | 198° 35' 30" | 7.065 |
| 82 | 198° 35' 30" | 7.065 |
| 83 | 198° 35' 30" | 7.065 |
| 84 | 198° 35' 30" | 7.065 |
| 85 | 198° 35' 30" | 7.065 |
| 86 | 198° 35' 30" | 7.065 |
| 87 | 198° 35' 30" | 7.065 |
| 88 | 198° 35' 30" | 7.065 |
| 89 | 198° 35' 30" | 7.065 |
| 90 | 198° 35' 30" | 7.065 |
| 91 | 198° 35' 30" | 7.065 |
| 92 | 198° 35' 30" | 7.065 |
| 93 | 198° 35' 30" | 7.065 |
| 94 | 198° 35' 30" | 7.065 |
| 95 | 198° 35' 30" | 7.065 |
| 96 | 198° 35' 30" | 7.065 |
| 97 | 198° 35' 30" | 7.065 |
| 98 | 198° 35' 30" | 7.065 |
| 99 | 198° 35' 30" | 7.065 |
| 100 | 198° 35' 30" | 7.065 |

| | | |
|--|------------|------------|
| DP 831539 | Registered | 1808919199 |
| This is sheet 12 of my plan in "3 sheets dated 1st April 1993 | | |
| Garry Small | | |
| Surveyor registered under Surveyors Act 1932 | | |
| This is sheet of the plan of area covered by my certificate No | | |
| Council Clerk | | |
| For use where space is insufficient in any page on plan Form 2 | | |

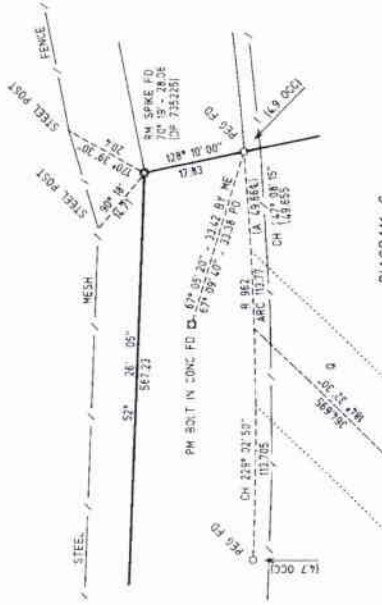


DIAGRAM G
NOT TO SCALE

- H EASEMENT FOR WATERMAIN VIDE DP 228640 DEALING K 454256
- J EASEMENT TO DRAIN WATER DEALING K 888355
- Q EASEMENT FOR TRANSMISSION LINE 30 WIDE
- U PROPOSED EASEMENT TO DRAIN WATER 10 WIDE
- U R RIGHT OF CARRIAGEWAY 6.1 WIDE VIDE DP 228640

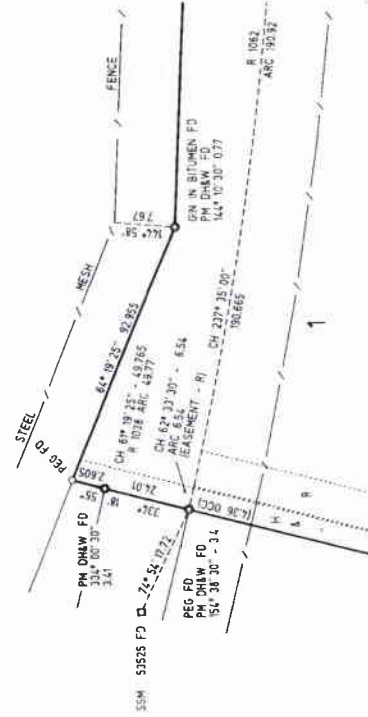
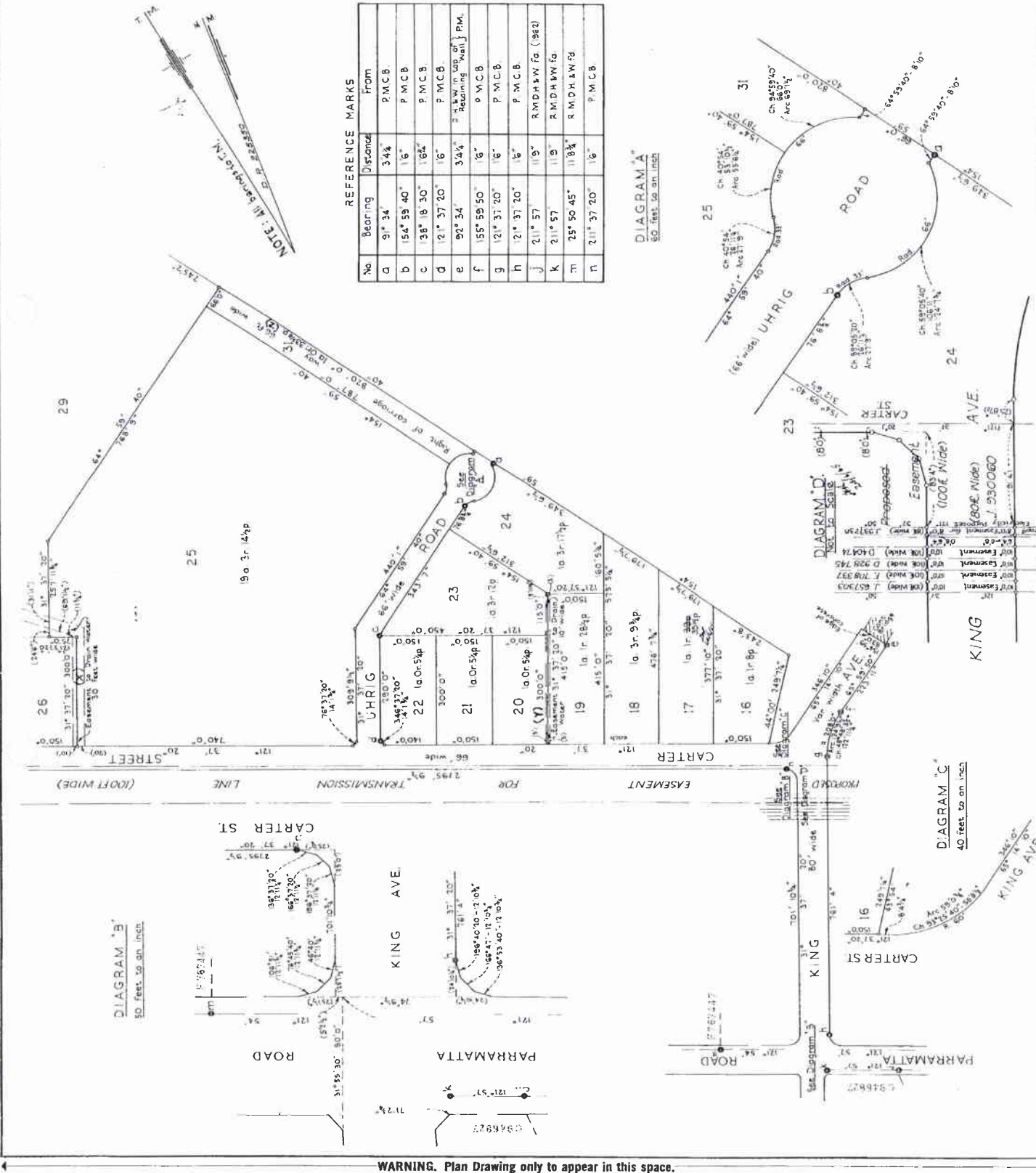


DIAGRAM H
NOT TO SCALE



DIAGRAM F
NOT TO SCALE

| | |
|---|---|
| Registered: DP225350 | |
| C.A.: 365 of 19-1-65 | Title System: Torrens |
| Purpose: Subdiv | Ref. Map: Lidcombe (see 19-1-65) |
| Last Plan: do | |
| PLAN OF PART OF LAND IN C.T. VOL. 6129 FOL. 216 being part of par. 138 | |
| Scale: 200 feet to an inch | |
| Mun. AUBURN | Locality: LIDCOMBE |
| Parish: CONCORD | County: CUMBERLAND |
| Timothy Alfred Rolles of 95 Pitt St., Sydney a surveyor, registered under the Surveyors Act, 1929, as amended, hereby certifies that the survey represented in this plan is accurate and has been made in accordance with the Survey Practice Regulations, 1931, and was completed on 18th January, 1935. | |
| Signature: <i>Timothy Alfred Rolles</i> Surveyor registered under Surveyors Act, 1929, as amended. Deputy of Assistant: A.B. | |
| Statements of Dedications, Easements, (Signatures and Seals to appear in panel provided.) | |
| It is intended to dedicate Carter Street, Uhrig Road and Road to the public for Road purposes & 100 ft wide. | |
| It is intended to create: 1. Easement to drain water 10 feet wide and 50 feet wide appurtenant to Carter Street and Uhrig Road. 2. Easement to drain water 10 feet wide appurtenant to Lots 19, 20, 23 and 24. 3. Right of Carriageway 66 feet wide in favour of the Commission for Railways. | |
| Instrument filed as K55793 Subject to Easements in 240474, 2928745, 2708337, 2657503, 2590060 and 2557238 | |



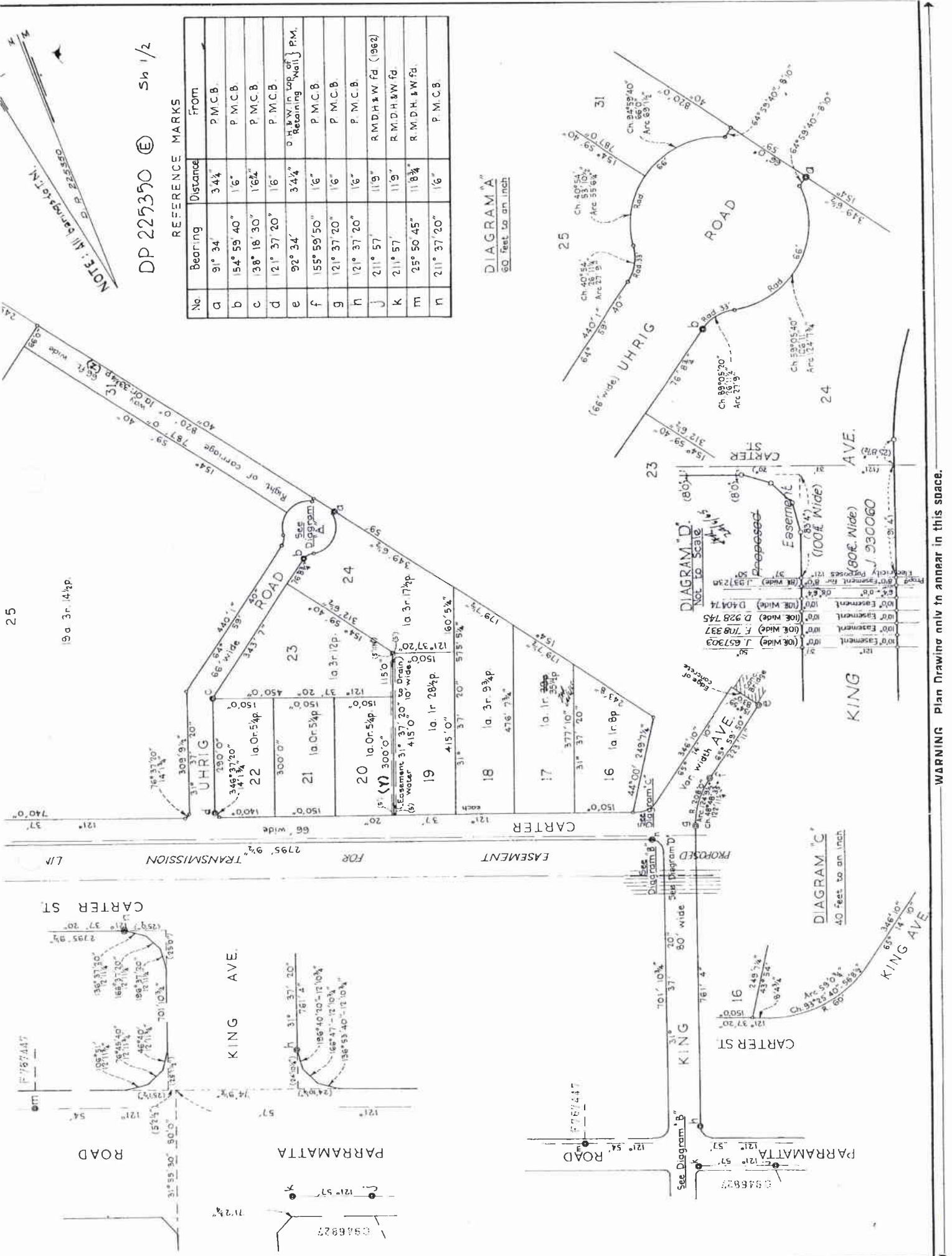
WARNING: Plan Drawing only to appear in this space.

WARNING: Plan Drawing only to appear in this space.

* Strike out either (1) or (2) if not date of survey.

REF. 10327

eq:R5393
el:OITMA



WARNING. Plan Drawing only to appear in this space.

WARNING Plan Drawing only to appear in this space.

DP225350 (E)

Registered: *[Signature]*

This is Sheet 2 of my plan in 2

Sheets dated 18th January, 1965

[Signature]

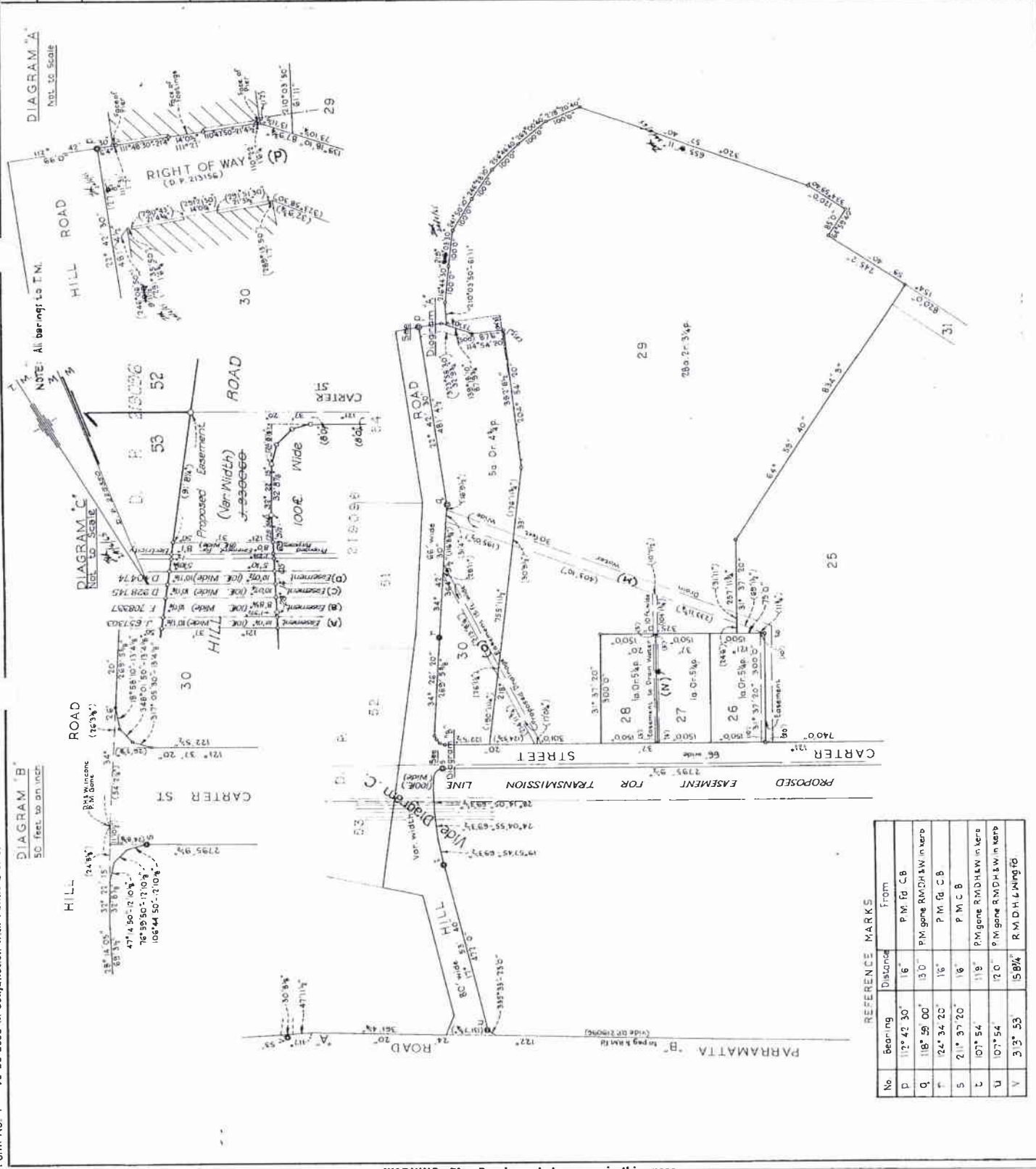
Surveyor registered with Surveyor Act, 1925, as amended.

This is Sheet 2 of the plan of 2

Sheets covered by my Certificate No. 2 of 1:5.5

[Signature]

Council Clerk



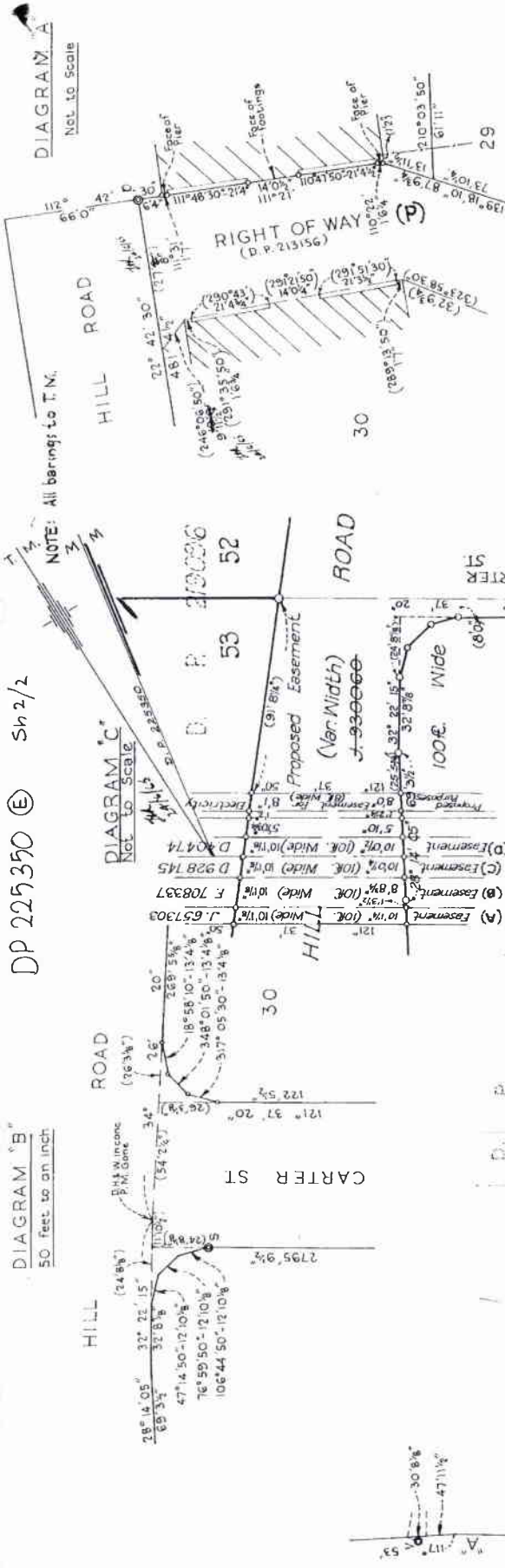
WARNING. Plan Drawing only to appear in this space.

Scale: 200 feet to an inch

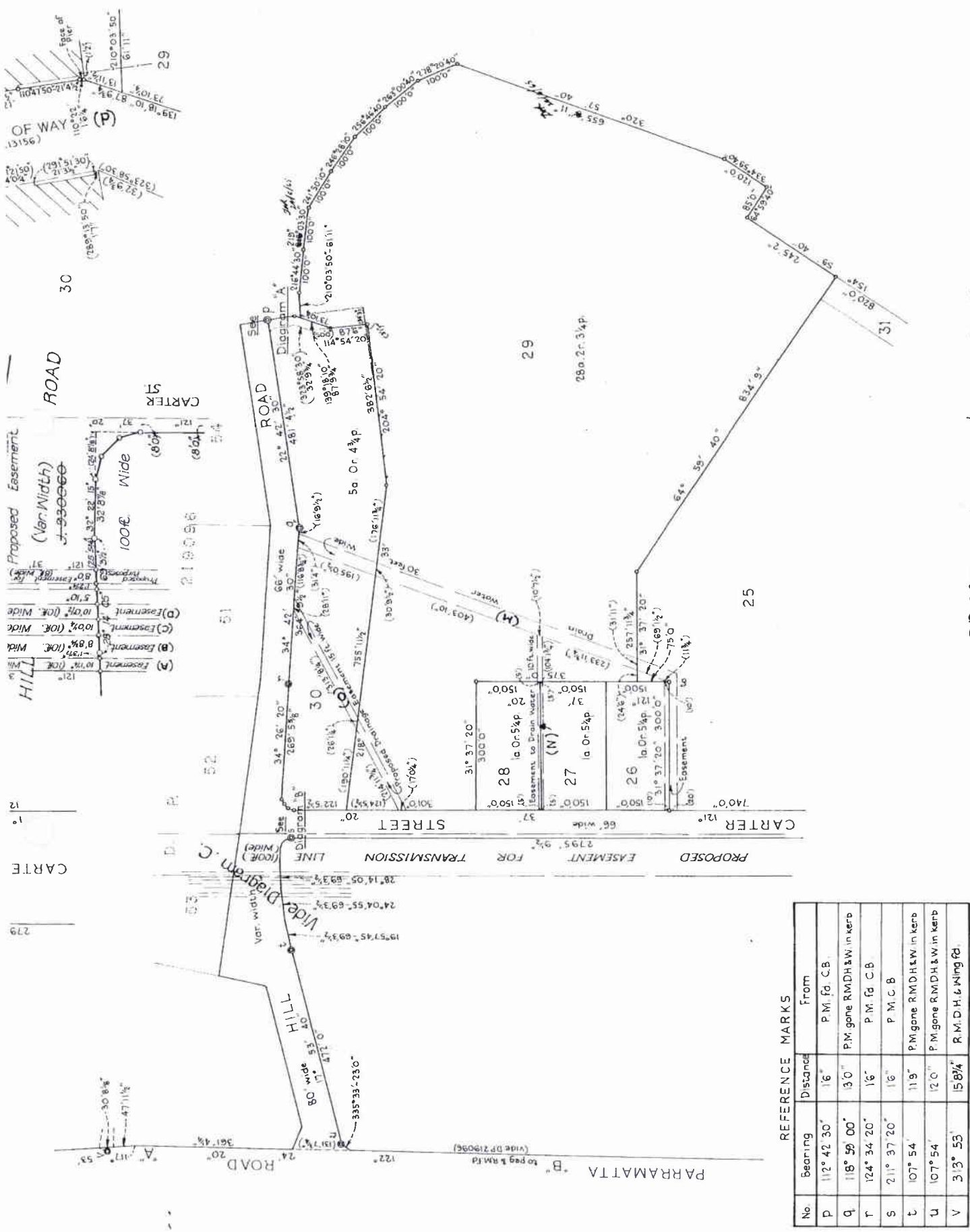
WARNING. Plan Drawing only to appear in this space.

DIAGRAM "B"
50 feet to an inch

DP 225350 © Sh 2/2



WARNING. Plan Drawing only to appear in this space.



REFERENCE MARKS

| No | Bearing | Distance | From |
|----|--------------|----------|----------------------------|
| P | 112° 42' 30" | 16" | P.M. fd. C.B. |
| Q | 118° 59' 00" | 13.0" | P.M. gone RMDH & W in kerb |
| R | 124° 34' 20" | 16" | P.M. fd. C.B. |
| S | 211° 37' 20" | 16" | P.M. C.B. |
| T | 107° 54' | 11.9" | P.M. gone RMDH & W in kerb |
| U | 107° 54' | 12.0" | P.M. gone RMDH & W in kerb |
| V | 313° 53' | 158 3/4" | R.M.D.H. & Wing fd. |

WARNING. Plan Drawing only to appear in this space.

DP 225350 @ 5h 2/2

WARNING. Plan Drawing only to appear in this space.

DP225350(2)
Registered: 315 of 29-1-65
Title System: Torrens
Purpose: Subdiv.
Ref. Map: Lidcombe (see sheet)
Last Plan: do
PLAN OF PART OF LAND IN
C.T. VOL 6129 FOL 216
being part of par. 138
Scale: 200 feet to an inch
Mun. District: AUBURN
Locality: LIDCOMBE
Parish: CONCORD
County: CUMBERLAND
Timothy Alfred Roles
of 50 Pitt St. Sydney
I, the undersigned, being a surveyor registered under the Surveyors Act, 1919, do hereby certify that the above is a correct and true plan of the land described in the Certificate of Title referred to, and that the same is in accordance with the Surveyors Regulations, 1912, and was compiled on 18th January, 1965.
Signature: [Signature]
Surveyor registered under Surveyors Act, 1919 as amended.
Office Use Only
Statements of Dedications, Easements, (Signatures and Seals to appear in panel provided.)
It is intended to Dedicate Carter Street, adjoining Road and King Avenue to the Public for Road purposes, & the same is intended to create, pursuant to Section 88 of the Conveyancing Act, 1919-1964:-
1. Easement to drain water 10 feet wide and 30 feet deep appurtenant to Carter Street, and Hill Road.
2. Easement to drain water 10 feet wide appurtenant to Lots 19, 20, 21 and 22.
3. Right of carriage-way 66 feet wide in favour of the Commission for Railways.
Instrument filed as K55993
Subject to Easements in D40474, D858745, F708337, & 657303, D850060 and 2937338

SIGNATURES AND SEALS ONLY.
[Signatures and Seals]
I hereby certify that the requirements of the Local Government Act, 1919 (other than the requirements for registration of plan), have been complied with and only the application is required to the proposed subdivision and the same is in accordance with the Surveyors Regulations, 1912, and was compiled on 18th January, 1965.
Signature: [Signature]
Surveyor registered under Surveyors Act, 1919 as amended.
Office Use Only
Statements of Dedications, Easements, (Signatures and Seals to appear in panel provided.)
It is intended to Dedicate Carter Street, adjoining Road and King Avenue to the Public for Road purposes, & the same is intended to create, pursuant to Section 88 of the Conveyancing Act, 1919-1964:-
1. Easement to drain water 10 feet wide and 30 feet deep appurtenant to Carter Street, and Hill Road.
2. Easement to drain water 10 feet wide appurtenant to Lots 19, 20, 21 and 22.
3. Right of carriage-way 66 feet wide in favour of the Commission for Railways.
Instrument filed as K55993
Subject to Easements in D40474, D858745, F708337, & 657303, D850060 and 2937338

Table with 4 columns: FEET INCHES, METRES, FEET INCHES, METRES. Contains numerical data for conversion.

Table with 4 columns: FEET INCHES, METRES, FEET INCHES, METRES. Contains numerical data for conversion.

Table with 4 columns: FEET INCHES, METRES, FEET INCHES, METRES. Contains numerical data for conversion.

Table with 4 columns: FEET INCHES, METRES, FEET INCHES, METRES. Contains numerical data for conversion.

Registrar General this day. 4th August 1992

34316 (10)

PLAN FORM 3

| | | | | | | | | | | | |
|----|----|----|----|----|----|----|-------------|-----|-----|-----|-----|
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | Table of mm | 110 | 120 | 130 | 140 |
|----|----|----|----|----|----|----|-------------|-----|-----|-----|-----|

02 109129

(AA) LAND EXCLUDES MINERALS -- JAB6627
(AH) RESERVATIONS & CONDITIONS IN CROWN GRANT
(AI) BENEFITED BY RIGHT OF WAY - LBCT089
(AE) BENEFITED BY RIGHT OF CARRIAGEWAY -- JAB6626
(AF) BENEFITED BY RIGHT OF CARRIAGEWAY -- K514605
(AG) BENEFITED BY EASEMENT TO DRAIN WATER -- K666755



951

S.B. 51993

Ref: OITMAA / Src: B
-Req: R539374 / Doc: DP 0849975 P / Rev: 16-Jun-1995 / Sts: OK. OK / Prt: 17-Nov-2007 19:58 / Pgs: ATL / Seq: 3 of 3
5.D.51993

Ref:OITMAA / SRC:B

Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE : 8278AAAC/AAAE.G05

PDP 2752

S.B. 51993

DP 849975

Registered: add 7-

This is sheet 3 of my plan in 3 sheets
dated 27th OCTOBER 1994

Abstract

Previous: [Inclusion of the Secretary Act 1979](#)

*This is sheet of the plan of
sheets covered by my certificate No.
of*

General Manager/Authorized Officer

| | |
|-----------|------------|
| L.G.A.: | AUBURN |
| Locality: | HOMEBUSH |
| Parish: | CONCORD |
| County: | CUMBERLAND |

For use where space is insufficient in any part on this form.