4.0 AIR QUALITY

4.1 Introduction

4.1.1 The following section describes the receivers that will be sensitive to air pollution, the existing air quality in the study area, the potential sources of air pollution from the construction and operation of the project and the impacts they may have on the environment, together with recommended mitigation measures to reduce potential impacts where appropriate.

4.2 Air Sensitive Receivers

4.2.1 Representative Air Sensitive Receivers (ASRs) have been identified in accordance with criteria set out in the Technical Memorandum on the Environmental Impact Assessment Process.

4.2.2 The construction ASRs are shown in Table 4.1 below and Drawings 4.1a to 4.1h.

Table 4.1: Construction Air Sensitive Receivers

ASR ID (as in Drawing 4.1)	Name of sensitive receivers	Type of usage
C1	Siu Lam Correctional Institution	Clinic
C2	Customs and Excise Training School	School
C3	Siu Lam Hospital	Hospital
TC1 - TC21	Tai Lam Chung Tsuen	Residential
LC1 - LC13	Lok Chui Street	Residential
LT2	School in Luen On San Tsuen	Education
LT2	Kindergarten in Luen On San Tsuen	Education
LT3 - LT8	Luen On San Tsuen	Residential
WU1 - WU3	Wu Uk	Residential
WK1 - WK4	Wong Uk	Residential
P1 - P3	Planned Receivers in Siu Lam	Residential
ST1 - ST18	So Kwun Wat Tsuen	Residential
SS1 - SS5	So Kwun Wat San Tsuen	Residential

4.2.3 It should be noted that operational air quality impacts relate only to odour emissions from the pumping stations and thus only a selected number of ASRs close to the proposed pumping station locations are expected to be potentially affected. The closest operational air sensitive receivers are shown in Table 4.2 and also on Drawings 4.1a-4.1h. have been selected. However, all sensitive receivers have been assessed in terms of odour impacts.

Table 4.2: Operational Air Sensitive Receivers

ASR ID (as in Figure 4.1)	**Relevant Pumping Station**	**Types of usage**
C1	Tai Lam Chung Correctional Institution	Clinic
TC1, TC2, TC15	Tai Lam Chung Tsuen	Residential
TC21	Tai Lam Valley	Residential
LC6, LC7	Castle Peak Villas	Residential
LT1, LT2, LT4	Luen On San Tsuen	School, Residential
N1(1)		CDA Site in Tai Lam Chung Tsuen Residential (high rise)
ST18	So Kwun Wat Tsuen	Residential

Note (1): denotes future sensitive receiver

4.3 Existing Conditions

4.3.1 The villages to be sewered are mostly rural in nature, being either within or surrounded by agriculture or open space, where the main source of air pollution would be agricultural. However, the villages located along the Tai Lam Chung Road, Lok Chui Street and So Kwun Wat Road may be subject to dust and vehicle emissions. The Tuen Mun and Castle Peak Roads are the major sources of air pollution in the overall area but will have limited impact on the majority of the study area.

4.3.2 The Environmental Protection Department have fixed monitoring stations around Hong Kong. The closest station to the study area is at Yuen Long and Total Suspended Particulate (TSP) and Respirable Suspended Particulates have been extracted from the Yuen Long air quality monitoring station average values for January through to December 1996 as an indication of the air quality in the study area. The annual average concentrations of TSP and RSP recorded in Yuen Long are shown in Table 4.3 below.

Table 4.3: TSP and RSP Concentrations from EPD's Yuen Long Monitoring Station (1996)

Monitoring Station	**TSP (annual average)**	**RSP (annual average)**
Yuen Long	114 $\mu g/m^3$	64 $\mu g/m^3$

4.3.3 The figures show that there is a slight exceedance of the Air Quality Objectives in both cases. The levels in the study area would be expected to the lower, however, due to the more rural location of the site.

4.4 Construction Phase Air Pollution Assessment

4.4.1 The likely air quality impact arising from the construction of project is related to dust nuisance and gaseous emissions from construction plant and vehicles.

4.4.2 SO_2 and NO_2 will be emitted form the diesel-powered equipment used. However, the numbers of such plant required on-site will be limited, the gaseous emissions will be minor and, thus, the Air Quality Objectives (AQOs) for these gases are not expected to be exceeded.

4.4.3 The number of vehicle trips during construction is expected to be very few and, for most areas, vehicles movements will be on paved roadways. Only minimal movement of vehicles on unpaved roads will be required and vehicle speed will be very low due to the restricted nature of the sites. The loading of surplus material excavated from trenches into trucks and unloading of backfill will be limited, as a large proportion of the material excavated from the trenches will be used as backfill. It is expected that no more than one truckload per day would be generated, which will not generate significant dust impacts.

4.4.4 In addition, some of the existing septic tanks in the villages may required removal or filling in to allow the village sewerage system to be constructed and this could cause some release of odour. The odour from the removal of existing septic tanks will be short term, however, only lasting one to two days, and any impacts are not considered to be significant.

4.4.5 Potential dust nuisance during the construction phase will be the only major air quality concern. The major sources of dust on site have been assumed to be from construction work itself and blown dust from exposed surfaces. Dust may be generated from the following construction activities:

- concrete breaking and removal;
- excavation of trenches, manholes and pumping stations;
- stockpiling of excavated material and other material, such as bedding material; and
- backfilling of material.

4.4.6 The key areas for control will be during the concrete breaking operations in the villages themselves due to the proximity of the sensitive receivers, particularly residents in Tai Lam Chung Tsuen, Luen On San Tsuen, Wong Uk, Wu Uk, the residents along Lok Chui Street, So Kwun Wat Tsuen and So Kwun Wat San Tsuen. However, the works will be of short duration in any one location and as such impacts can be controlled to within acceptable levels with appropriate mitigation measures.

4.4.7 Excavation works for the pumping stations will potentially affect a limited number of the closest sensitive receivers as shown in Table 4.2. However, with the implementation of suitable mitigation measures, impacts from all sites can be controlled.

4.5 Construction Phase Mitigation Measures

4.5.1 Based upon the recent enactment of the Air Pollution Control (Construction Dust) Regulation, the Contractor will be responsible for ensuring that the dust concentrations comply with the regulatory standards of 260Fg/m^3 and 500Fg/m^3 for 24 hour and 1 hour total suspended particulates for the duration of the construction works. Mitigation measures which can be included in the construction contract for the control of dust will include:

(i) The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that dust levels are controlled to acceptable levels at the Site boundary and any nearby sensitive receiver.

(ii) The Contractor shall not burn debris or other materials on the works areas.

(iii) The Contractor shall implement dust suppression measures which shall include, but not be limited, to be following:

(a) Stockpiles of imported material kept on site shall be contained within hoardings, dampened and/or covered during dry and windy weather.

(b) Material stockpiled alongside trenches should be covered with tarpaulins whenever works are within village boundaries.

(c) Water sprays shall be used during the delivery and handling of cement, sands, aggregates and the like.

(d) No batching of concrete should be carried out on site. Concrete should be used in ready mixed form and off loaded adjacent to designated works areas.

(e) Any vehicle used for moving cement, sands, aggregates and construction waste shall have properly fitting side and tail boards. Materials shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.

(f) No earth, mud, debris, dust and the like shall be deposited on public roads. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site.

4.6 Operational Phase Air Pollution Assessment

4.6.1 Air pollution emissions during operation of the Project will be restricted to odours from the ventilation systems of pumping stations and odour from removal of screenings from the pumping stations. Thus, the ASRs for the operational stage are limited to those in proximity to the proposed pumping stations as detailed in Table 4.2.

4.6.2 The potential sources of odours in the pumping stations are the wet wells, with hydrogen sulphide gas (H_2S) forming the primary cause of odour nuisance. In order to obtain baseline odour information upon which to make an assessment of the potential odour impacts, odour measurements in the form of H_2S emissions from the wet well were taken at the existing pumping station at So Kwun Wat. This station was chosen due to it being similar in design and capacity to the proposed pumping stations in the project area. The So Kwun Wat Pumping Station has an average dry weather flow of 254.6 L/s, as compared to the average dry weather flow of the largest proposed pumping station at Castle Peak Villas of 109 L/s, and a such represents a worst case situation for the assessment.

Odour Monitoring Baseline Survey Methodology

4.6.3 Sampling of hydrogen sulphide was carried out on the 9th March 1999 using the NIOSH Method P&CAM 126 involving the absorption of H_2S gas by the aspiration of a measured volume of air sample through an absorbing reagent. Measurements were taken at both the deodoriser outlet and on the western boundary of the pumping station site, as shown in Drawing 4.2. The following sampling strategy was adopted:

- the H_2S sampling was carried out once in the morning and repeated in the afternoon;
- two successive samples, each approximately one hour in duration, were undertaken at each of the two sampling locations for each round of sampling producing 8 samples in total;
- ambient temperatures were recorded during the sampling; and
- immediately after sampling, the samples were returned to the laboratory for analysis.

4.6.4 Analysis of the sample was undertaken in accordance with the ISC 42402-01-70T method. This method comprises the development of the coloured complex by the addition of a reagent to the sample and the concentration of the coloured complex measured spectrophotometrically. The limit of detection was 0.5ppb.

Odour Monitoring Baseline Survey Results

4.6.5 One odour unit for H_2S is equivalent to 0.5ppb or 0.0005ppm based upon the recognition concentration of the gas. The results of the baseline odour survey at So Kwun Wat Pumping Station are shown in Table 4.4 below.

Table 4.4: Hydrogen Sulphide Baseline Measurements

Sampling Location	Sampling Time	Ambient Temperature (ºC)	Concentration of Hydrogen Sulphide (ppm)	Equivalent Odour Units
Site Boundary	0948-1048	23	0.004	8
	1048-1148	23	0.006	12
Deodoriser Efflux	0953-1053	23	0.359	718
	1053-1153	23	0.575	1150
Site Boundary	1415-1515	24	0.004	8
	1515-1615	24	0.028	56
Deodoriser Efflux	1417-1517	24	0.398	786
	1517-1617	24	0.680	1360

4.6.6 The results show that, predictably, the concentrations measured immediately at the outlet of the deodoriser are notably higher than at the site boundary where significant dispersion would have already taken place. Overall, the level of reduction afforded by natural dispersion of the odour from the outlet and the site boundary was consistent between the sets of readings, with the exception of the afternoon measurement at the boundary which produced a result a magnitude higher than the other three concentrations determined. However, based upon the measurements detailed in Table 4.4, an overall rate of odour dispersion can be determined. This regression can be seen in diagrammatic format in Drawing 4.3 and indicates that the odour would be approaching zero at a short distance after the station boundary.

4.6.7 Based upon the dispersion rate of the odour over distance and the setback of the closest sensitive receivers, even assuming a non linear relationship between the rate of dispersion and distance, the odour would be virtually undetectable at the closest sensitive receivers and well within the criteria of 5 odour units under normal operating circumstances.

4.6.8 It should be noted that the odour modelling at the existing So Kwun Wat pumping station was undertaken at a time of relatively cool weather and the odour levels would, therefore, be expected to less than in the hot, humid summer months. Notwithstanding this, the ADWF of this pumping station is nearly two and a half times greater than the largest pumping station proposed as part of this project. Thus, the values obtained are considered to more than adequately represent the odour levels that could be expected during the summer months from the proposed project.

Odour Modelling Methodology

4.6.9 In addition to the odour monitoring of an existing pumping station, odour modelling was also conducted. Odour dispersion is modelled by the Industrial Source Complex Short Term Model (ISCST3). Owing to the relative complex terrain of the study area, micrometeorological conditions (e.g. local wind direction and speed) are not likely followed by the conditions measured in the nearest meteorological station. In view of this, the worst case wind direction, based upon 10 degree increment, and assumed to be blowing the direction of the sensitive receivers, speed (i.e. 1 m/s) and stability classes D (for daytime) and F (for nighttime) have been adopted in the model. The deodoriser unit will be located within the pump house itself and vented through an external wall, as compared to the So Kwun Wat pumping station deodoriser which was located within the compound. The outlet vents will be positioned on the furthest wall of the pumping stations away from the closest existing sensitive receivers. The emission height of the odour plume is taken to be the height of the pumping stations as the dispersion plume will have to rise above the pump house before dispersing towards the sensitive receivers. In addition, the outlet is considered as a stack source for the purpose of the modelling. Details the outlet locations for each of the pumping stations, together with their heights are provided in Table 4.5.

Table 4.5 Pumping Station Height and Deodoriser Outlet Locations

Proposed Pumping Station	Height (m)	Outlet Location at the Station
Tai Lam Correctional Institution	6.3	Western Wall
Luen On San Tsuen	6.7	South-eastern Wall
Tai Lam Chung Tsuen	6.6	Western Wall Facing the Nullah
Tai Lam Valley	6.7	Southern Wall Facing the Nullah
So Kwun Wat Tsuen	6.7	Southern Wall Facing the Stream
Castle Peak Villas	6.7	Southern Wall Facing the Sea

4.6.10 The deodorisation system will be designed to extract foul air from the wet well of the pumping station and deodorise it through activated carbon filter beds before discharging to atmosphere. The specified H_2S removal efficiency shall be 99.5% at 5 ppm or less with a maximum discharge concentration of 25ppb.

4.6.11 Given one odour unit for H_2S is equivalent to 0.47 ppb and the design H_2S discharge concentration is 25 ppb, the emission rate adopted for the assessment is 53 odour units. In order to calculate the 5-second average concentration, the hourly averaged concentrations predicted by ISCST3 are first converted to 3-minute average concentrations using the formula below (Duffee et.al., 1996):

$$C_L / C_S = (t_S / t_L)^n$$

where

- C_L and C_S are the time averaged odour concentrations in longer and shorter periods respectively;
- t_L and t_S are the longer and shorter time averaging periods respectively; and
- n is an exponential value which depends upon the stability class (i.e. 0.2 for class D and 0.167 for class F).

4.6.12 The 3-minute average concentrations can be converted to 5-second average concentrations by multiplying by a factor of 5 (OME, 1996).

Odour Modelling Results

4.6.13 Table 4.6 shows the predicted maximum 5-second average odour concentrations at all the representative sensitive receivers and the model input and output data is given in Appendix A. Odour contour plots for each pumping station during stability classes D and F and at heights of 4.5m and 7.5m above local ground level can be seen in Drawings 4.4a-d for Tai Lam Correctional Institution, Luen On San Tsuen, Tai Lam Chung Tsuen and Tai Lam Valley pumping stations, 4.5a-d for Castle Peak Villas pumping station and 4.6a-d for So Kwun Wat Tsuen pumping station.

4.6.14 Due to the relatively high momentum of the plume from the source, pollutants are lifted to a higher level from the ground before being horizontally transported by the wind. As a result, all of the existing low rise buildings suffer only negligible impacts from the odour sources. However, mid-rise buildings such as C2 and LC9 are more affected by the odour emissions, especially in the more stable conditions during the night. Nevertheless, the results show that the odour concentrations at all ASRs will be within the 5 odour unit criteria for both stability classes.

Odour Assessment

4.6.15 The modelled predictions concur with the results of the monitoring exercise at So Kwun Wat and show that all predicted odour concentrations with the deodoriser in place will be within the 5-odour unit criteria.

4.6.16 The proposed future housing development on the CDA site at Tai Lam Chung on the areas currently designated as open storage, has also been investigated in terms of operational phase odour impacts. The closest block of the high rise housing development, approximately 40m from the deodoriser outlet, has been assessed. The second and third floors are the worst affected during the nighttime, but with the bottom two floors comprising non-sensitive car parking. However, no exceedance of the regulatory standard for all the future sensitive receivers is predicted.

4.6.17 The proposed development in Area 56 in So Kwun Wat has also been considered. The exact details of the site are not known but the land designation of the site has been consulted. The closest residential area, denoted by N3 in Drawing 4.1h, is over 300m away for the So Kwun Wat Pumping Station. The worst odour levels at this location would be approximately 0.46 odour units for the 3rd floor of a low rise property and 0.93 odour units for the 5th floor of a highrise building. In additon, an area of green belt is designated within 150m and based upon the worst case situation that this will be a sensitive area, odour levels at the closest edge, denoted by N2 on Drawing 4.1h, would be in the region of 0.15 odour units. These results show that predicted odour concentrations are well within the standard at both these locations.

4.6.18 In addition, the ventilation system for the pumping stations should extract the air within the wet well and pass it through a deodoriser. As the inlet screening area is not enclosed, odour from this source can concentrate within the pumping house atmosphere and, thus, during routine maintenance activities when the doors to the pumping station are opened, this stagnant air is released. The maintenance activities are, however, undertaken on a very infrequent basis and thus, any odour nuisance would not be considered significant.

4.6.19 The other potential source of odour will be screenings removed from the pumping stations routinely during operation and maintenance. Screenings removal will likely be undertaken 1-2 times per week dependent upon the quantity of screenings collected during the initial operation stage. However, as the screenings will be stored and transported in a covered container and collection and transfer process confined to within the pump house, odour impacts will not be significant.

4.7 Residual Impacts

4.7.1 Construction phase dust levels can be controlled to within acceptable levels with the implementation of recommended mitigation measures and, thus, no residual impacts are predicted. In respect of the operational phase, with the integration of the deodoriser into the pumping station, operational impacts are within the odour criteria and no residual impacts will occur.

4.8 Environmental Monitoring and Audit

4.8.1 The assessment has concluded that construction dust impacts can be mitigated to acceptable levels and no residual impacts will occur. However, it is recommended that construction phase environmental monitoring and audit is undertaken to ensure that the recommended mitigation measures are being implemented and are effective. EM&A for odour during the operational phase is not required. Further details of the specific EM&A requirements are detailed in Section 11 of this report and in the EM&A Manual.

4.9 References

4.9.1 The following references have been used:

C Duffee, R.A., O'Brien, M.A., Ostojic, N., 1991, Odour Modelling: Why and How, Transactions -Air & Waste Management Association, Pittsburgh, Pennsylvania, 1991. In recent Developments and Current Practices in Odour Regulations, Control and Technology. Edited by D.R. Derenzo and A. Gnyp.

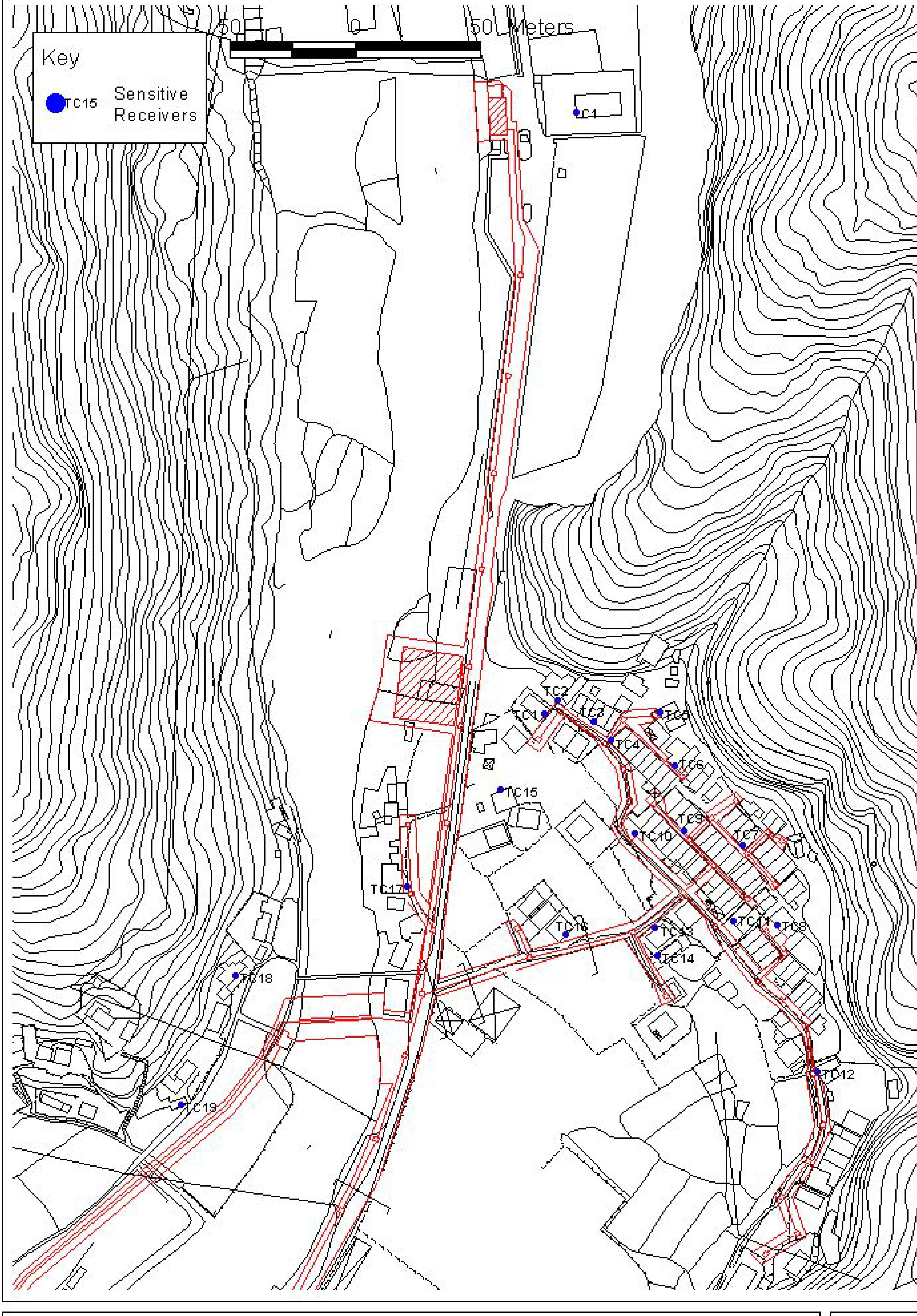
C Ontario Ministry of Environment (OME), 1996, Odour Impacts - An Overview. Science and Technology Branch, Environmental Engineering Services, STB Technical Bulletin No. EES-1, February 1996.

Table 4.6 Predicted Maximum 5-second Average Odour Concentrations at ASRs

Air Sensitive Receiver	Floors	Odour Concentrations (OU)		Air Sensitive Receiver	Floors	Odour Concentrations (OU)		Air Sensitive Receiver	Floors	Odour Concentrations (OU)	
		Stability Class D	Stability Class F			Stability Class D	Stability Class F			Stability Class D	Stability Class F
C1	1	0.1	0.2	TC12	1	0.1	0.2	LT6	2	0.1	0.1
C2	1	0.2	0.4	TC12	2	0.2	0.3	LT6	3	0.1	0.1
C2	2	0.2	0.4	TC13	1	0.1	0.1	LT7	1	0.1	0.1
C2	3	0.2	0.5	TC13	2	0.2	0.2	LT7	2	0.1	0.1
C2	4	0.3	1.3	TC13	3	0.2	0.4	LT7	3	0.2	0.1
C2	5	0.8	4.3	TC14	1	0.1	0.1	LT8	1	0.2	0.1
C3	1	0.1	0.2	TC14	2	0.2	0.2	LT8	2	0.2	0.2
C3	2	0.1	0.2	TC14	3	0.2	0.6	LT8	3	0.3	0.7
C3	3	0.1	0.2	TC15	1	0.1	0.1	N1	1	0.3	1.6
TC1	1	0.1	0.1	TC15	2	0.2	0.2	N1	2	0.9	4.8
TC1	2	0.1	0.1	TC16	1	0.1	0.1	N1	3	1.8	4.7
TC1	3	0.1	0.2	TC16	2	0.1	0.1	N1	4	2.6	1.5
TC2	1	0.1	0.1	TC16	3	0.2	0.5	N1	5	2.5	0.4
TC3	1	0.1	0.1	TC17	1	0.1	0.1	WU1	1	0.2	0.4
TC3	2	0.2	0.3	TC17	2	0.1	0.1	WU1	2	0.2	0.4
TC4	1	0.1	0.1	TC17	3	0.2	0.3	WU1	3	0.2	0.4
TC4	2	0.2	0.2	TC18	1	0.1	0.1	WU2	1	0.2	0.3
TC4	3	0.2	0.4	TC18	2	0.1	0.1	WU2	2	0.3	0.4
TC5	1	0.1	0.2	TC19	1	0.2	0.1	WU2	3	0.3	0.6
TC5	2	0.1	0.2	TC19	2	0.2	0.2	WU3	1	0.2	0.1
TC6	1	0.1	0.1	TC20	1	0.2	0.2	WU3	2	0.2	0.2
TC6	2	0.1	0.1	TC21	1	0.1	0.1	WK1	1	0.1	0.2
TC7	1	0.2	0.1	TC21	2	0.1	0.1	WK1	2	0.2	0.2
TC7	2	0.2	0.3	LT1	1	0.2	0.1	WK1	3	0.2	0.4
TC7	3	0.2	0.5	LT1	2	0.2	0.1	WK2	1	0.2	0.1
TC8	1	0.2	0.2	LT1	3	0.2	0.2	WK2	2	0.2	0.2
TC8	2	0.2	0.3	LT2	1	0.2	0.4	WK2	3	0.2	0.4
TC9	1	0.1	0.2	LT3	1	0.1	0.1	WK3	1	0.1	0.2
TC9	2	0.1	0.2	LT3	2	0.1	0.1	WK3	2	0.1	0.2
TC9	3	0.2	0.5	LT4	1	0.1	0.1	WK3	3	0.2	0.6
TC10	1	0.1	0.2	LT4	2	0.1	0.1	WK4	1	0.2	0.2
TC10	2	0.1	0.3	LT5	1	0.1	0.1	WK4	2	0.2	0.2
TC10	3	0.2	0.4	LT5	2	0.1	0.1	WK4	3	0.2	0.6
TC11	1	0.1	0.1	LT5	3	0.1	0.2	P1	1	0.1	0.1
TC11	2	0.1	0.1	LT6	1	0.1	0.1	P2	1	0.0	0.0

Table 4.6 Predicted Maximum 5-second Average Odour Concentrations at ASRs

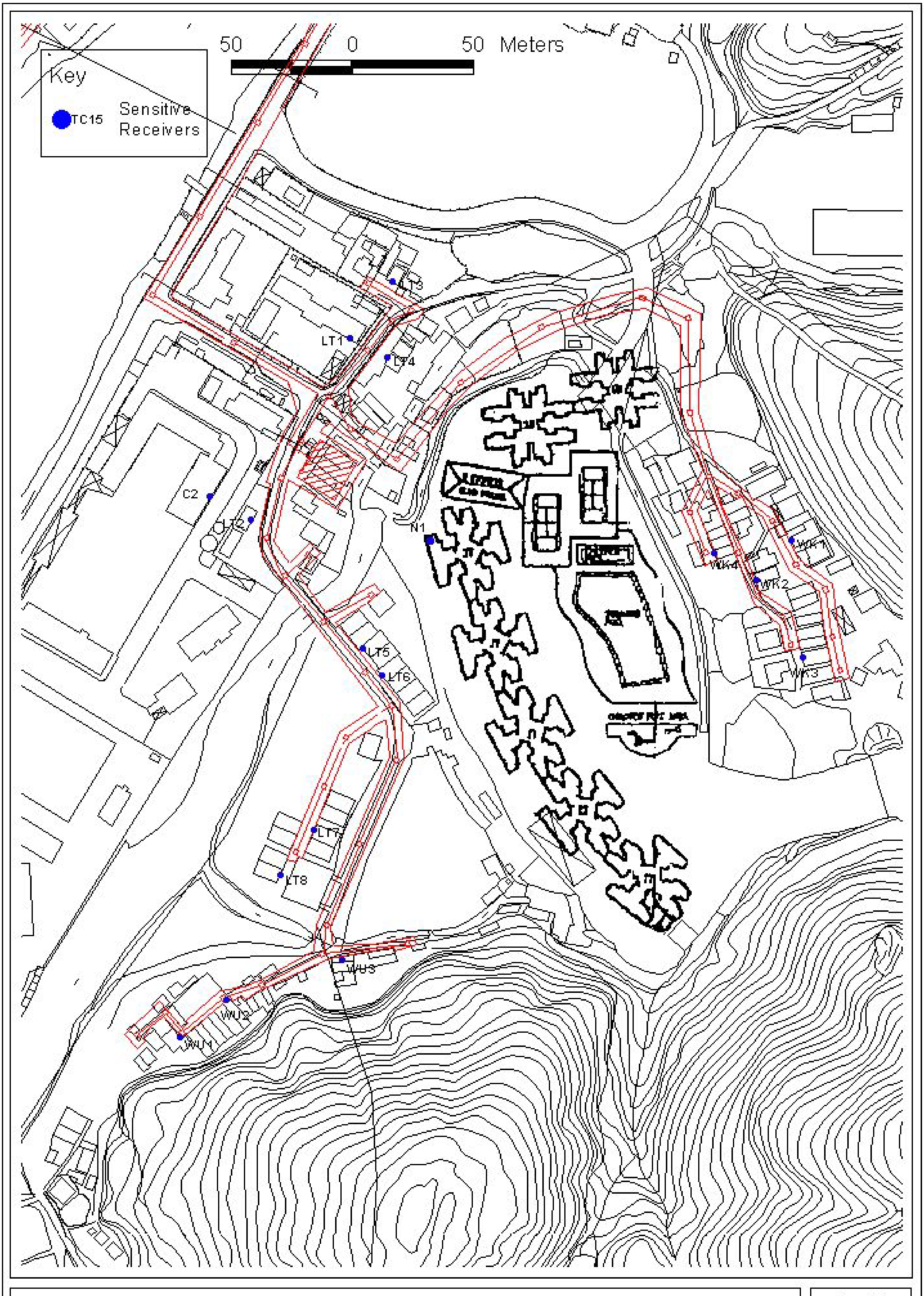
Air Sensitive Receiver	Floors	Odour Concentrations (OU)		Air Sensitive Receiver	Floors	Odour Concentrations (OU)		Air Sensitive Receiver	Floors	Odour Concentrations (OU)	
		Stability Class D	Stability Class F			Stability Class D	Stability Class F			Stability Class D	Stability Class F
LC1	1	0.1	0.1	LC10	6	1.0	0.3	ST6	2	0.1	0.1
LC1	2	0.1	0.1	LC11	1	0.1	0.1	ST6	3	0.2	0.2
LC1	3	0.2	0.5	LC11	2	0.1	0.1	ST7	1	0.1	0.1
LC2	1	0.1	0.1	LC11	3	0.2	0.2	ST7	2	0.1	0.1
LC2	2	0.2	0.2	LC12	1	0.1	0.1	ST7	3	0.2	0.2
LC2	3	0.2	0.5	LC12	2	0.1	0.1	ST8	1	0.1	0.1
LC3	1	0.1	0.1	LC12	3	0.2	0.3	ST8	2	0.2	0.2
LC3	2	0.1	0.1	LC13	1	0.1	0.2	ST8	3	0.2	0.5
LC3	3	0.1	0.2	LC13	2	0.1	0.2	ST9	1	0.1	0.1
LC4	1	0.1	0.1	LC13	3	0.2	0.4	ST9	2	0.1	0.1
LC4	2	0.1	0.1	SS1	1	0.1	0.1	ST9	3	0.1	0.1
LC4	3	0.2	0.2	SS1	2	0.1	0.1	ST10	1	0.1	0.1
LC5	1	0.1	0.1	SS2	1	0.1	0.1	ST10	2	0.1	0.1
LC5	2	0.1	0.1	SS2	2	0.1	0.1	ST10	3	0.2	0.2
LC5	3	0.2	0.3	SS3	1	0.1	0.1	ST11	1	0.1	0.1
LC6	1	0.1	0.1	SS3	2	0.1	0.1	ST11	2	0.1	0.1
LC6	2	0.2	0.2	SS4	1	0.1	0.2	ST11	3	0.2	0.2
LC6	3	0.2	0.4	SS4	2	0.1	0.2	ST12	1	0.1	0.1
LC7	1	0.1	0.1	SS5	1	0.1	0.2	ST12	2	0.2	0.2
LC7	2	0.2	0.2	SS5	2	0.1	0.3	ST12	3	0.2	0.4
LC7	3	0.2	0.4	ST1	1	0.1	0.1	ST13	1	0.1	0.1
LC8	1	0.1	0.2	ST1	2	0.1	0.2	ST13	2	0.1	0.1
LC8	2	0.2	0.3	ST1	3	0.2	0.6	ST13	3	0.1	0.1
LC8	3	0.2	0.4	ST2	1	0.1	0.1	ST14	1	0.1	0.1
LC9	1	0.2	0.6	ST2	2	0.1	0.2	ST14	2	0.1	0.1
LC9	2	0.5	2.8	ST2	3	0.2	0.5	ST14	3	0.1	0.1
LC9	3	1.1	4.6	ST3	1	0.1	0.1	ST15	1	0.1	0.1
LC9	4	1.7	2.9	ST3	2	0.1	0.1	ST15	2	0.1	0.1
LC9	5	1.9	0.7	ST3	3	0.1	0.1	ST16	1	0.1	0.1
LC9	6	1.7	0.2	ST4	1	0.0	0.1	ST16	2	0.1	0.1
LC10	1	0.3	1.0	ST4	2	0.1	0.1	ST17	1	0.1	0.1
LC10	2	0.5	2.4	ST5	1	0.1	0.1	ST17	2	0.1	0.1
LC10	3	0.8	3.4	ST5	2	0.1	0.1	ST18	1	0.0	0.1
LC10	4	1.0	2.5	ST5	3	0.2	0.4	ST18	2	0.0	0.1
LC10	5	1.1	1.0	ST6	1	0.1	0.1	ST18	3	0.0	0.1



Mouchel

Location of Sensitive Receivers (1 of 8)

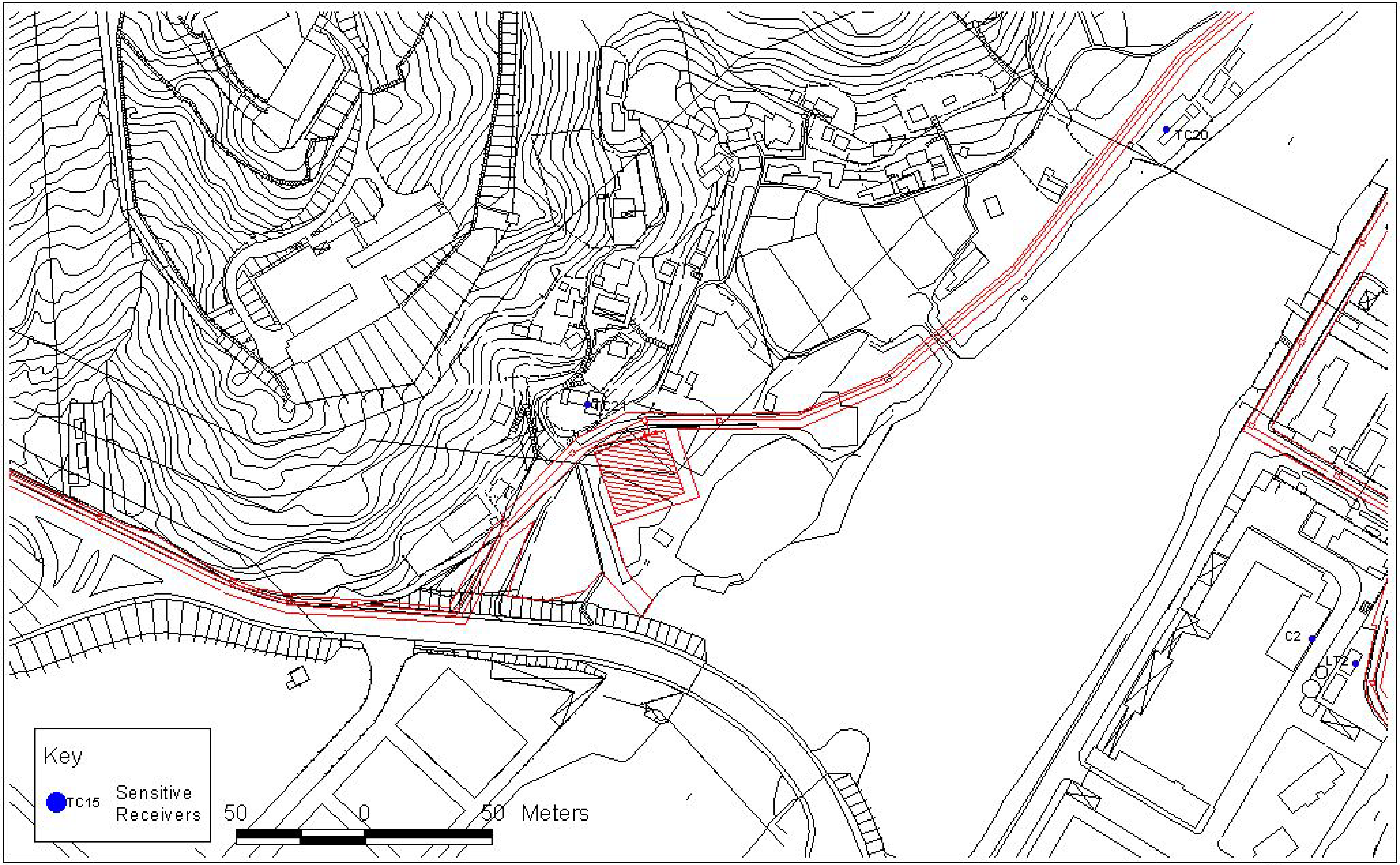
Drawing No. 4.1a



Location of Sensitive Receivers (2 of 8)

Mouchel

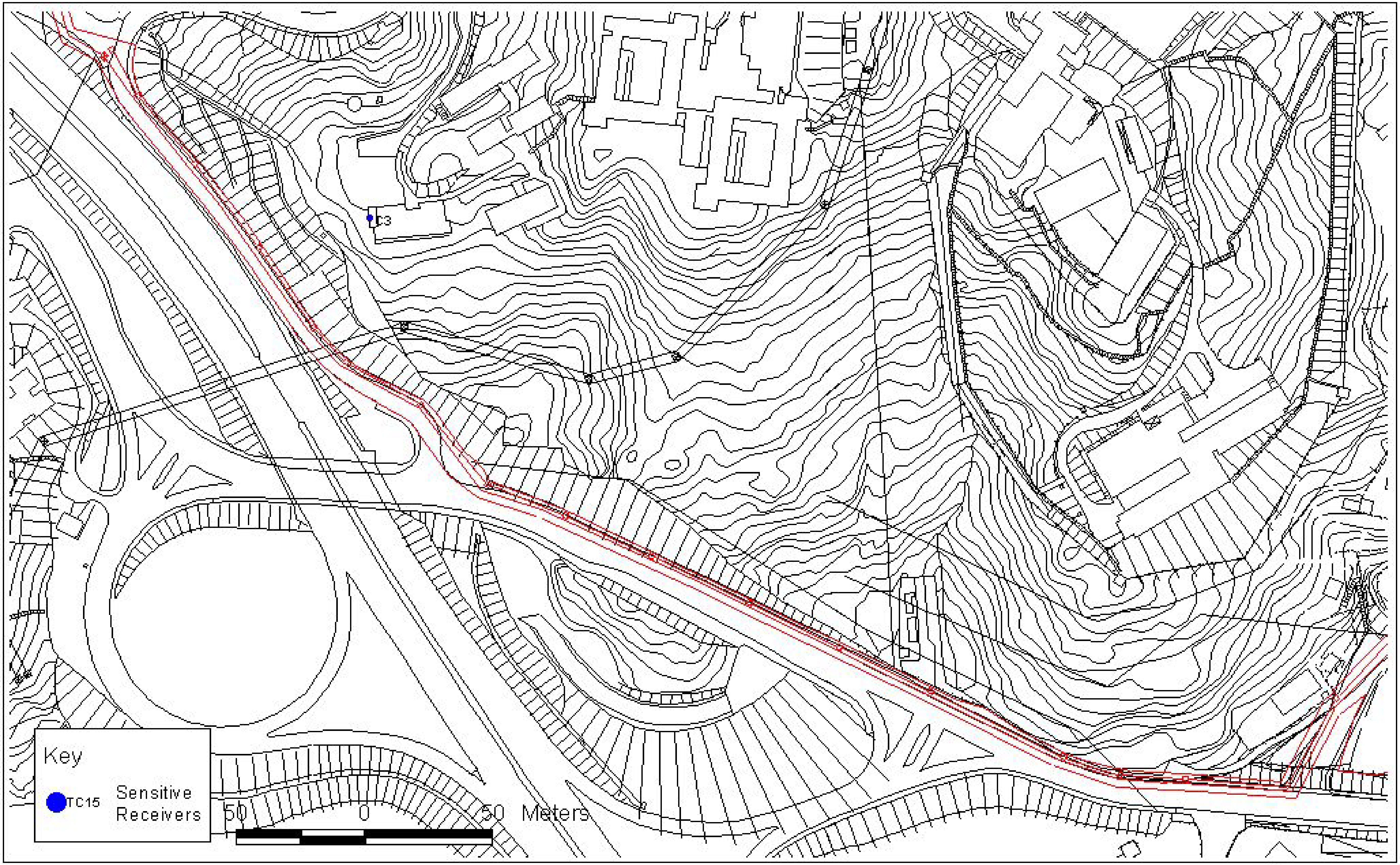
4.1b



Location of Sensitive Receivers (3 of 8)

Mouchel

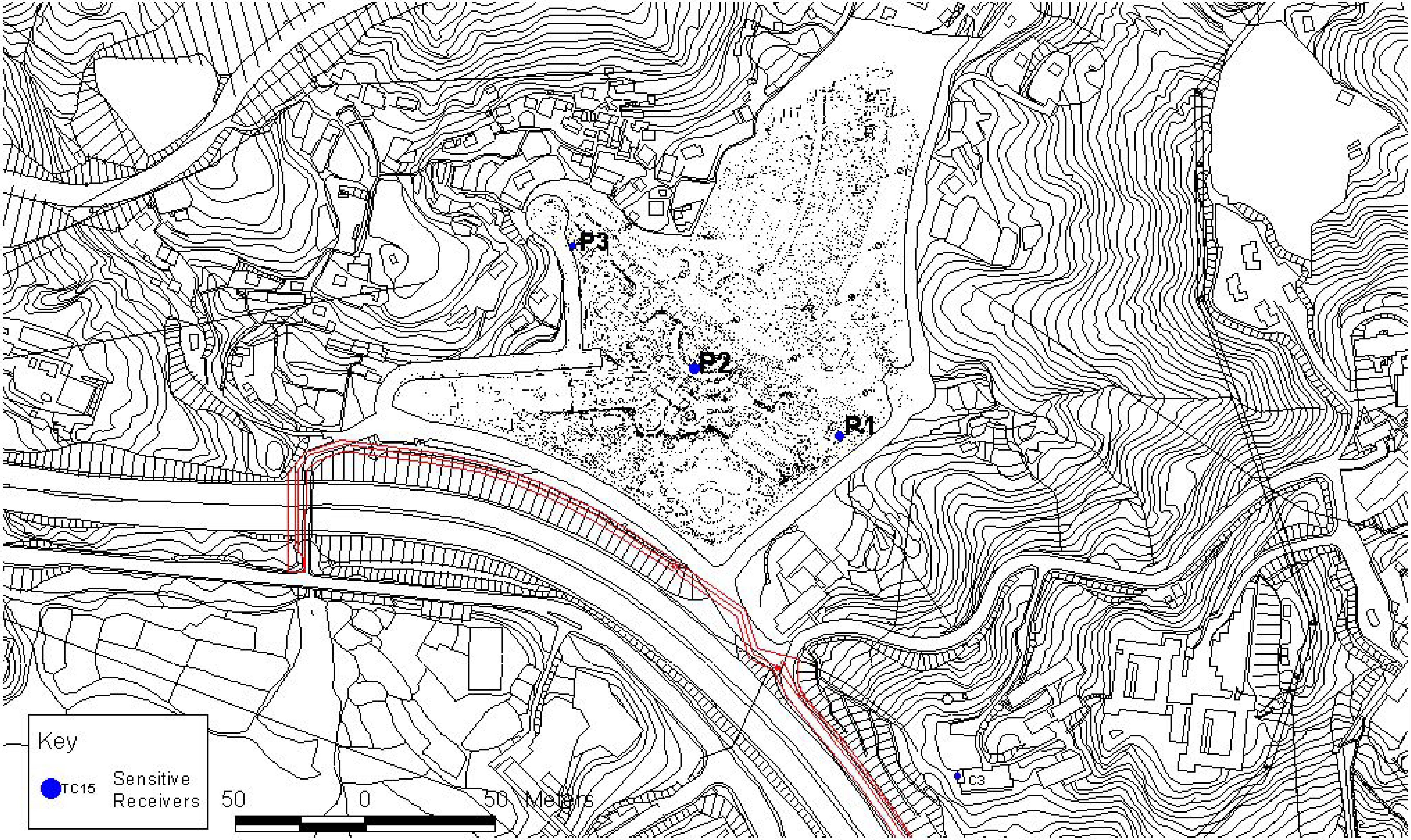
Drawing No. 4.1c



Location of Sensitive Receivers (4 of 8)

Mouchel

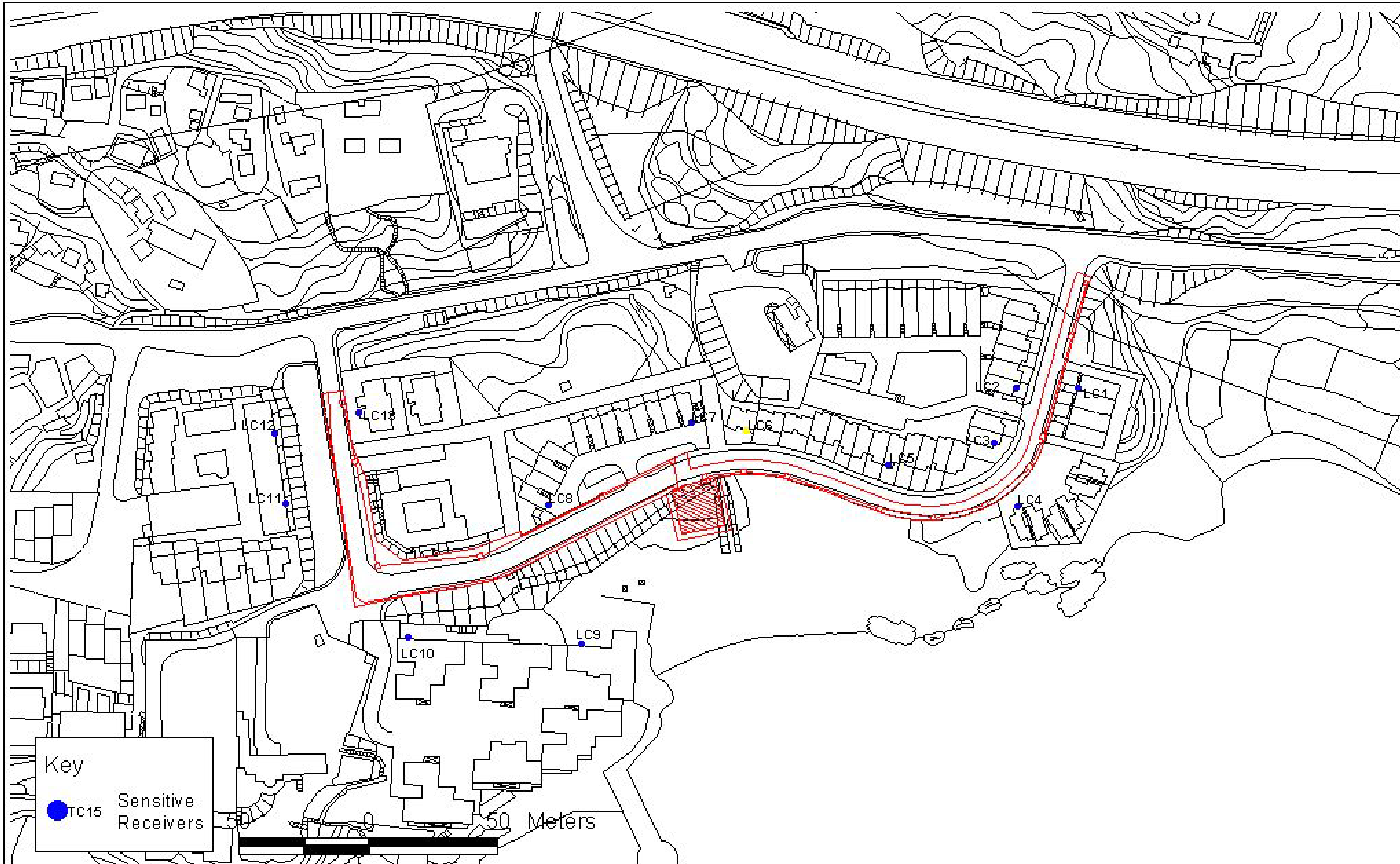
4.1d



Location of Sensitive Receivers (5 of 8)

Mouchel

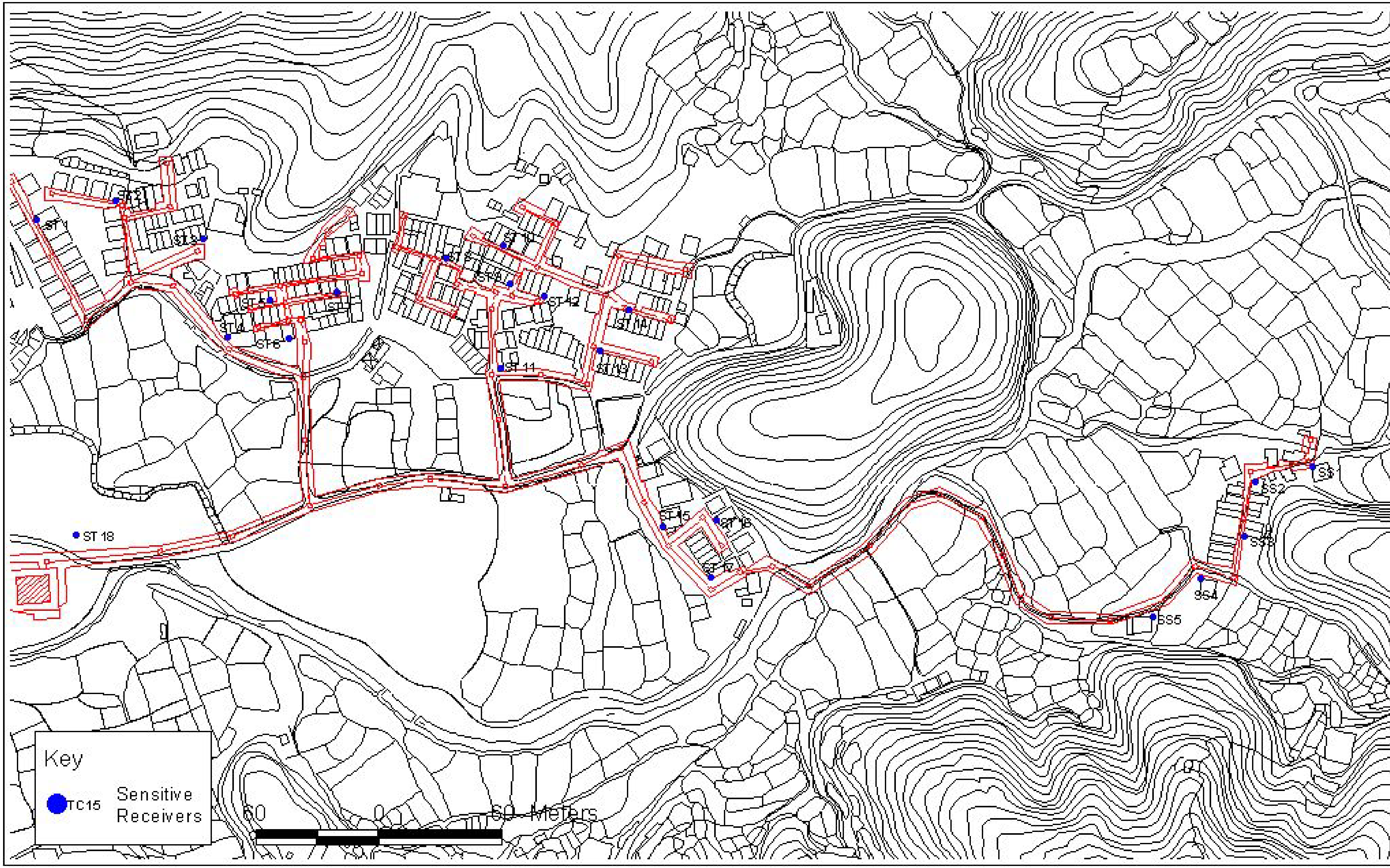
4.1e



Mouchel

Drawing No. 4.1f

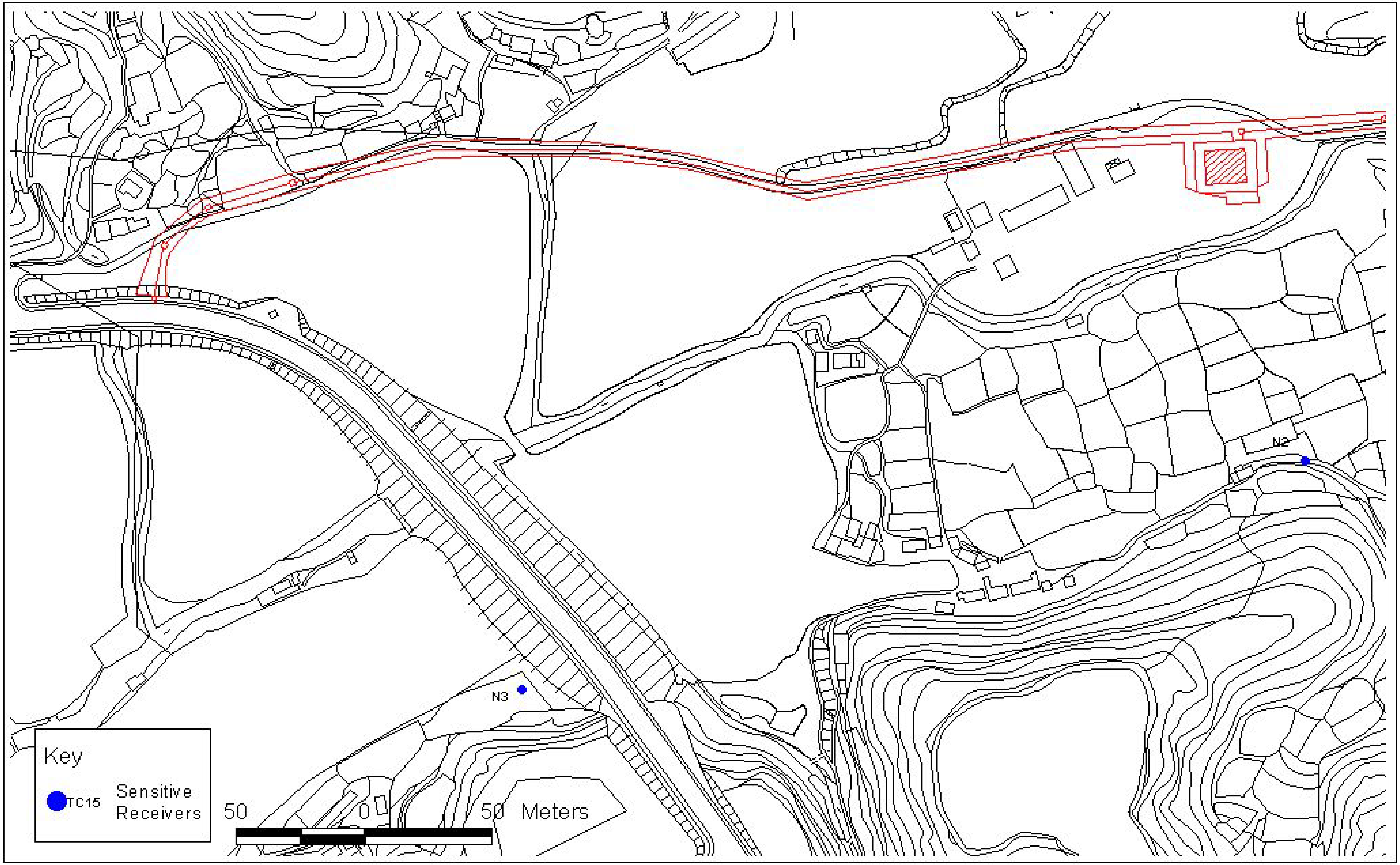
Location of Sensitive Receivers (6 of 8)



Mouchel

Location of Sensitive Receivers (7 of 8)

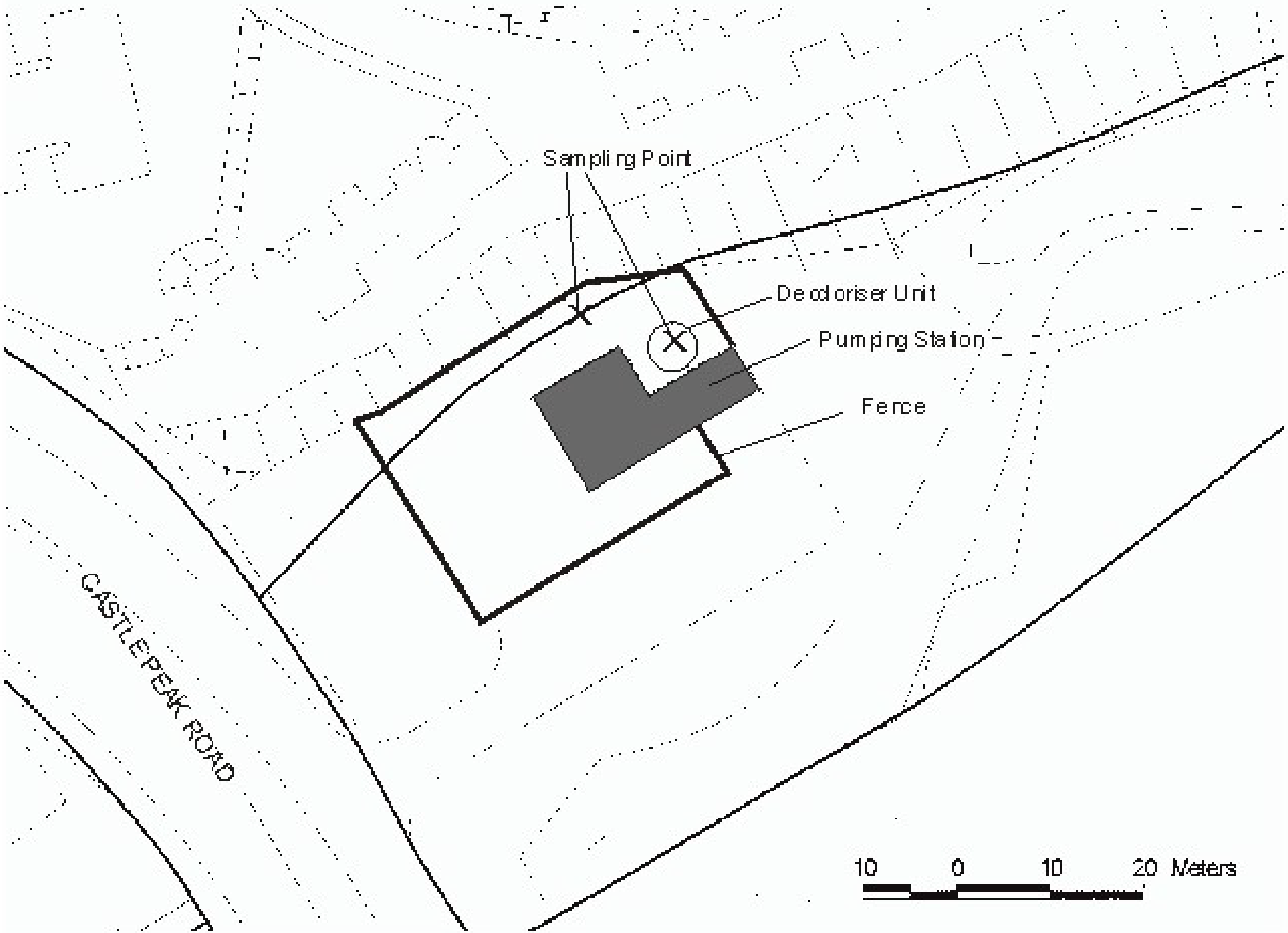
4.1g



Mouchel

Location of Sensitive Receivers (8 of 8)

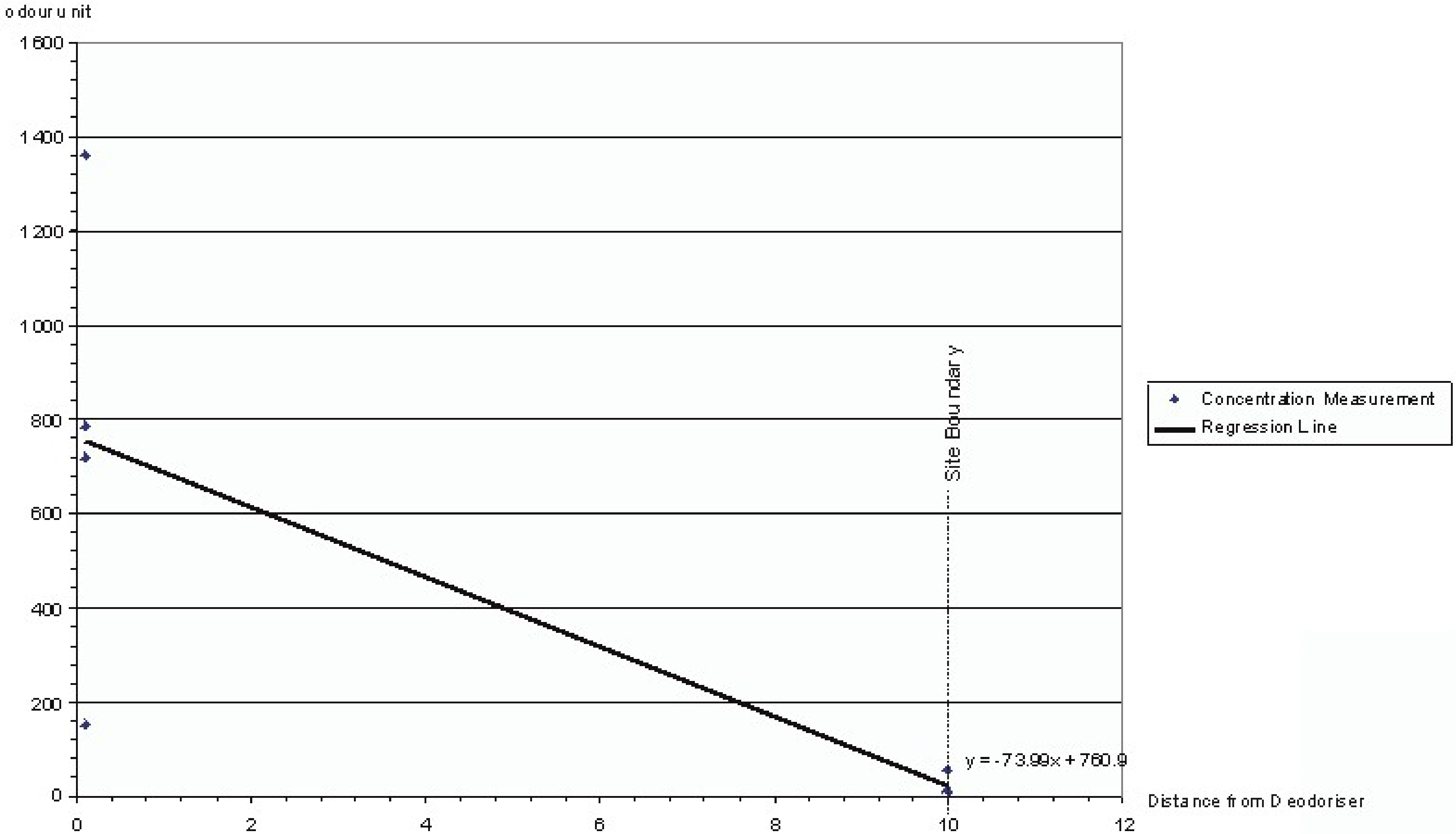
4.1h



Sampling Point of Hydrogen Sulphide in So Kwun Wat Pumping Station

Mouchel

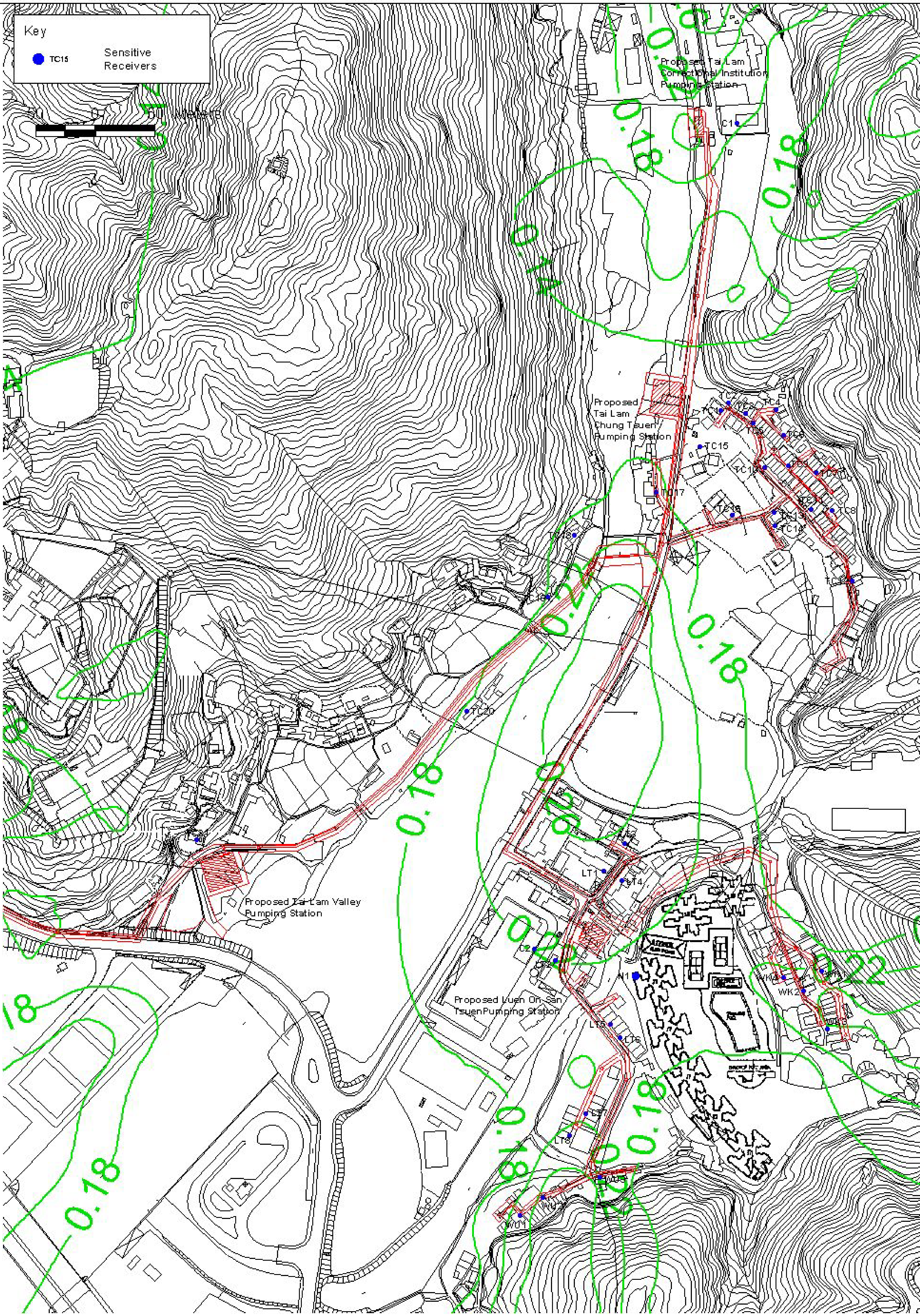
4.2



Odour Unit Regression Line

Mouchel

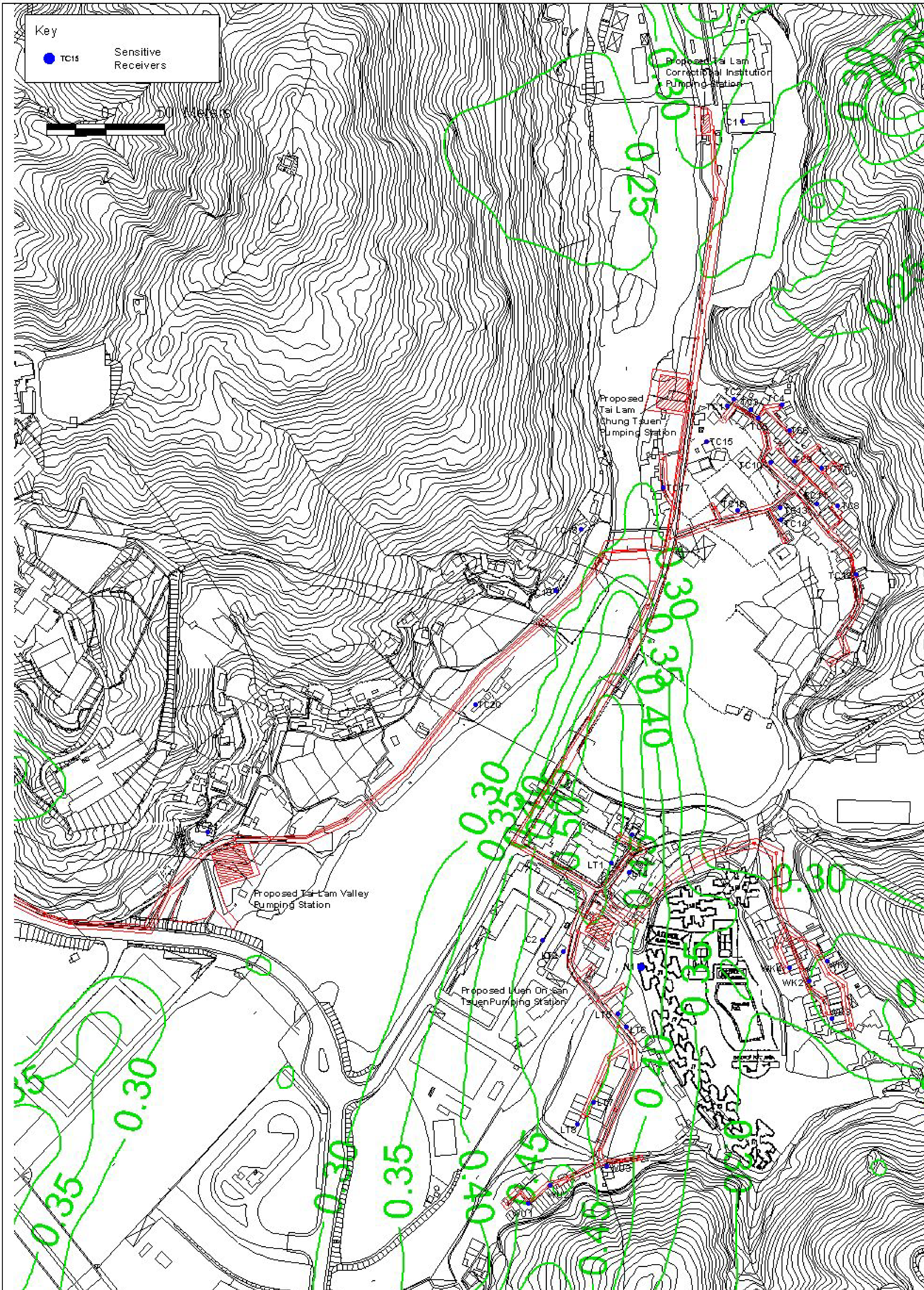
4.3



Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class D
(Tai Lam Correctional Institution, Luen On San Tsuen ,
Tai Lam Chung Tsuen and Tai Lam Valley Pumping Stations)

Mouchel

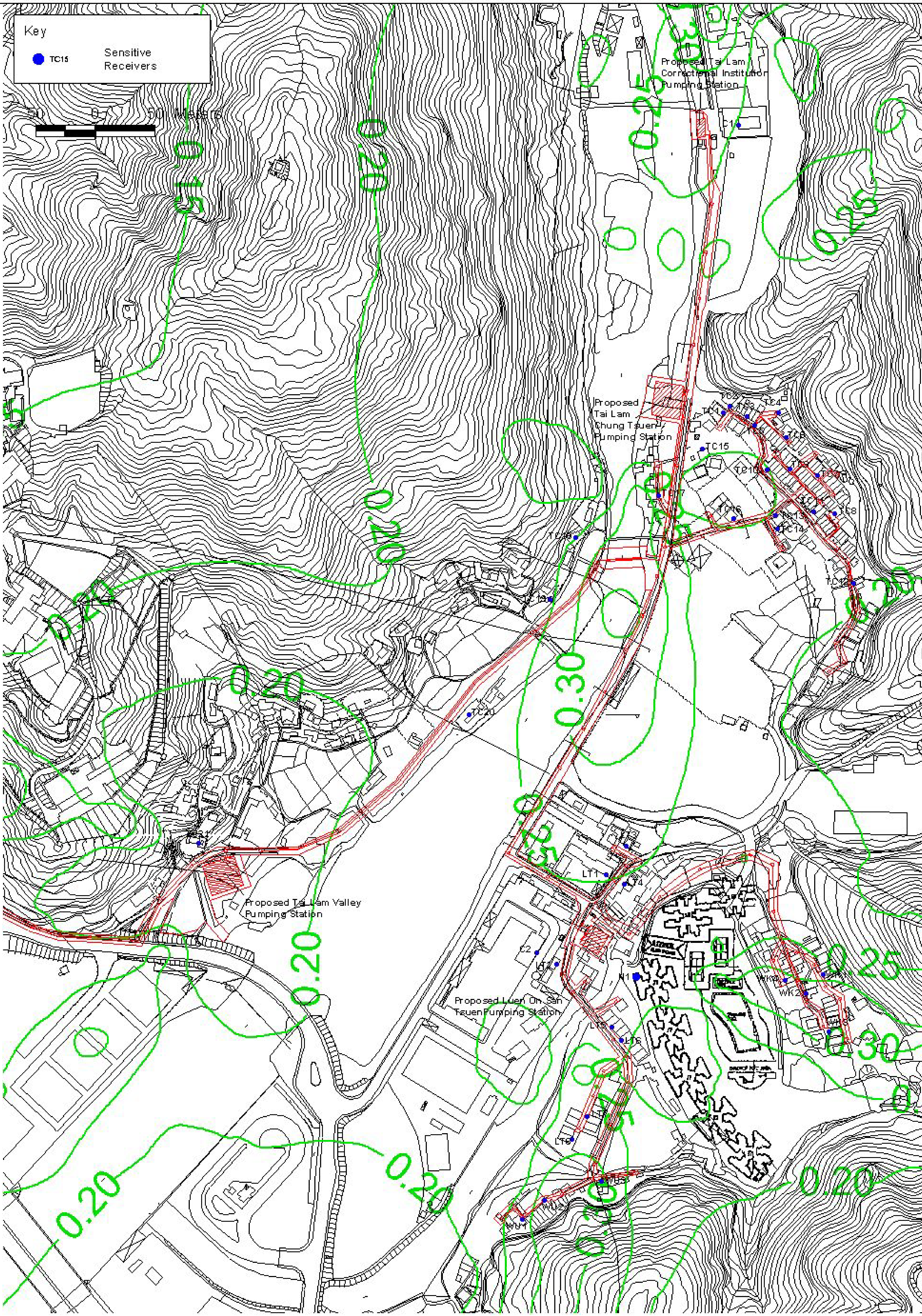
Drawing No. 4.4 a



Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class F (Tai Lam Correctional Institution, Luen On San Tsuen, Tai Lam Chung Tsuen and Tai Lam Valley Pumping Stations)

Mouchel

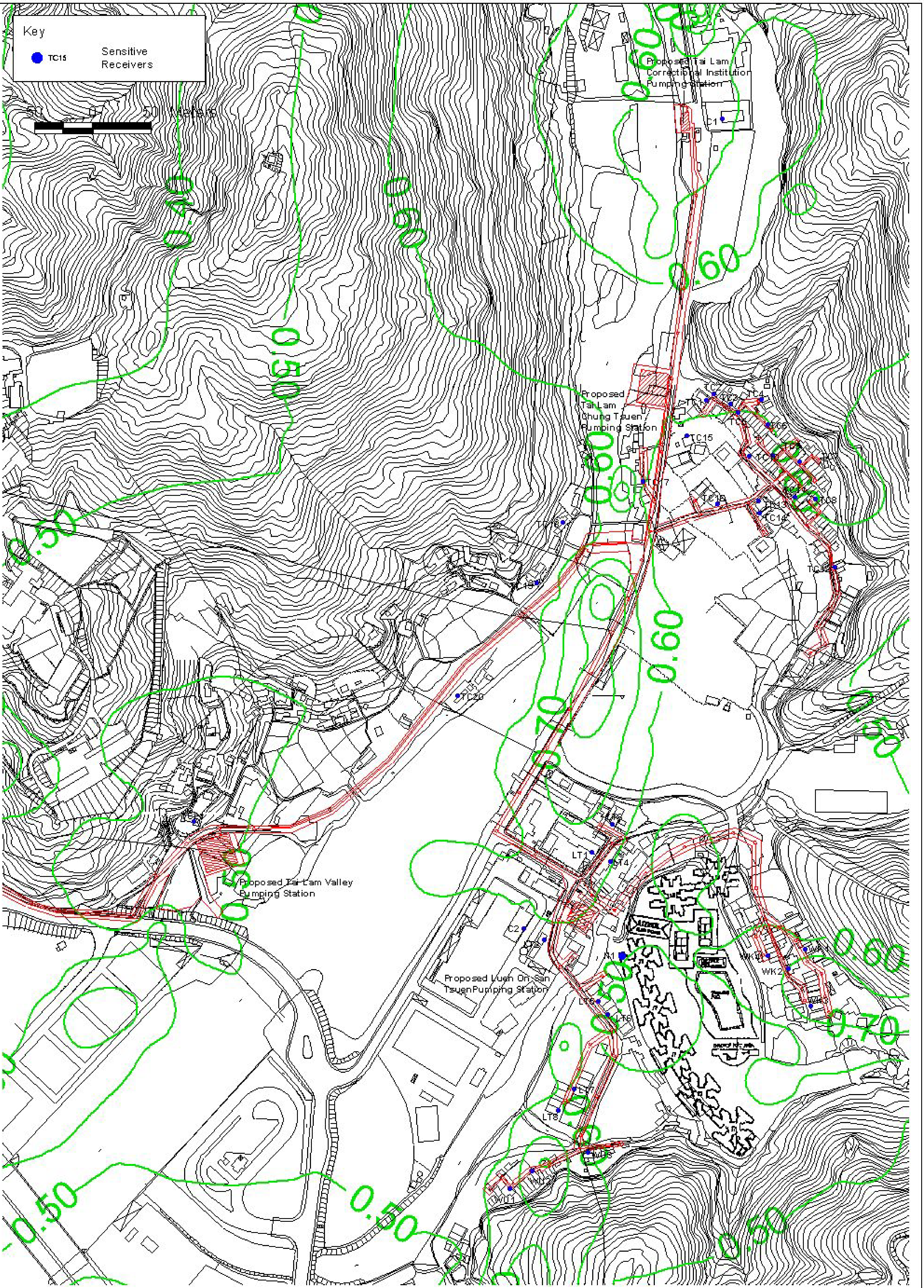
Drawing No. 4.4b



Odour Contour (Unit: ou) Plot at 7.5m Above Local Ground at Stability Class D
(Tai Lam Correctional Institution, Luen On San Tsuen ,
Tai Lam Chung Tsuen and Tai Lam Valley Pumping Stations)

Mouchel

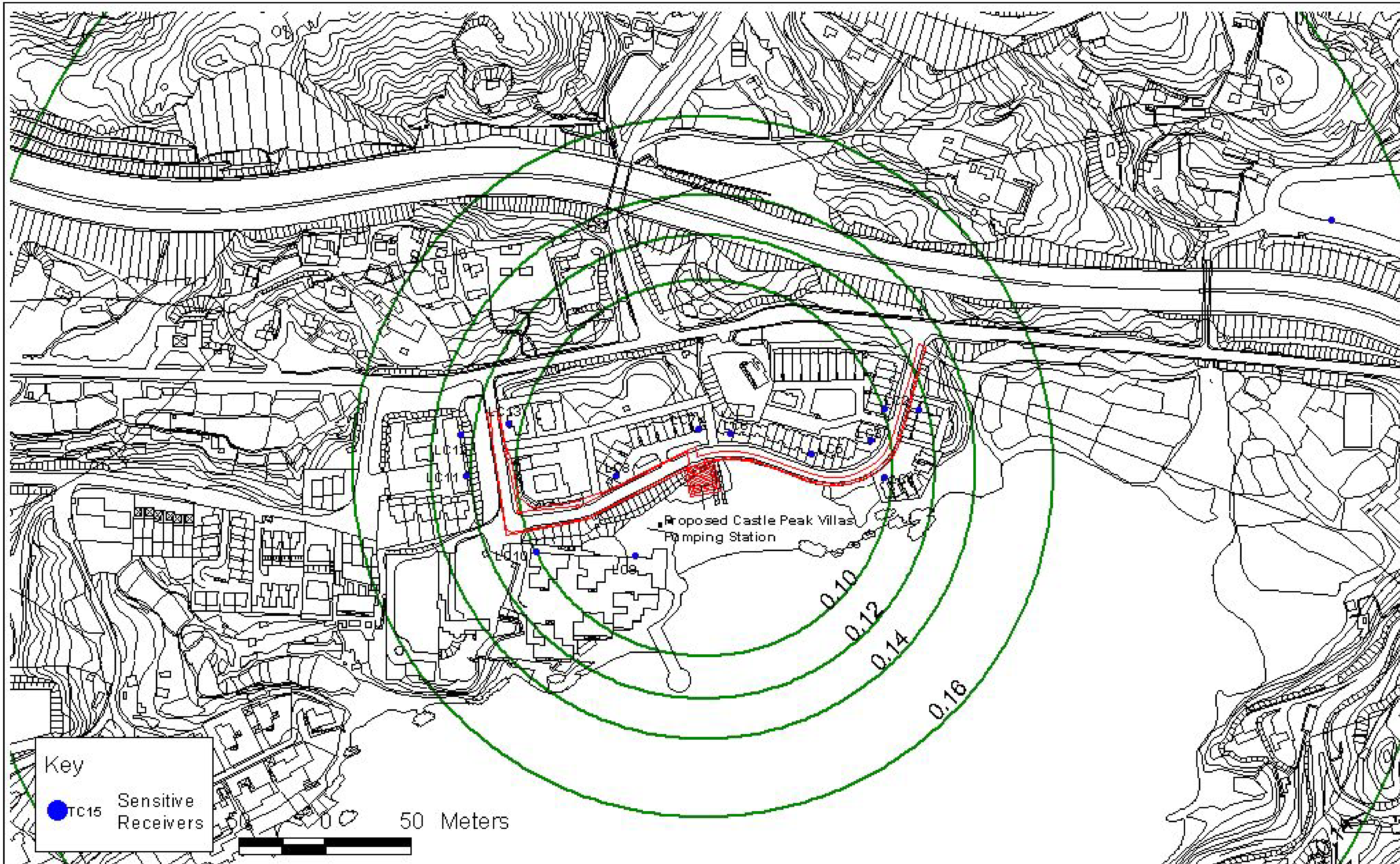
Drawing No. 4.4 c



Odour Contour (Unit: ou))Plot at 7.5m Above Local Ground at Stability Class F
(Tai Lam Correctional Institution, Luen On San Tsuen ,
Tai Lam Chung Tsuen and Tai Lam Valley Pumping Stations)

Mouchel

Drawing No. 4.4 d



Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class D
(Castle Peak Villa Pumping Station)

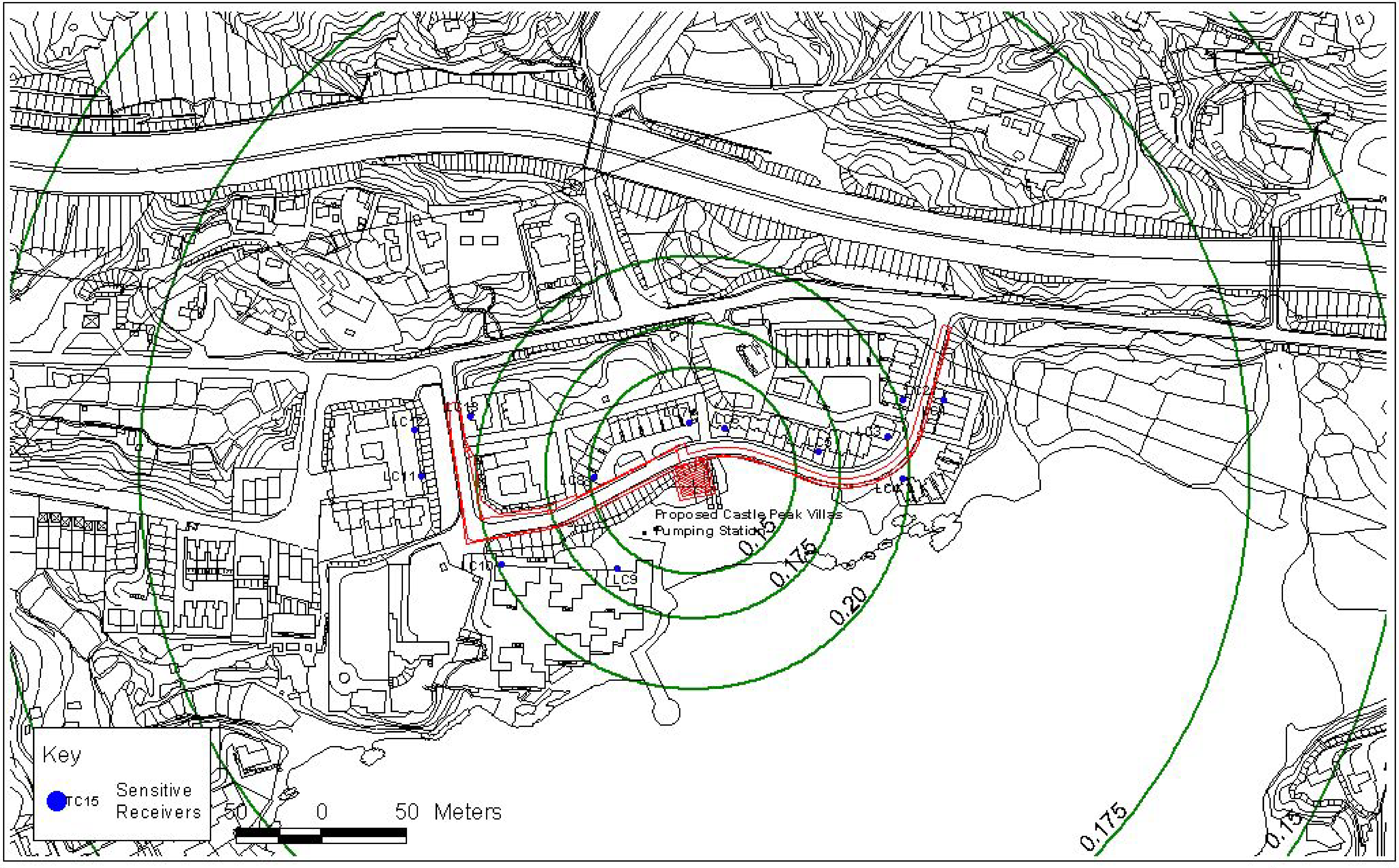
Mouchel

4.5a

Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class F
(Castle Peak Villa Pumping Station)

Mouchel

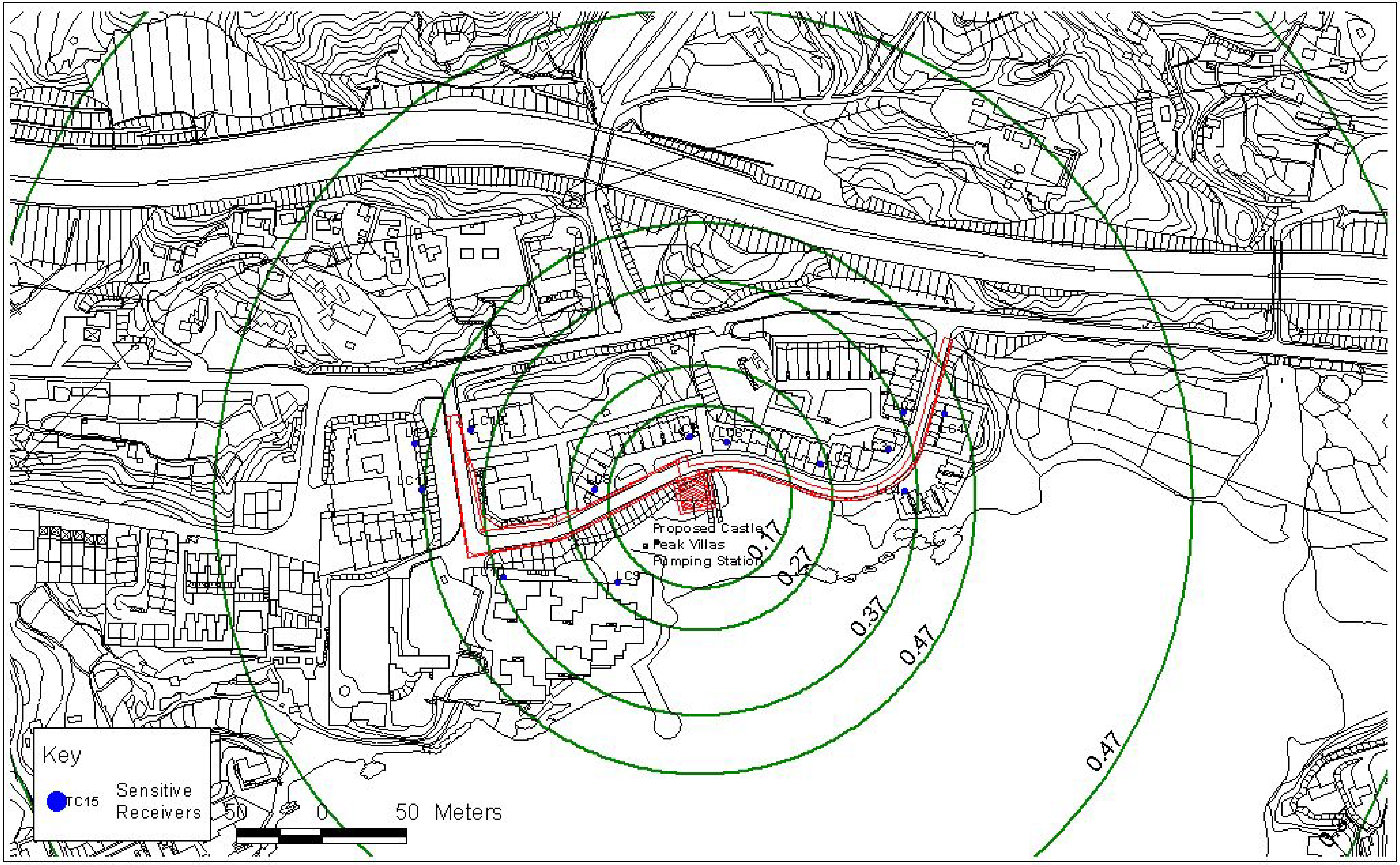
4.5b



Odour Contour (Unit: ou) Plot at 7.5m Above Local Ground at Stability Class D
(Castle Peak Villa Pumping Station)

Mouchel

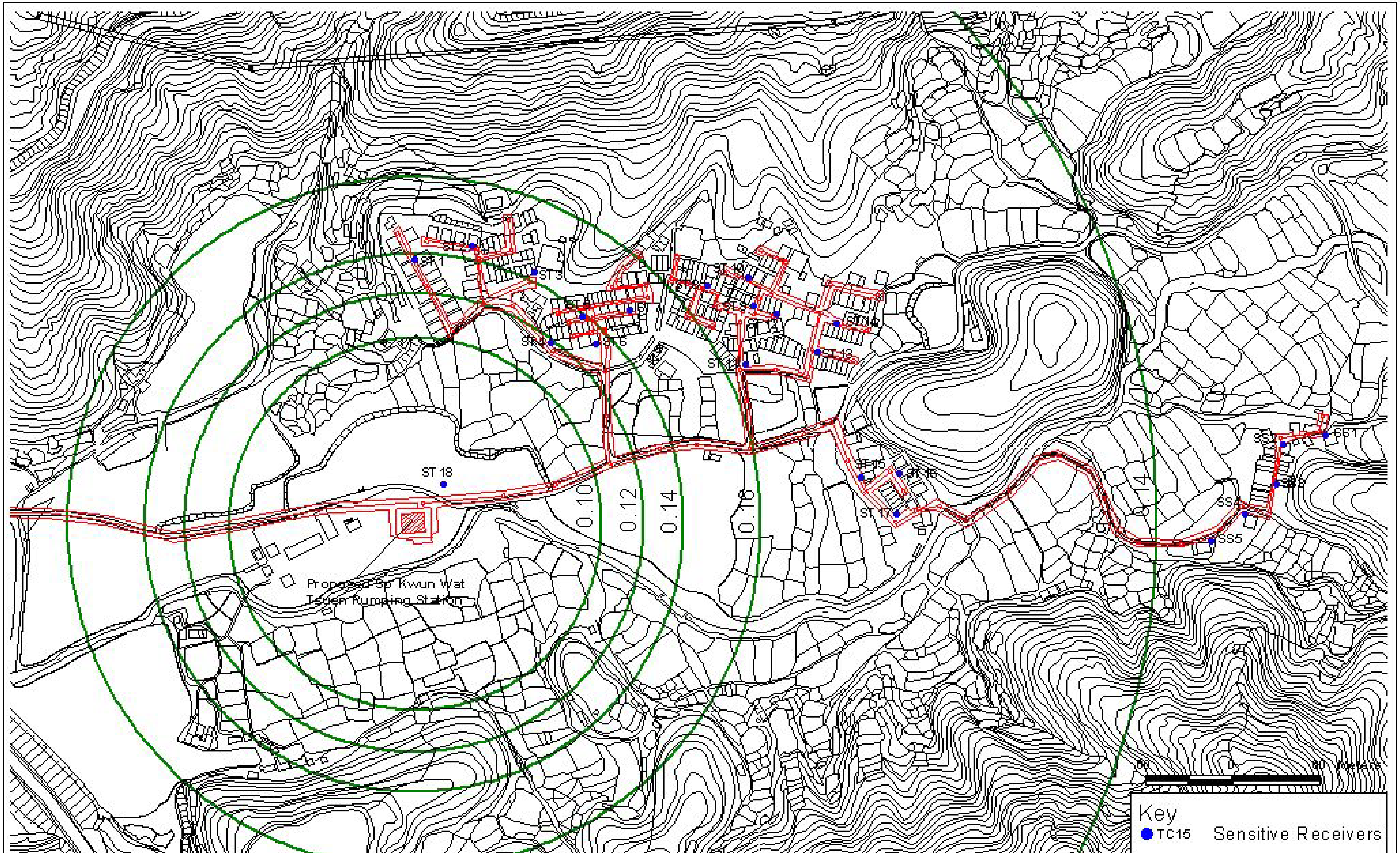
4.5c



Odour Contour (Unit: ou) Plot at 7.5m Above Local Ground at Stability Class F (Castle Peak Villa Pumping Station)

Mouchel

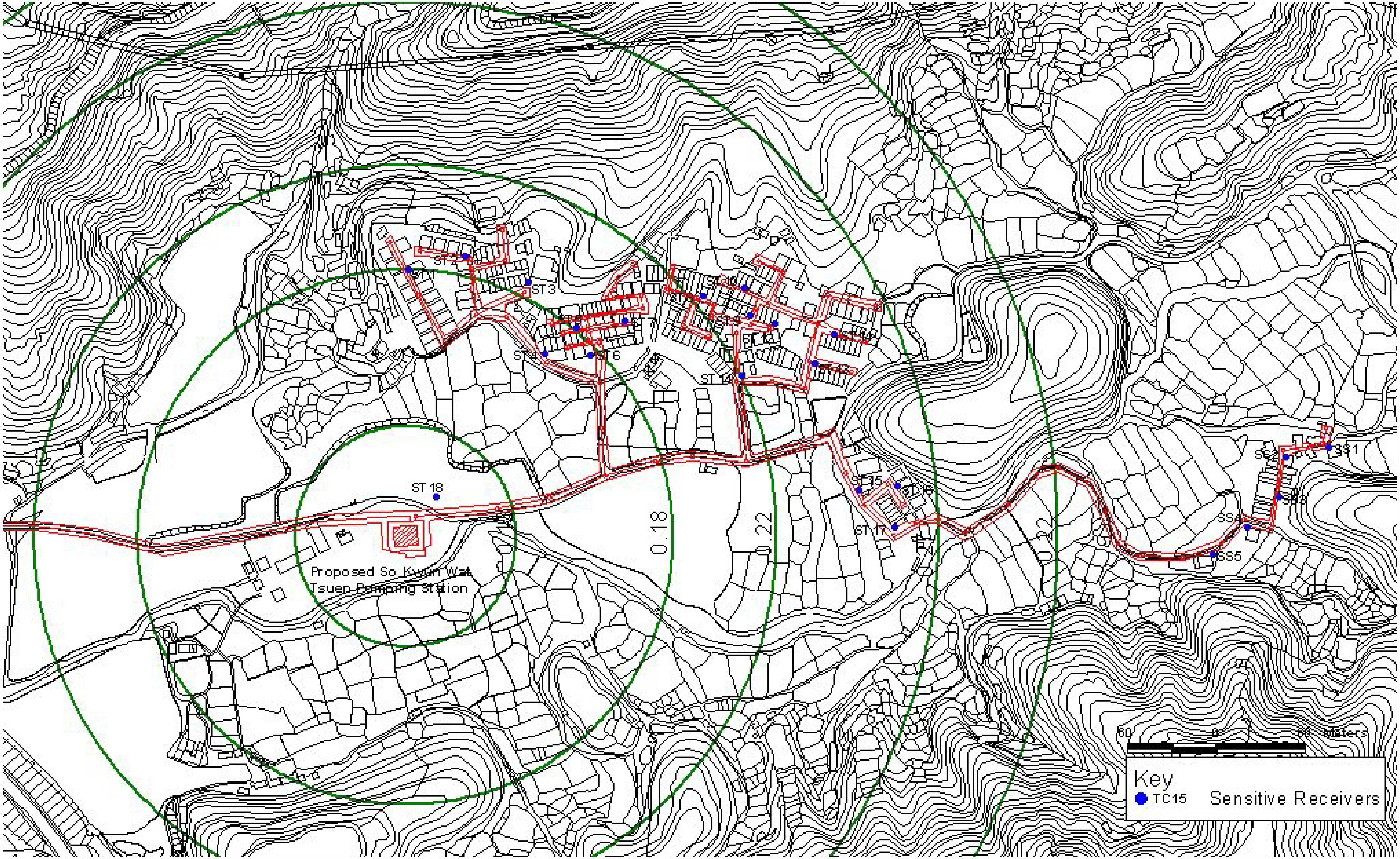
4.5d



Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class D (So Kwun Wat Tsuen Pumping Station)

Mouchel

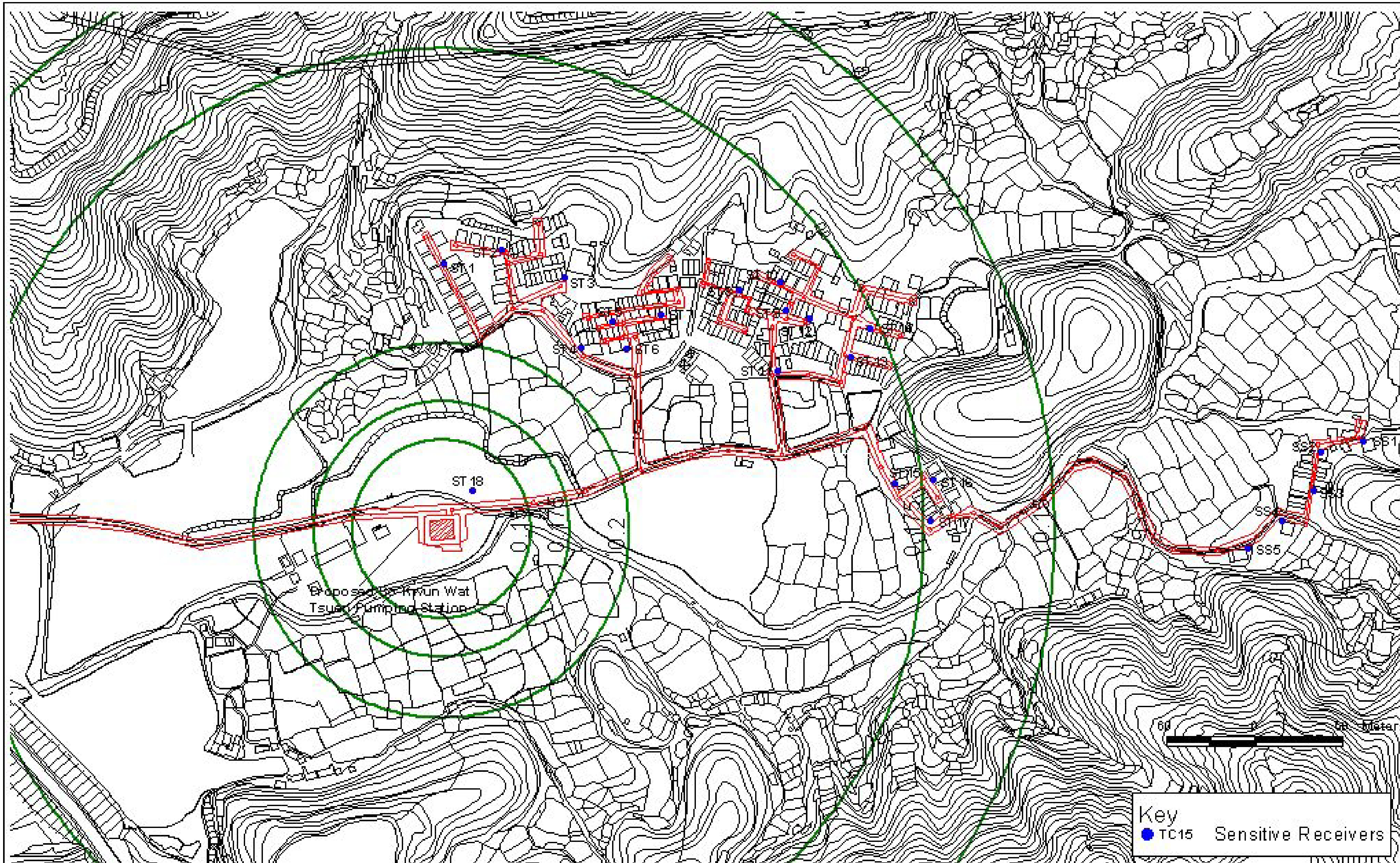
4.6 a



Odour Contour (Unit: ou) Plot at 4.5m Above Local Ground at Stability Class F
(So Kwun Wat Tsuen Pumping Station)

Mouchel

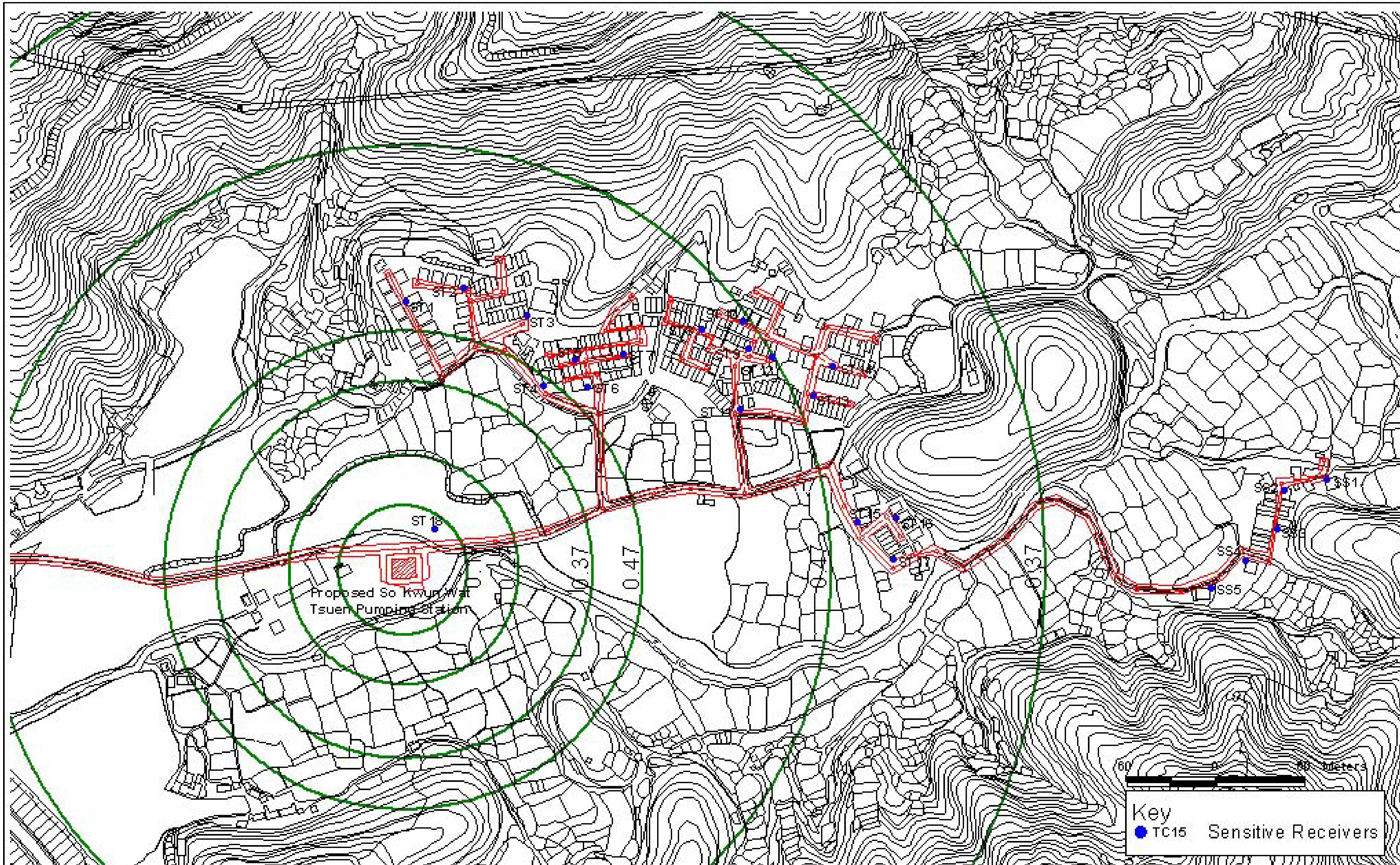
4.6b



Odour Contour (Unit: ou) Plot at 7.5m Above Local Ground at Stability Class D
(So Kwun Wat Tsuen Pumping Station)

Mouchel

4.6c



Odour Contour (Unit: ou) Plot at 7.5m Above Local Ground at Stability Class F (So Kwun Wat Tsuen Pumping Station)

Mouchel

4.6d