

STORMWATER MANAGEMENT PLAN

PROPOSED RESIDENCE

121 PACIFIC ROAD, PALM BEACH

| GENERAL |
|---|
| <ul style="list-style-type: none">• THESE DRAWINGS CAN BE USED IN CONJUNCTION WITH ARCHITECTS AND OTHER CONSULTANTS DRAWINGS. ANY DIFFERENCES ARE TO BE REFERRED TO THE ENGINEER PRIOR TO PROCEEDING WORK.• ALL MATERIALS AND WORKMANSHIP MUST MEET AS/NZS 3500.3:2003 STORMWATER DRAINAGE, BCA AND LOCAL COUNCIL DEVELOPMENT POLICIES, CONSENTS AND REQUIREMENTS.• ALL DIMENSIONS AND LEVELS TO BE VERIFIED BY THE BUILDER PRIOR TO COMMENCEMENT OF WORKS. THIS INCLUDES EXISTING SERVICES AND/OR OTHER STRUCTURES THAT MAY AFFECT/BE AFFECTED BY THIS DESIGN PRIOR TO CONSTRUCTION.• ALL SURVEY INFORMATION, PROPOSED BUILDING LEVELS, FINISHED SURFACE LEVELS AND SITE DETAILS SHOWN IN THESE DRAWINGS ARE BASED UPON LEVELS OBTAINED FROM DETAILS BY OTHERS.• THESE DRAWINGS DEPICT THE DESIGN OF SURFACE STORMWATER RUNOFF DRAINAGE SYSTEMS ONLY AND DO NOT DEPICT ROOF DRAINAGE OR SUBSOIL DRAINAGE SYSTEMS UNLESS NOTED OTHERWISE. THE DESIGN OF ROOF AND SUBSOIL DRAINAGE SYSTEMS ARE THE RESPONSIBILITY OF OTHERS.• IT IS THE BUILDERS RESPONSIBILITY TO LOCATE AND LEVEL ALL EXISTING SERVICES OR OTHER STRUCTURES WHICH MAY AFFECT/BE AFFECTED BY THIS DESIGN PRIOR TO COMMENCEMENT OF WORKS.• UNLESS NOTED OTHERWISE, ALL LEVELS ARE IN METRES AND DIMENSIONS IN MILLIMETRES.• ANY SUBSTITUTION OF MATERIALS SHALL BE APPROVED BY THE ENGINEER AND INCLUDED IN THE DEVELOPMENT APPLICATION.• THIS DRAWING IS NOT TO BE USED FOR SET-OUT PURPOSES. REFER TO ARCHITECTURAL DRAWINGS.• CONTRACTOR TO INVESTIGATE ALL EXISTING SERVICES AND APPLY FOR "DIAL BEFORE YOU DIG" BEFORE CONSTRUCTION COMMENCES. |

| COMPLIANCE |
|---|
| <ul style="list-style-type: none">• THESE PLANS WERE PREPARED IN ACCORDANCE WITH COUNCIL'S POLICIES AND REQUIREMENTS, AS 3500:2013, BASIX REQUIREMENTS, ARR(1997), ARQ (2006), RELEVANT LEGISLATION, AND NSW MUSIC MODELLING GUIDELINES.• THE OSD SYSTEM DESIGN PRESENTED HAS BEEN MODELLED TO LIMIT THE POST-DEVELOPMENT RUNOFF TO PRE-DEVELOPMENTS RUNOFF FOR ALL DESIGN STORM EVENTS (1 IN 1YR ARI TO 1 IN 100YR ARI) |

| SCOPE OF WORKS |
|---|
| <ul style="list-style-type: none">• DETAILED DESIGN, MODELLING AND DOCUMENTATION FOR THE FOLLOWING (WHERE APPLICABLE): ROOFED, IMPERVIOUS AND PERVIOUS AREAS; RAINWATER REUSE SYSTEM; OSD; AND STORMWATER DISPOSAL. |

| ROOFING |
|---|
| <ul style="list-style-type: none">• EAVES GUTTERS & DOWNPIPES TO BE CONSTRUCTED ACCORDINGLY TO AS 3500. IT IS THE RESPONSIBILITY OF THE PLUMBER AND/OR BUILDER TO COMPLY.• ROOF GUTTERS TO HAVE OVERFLOW PROVISION SET IN ACCORDANCE WITH AS/NZS 3500.3:2003 AND SECTIONS 3.5.3, 3.7.5.• DOWNPIPES SHALL BE Ø100mm uPVC MINIMUM U.N.O.• EAVES GUTTERS SHALL BE A MINIMUM OF 8200MM² COLORBOND OR ZINCALUME STEEL. |

| TREES |
|---|
| <ul style="list-style-type: none">• IT IS THE RESPONSIBILITY OF THE BUILDER TO OBTAIN ANY PRIOR APPROVAL REQUIRED FROM COUNCIL WITH RESPECT TO POTENTIAL IMPACT ON TREES. |

| RAINWATER RE-USE TANK |
|---|
| <ul style="list-style-type: none">• SIZE: REFER TO PLAN AND/OR BASIX REPORT• INSTALL TO MANUFACTURES SPECIFICATIONS, AS3500 AND COUNCIL REQUIREMENTS• FOR RE-USE AS SPECIFIED BY BASIX CERTIFICATE• TANK TO BE INSTALLED BY LICENSED PLUMBER IN ACCORDANCE WITH AS/NZS 3500:2003 AND NSW CODE OF PRACTICE PLUMBING AND DRAINAGE 2006 |

| MINIMUM PIPE COVER | | |
|---|--|------------------------------|
| TOP OF PIPE TO FINISHED SURFACE LEVEL | | |
| LOCATION | MINIMUM COVER (mm) | |
| | CAST IRON DUCTILE IRON GALV. STEEL | OTHER AUTHORISE PRODUCTS* |
| 1. NOT SUBJECT TO VEHICULAR LOADING: (a) WITHOUT PAVEMENT - (i) FOR SINGLE DWELLINGS (ii) FOR ITEMS OTHER THAN (i) | 0 | 100 |
| | 0 | 300 |
| (b) WITH PAVEMENT OF BRICK/ UNREINFORCED CONCRETE | 0 (†) | 50 (†) |
| 2. SUBJECT TO VEHICULAR LOADING: (a) OTHER THAN ROADS (i) WITHOUT PAVEMENT (ii) WITH PAVEMENT OF: - REINFORCED CONCRETE FOR HEAVY VEHICULAR LOADINGS - BRICK/UNREINFORCED CONCRETE FOR LIGHT VEHICULAR LOADING | 300 | 450 |
| | 0 (††) | 100 (††) |
| | 0 (††) | 75 (††) |
| | 300 | 500 (‡) |
| | 300 | 500 (‡) |
| (b) ROADS (i) SEALED (ii) UNSEALED | | |
| 3. SUBJECT TO CONSTRUCTION EQUIPMENT OR IN EMBANKMENT CONDITIONS | 300 | 500 (‡) |
| | | |
| * INCLUDES OVERLAY ABOVE TOP OF THE PIPE OF NOT LESS THAN 50mm THICK † BELOW THE UNDERSIDE OF THE PAVEMENT ‡ SUBJECT TO COMPLIANCE WITH AS 1762, AS 2033, AS/NZS 2566.1, AS 3725, AS 4060 | | |

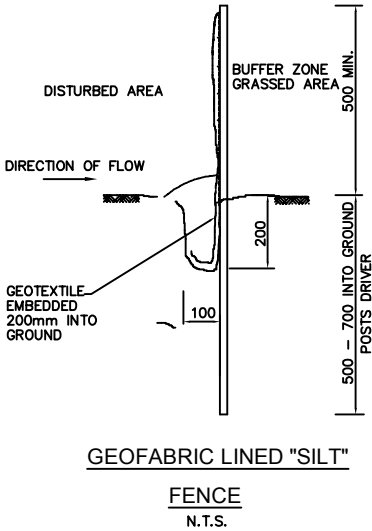
| MODELLING AND CALCULATIONS |
|---|
| <ul style="list-style-type: none">• AS SHOWN ON PLAN - SEE ATTACHED DRAINS MODEL AND OUTPUT DATA (ELECTRONIC COPY ONLY) WHERE APPLICABLE. |

| DRAINAGE LINES |
|---|
| <ul style="list-style-type: none">• ALL DRAINAGE LEVELS TO BE CONFIRMED ON SITE, PRIOR TO COMMENCING CONSTRUCTION.• TRENCH BACKFILL IN ROADWAYS TO COMPRISE OF SHARP, CLEAN GRANULAR BACKFILL IN ACCORDANCE WITH LOCAL AUTHORITY SPEC.• SUBSOIL DRAINAGE SHALL BE PROVIDED TO ALL RETAINING WALLS AND EMBANKMENTS WITH THE LINES FEEDING INTO THE STORMWATER DRAINAGE SYSTEM. |

| MINIMUM PIPE Ø (U.N.O) | mm | MINIMUM STORMWATER DRAIN GRADIENT (U.N.O) | |
|--|-----|--|---------------|
| a) WHERE THE LINE ONLY RECIEVES ROOFWATER | 100 | NOMINAL SIZE Ø (mm) | MIN. GRADE |
| b) WHERE THE LINE RECEIVES RUN -OFF FROM PAVED/UNPAVED AREAS OF THE SITE | 100 | 90 to < 225 | 1:100 (1%) |
| | | 225 to < 300 | 1:200 (0.5%) |
| | | 300 to < 375 | 1:250 (0.4%) |
| | | 375 + | 1:300 (0.33%) |

| PITS |
|--|
| <ul style="list-style-type: none">• ALL PITS WITHIN DRIVEWAYS TO BE 150mm THICK CONCRETE OR EQUIVALENT.• PIT CONSTRUCTION WITHIN THE SUBJECT PROPERTY ARE TO BE OF THE FOLLOWING:<ul style="list-style-type: none">a) PRECAST STORMWATER PITSb) CAST INSITU MASS CONCRETEc) CEMENT RENDERED 230mm BRICKWORKALL PIT CONSTRUCTION IS SUBJECT TO RELEVANT LGA SPEC.• ALL PITS ARE TO BE FITTED WITH APPROVED GALAVANISED STEEL GRATES:<ul style="list-style-type: none">a) LIGHT DUTY FOR LANDSCAPED AREASb) HEAVY DUTY WHERE SUBJECT TO VEHICULAR TRAFFIC• ALL PITS IN ROADWAYS ARE TO BE FITTED WITH LOCKING BOLTS AND CONTINUOUS HINGE.• PROVIDE STEP IRONS TO STORMWATER PITS > 900mm IN DEPTH.• ALL PIPES SHOULD BE CUT FLUSH WITH THE WALL OF THE PITS.• THE GRATED COVERS OF PITS LARGER THAN 600 X 600mm ARE TO BE HINGED.• THE BASE OF THE DRAINAGE PITS SHOULD BE THE SAME LEVEL AS THE INVERT OF THE OUTLET PIPE.• RAINWATER SHOULD NOT BE PERMITTED TO POND WITHIN THE STORMWATER SYSTEM. |

| MINIMUM INTERNAL DIMENSIONS FOR STORMWATER/INLET PITS | | | |
|--|--------|----------|--------|
| DEPTH TO INVERT OF OUTLET | | INTERNAL | |
| | | WIDTH | LENGTH |
| > 600 | ≤ 600 | 450 | 450 |
| | ≤ 900 | 600 | 600 |
| | ≤ 1200 | 600 | 900 |
| | 900 | 900 | 900 |



| D.Q | D.Q | B | 30.01.2020 | FOR APPROVAL |
|-----|------|------|------------|--------------|
| D.Q | D.Q | A2 | 21.11.2019 | FOR APPROVAL |
| BY | REV. | ISS. | DATE. | DESCRIPTION |

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STORMWATER

Consulting Engineers

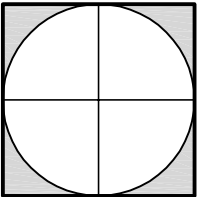
Wastewater
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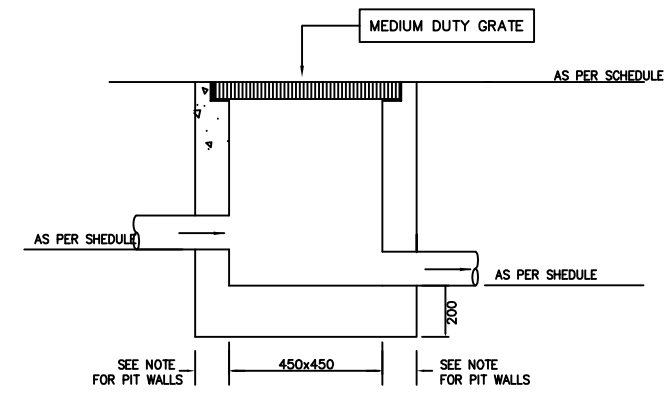
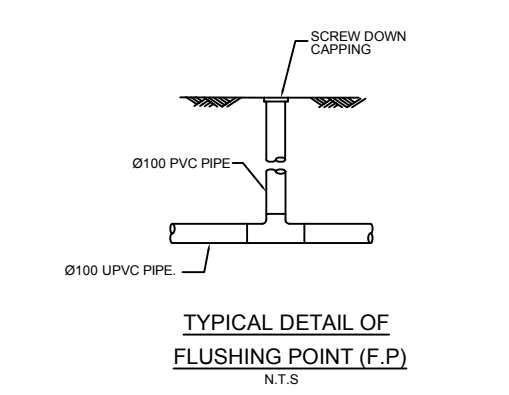
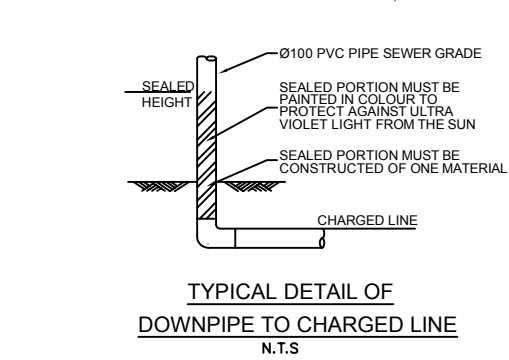
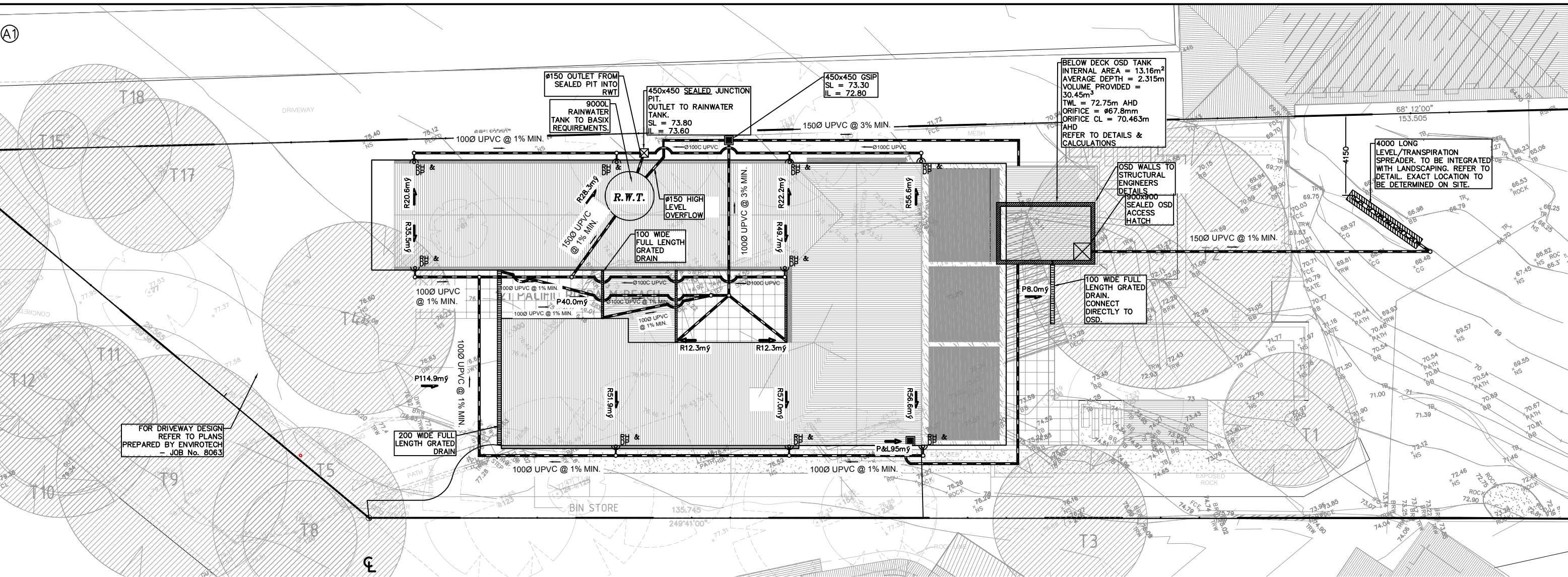
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| TITLE | GENERAL NOTES |
|---------|--|
| PROJECT | PROPOSED RESIDENCE 121 PACIFIC ROAD, PALM BEACH |

| envirotech Consulting Group | | |
|--------------------------------|---------|----------|
| JOB No. | DWG No. | SCALE. |
| 19-8034-A2 | 1/3 | AS SHOWN |

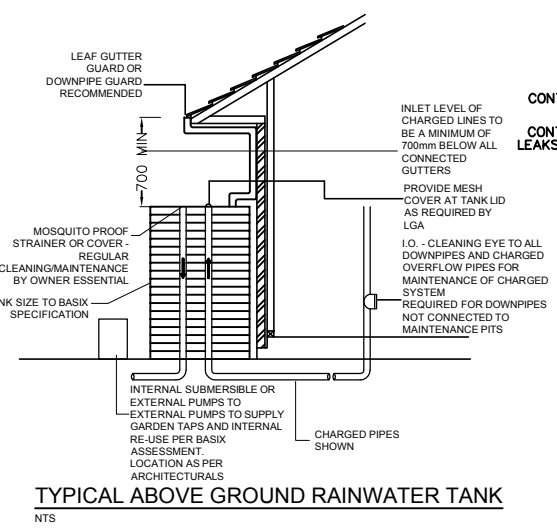
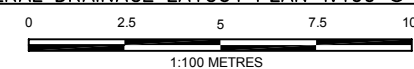


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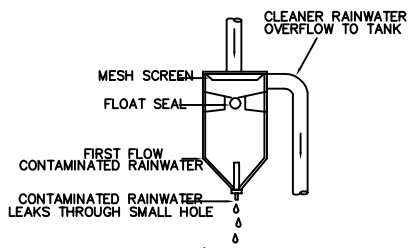
- PIT WALLS TO BE EITHER:**
- 150mm 20MPa IN-SITU CONCRETE WITH N12 AT 400mm CENTRES EACH WAY or
 - 200mm GROUT FILLED CONCRETE BLOCKS WITH N12 AT 400mm CENTRES EACH WAY or
 - 110mm BRICK WITH ENGAGED PIERS AT MID SPAN AND AT CORNERS
 - PRECAST PIT TO MANUFACTURERS SPEC.

GENERAL DRAINAGE LAYOUT PLAN 1:100 @ A1



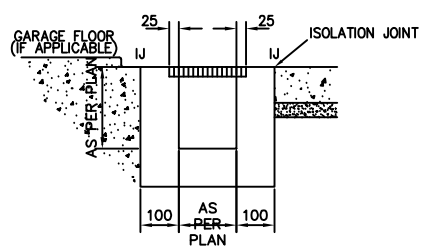
TYPICAL ABOVE GROUND RAINWATER TANK

TO BE USED FOR IRRIGATION PURPOSES AND MUST BE CONNECTED TO ALL TOILETS, IN ACCORDANCE WITH BASIX REQUIREMENTS & COUNCIL GUIDELINES



SCHEMATIC DIAGRAM FIRST FLUSH DEVICE LAYOUT

ENLARGED DETAIL : NTS



TYPICAL TRENCH GRATE DETAIL (FOR PAVED AREAS)

SCALE: 1:10

- STORMWATER DESIGN NOTES:**
- ALL CHARGED LINES TO BE SOLVENT WELDED SEWER GRADE uPVC
 - ALL DRAINAGE LINES LAID TO A MIN 1:100 GRADE UNO
 - MINIMUM EFFECTIVE EAVE GUTTER GRADE 1:500 UNO
 - MINIMUM EFFECTIVE EAVES GUTTER C.S. AREA: 8200mm²
 - BOX COLORBOND OR ZINCALUME STEEL GUTTERS SHALL BE A MINIMUM OF 450 WIDE x 150 DEEP.
 - FOR OSD REFER TO CALCULATIONS/MODEL IF APPLICABLE.

- NOTATION:**
- GSIP - REFER TO PLAN AND/OR SCHEDULE.
 - 900x900 APPROVED OSD OPEN INSPECTION UNO. ACCESS POINT AS PER MANUFACTURERS SPECS. REFER TO PLAN TO CONFIRM SIZE.
 - ASSUMED EXISTING DRAINAGE LINE
 - PROPOSED FINISHED FLOOR LEVEL
 - 0.000 @0.000 (E.G. 0.100C) CHARGED LINE
 - DP 100 DOWNPIPE UNO
 - RH RAINHEAD
 - SP&DP RAINWATER SPREADER & DOWNPIPE
 - RXXXm² ROOF CATCHMENT AREA PER DP
 - PXXXm² PAVED CATCHMENT AREA PER PIT ETC
 - LXXXm² LANDSCAPED CATCHMENT AREA PER PIT ETC

| | | | | |
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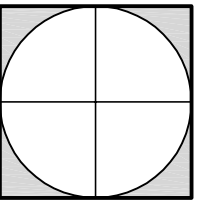
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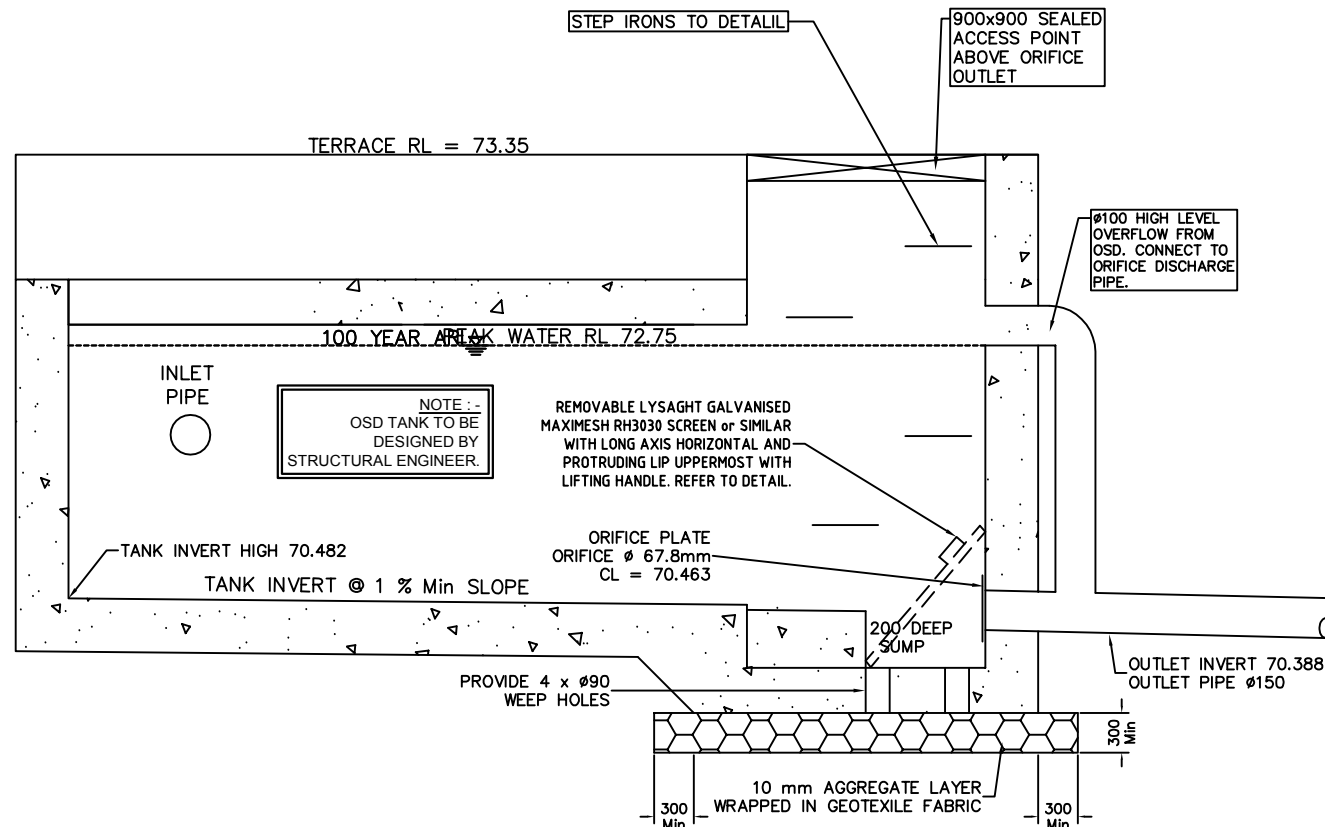
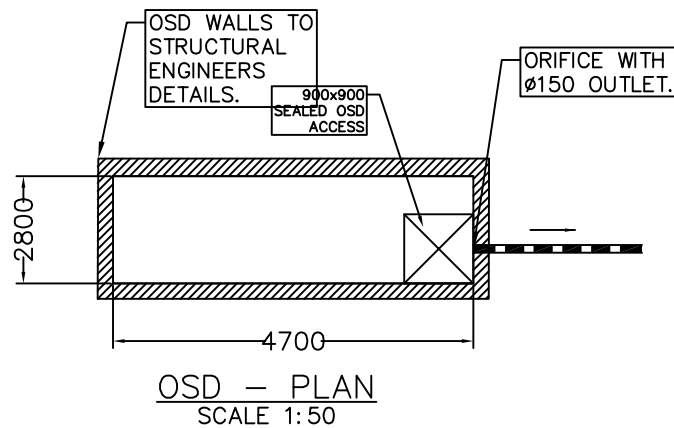
TITLE
DRAINAGE LAYOUT PLAN & DETAILS

PROJECT
PROPOSED RESIDENCE
121 PACIFIC ROAD, PALM BEACH

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OSD CALCULATIONS:

TOTAL SITE AREA = 3072m²

EXISTING SITE CALCULATIONS:

IMPERVIOUS AREAS:

ROOF = 138.7m²
SUPP = 96.4m²
TOTAL IMP = 235.1m²

PROPOSED SITE CALCULATIONS:

IMPERVIOUS AREAS:

ROOF = 390.7m²
SUPP = 253.6m²
TOTAL IMP = 644.9m²

SSR & PSD CALCULATION:

INCREASE IN IMP AREA = 409.2m²
THEREFORE AS PER PITWATER DCP 21:

SSR = 30m³

PSD = 15L/s

DESIGN SUMMARY:

VOLUME REQUIRED (SSR) = 30.00m³
VOLUME PROVIDED (SEE BELOW) = 30.45m³
THEREFORE OK

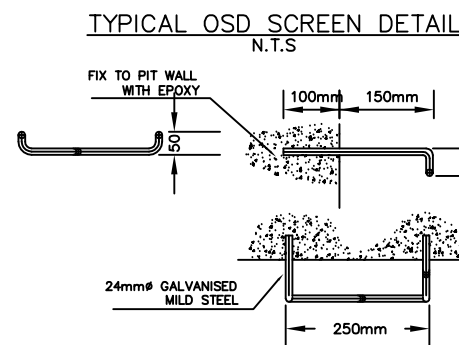
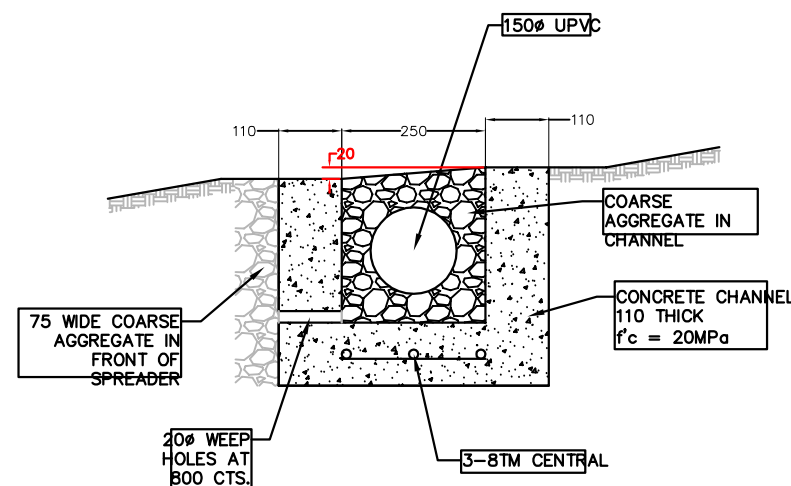
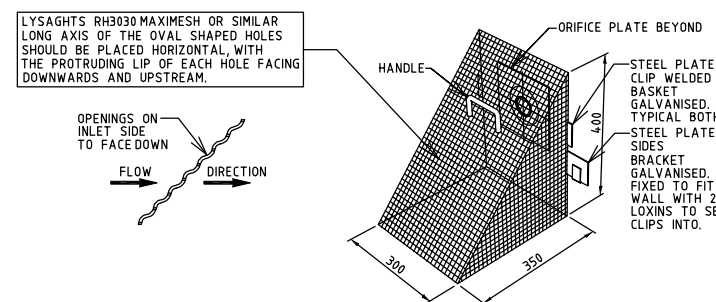
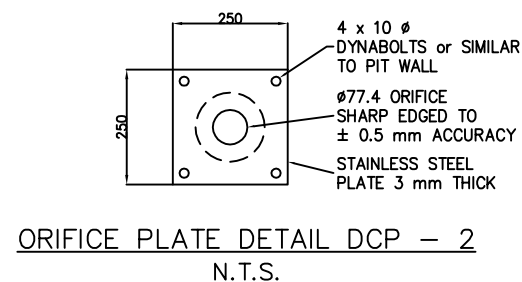
PSD = 15L/s
ORIFICE Ø = 67.8mm (USING ORIFICE EQUATION WITH Cd = 0.62)

STORAGE CALCULATIONS:

UNDERGROUND OSD INTERNAL AREA = 13.16m²

AVERAGE DEPTH = 2.315m

VOLUME PROVIDED = 30.45m³



JOB ADDRESS : PROPOSED DUPLEX AT 121 PACIFIC ROAD, PALM BEACH

A.R.I. IN YEARS : 20

TIME OF CONC. : 5min

RAINFALL INTENSITY : 209mm/hr (OBTAINED FROM B.O.M. ON 30/08/19)

MANNINGS ROUGHNESS : 0.01 "n" UPVC

DRAINAGE CALCULATIONS

| L | I | N | IN No. | LET Type | AREA m ² | RUNOFF COEF. "C" | INLET IMP AREA | DISC "q" l/s | SIDE Lin | LINE Area | TOT. IMP. AREA | DESIGN "q" l/s | DIA mm | PIPE GRADE % | NOM. CAP. l/s | REMARKS |
|--|---|---|--------|----------------|---------------------|------------------|----------------|--------------|----------------|-----------|----------------|----------------|--------|--------------|---------------|--|
| PROPOSED RESIDENCE | | | | | | | | | | | | | | | | |
| 1 | 1 | 2 | DP | DP | 56.6 | 0.95 | 53.8 | 3.1 | | | 53.8 | 3.1 | 100.0 | CHARGED | | ROOF AREA INTO SEALED PIT NORTH |
| | | | | | 22.2 | 0.95 | 21.1 | 1.2 | | | 74.9 | 4.3 | 100.0 | | | |
| 2 | 1 | 2 | DP | DP | 20.6 | 0.95 | 19.6 | 1.1 | | | 19.6 | 1.1 | 100.0 | CHARGED | | ROOF AREA INTO SEALED PIT (NORTH) |
| | | | | | 28.3 | 0.95 | 26.9 | 1.6 | | | 46.5 | 2.7 | 100.0 | | | |
| 3 | 1 | | | SEALED PIT | 121.3 | 1.00 | 121.3 | 7.0 | | | 121.3 | 7.0 | 150.0 | CHARGED | | SEALED PIT (NORTH) INTO RWT |
| 4 | 1 | 2 | DP | DP | 56.6 | 0.95 | 53.8 | 3.1 | | | 53.8 | 3.1 | 100.0 | CHARGED | | ROOF AREA INTO SEALED PIT (ENTRY) |
| | | | | | 57.0 | 0.95 | 54.2 | 3.1 | | | 107.9 | 6.3 | 100.0 | | | |
| | | | | | 51.9 | 0.95 | 49.3 | 2.9 | | | 157.2 | 9.1 | 101.0 | | | |
| | | | | | 35.5 | 0.95 | 33.7 | 2.0 | | | 191.0 | 11.1 | 102.0 | | | |
| 5 | 1 | | | DP | 49.7 | 0.95 | 47.2 | 2.7 | | | 47.2 | 2.7 | 100.0 | CHARGED | | ROOF AREA INTO SEALED PIT (ENTRY) |
| 6 | 1 | | | JUNCTION POINT | 238.2 | 1.00 | 238.2 | 13.8 | | | 238.2 | 13.8 | 150.0 | 1.0 | 13.8 | JUNCTION POINT (ENTRY) INTO RWT |
| 7 | 1 | 2 | GRATE | GSIP | 114.9 | 0.90 | 103.4 | 6.0 | GRATE RWT O.F. | 40.0 | 103.4 | 6.0 | 100.0 | 1.0 | 6.7 | PAVED ROOF AND PAVED RWT O.F. & SURFACE CONNECT TO OSD |
| | | | | | 34.0 | 0.95 | 32.3 | 1.9 | | | 173.7 | 10.1 | 100.0 | 3.0 | 11.6 | |
| | | | | | 0.0 | 1.00 | 0.0 | 0.0 | | | 533.2 | 31.0 | 150.0 | 3.0 | 34.3 | |
| 8 | 1 | | | GRATE | 8.0 | 0.90 | 7.2 | 0.4 | | | 7.2 | 0.4 | 100.0 | 1.0 | 6.7 | PAVED |
| 9 | 1 | | | GSIP | 95.0 | 0.90 | 85.5 | 5.0 | | | 85.5 | 5.0 | 100.0 | 1.0 | 6.7 | PAVED |
| TOTAL IMPERVIOUS INTO OSD = 575.3m ² (89.3% OF IMP AREA INTO OSD) | | | | | | | | | | | | | | | | |

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