

**FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
279 BROADGATE, SUTTON ST. EDMUND,
SPALDING, Lincs.**

FINAL REPORT

GEOFF BEEL CONSULTANCY

SEPTEMBER 2020

GCB/SWANN EDWARDS

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Swann Edwards Architecture drg. no. SE-974-01
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Swann Edwards Architecture drg. no. SE-974-02
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1.0 INTRODUCTION

- 1.1 An outline planning application is to be submitted by Swann Edwards Architecture Ltd on behalf of Mr & Mrs S Durston for proposed residential development at 279 Broadgate, Sutton St. Edmund, Spalding, Lincs.
- 1.2 Planning approval requires a Flood Risk Assessment to accompany the planning applications to meet the requirements and general principles contained in Planning Practice Guidance to the National Planning Policy Framework (NPPF) and for approval by the Environment Agency.

The site, as situated, is located in Flood Zone 3 of the Environment Agency's Flood Map for Planning. The Agency's latest Flood Zone Maps have been created as a tool to raise awareness of flood risk with the public and partner organisations such as Local Authorities, Emergency Services and Drainage Authorities. The Maps do not take into account any flood defences.

The site is however not shown in any Hazard Zone of the South Holland Updated Strategic Flood Risk Assessment Hazard Zone Map (2016).

The site is also located in the North Level Internal Drainage Board district.

- 1.3 Geoff Beel Consultancy was appointed on 18th June 2018 to prepare a Flood Risk Assessment.

2.0 LOCATION

- 2.1 The development site is located west of Broadgate, Sutton St. Edmund 3.00kms north-west of the North Level Main Drain and 13.50kms west of the River Nene. The National Grid Reference of the site is TF 36681344.
- 2.2 The position and extent of the site are shown on Fig 1 – Survey Drawing; Plans & Elevations at the end of the document.
- 2.3 The site is located in the North Level Internal Drainage Board district and is shown within Flood Zone 3 as detailed on the Environment Agency Flood Map for Planning but outside any Hazard Zone of the South Holland Updated Strategic Flood Risk Assessment Hazard Zone Maps (2016).

3.0 THE SITE AND SEQUENTIAL TEST

- 3.1 The site is currently a redundant agricultural building at 279 Broadgate, Sutton St. Edmund.
- 3.2 The area of development is approximately 0.24 hectare.
- 3.3 The proposed site layout consists the conversion of the redundant agricultural building to a single storey dwelling.

The Sequential Test and Exception Test will require to be applied by the Local Planning Authority but the development may be permitted as the site is protected against both the 1 in 200 year return period tidal event as well as the 1 in 100 year return period fluvial event meeting the requirements of NPPF.

The Sequential Test is met as the site is located outside any Hazard Zone of the South Holland Updated Strategic Flood Risk Assessment Hazard Zone Maps (2016).

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be small.

4.2 The site is located in the North Level Drainage Board area, the nearest main drain is situated 250m west of the site. Land level is generally at 1.00m aOD.

The site drains to the North Level Main Drain south east of the site approximately 15.0kms upstream of Tydd Pumping Station which discharges into the tidal River Nene.

4.3 The existing standard of drainage for the IDB main drain is 1 in 50 years return period, compatible with the Department of Environment, Food and Rural Affairs target level of service for rural urban drainage and flood defence works. The North Level Main Drain discharges to the tidal River Nene at the Tydd Pumping Station.

4.4 Tidal flood protection from the River Nene between Wisbech and Sutton Bridge is estimated to be a 1 in 200 years return period. The Environment Agency has recently carried out the River Nene Tidal Strategic Study which covers the tidal River Nene from the Dog in a Doublet Sluice near Peterborough to its outfall in the Wash at Nene Lighthouses, a distance of some 39.5km.

4.5 The Strategic Study has concluded that improvement works are cost effective to meet Department of the Environment, Food and Rural Affairs guidelines in order to sustain the existing tidal defences over the 50 year appraisal period up to a 1 in 200 year standard.

4.6 Current maintenance standards of the Environment Agency for tidal defences; and the North Level Internal Drainage Board for surface water and land drainage are considered to be very good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seek to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc, may occur from time to time and these matters are usually dealt with promptly.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Four potential sources of flooding have been identified as a result of this assessment:

- a) local blockages to existing IDB main drains
- b) storm return period of 1 in 50 years being exceeded
- c) failure of Tydd Pumping Station
- d) overtopping and breaching of the River Nene, Wisbech to Sutton Bridge tidal defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from source b) is also low due to the North Level IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

The Board has confirmed that the IDB main drain discharges into the North Level Main Drain with a maximum design water level of minus 1.30m aOD. Freeboard of some 2.30 metres exists between maximum design water level of the North Level Main Drain and existing ground level at the development site.

5.3 Failure of the Tydd Pumping Station may occur due to mechanical breakdown or electricity power failure. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low.

5.4 The existing tidal defences between Wisbech and Sutton Bridge consist generally of strengthened and heightened earth embankments with a riverside berm. Crest levels are at 7.00m aOD. The recorded tidal surge level reached 5.60m aOD at Wisbech on 11th January 1978 when extensive areas of the town were flooded. The more recent tidal surge event of 5th December 2013 reached a level of 6.10m aOD and the town and surrounding areas were protected by the improved defences.

The site is located approximately 13.50kms west of the River Nene tidal defences which were raised and strengthened after the 1978 surge event.

More recent studies by the Environment Agency have concluded a design water level for the 1 in 200 year tidal event between Sutton Bridge and Wisbech to be below existing tidal defence crest level with sufficient freeboard to take into account sea level rise during the next 100 years.

If any overtopping or breaching of the River Nene tidal defences occurred, floodwaters from east to west would be captured by the North Level Main Drain to return the floodwaters via Tydd Pumping Station to the tidal River Nene.

It is therefore highly unlikely that any overtopping or breaching of the tidal defences would affect the development site.

- 5.5 The developer should ensure that the eventual occupiers of the properties are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding contacting 0345 988 1188.

6.0 EXTENT OF KNOWN FLOODING

- 6.1 During the preparation of this assessment, the site did not flood during the tidal surge event of February 1978 and since that date, the defences between Sutton Bridge and Wisbech have been raised to the 1 in 200 year standard.

7.0 PROBABILITIES AND TRENDS OF FLOODING

- 7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to construct floor levels 300mm above existing ground level at a minimum of 1.30m aOD.
- 7.2 The probability of the site flooding with water from the River Nene tidal river system is less than 0.5% because of the standards of the existing flood defences.
- 7.3 If under very extreme events, levels of floodwater from the North Level Main Drain or other IDB arterial systems rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.
- 7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing main drains and tidal defences together with the raising of floor levels 300mm above existing ground level at a minimum of 1.30m aOD will be appropriate for the design life of the development (i.e. 100 years).

8.0 IMPACTS OF FLOODING

- 8.1 No significant impacts of flooding are anticipated.
- 8.2 Floor levels of the development will be raised 300mm above existing ground levels at a minimum of 1.30m aOD to offset impacts arising from any extreme short duration, localised events.
- 8.3 The general location of the site within the catchment is such that if flooding occurred from the IDB main drain or the River Nene tidal system sufficient warning time would be available.
- 8.4 No displacement of water from the site will affect any adjoining properties as the site will be provided with soakaway drainage to BRE365 design requirements and Building Regulations approval.
- 8.5 Safe access and egress is available from the site onto Broadgate which remains in Flood Zone 1.

9.0 RESIDUAL RISK – EXTREME EVENTS

- 9.1 The residual risk from extreme events is very low on this site, because of its location, within the internal drainage system, existing levels of tidal defences and proposed floor level compared to surrounding land and road levels.
- 9.2 The site is within Flood Zone 1 according to NPPF classification, with a very low risk of flooding due to the proposed standards of drainage and flood defence and land levels. The site is not located within a Functional Flood Plain of any 'main river' or 'main drain'. The Environment Agency Flood Map for Planning has been produced irrespective of existing flood defences and standards of protection. The risk of flooding to adjoining properties in the vicinity is not increased in terms of probability by the proposed development.
- 9.3 In the extreme event of a serious pumping station failure occurring to the IDB main drain system, or the overtopping of tidal defences, protection will be afforded by the proposed raising of floor levels above existing ground level.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive Floodplain protected by existing River Nene tidal defences to a minimum standard of 1 in 200 years.
- The site is outside any Hazard Zone of the South Holland Updated Strategic Flood Risk Assessment Hazard Zone Maps with the actual risk of site flooding from the tidal River Nene system being very low (less than 0.5%).
- Although the site is located within an Internal Drainage District with a standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. A minimum of 900mm freeboard is provided within the main drain design standard to the lowest land level which provides further storage to cater for events greater than 1 in 50 years.
- On site surface water drainage to be discharged via soakaways to BRE365 design requirements and Building Regulations approval.
- Floor levels will be 300mm above existing ground level at a minimum of 1.30m aOD with an additional 300mm of flood resilient construction above finished floor level.



Front Elevation (E)
Scale: 1:100



Side Elevation (N)
Scale: 1:100



Rear Elevation (W)
Scale: 1:100



Side Elevation (S)
Scale: 1:100



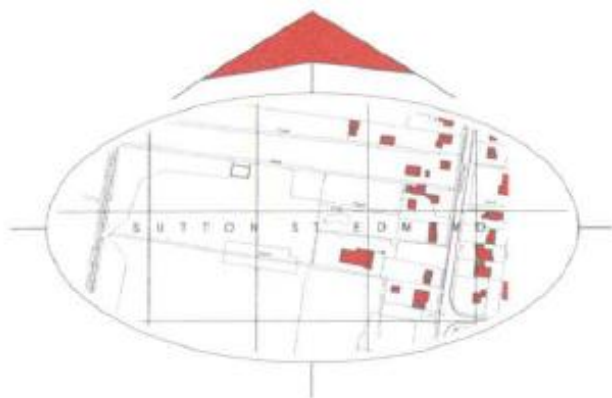
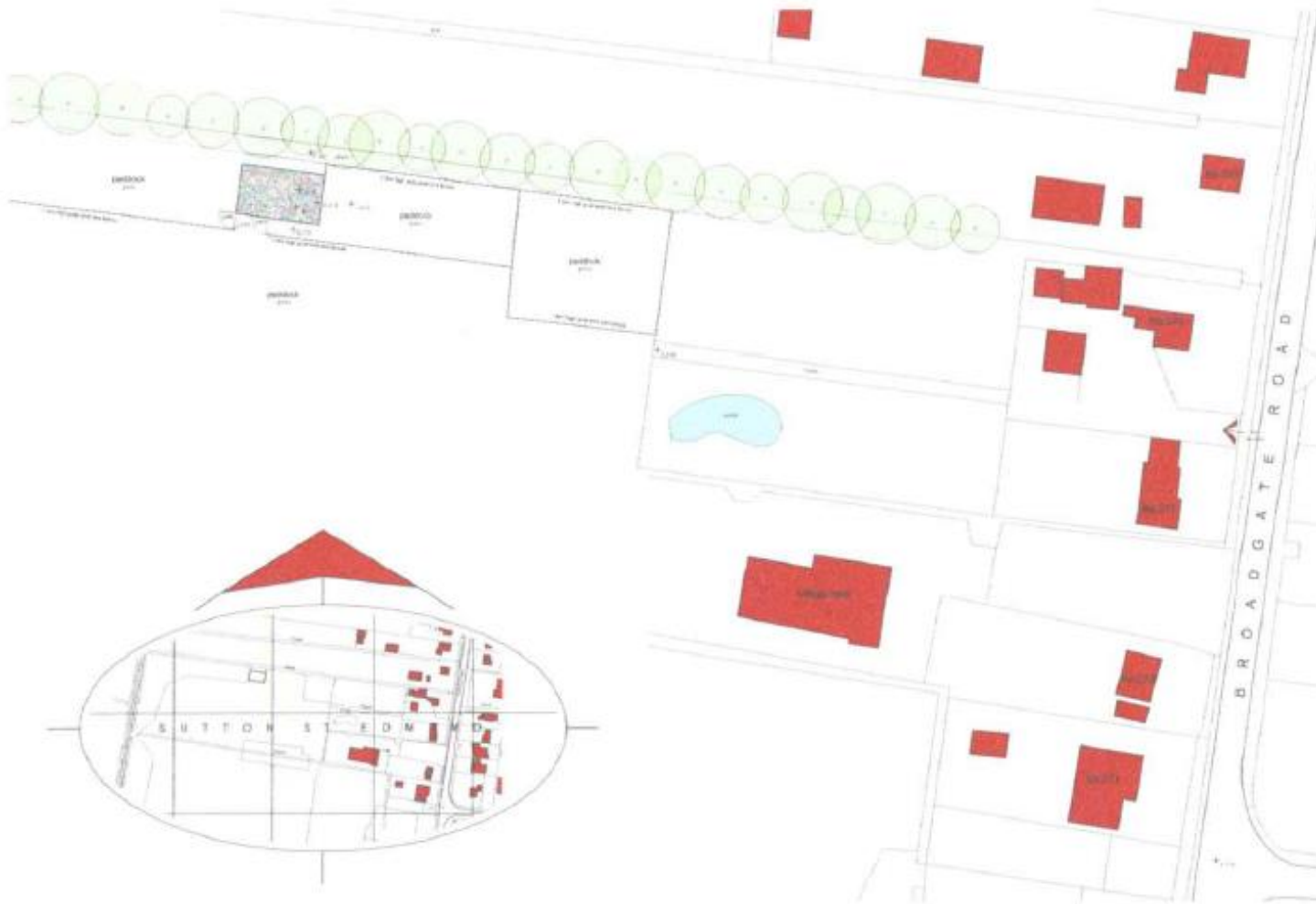
Section A-A
Scale: 1:100



Section B-B
Scale: 1:100



Floor Plan
Scale: 1:100

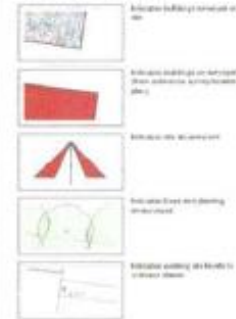


Location Plan
Scale: 1:2500

Site Plan
Scale: 1:500

Notes:
1. The site is located on the east side of Broadgate Road, just south of the junction with the A10.
2. The site is currently used as a storage area for hay and other agricultural products.
3. The site is surrounded by other agricultural land and is part of a larger farm complex.
4. The site is situated on a gentle slope and is well-drained.
5. The site is accessible by a private road which connects to Broadgate Road.

SITE PLAN KEY



SWANN EDWARDS
ARCHITECTURE

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Prepared by: Architectural Services	Drawn by: Architectural Services	Checked by: Architectural Services
Designed by: Architectural Services	Reviewed by: Architectural Services	Approved by: Architectural Services



Site Plan
Scale: 1/8" = 1'-0"

2000-2001 2002-2003 2004-2005 2006-2007 2008-2009 2010-2011 2012-2013 2014-2015 2016-2017 2018-2019 2020-2021 2022-2023 2024-2025 2026-2027 2028-2029 2030-2031 2032-2033 2034-2035 2036-2037 2038-2039 2040-2041 2042-2043 2044-2045 2046-2047 2048-2049 2050-2051 2052-2053 2054-2055 2056-2057 2058-2059 2060-2061 2062-2063 2064-2065 2066-2067 2068-2069 2070-2071 2072-2073 2074-2075 2076-2077 2078-2079 2080-2081 2082-2083 2084-2085 2086-2087 2088-2089 2090-2091 2092-2093 2094-2095 2096-2097 2098-2099 2100-2101 2102-2103 2104-2105 2106-2107 2108-2109 2110-2111 2112-2113 2114-2115 2116-2117 2118-2119 2120-2121 2122-2123 2124-2125 2126-2127 2128-2129 2130-2131 2132-2133 2134-2135 2136-2137 2138-2139 2140-2141 2142-2143 2144-2145 2146-2147 2148-2149 2150-2151 2152-2153 2154-2155 2156-2157 2158-2159 2160-2161 2162-2163 2164-2165 2166-2167 2168-2169 2170-2171 2172-2173 2174-2175 2176-2177 2178-2179 2180-2181 2182-2183 2184-2185 2186-2187 2188-2189 2190-2191 2192-2193 2194-2195 2196-2197 2198-2199 2200-2201 2202-2203 2204-2205 2206-2207 2208-2209 2210-2211 2212-2213 2214-2215 2216-2217 2218-2219 2220-2221 2222-2223 2224-2225 2226-2227 2228-2229 2230-2231 2232-2233 2234-2235 2236-2237 2238-2239 2240-2241 2242-2243 2244-2245 2246-2247 2248-2249 2250-2251 2252-2253 2254-2255 2256-2257 2258-2259 2260-2261 2262-2263 2264-2265 2266-2267 2268-2269 2270-2271 2272-2273 2274-2275 2276-2277 2278-2279 2280-2281 2282-2283 2284-2285 2286-2287 2288-2289 2290-2291 2292-2293 2294-2295 2296-2297 2298-2299 2300-2301 2302-2303 2304-2305 2306-2307 2308-2309 2310-2311 2312-2313 2314-2315 2316-2317 2318-2319 2320-2321 2322-2323 2324-2325 2326-2327 2328-2329 2330-2331 2332-2333 2334-2335 2336-2337 2338-2339 2340-2341 2342-2343 2344-2345 2346-2347 2348-2349 2350-2351 2352-2353 2354-2355 2356-2357 2358-2359 2360-2361 2362-2363 2364-2365 2366-2367 2368-2369 2370-2371 2372-2373 2374-2375 2376-2377 2378-2379 2380-2381 2382-2383 2384-2385 2386-2387 2388-2389 2390-2391 2392-2393 2394-2395 2396-2397 2398-2399 2400-2401 2402-2403 2404-2405 2406-2407 2408-2409 2410-2411 2412-2413 2414-2415 2416-2417 2418-2419 2420-2421 2422-2423 2424-2425 2426-2427 2428-2429 2430-2431 2432-2433 2434-2435 2436-2437 2438-2439 2440-2441 2442-2443 2444-2445 2446-2447 2448-2449 2450-2451 2452-2453 2454-2455 2456-2457 2458-2459 2460-2461 2462-2463 2464-2465 2466-2467 2468-2469 2470-2471 2472-2473 2474-2475 2476-2477 2478-2479 2480-2481 2482-2483 2484-2485 2486-2487 2488-2489 2490-2491 2492-2493 2494-2495 2496-2497 2498-2499 2500-2501 2502-2503 2504-2505 2506-2507 2508-2509 2510-2511 2512-2513 2514-2515 2516-2517 2518-2519 2520-2521 2522-2523 2524-2525 2526-2527 2528-2529 2530-2531 2532-2533 2534-2535 2536-2537 2538-2539 2540-2541 2542-2543 2544-2545 2546-2547 2548-2549 2550-2551 2552-2553 2554-2555 2556-2557 2558-2559 2560-2561 2562-2563 2564-2565 2566-2567 2568-2569 2570-2571 2572-2573 2574-2575 2576-2577 2578-2579 2580-2581 2582-258

Flood map for planning

Your reference

PE12 8AL

Location (easting/northing)

536681/313435

Scale

1:2500

Created

18 Jun 2018 11:04



Selected point



Flood zone 3



Flood zone 3: areas
benefitting from flood
defences



Flood zone 2



Flood zone 1



Flood defence

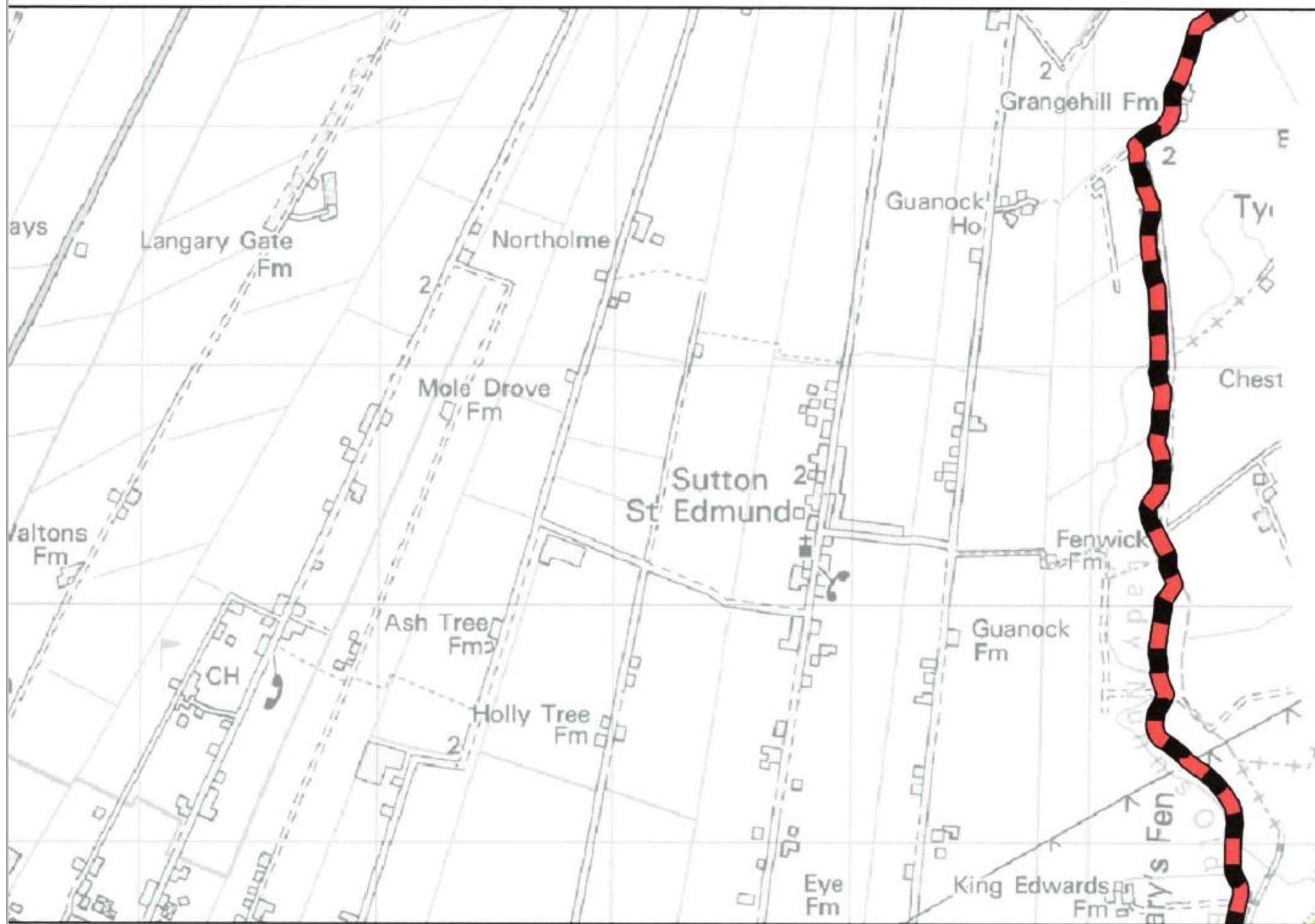


Main river

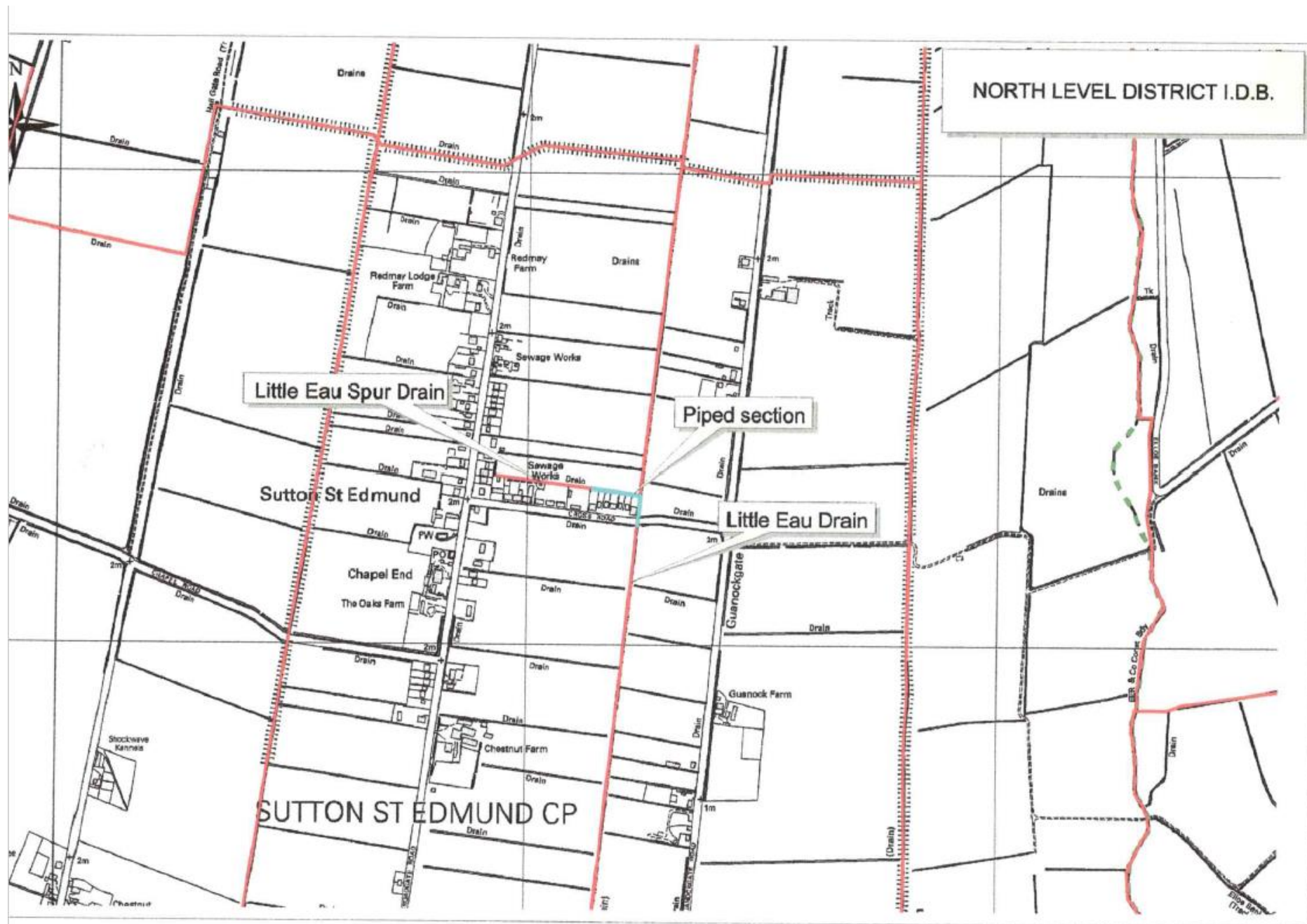


Flood storage area





2116



NORTH LEVEL DISTRICT I.D.B.

Little Eau Spur Drain

Piped section

Little Eau Drain

Sutton St Edmund

Chapel End

The Oaks Farm

SUTTON ST EDMUND CP

Guanockgate

Guanock Farm

Chestnut Farm

Shockwave Kinnels