Generating Ireland's Footways with PostGIS

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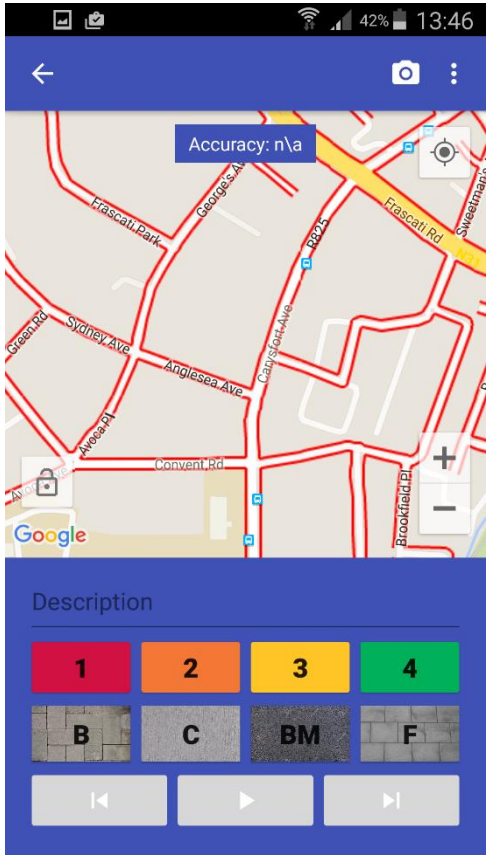
Compass Informatics

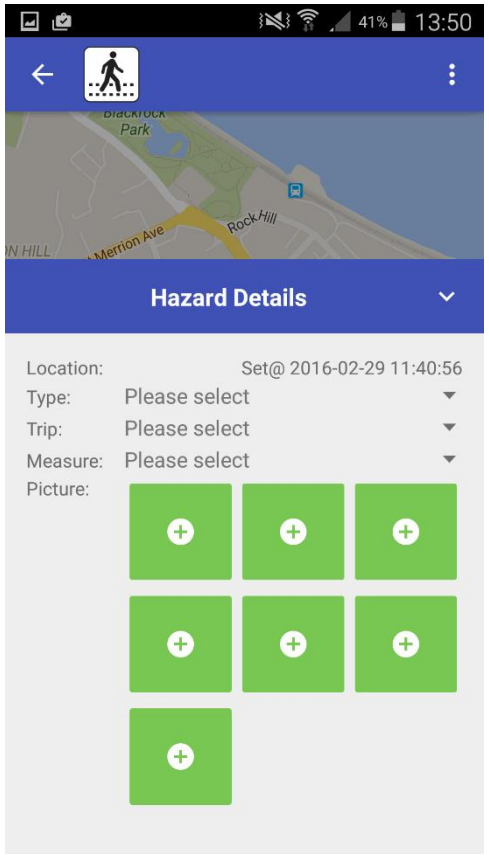
Business Requirement

Local Authorities to survey Footways for:

1. Pavement Condition Index to determine quality of Footpath

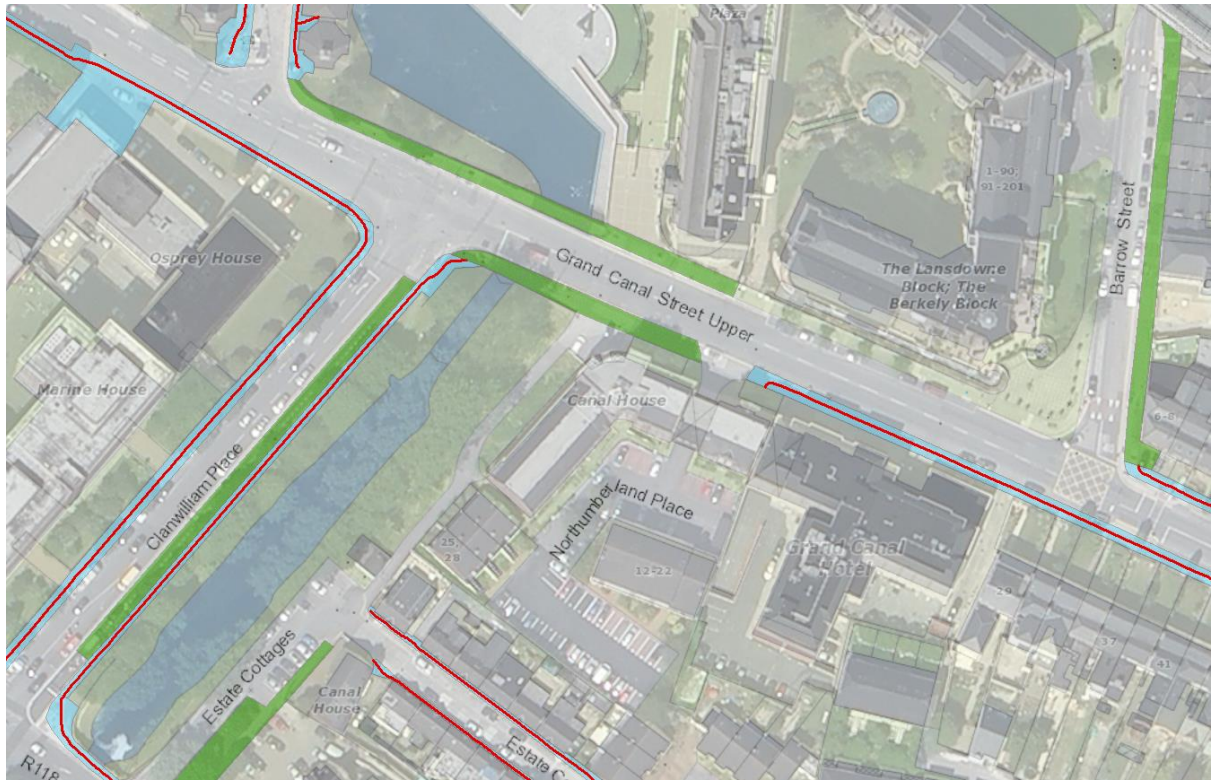
2. Potential “Trips and Falls”



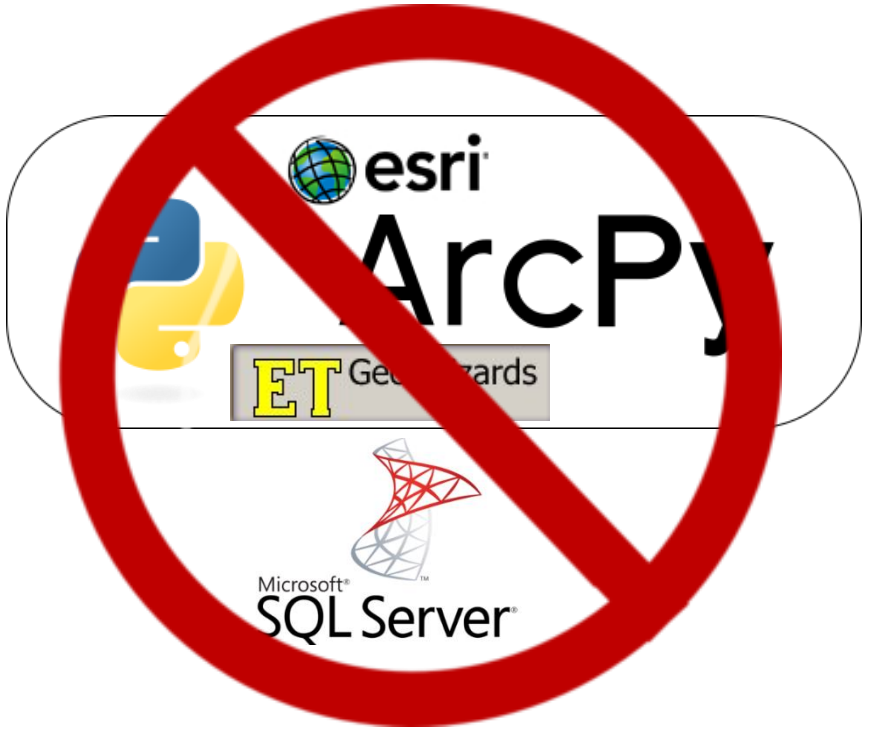


OSi Prime 2

- National Coverage
- Multitude of ground feature classes
- Ground feature objects in point, line and polygon formats



Why Open Source?



- Functions not available - Symmetrical diff, buffers (dissolved/non-dissolved)
- Multiple separate steps
- Speed - **8 hours** per Local Authority

PostGIS

PostgreSQL

- Parallelsql ran on PostgreSQL
- Simplification of algorithm
- Availability of spatial functions available
- **2 mins for Dún Laoghaire Rathdown CoCo**
- **50 mins for National dataset**

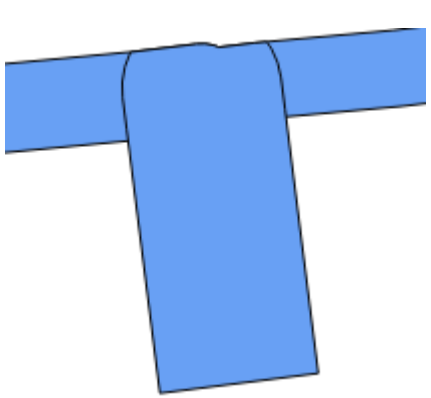
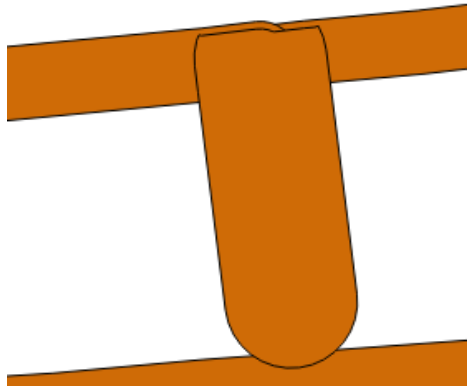
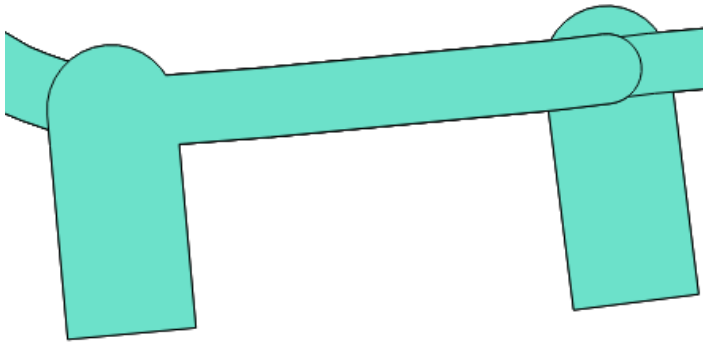
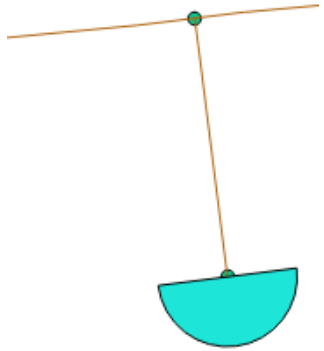
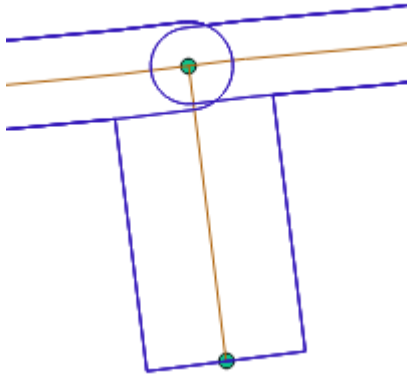
Prime 2 – Footways

Footways generated from Prime 2 data indirectly

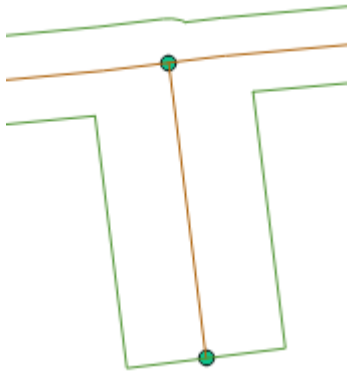
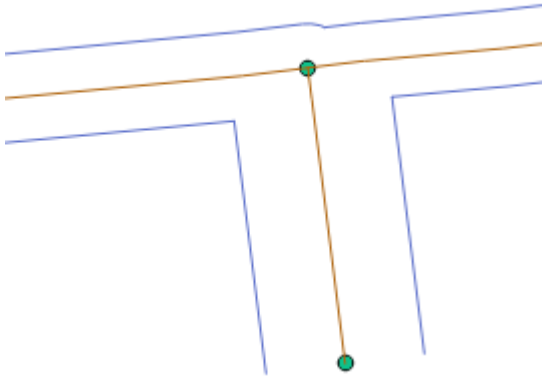
- Buffered Road Centrelines
  - Combination of WAY_POLY and WAY_LINE dataset
  - WAY_POLY used to calculate road widths

- Average Width used
  - All WAY_LINE segments buffered by distance based on average width the individual segment
  - E.g. if average width of WAY_POLY segment is 10.8m, buffer corresponding WAY_LINE segment by 5.4m.

Prime 2 – Footways

1. Round Buffer (Dissolved/Non-dissolved)
2. Flat Buffers (Dissolved/Non-dissolved)
3. Symmetrical Difference (cul de sacs)
4. Calculate all neighbouring round buffers and dissolve (T junction widths)
5. Dissolve no. 4 and outline is used

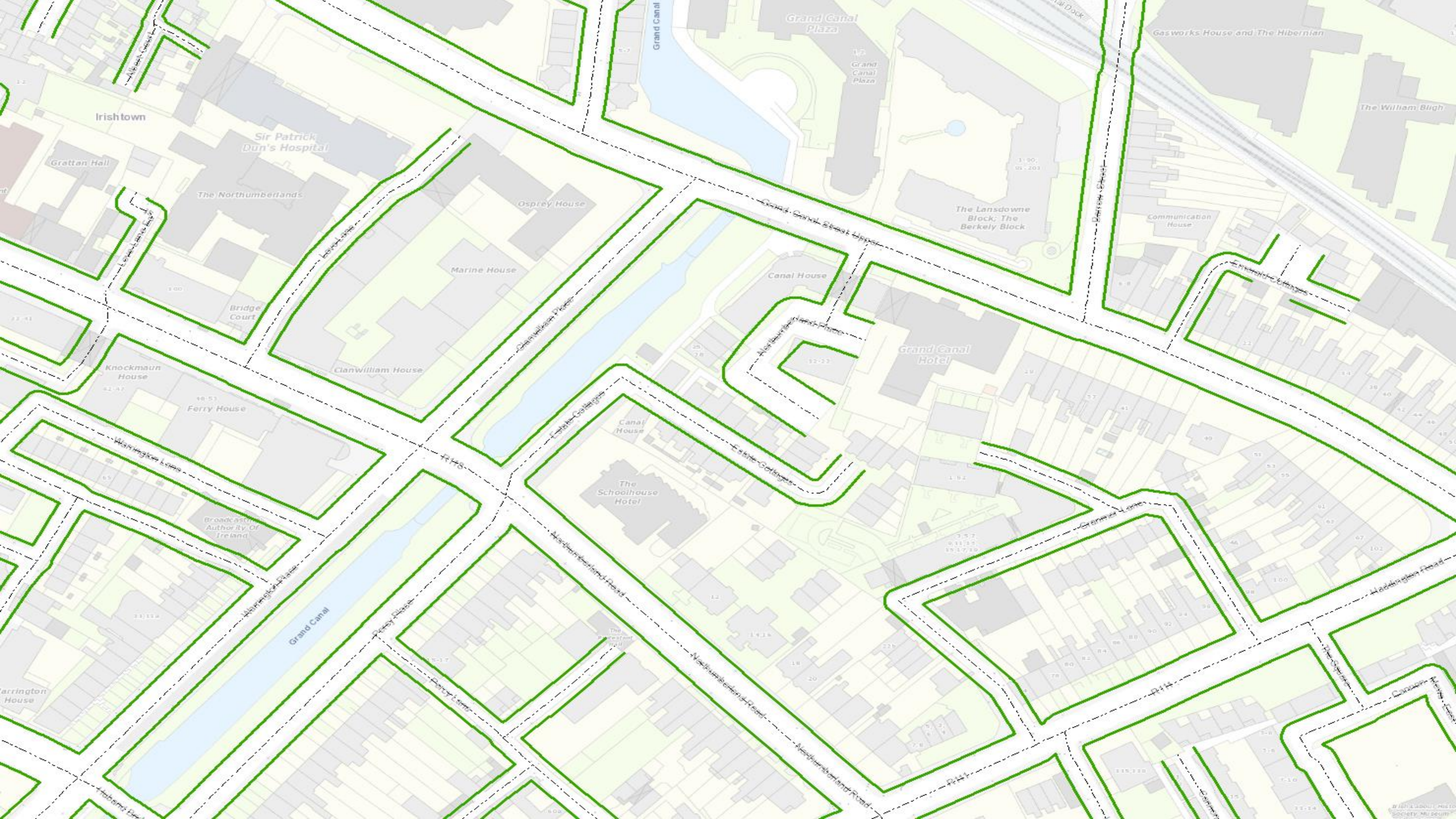



Prime 2 – Footways

```sql
DROP TABLE IF EXISTS footways_parts;

CREATE UNLOGGED TABLE footways_parts
(
  id serial,
  footways_edge_id integer NOT NULL,
  local_authority_id integer NOT NULL,
  geom2157 geometry,
  CONSTRAINT footways_parts_pkey PRIMARY KEY (id),
  CONSTRAINT enforce_srid_geom2157 CHECK (st_srid(geom2157) = 2157)
)
WITH (
  OIDS=FALSE
);
ALTER TABLE footways_parts
  OWNER TO postgres;

-- Index: idx_footways_parts_footways_edge_id

-- DROP INDEX idx_footways_parts_footways_edge_id;

CREATE INDEX idx_footways_parts_footways_edge_id
  ON footways_parts
  USING btree
  (footways_edge_id);

-- Index: idx_footways_parts_local_authority_id

-- DROP INDEX idx_footways_parts_local_authority_id;

CREATE INDEX idx_footways_parts_local_authority_id
  ON footways_parts
  USING btree
  (local_authority_id);

-- Index: sidx_footways_parts

-- DROP INDEX sidx_footways_parts;

CREATE INDEX sidx_footways_parts
  ON footways_parts
  USING gist
  (geom2157);
```

Prime 2 – Footways

```
TRUNCATE TABLE footways_parts;

-- takes 1:11 secs
SELECT parallelsql
(       'dbname=footways user=postgres password=''HuufDorf13!''', --connection string
        'round_buffers_for_intersections',             --table
        'rbi.footways_edge_id',                         --variable to partition by processes
        'WITH footways_p AS (
            SELECT rbi.footways_edge_id,
          rbi.local_authority_id,
            CASE WHEN de.geom2157 IS NULL THEN rbi.geom2157 ELSE ST_LineMerge(ST_Difference(rbi.geom2157,
ST_Buffer(de.geom2157, 0.00001, ''endcap=round join=round''))) END as geom2157
                FROM round_buffers_intersections rbi LEFT OUTER JOIN dead_ends de ON rbi.footways_edge_id =
de.footways_edge_id
                WHERE 1=1
            )
        SELECT footways_edge_id,
          local_authority_id,
          (ST_Dump(geom2157)).geom AS geom2157
        FROM footways_p
        ;',                                     --the statement as string to be executed in parallel
        'footways_parts (footways_edge_id, local_authority_id, geom2157)',              --result table, has to be created
first
        'rbi',                                    --table alias used for split column
        8,                                        --number of cores
        '1=1',                                    --replace string in the query
        10000                                     --block size
);

ANALYZE footways_parts;
```



Irishtown
Sir Patrick Dun's Hospital
Grattan Hall
The Northumberlands
Osprey House
Marine House
Bridge Court
Clanwilliam House
Clanwilliam Place
Knockmaun House
Ferry House
Warrington Lane
Warrington Place
Broadcasting Authority Of Ireland
Grand Canal
Grand Canal Plaza
Grand Canal Street Upper
Canal House
Grand Canal Hotel
The Lansdowne Block; The Berkely Block
Gasworks House and The Hibernian
The William Bligh
Communication House
Estate Cottages
The Schoolhouse Hotel
Northumberland Road
Percy Place
Percy Lane
Haddington Road
R118
R111