

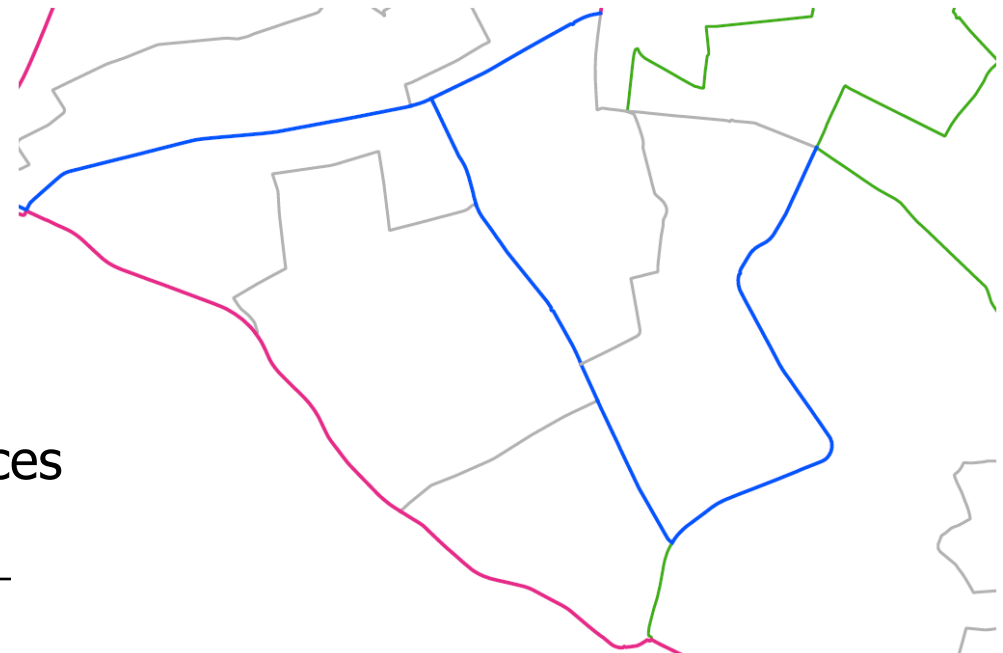
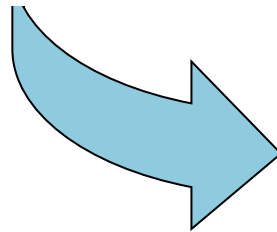
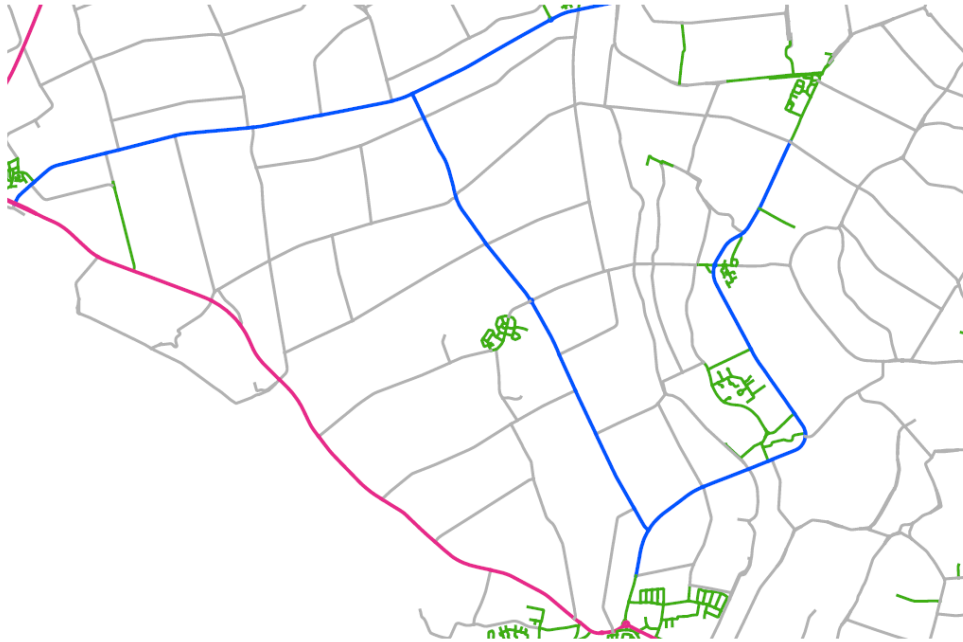
Large scale road network generalization for vario-scale map

8-9-2015

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18th ICA Workshop on Generalisation and Multiple Representation,
21st August 2015, State University of Rio de Janeiro, Brazil

Smaller scale road network generalization in tGAP (ICA 2014)

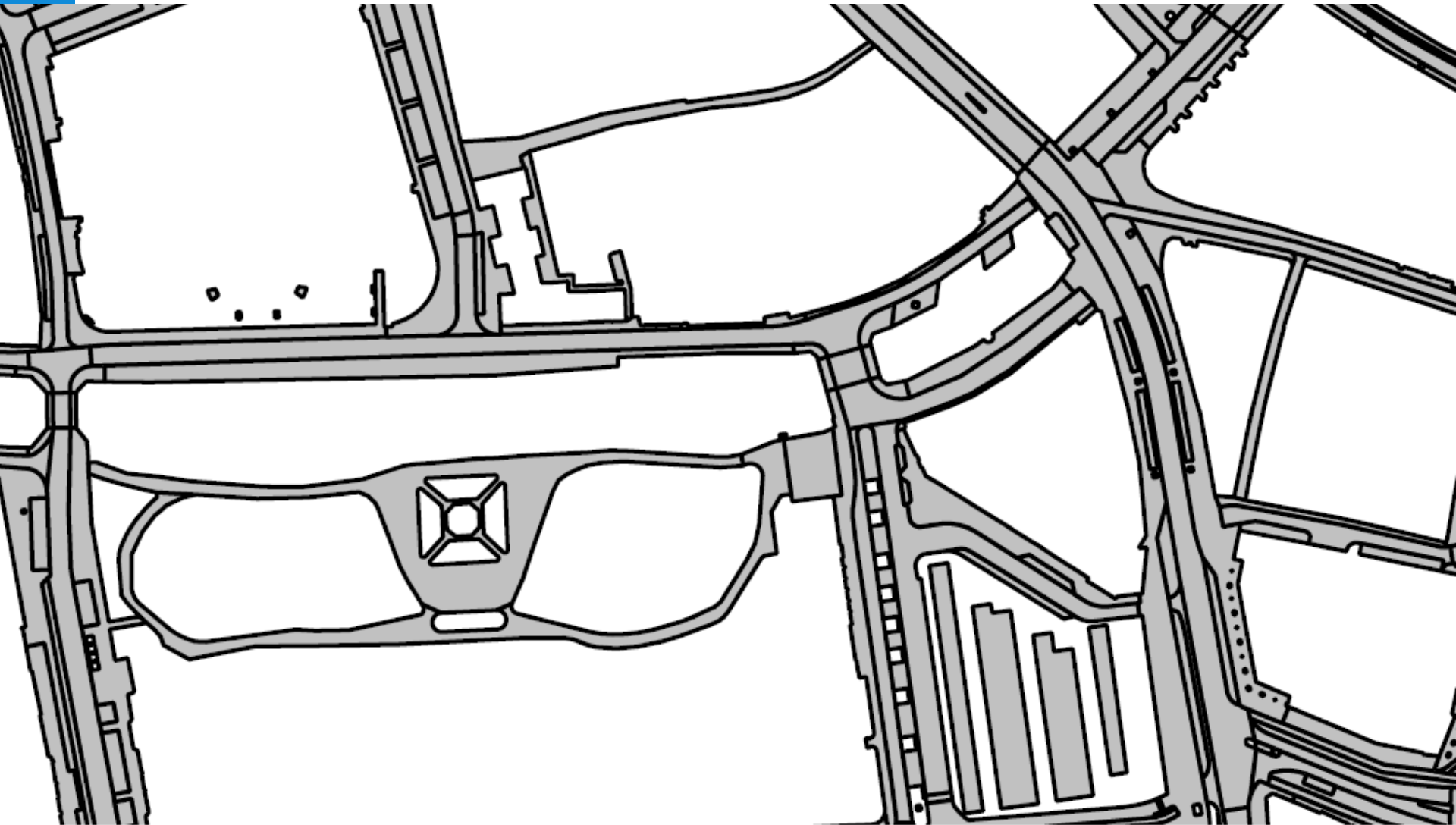


Roads are lines (edges in tGAP)

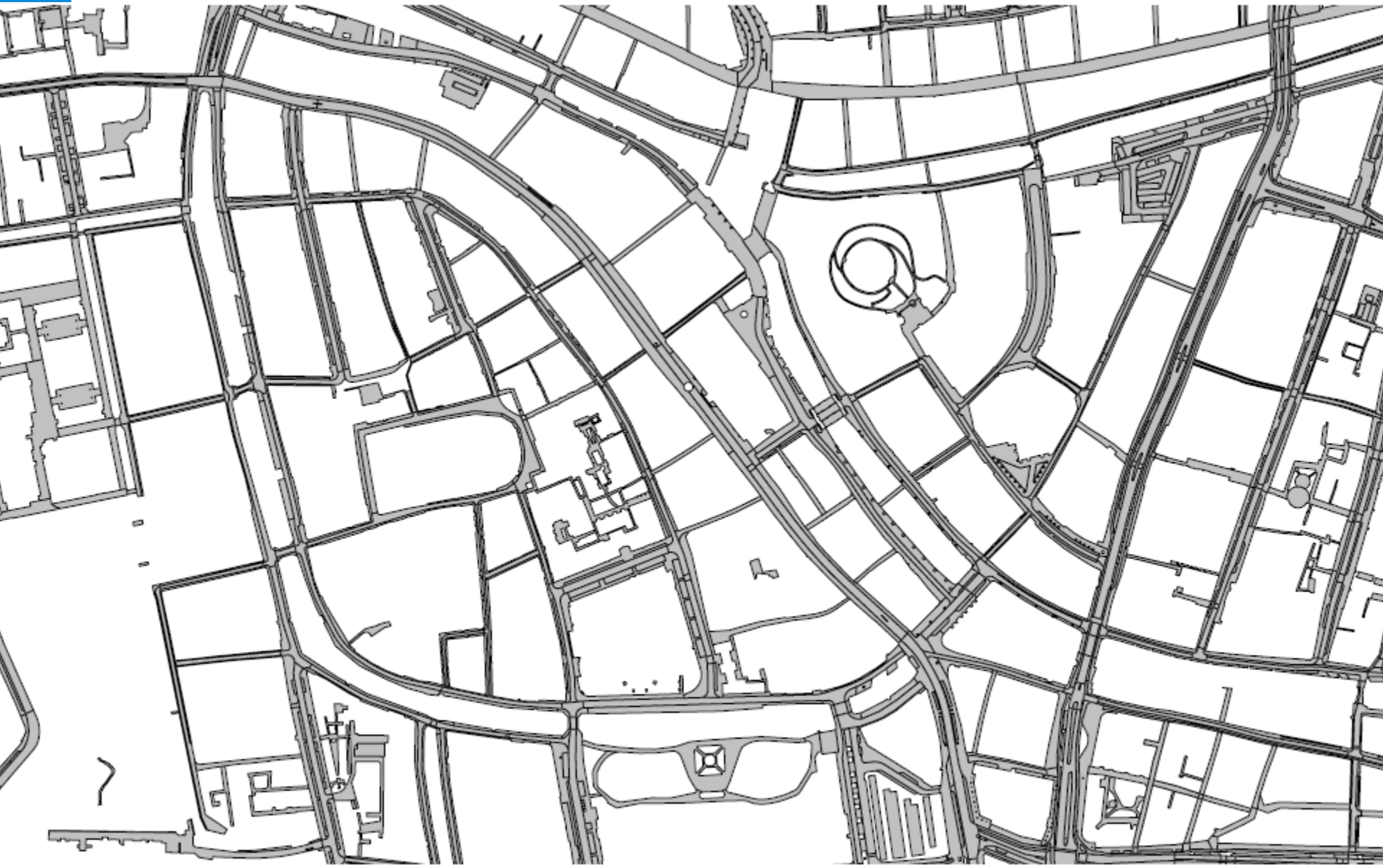
Main idea:

merge terrains (road cycles) faces
remove shared edge (road)

Road as areas (from Dutch base map:
to be used at 1:500 – 1:5,000)



Base map, zoomed out



Roads as lines (NWB 1:25,000) → shock



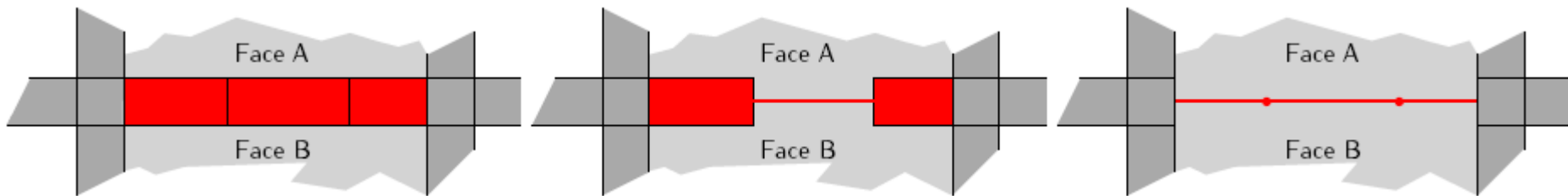
Road network generalization: levels of granularity

Granularity indicates number of elements involved per step:

- *Coarse:* one or more complete classes is generalized;
e.g. all highways
- *Medium:* group of features are generalized together;
e.g. road consists of multiple parts
- *Fine:* individual part, object or road segment;
e.g. segment between junctions (or different speed/material)

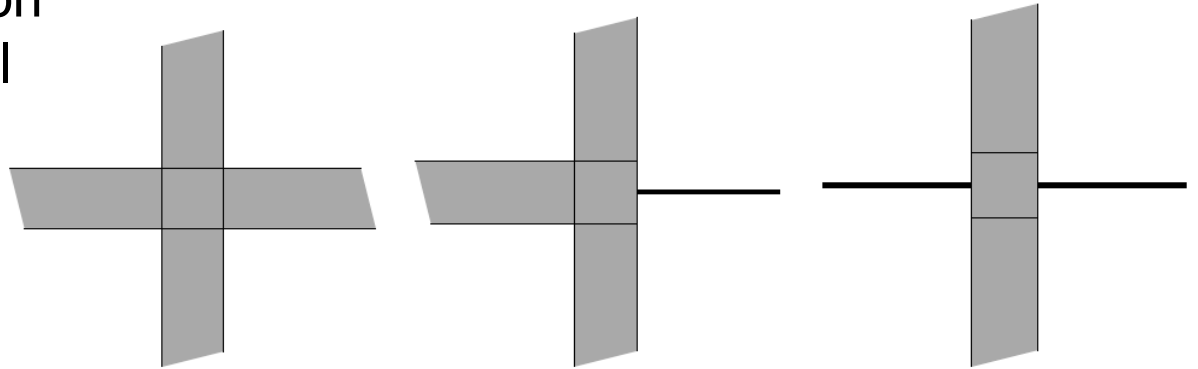
Pro's and con's of granularity levels

- Coarse/medium
pro: easy to read
con: content shocks, computational expensive, complex problem
- Fine
pro: more gradual, easier to compute, history of steps, feature links
con: can be 'disturbing'

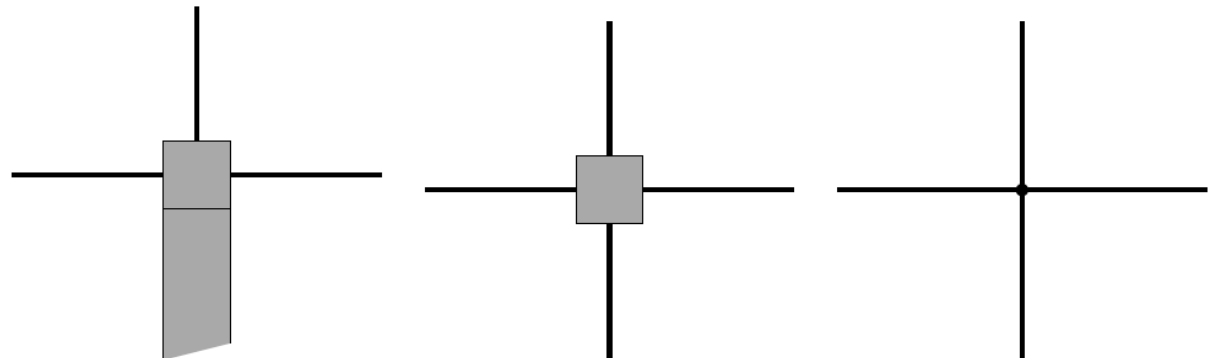


Fine granularity, (no) overall recipe

- Assume: connection road class of equal importance and junction class of higher importance



- Normal tGAP algorithm → remove least important feature (collapse)



- tGAP with both areas and lines features

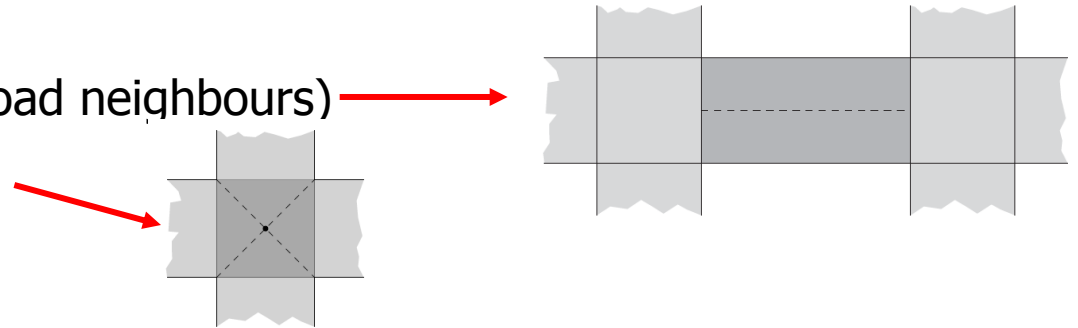
tGAP creation (road network)

- Start with area partition consisting of 3 types of faces:

1. non-road

2. road connection (2 road neighbours) →

3. road junction (more) →



- Select least important face, then in case:

1. face is non-road, when possible merge with best adjacent non-road;

When not possible, raise importance and back in queue

2. face is connection and there exists neighbour connection, then merge;

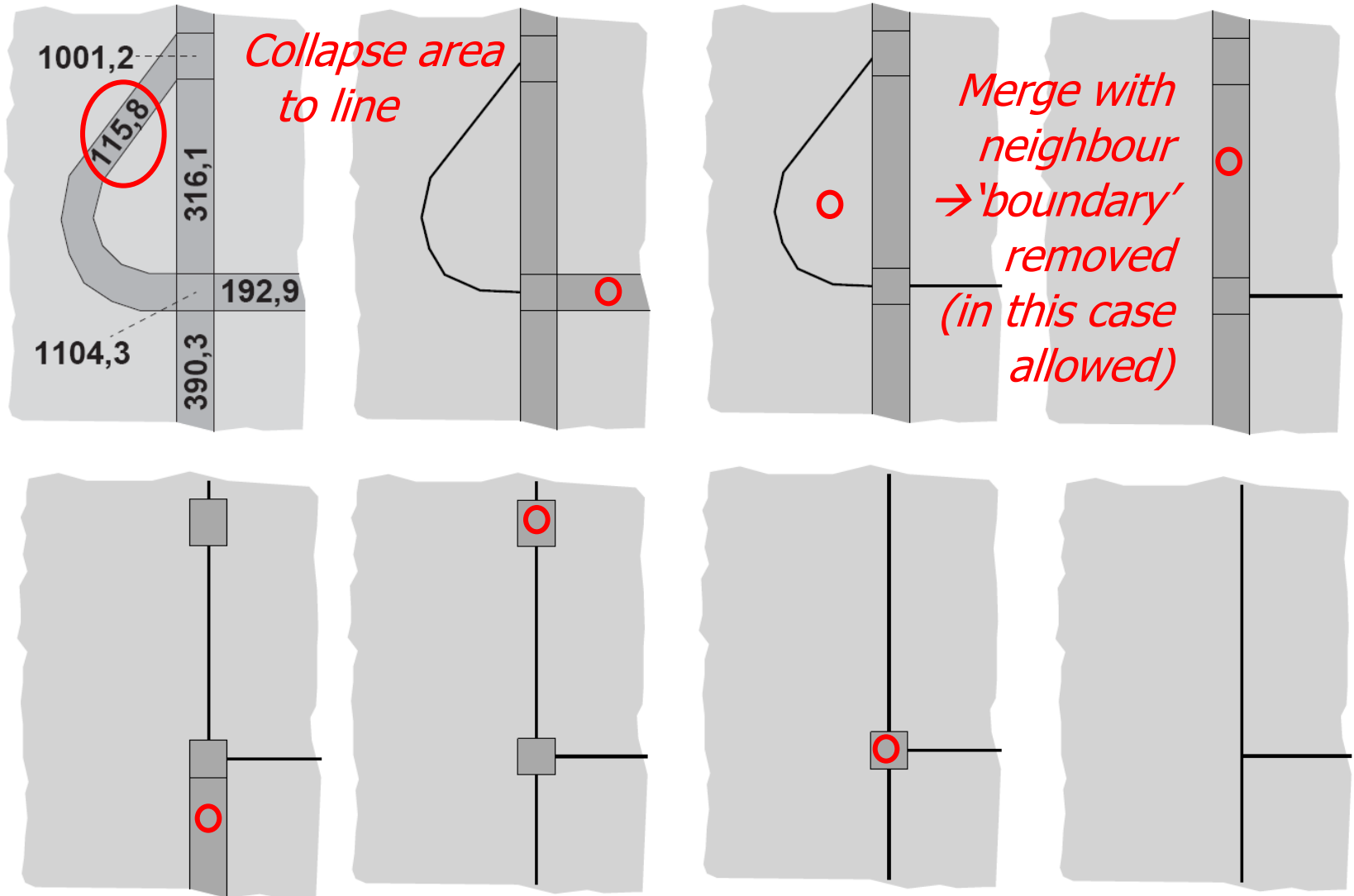
Otherwise collapse road connection face to line

3. face is junction, only collapse if adjacent road connections are lines;

When not the case, raise importance and back in queue

- Continue (at least) until road features are all lines

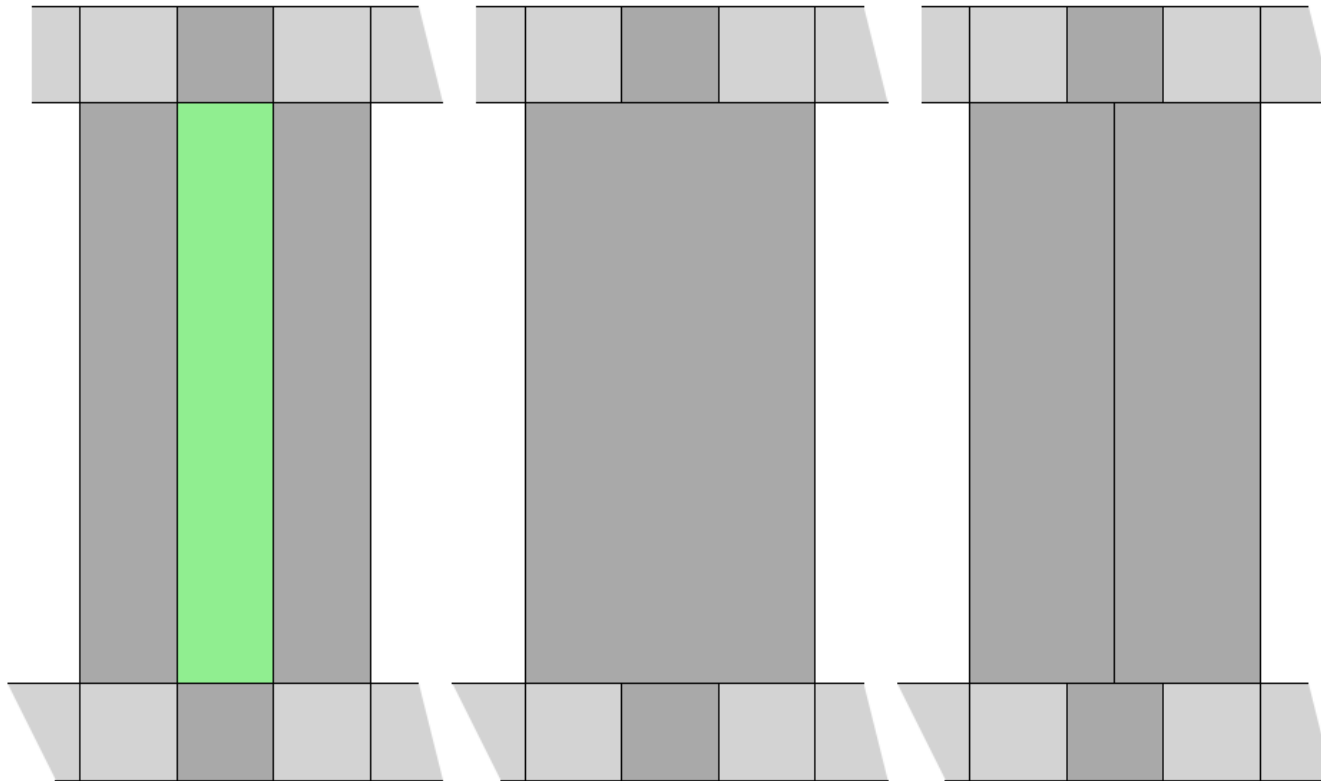
Remove least important feature



Remove least imp face (non-road)

Problem: all neighbors road faces...

2 options to continue: 2 road merges or... 1 split+merge parts



(green=non-road, dark grey=connection, light grey= junction)

Some discussion

- Fine granularity indeed preferred by users? → usability test
- Just ideas presented, basic operations (split, merge) available, but is overall process steering Ok?
- Features not too often put back in queue with higher imp?
- Now only one non-read class, but in reality more classes (with different imp and characteristics) → more challenging
- Can road subclass granularity level be obtained by simple part-by-part tGAP approach?
(first all minor roads collapsed to lines, before next level)
- Line road segment only removed when 2 neighbour non-road faces merge, because one was least imp
(alternative: also select least imp line features (road) in tGAP?)

Thanks

- for your attention!
- for support by the Dutch Technology Foundation STW (project number 11185)

- Suggestions, Questions?

