

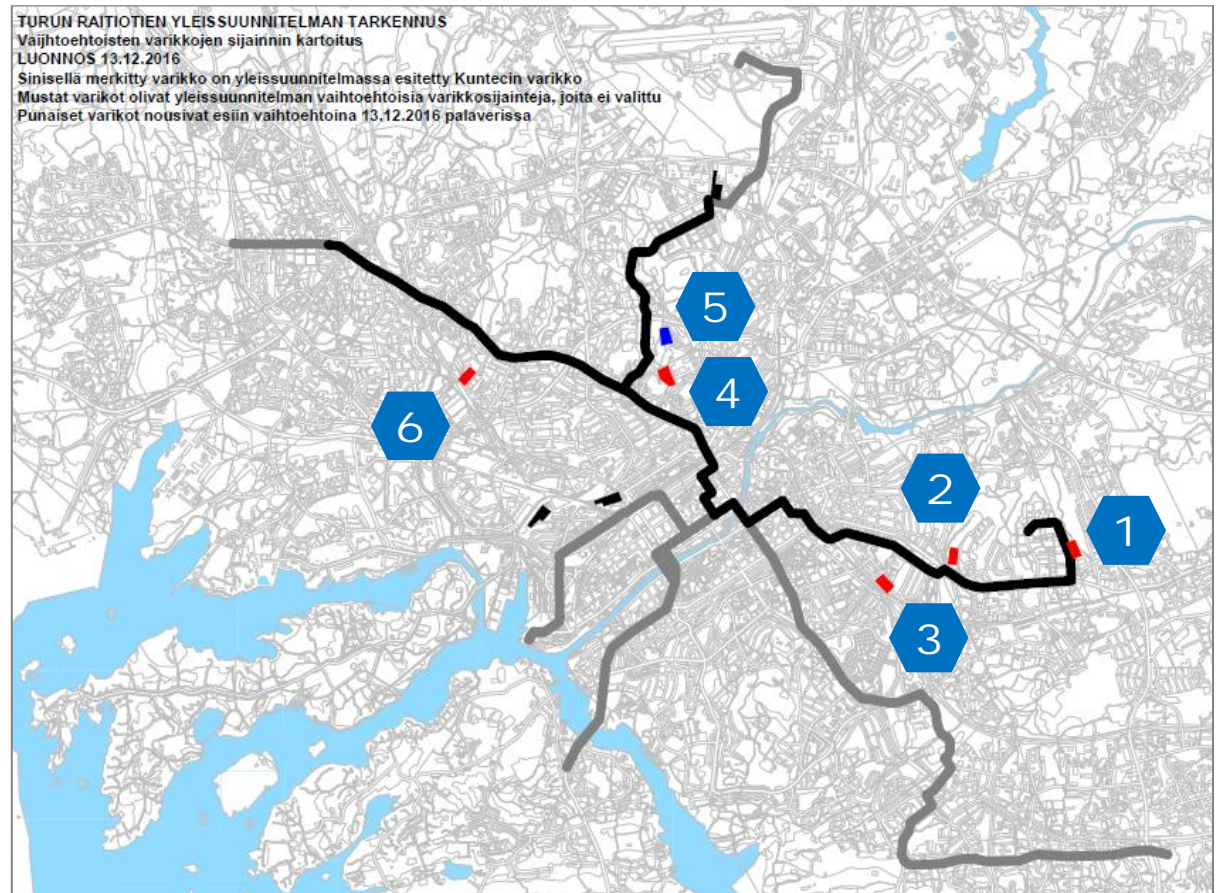
TURKU LIGHT RAIL DEPOT STRATEGY

METHODOLOGY

- Sampling relevant information about new locations:
 - Situation
 - Distance to alignment
 - Urban integration respectively land use
 - Environmental impacts
 - Land ownership (price and availability)
 - Conformity with urban masterplan
 - Constraints causing significantly higher construction cost
 - Suitability to alternative Light Rail network alternatives and phasing concepts
- Expert evaluation
- Multi-criteria analysis
- Summary and recommendation

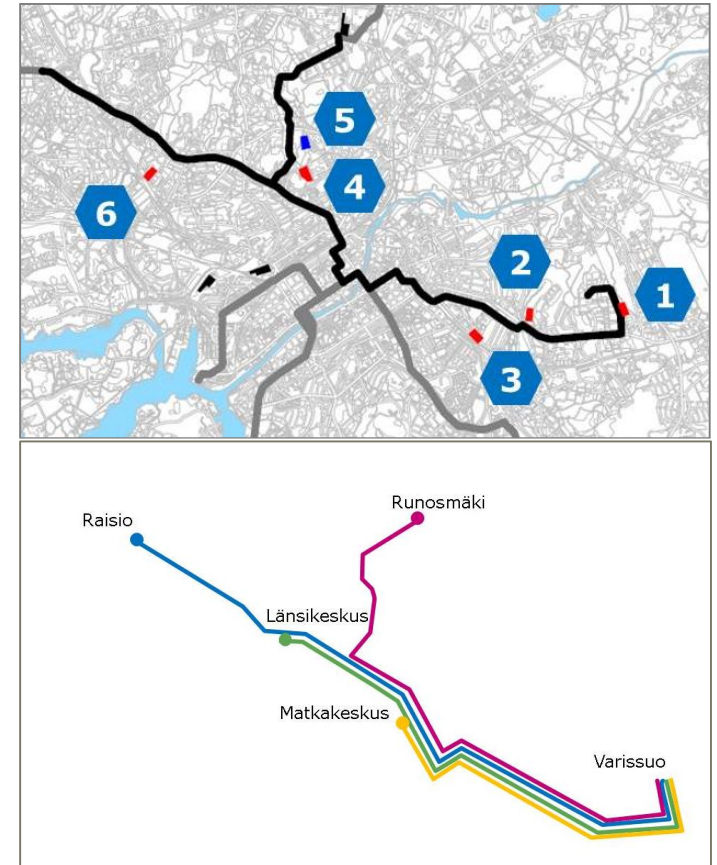
6 LOCATIONS IN THE FOCUS

1. Varissuo
2. Pääskyvuori
3. Itäharju
4. Vätin vinttikoirarata
5. Kuntecin varikko
6. Pläkkikaupunki



DIFFERENT LINE AND PHASING OPTIONS

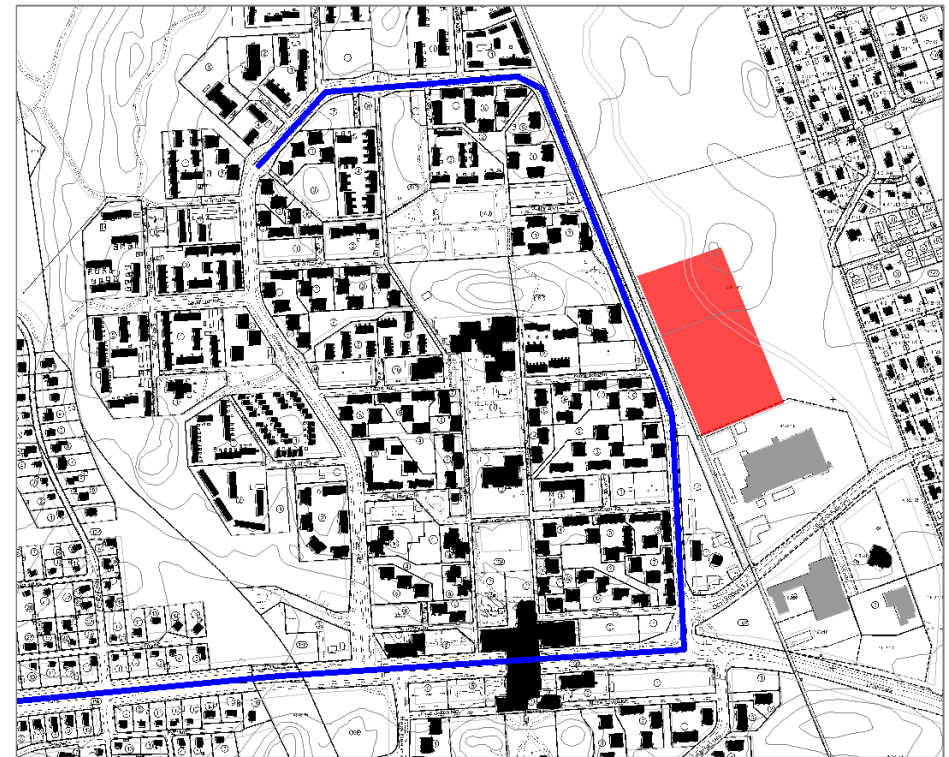
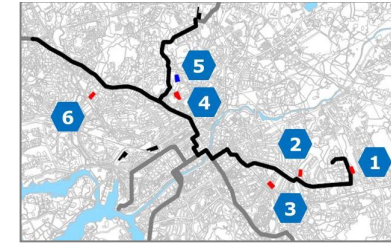
- Basis: Varissuo – Matkakeskus operated in any case
- Depending on the western terminus 5 network alternatives to consider
- Not in every scenario every depot location is situated close to operated lines



Suitability of Depot location to operational Scenario X: further evaluation ?: certain distance to the line -: far from the line	Varissuo	Pääskyyvuori	Itäharju	Vätiin Vinttikoirarata	Kuntecin Varikko	Piäkkikaupunki
No. of Depot Location	1	2	3	4	5	6
Raisio & Runosmäki	X	X	X	X	X	X
Runosmäki	X	X	X	X	X	-
Länsikeskus	X	X	X	X	?	-
Raisio	X	X	X	X	?	X
Matkakeskus	X	X	X	-	-	-

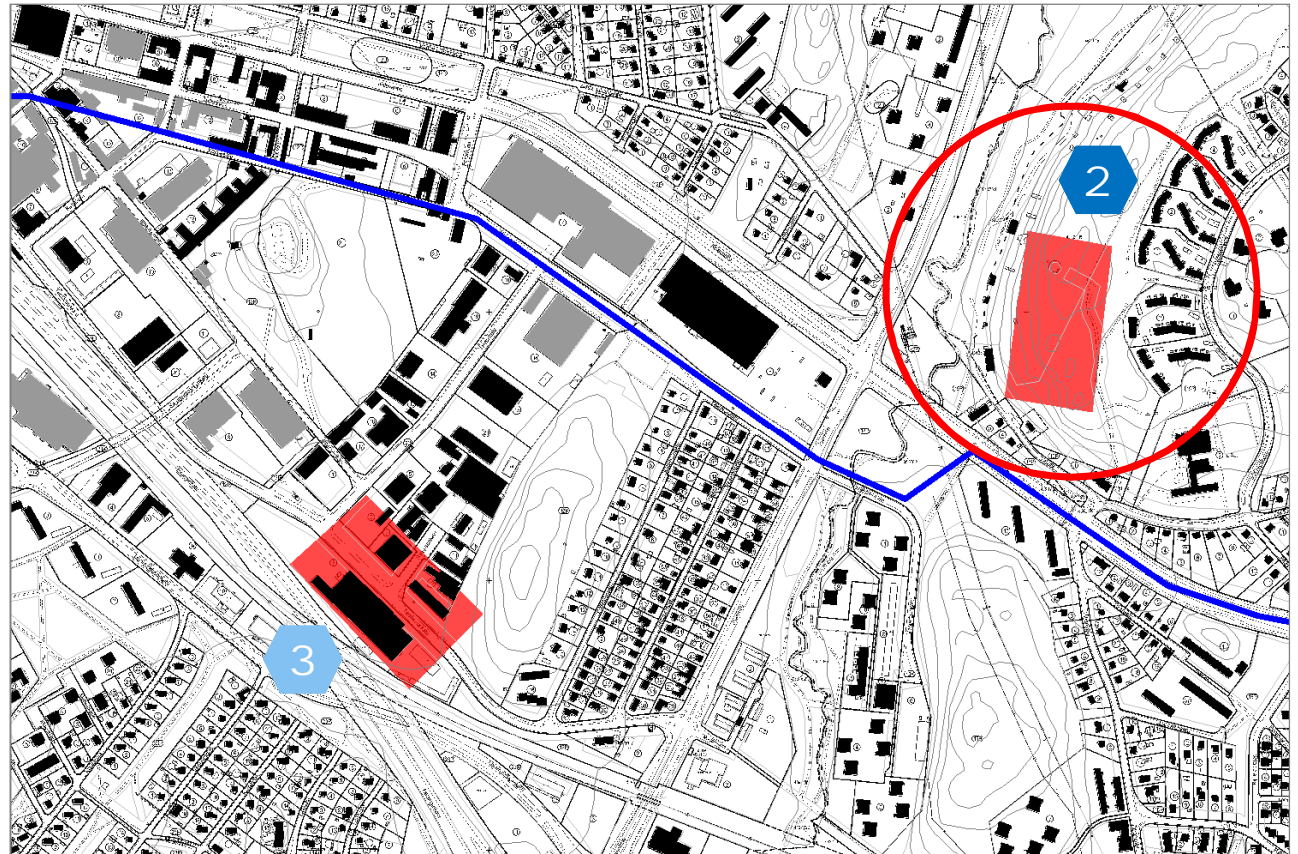
ALTERNATIVE 1: VARISSUO

- Varissuo depot site should be located in the municipality of Kaarina
- Need for discussion with people from Kaarina whether this is a viable solution.
- Multi-storey residential buildings on the Western side of Karvataskunkatu and one-family houses would be at a distance of around 100 m separated by a forest belt.
- Would fit all network alternative (in all cases the other end of the line is in Varissuo).

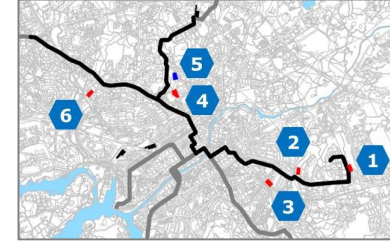


ALTERNATIVE 2: PÄÄSKYVUORI

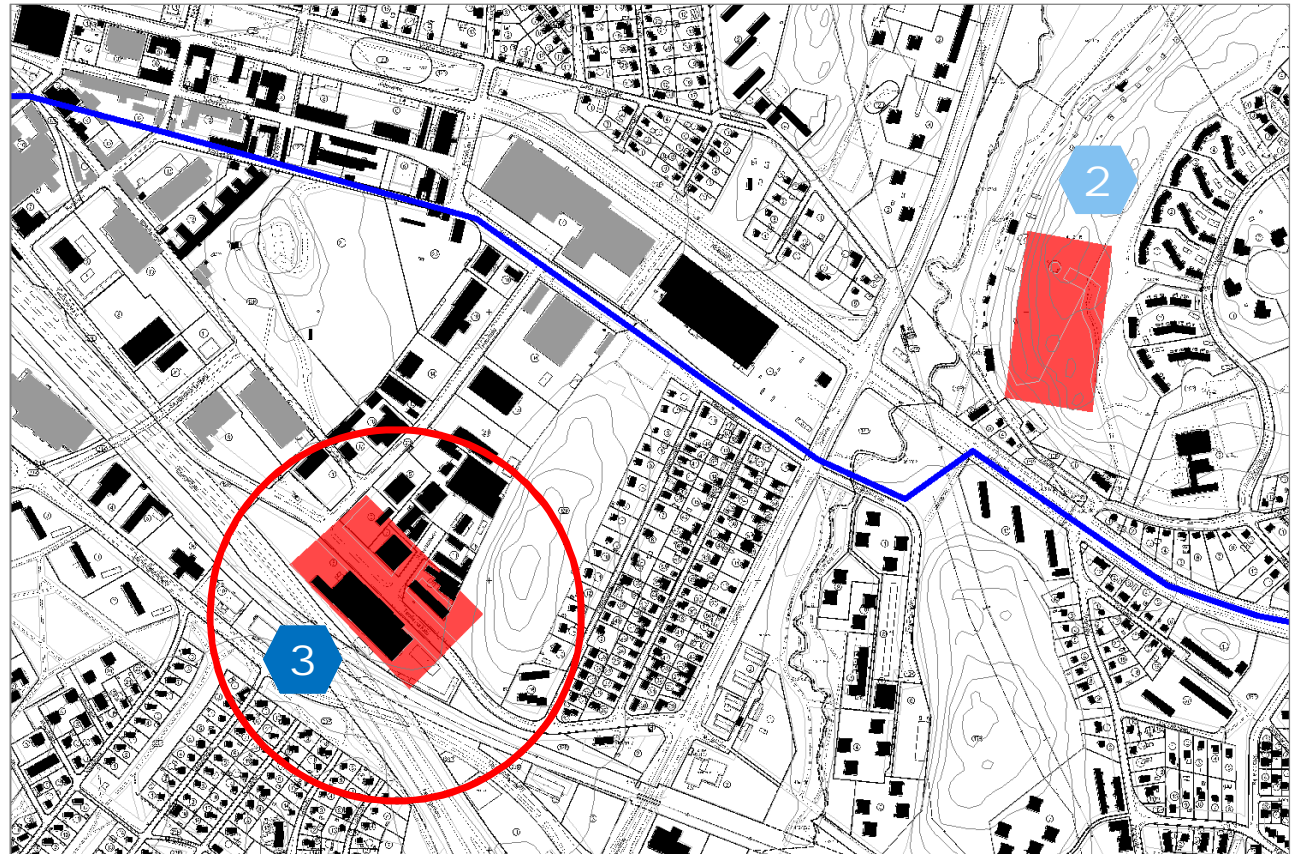
- Pääskyvuori depot would reside underground
- Truly expensive solution. Land owned by the city.
- Would fit all network alternative (in all cases the other end of the line is in Varissuo).



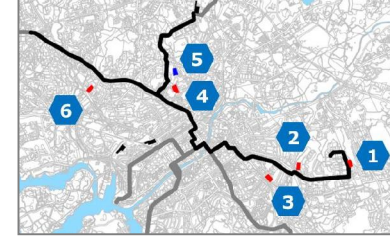
ALTERNATIVE 3: ITÄHARJU



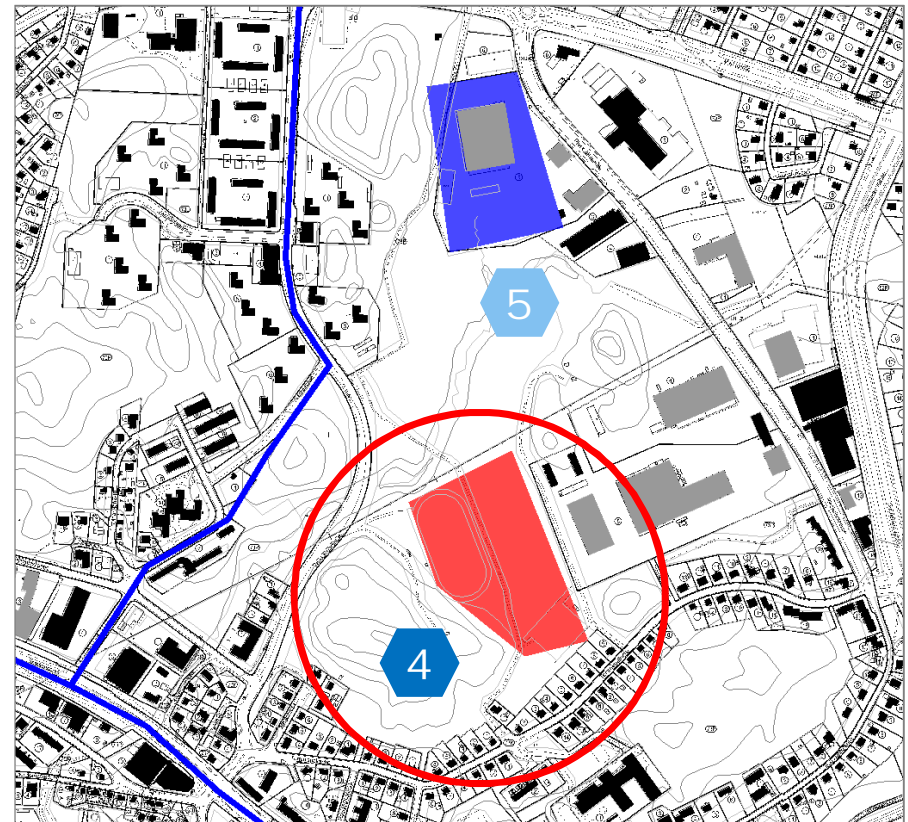
- Itäharju depot would be located somewhere in the red area no. 3
- In contradiction with the draft of the areal master plan of Itäharju. In the master plan next to or in the same place is considered residential and mixed land use.
- Land owned by the city.
- Would fit all network alternative.



ALTERNATIVE 4: VÄTIN VINTTIKOIRARATA

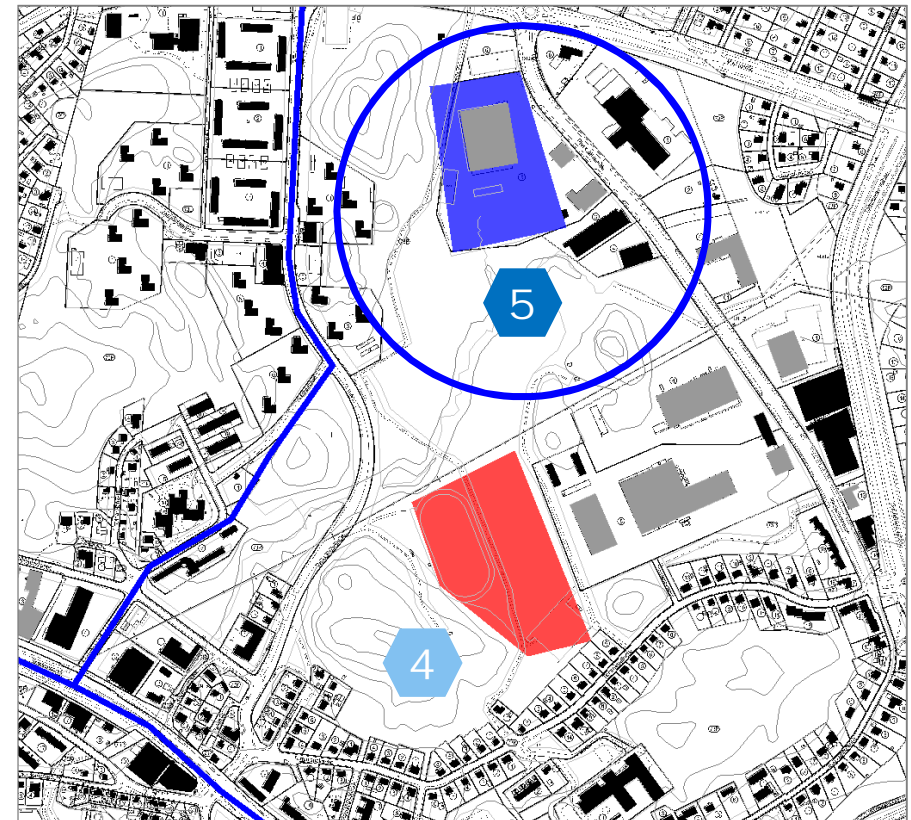
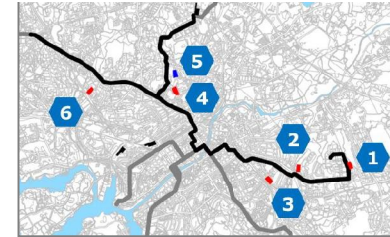


- Vätti greyhound racetrack
- If first phase would be Varissuo-Matkakeskus, distance to the depot site would be more than 2 km → expensive in the long run.
- But it could fit other network alternatives (Varissuo-Runosmäki / Varissuo-Raisio / Varissuo-Länsikeskus).
- The site would be in the backyard of Valio factory, is that transformed into housing in the future?
- Land owned by the city.
- Probably bad ground conditions?



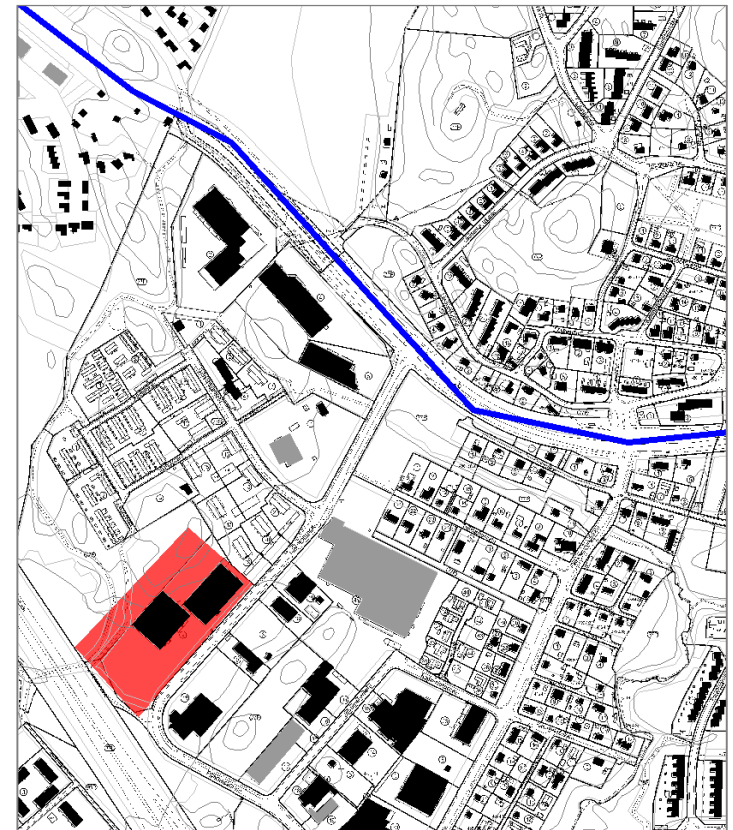
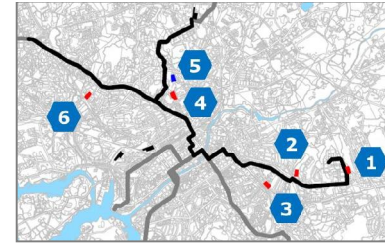
ALTERNATIVE 5: KUNTECIN VARIKKO

- Kuntec depot too far away from Matkakeskus
 - if first phase would be Varissuo-Matkakeskus and
 - also far from Satakunnantie (ca. 1.5 km) if first phase does not go to Runosmäki but stops at Länsikeskus or continues to Raisio from there.
- Land is owned by the city, but during in the master plan a net value of 7 Mio. € was assumed for the existing Kuntec depot.
- Options for relocation of the current Kuntec depot need to be find.



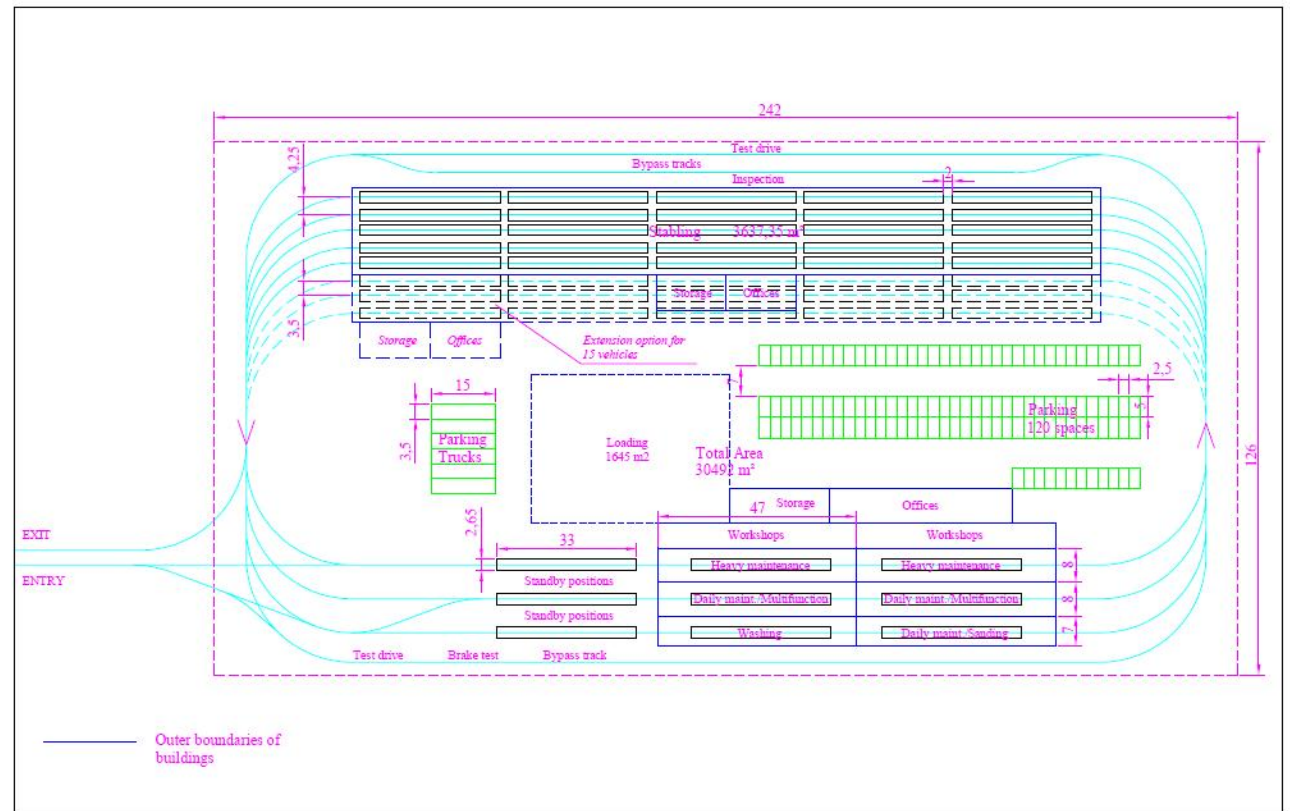
ALTERNATIVE 6: PLÄKKIKAUPUNKI

- Too far away from Matkakeskus and Runosmäki branch,
- Also a bit far from Länsikeskus (a little more than 1 km) in case that the first phase does not include the Raisio branch.
- If line to Raisio is included it would be fairly ok.
- Would be located quite close to West Park.
- Land is mainly privately owned.



CONCEPTUAL DEPOT LAYOUT

- Standard layout
- Not yet adapted to specific location
- Modification of shape for Alternative 4: Vätin vinttikoirarata likely
- Pääskyvuori would need individual consideration because of underground site



TURKU MASTER PLAN
TRAM DEPOT LAYOUT 2

1 : 750 (A3)

Ramboll Transport Germany
RAMBOLL 02.12.2016

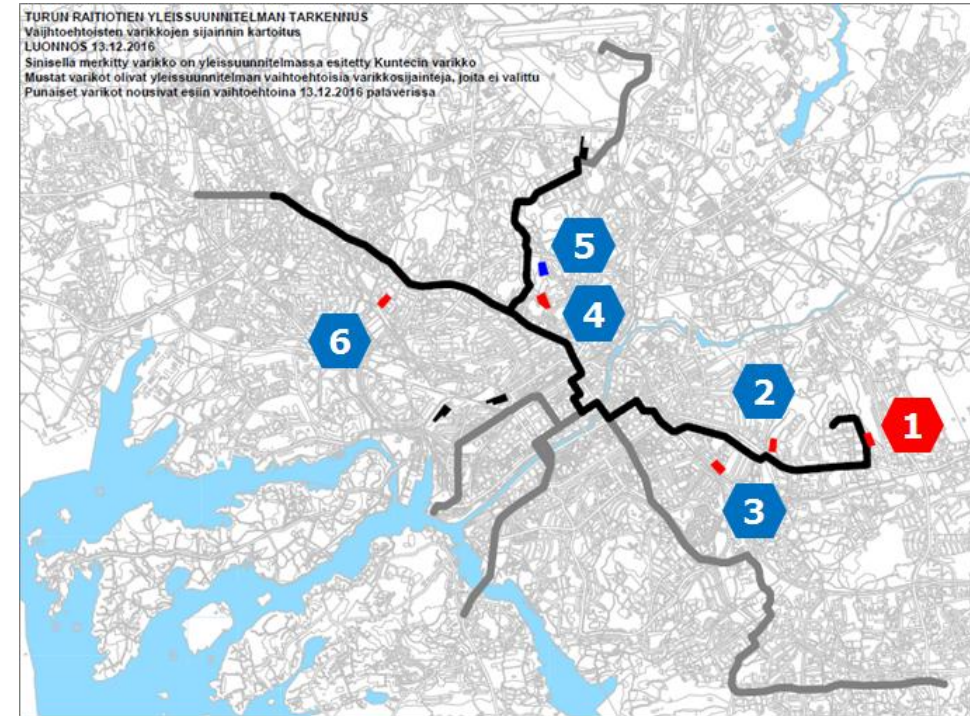
BASIS FOR MULTI-CRITERIA ANALYSIS – LOCATION SPECIFIC

- Multi criteria analysis shall help to evaluate the location
- Estimations and qualitative evaluations needed
- Location within the network has to be evaluated depending on the network scenario

Criterion	Assessment
Location	<ul style="list-style-type: none">• Surrounding area (residential, industrial, mixed, natural heritage, etc.?)• Level or undulating environment• Access from road network
Distance to closest network alternative	<ul style="list-style-type: none">• How far is the depot located from the next planned route
Location within the network	<ul style="list-style-type: none">• Is the location well placed in terms of operation / empty running
Cost (Construction & Modernisation)	<ul style="list-style-type: none">• Only in relation to the surrounding area

ALTERNATIVE 1: VARISSUO

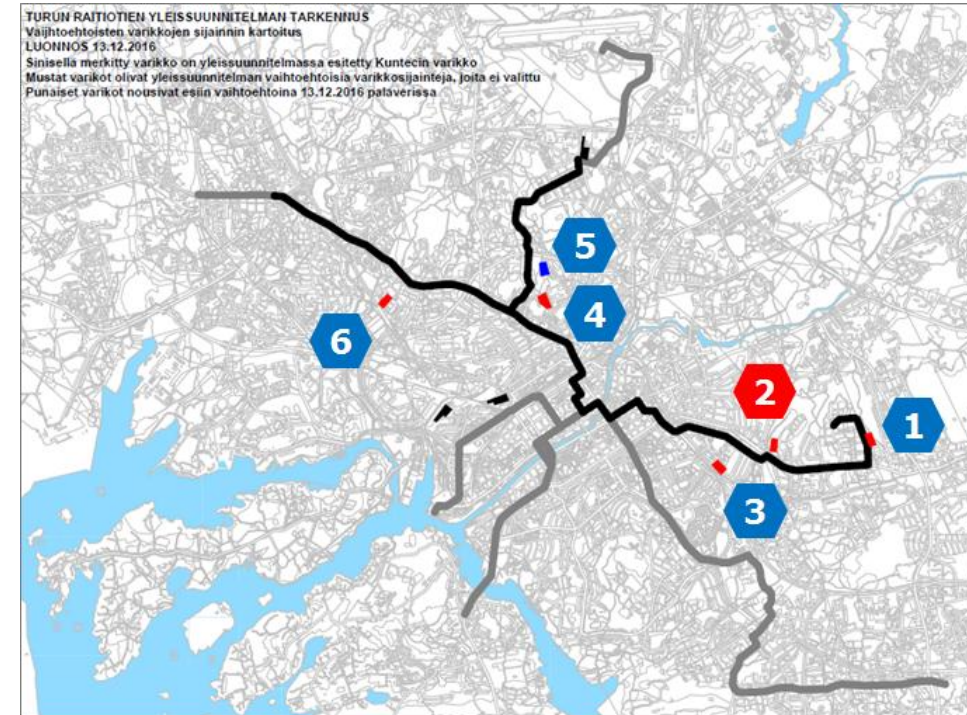
Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	--	Close to and surrounded by residential buildings and also on ground of a different municipality
Distance to closest network alternative	++	Located directly on one of the lines
Location within the network (operationally)	--	Poorly located at the end of one branch line
Cost	0	Should be straightforward to construct, however located on other municipality



Overall Evaluation: -0.4
 between -2 ("--") and +2 ("++"):

ALTERNATIVE 2: PÄÄSKYVUORI

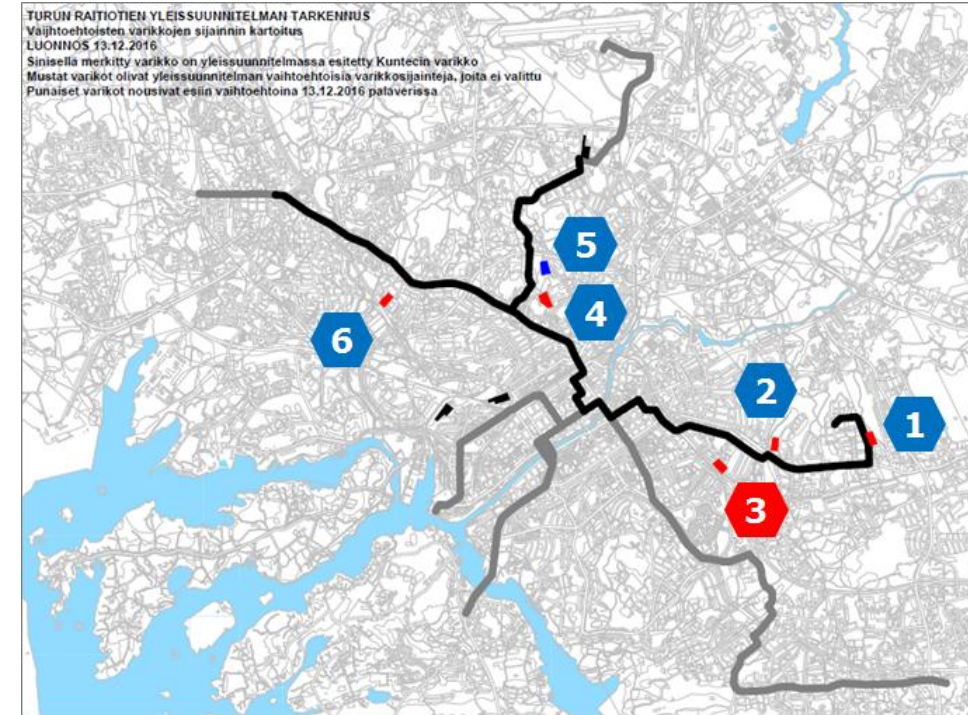
Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	-	Close to and surrounded by residential buildings
Distance to closest network alternative	+	Located slightly removed from the next line
Location within the network (operationally)	-	Located towards the end of one of the branch lines resulting in empty running as network grows
Cost	--	Very expensive alternative based on initial client assessment and as it is a recreational area



Overall Evaluation: -0.6
between -2 ("--") and +2 ("++"):

ALTERNATIVE 3: ITÄHARJU

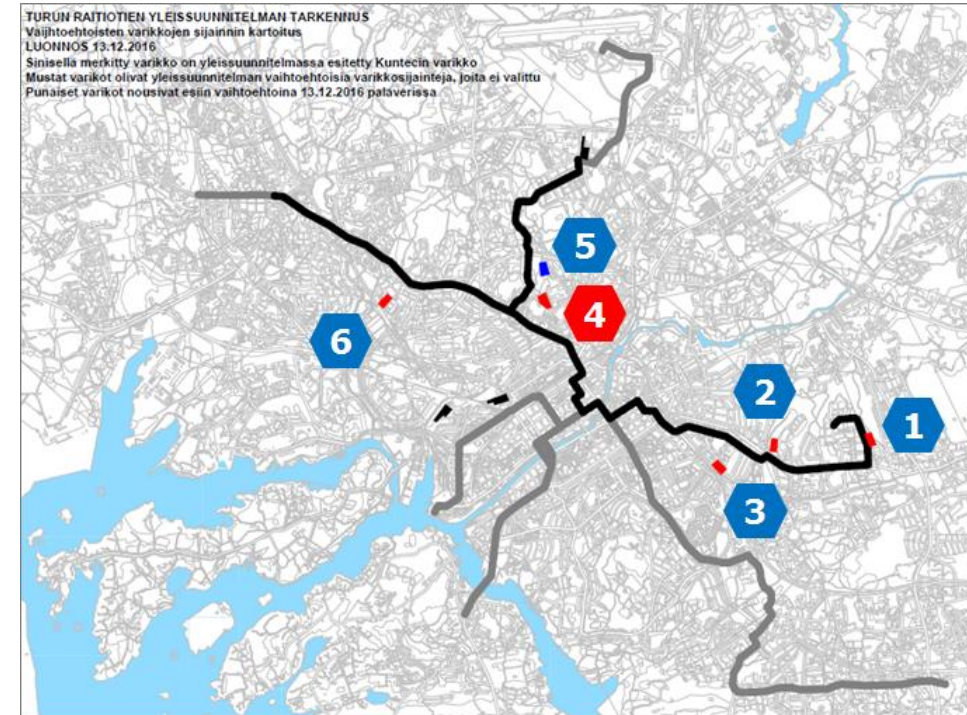
Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	+	Located in an area which is currently an industrial estate. However there may be intentions to convert this to residential use in the future (urban plan?)
Distance to closest network alternative	+	Located a small distance from the closest network route
Location within the network (operationally)	0	Located towards the end of one of the branch lines resulting in empty running as network grows; but slightly closer than alternative 2.
Cost	-	Relatively flat terrain however existing industrial use and road will need to be re-located



Overall Evaluation: +0.2
between -2 ("--") and +2 ("++"):

ALTERNATIVE 4: VÄTIN VINTTIKOIRARATA

Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	0	Area should be available (old greyhound track) but it also appears to be of recreational value.
Distance to closest network alternative	+	Located a small distance from the closest network route
Location within the network (operationally)	+	Operationally very good location - if the lines reach as far as this point.
	--	Not suitable for short line scenario to Matkakeskus
Cost	0	Should be straightforward to construct

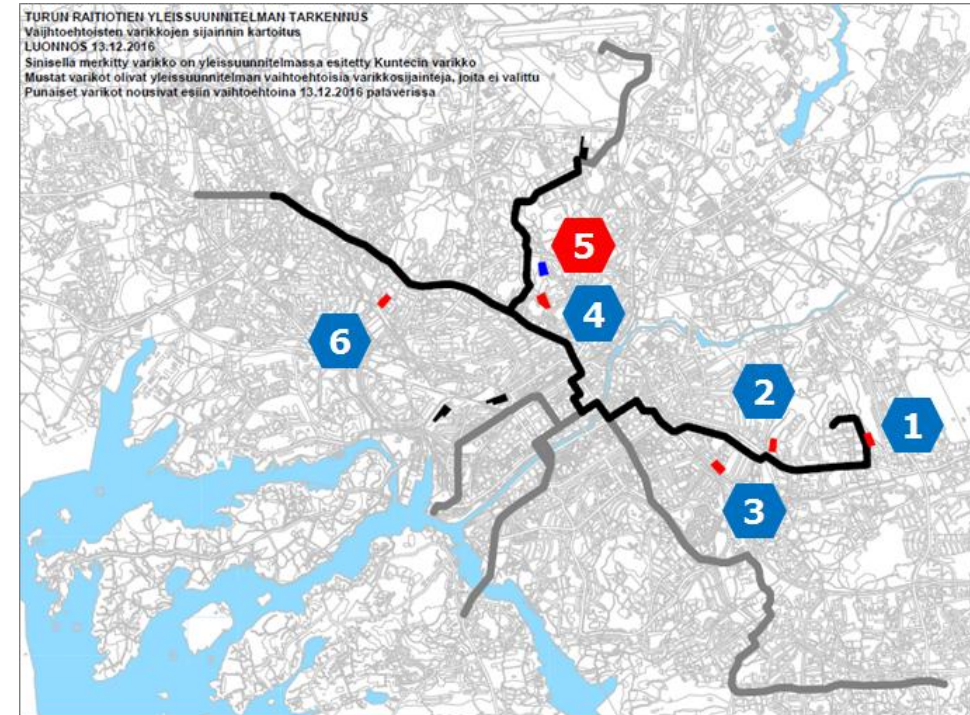


Overall Evaluation: +0.4
between -2 ("--") and +2 ("++")

Short line to Matkakeskus: -0.8

ALTERNATIVE 5: KUNTECIN VARIKKO

Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	++	This area is currently used as a public transport depot and therefore should be easy to convert into a new tram / superbuss depot.
Distance to closest network alternative	+	Located a small distance from the closest network route
Location within the network (operationally)	+	Operationally very good location - if the lines reach as far as this point.
	--	Not suitable for short line scenario to Matkakeskus
Cost	-	Should be straightforward to construct, however existing use will need to be re-located

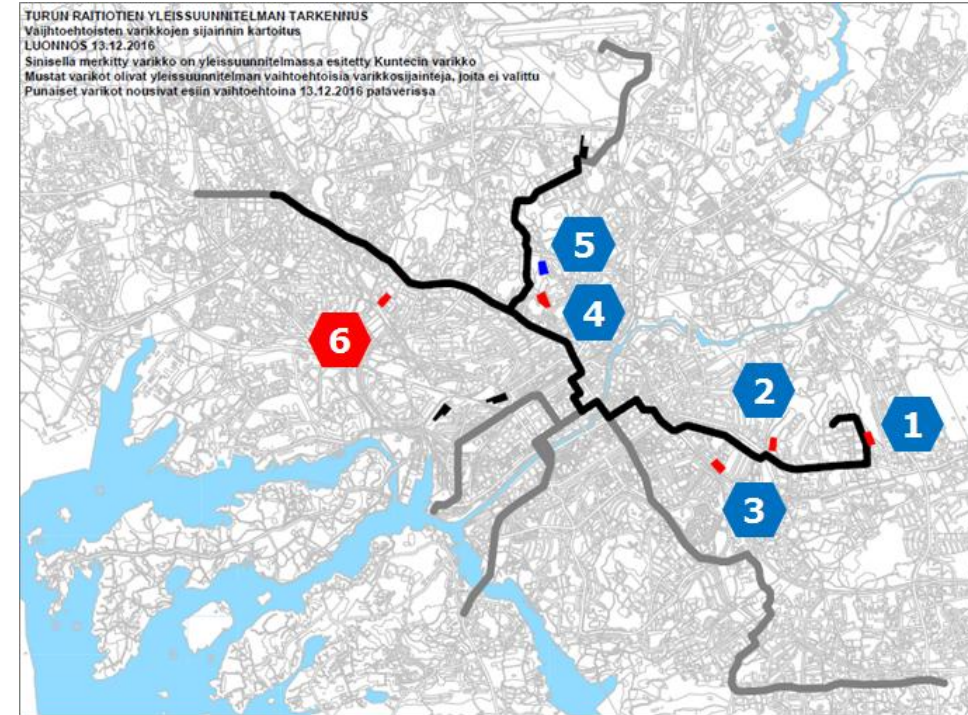


Overall Evaluation: +0.6
between -2 ("--") and +2 ("++")

Short line to Matkakeskus: -0.6

ALTERNATIVE 6: PLÄKKI KAUPUNKI

Criteria (Quantities)	Evaluation	Reasoning
Situation within the urban environment	+	This is an industrial area, however there are also some residential buildings in close proximity.
Distance to closest network alternative	0	Distance from closest line appears to be slightly longer than from other alternatives
Location within the network (operationally)	-	Located towards the end of one of the branch lines resulting in empty running as network grows
	--	Not suitable for short line scenarios to Matkakeskus and Länsikeskus and single line scenario to Runosmäki
Cost	-	Should be straightforward to construct, however existing use will need to be re-located



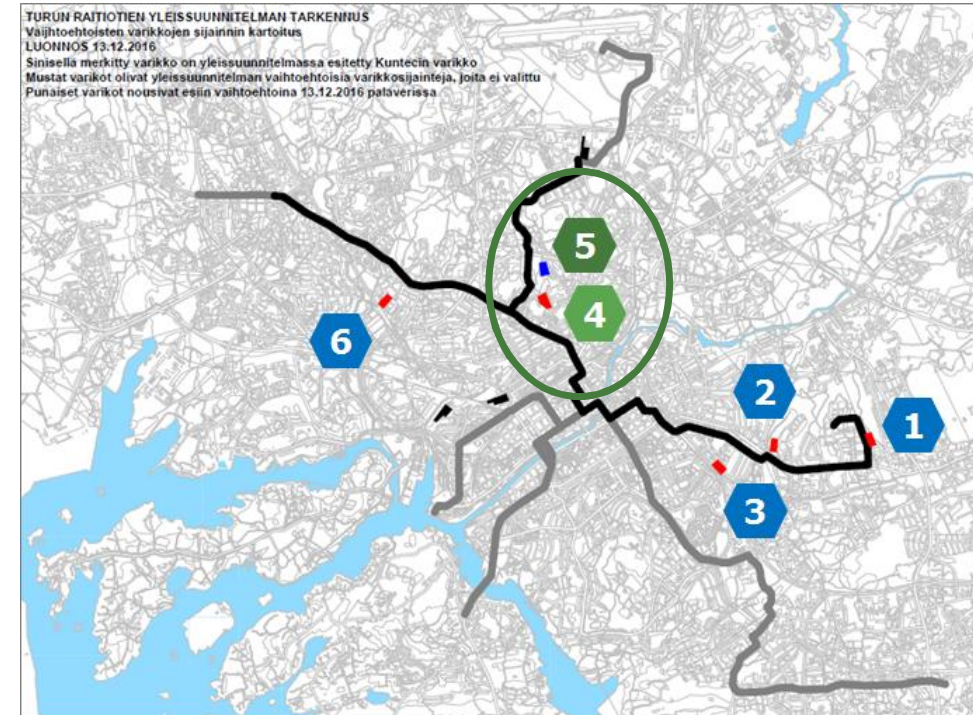
Overall Evaluation: -0.2
between -2 ("--") and +2 ("++")

Scenarios with terminus in Matkakeskus,
Länsikeskus or Runosmäki: -0.8

RECOMMENDATION IF ALL BRANCHES WILL BE BUILT

- Evaluation result with the assumption of the realisation of all lines to Varissuo, Runosmäki and Raisio

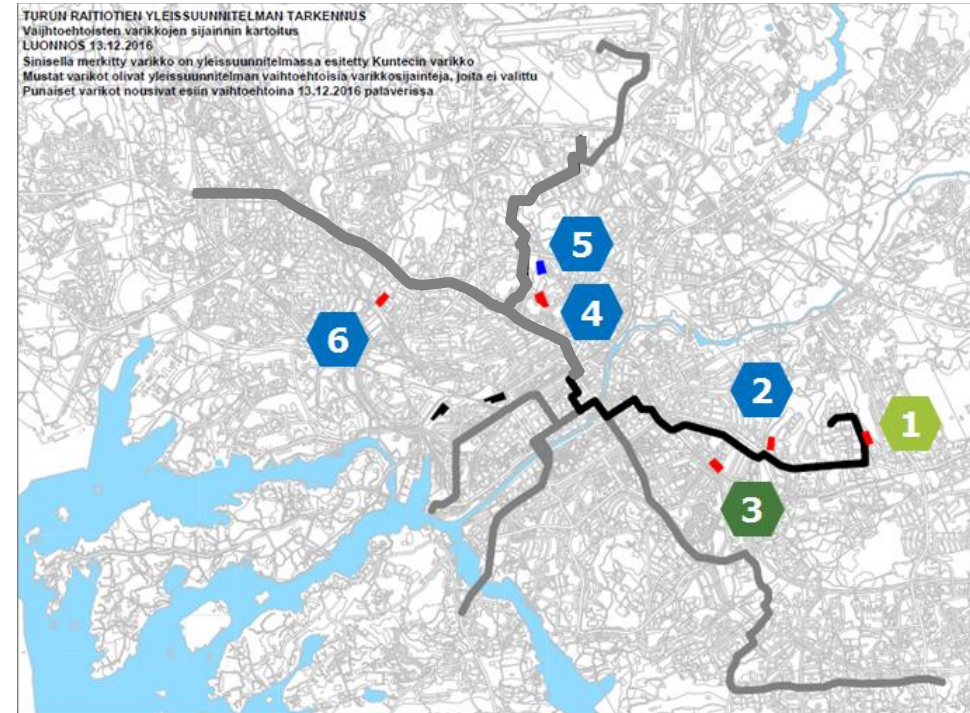
Deport location	Evaluation
1. Varissuo	-0,4
2. Pääskyvuori	-0,6
3. Itäharju	0,2
4. Vätin Vinttikoirarata	0,4
5. Kuntecin Varikko	0,6
6. Pläkkikaupunki	-0,2



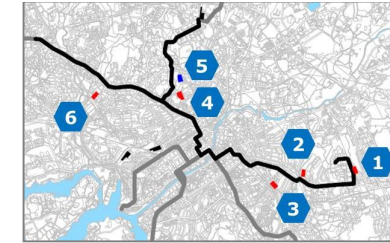
- ➔ Kuntecin Varikko (No. 5) is the location with the best evaluation
- ➔ Vätin Vinttikoirarata (No. 4) is the second best candidate

SPECIAL CONSIDERATION TERMINUS AT MATKAKESKUS

- If only one line ending in the City Centre would be realised, the evaluation result would be different:
 - ➔ Itäharju (No. 3) is the location with the best evaluation
 - ➔ Varissuo (No. 1) is the second best candidate
- A short line to Matkakeskus would fix a non-optimal depot location in regard to later extensions



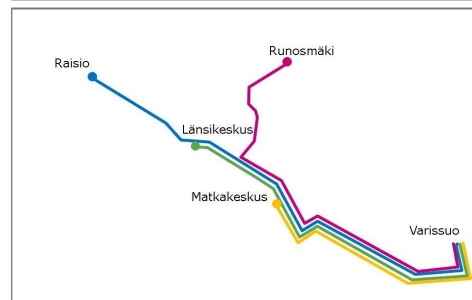
DETAILED COMPARISON OF LOCATIONS DEPENDING ON THE REALISED NETWORK



- Based on the quantitative evaluation a ranking of the suitability of the locations has been made
 - Kuntecin Varikko is the best evaluated location for the two scenarios with terminus at Runosmäki
 - Vätin Vinttikoirarata is a good choice for Länsikeskus and Raisio scenario
 - For the Länsikeskus scenario both depot locations Vätin Vinttikoirarata and Kuntecin Varikko have the same rating → This assumes that Kuntecin Varikko can be easier obtained than Vätin Vinttikoirarata
 - Only for the Matkakeskus alternative Itäharju would be the best solution

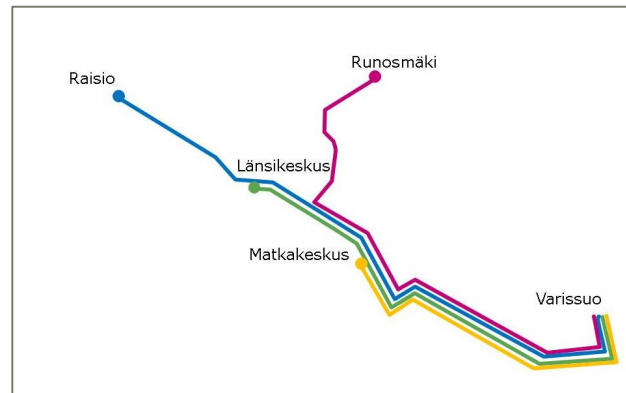
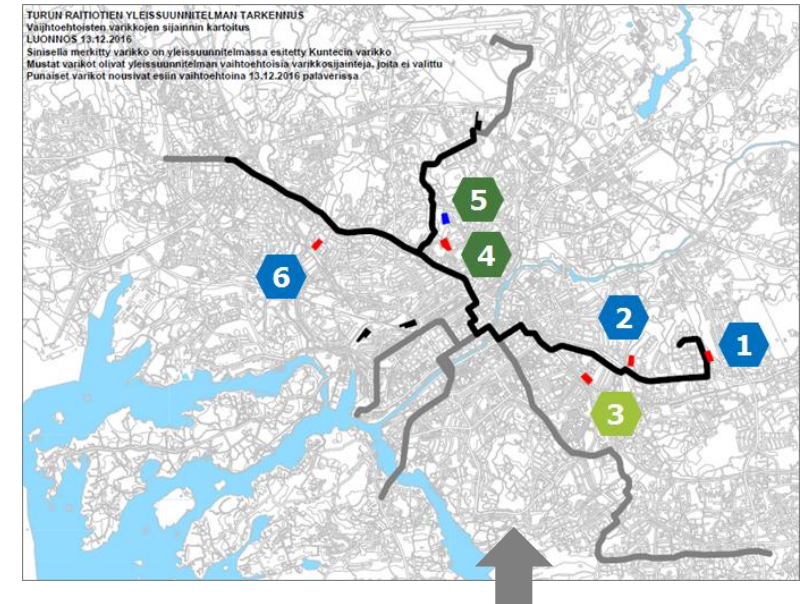
	1. Varissuo	2. Pääskylvuori	3. Itäharju	4. Vätin Vintti- koirarata	5. Kuntecin Varikko	6. Pläkki- kaupunki
Complete	-0,4	-0,6	0,2	0,4	0,6	-0,2
Runosmäki	-0,4	-0,6	0,2	0,4	0,6	-0,8
Länsikeskus	-0,4	-0,6	0,2	0,4	0,4	-0,8
Raisio	-0,4	-0,6	0,2	0,4	0,2	-0,2
Matkakeskus	-0,4	-0,6	0,2	-0,8	-0,6	-0,8

	1. Varissuo	2. Pääskylvuori	3. Itäharju	4. Vätin Vintti- koirarata	5. Kuntecin Varikko	6. Pläkki- kaupunki
Ranking unweighted						
Complete	5	6	3	2	1	4
Runosmäki	4	5	3	2	1	6
Länsikeskus	4	5	3	1	1	6
Raisio	5	6	2	1	2	4
Matkakeskus	2	3	1	5	3	5



SUMMARY AND RECOMMENDATION

- The recommended depot location is depending on the realisation of the network at its first stage.
- Kuntecin Varikko would be the recommended location for most of the scenarios
 → This assumes that the site can be easier obtained than Vätin Vinttikoirarata
- Vätin Vinttikoirarata is recommended for terminus at Länsikeskus or Raisio.
- Itäharju is recommended for terminus at Matkakeskus
 → A short line to Matkakeskus would fix a non-optimal depot location



Network Scenario	Depot Location
Raisio & Runosmäki	Kuntecin Varikko
Runosmäki	Kuntecin Varikko
Länsikeskus	Kuntecin Varikko or Vätin Vinttikoirarata
Raisio	Vätin Vinttikoirarata
Matkakeskus	Itäharju

THANK YOU