

**STEPS SUBMISSION ON WATERCARE CENTRAL INTERCEPTOR RESOURCE  
CONSENT APPLICATION**

**3 December 2012**

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**INTRODUCTION AND PRINCIPLES**

STEPS has for many years been working toward and advocating for a clean Meola creek and upgrade of Auckland sewerage network (see Appendix 2). STEPS sees the need to protect the aquifer, streams, lakes and wetlands on the one hand, and on the other, the need to seek and agree options which will benefit the people of Auckland, as well as the existing and future environment.

STEPS is pleased to see this Resource Consent Application as a prelude to an infrastructure project to strengthen an inadequate and outdated sewerage system. In addressing these issues we ask Watercare as a major publicly owned function to actively demonstrate recognition of environmental values and 21<sup>st</sup> century Best Practice environmental construction standards in this project with a life cycle of decades or centuries. Where damage is done to the many natural areas impacted, then mitigation must be proposed and worked through with the affected communities. Following are the fundamental values we expect to be demonstrated.

- 1) **Protection and no contamination of the aquifers/ ground water** during or after this project is seen to be one of the highest principles. There should be no reduction in base flows of any of the creeks due to Watercare's construction and ongoing operational activities resulting from this project.
- 2) **Identify, map and protect the natural stream functions for all streams end to end** and understand the natural stream linkages and environmental effects end to end and between sites– eg the six linked Meola sites and the Harbour.
- 3) **Facilitate public access and future streamside walkways** on all our creeks during design of sites (eg plan and build sufficient space and don't block them with fences and buildings).

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- 4) **Watercare Services and Auckland Council to take responsibility for opening historic piped creeks** wherever they intersect with this project. These were mostly installed by local bodies with limited community consultation and restoration or daylighting is overdue – eg upper Meola Creek at Haverstock Rd piped in 1990s by Auckland City.
- 5) **No increase in runoff from impervious surfaces as a result of this project.** STEPS expects Low impact design (LID) principles to be used in accordance with Best Practice 21<sup>st</sup> century environmental design eg permeable roads, green roofs, rain gardens etc to ensure no additional stormwater runoff is produced.
- 6) **Forest remnants need to receive priority over open space grass when selecting site locations.** Intact fragments of bird and skink habitat can perhaps never be replaced – especially not after 5-7 year construction period. Mature trees of 50 years cannot be replaced.
- 7) **Project and Central Interceptor (CI) operation to be carbon neutral.**  
STEPS requests design measures to ensure neutral carbon footprint (eg from tree removal, materials and fuel during construction, buildings and tunnel) during construction, throughout the interceptor's century long operational life and when / if demolished.  
  
Reportedly Watercare Services is one of the biggest power users in Auckland, and both energy consumption and carbon emissions will become more and more critical in the future. For economic reasons alone Watercare must ensure neutral carbon footprint both during the project and through the interceptor's life cycle.  
Examples of Carbon offset plans are wetlands and native plantings: please show the plans for these mitigations.
- 8) **Watercare to plan and stage this project to bring early benefits** to the people of Auckland and the environment. Plan so that each stage can be completed and the benefits realised. Work in consultation with local community groups to achieve environmental benefits.

STEPS requests that conditions be included in the resource consent to require Watercare to act in accordance with these principles and the recommendations and mitigations listed in this submission.

## KEY ISSUES, RISKS AND RECOMMENDATIONS

Note: Please refer to detailed corrections and omissions in the Consent application in Appendix 1 to identify the sources and supporting detail for these comments.

1. **Watercourses – Base flow reduction potential** due to additional impermeable surface from this project, reduced natural seepage; also impact of dewatering throughout the life of the system.

### STEPS Recommendations:

- Watercare to state for each site the amount of additional impermeable road surface they are adding and also the other impermeable surfaces – roofs etc, then plan for on-site management of all stormwater to recharge the aquifers. Calculate and document the total amount of new impervious surface area by site, and plan suitable mitigations using LID principles.

2. **Aquifer/ groundwater – possible contamination and also depletion** from same reasons as above. A key point is that large stormwater systems speed the path of stormwater to the harbour. A clear benefit is that this avoids flooding but at the same time it depletes the aquifer. By contrast, natural stream functions slow stream flows by meanders and ponding which allows for seepage and filtration into the underlying aquifer. Water retention and filtration is thus key to the health of the aquifer, ground water, springs and stream base flows.

### STEPS Recommendation:

- Watercare to design in wetlands to recharge the aquifer and slow the flow of water

3. **Natural stream functions and ecological processes** are often poor in these urban Auckland creeks. This project provides identified opportunities for restoration and '**daylighting**' (removal of historic piping installed by Auckland Council's predecessor local authorities) in mitigation of this project's destruction of riparian vegetation and other ecological impacts on public streams owned by Auckland Council. The AEE currently gives no view stream by stream of either the existing state or planned future impacts/ mitigation so it lacks the plans of how the project will 'greatly assist in the restoration of the mauri of this waterway and associated coastal waters' (Part A p xvi).

### STEPS recommendation:

- Auckland Council work with Watercare Services to remove this historic piping at all affected project sites.

4. **Native vegetation and ecological processes**

STEPS requests clear commitment from Watercare Services and Auckland Council to:

- protect and prevent loss of rare and endangered plants such as *fissidens berteroi*
- protect Auckland's unique lava rock forest remnants eg at Norgrove;
- protect original landscape elements, mature native canopy trees and plant diversity eg ferns, grasses at Lyon Ave (Roy Clements Treeway)

### STEPS Recommendations:

- Restore original **wetland character** of the landscape wherever possible eg Haverstock Rd.
- Restore **original rock forest** and retain the volcanic boulders and rocks at all Meola sites eg Lyon Ave.

- **Find alternative to removal of mature 30+ year old native trees in central 10% of Roy Clements Treeway at Lyon Ave site.** We note that by 2030 when construction is completed these trees would be 50 years old and have matured. There is no way of replacing 50 years of growth of hundreds of trees, so grass covered open space route has far lower impact.
5. **Vegetation – exotic weeds.** Noted in vegetation reports and a major urban creek problem. This project provides opportunities either for these to be removed in part mitigation of construction impacts; or increased as a result of disturbance and removal of natural cover if not managed.
- STEPS Recommendations:
- Watercare Services mitigate impacts by undertaking willow and privet removal and funding quality bark mulched native plantings of local wetland or rock forest species when remediating streamside sites.
  - Watercare Services provide funding to local groups such as STEPS to remove existing weeds from bush sites like Norgrove, Motions Rd and Lyon Ave; and to prevent new weeds taking hold in streamside areas like Rawalpindi and Haverstock where there are naturalization opportunities.
6. **Public access to creeks** has been reduced through years of local authority piping of streams (currently estimated at 9 km / year by Auckland Council Stormwater team) and fencing off by owners etc.
- STEPS Recommendation:
- Project provides opportunities to recover some of these losses to the public. Watercare is requested to **consider public access during design** (eg the shape of any earthworks affecting banks, and not placing built structures in historic water courses). STEPS requests that future **pathways by creeks** are facilitated by leaving space or an “esplanade strip” on the bank beside the stream.
7. Loss of natural character of **existing lava rock forest areas** eg Norgrove and Lyon Ave. It is unclear in all site maps whether the damage and destruction of vegetation will be limited to designated road/ construction areas or whether the entire (usually rectangular) site will be clear felled.
- STEPS Recommendation:
- State exact damage for all sites, especially Meola Creek bush sites – ie Norgrove, Lyon Ave
  - Provide future photos in 2030 of all sites (as done for Western Springs and MAWMR)
  - Calculate impact of mature tree felling on carbon footprint of this project over the next century and adapt or mitigate.
8. Future plan to **centralize ALL overflows in 2030 to Meola Creek and Western Springs.** According to the map on Part A Executive Summary p xvii, overflows will be eliminated in 2030 from every other waterway and site.
- STEPS asks:
- Why is it possible to virtually eliminate overflows elsewhere, but not four Meola sites?
  - What mitigations are planned for the Meola Creek communities to continue bearing the costs of Auckland’s combined sewer overflows for another century?
- No wetlands, plantings nor daylighting plans are mentioned.

- Why is it not clear that there are in fact six construction sites on Meola Creek, and why is there no overall assessment of effects on Meola Creek? Why is Meola creek length and wildlife understated
- Why is there no mention of threatened aquatic plant species in Western Springs? (See omissions and corrections below).
- What evidence is provided that reduction and centralisation of all overflows to Meola provides optimal benefits to Auckland?

Further information is needed to validate the statements on p xvi about the notable benefits to Meola.

#### STEPS Recommendations:

- Provide more rigorous cost benefit analysis to include environmental, social and health benefits of alternative technical solutions and staging options
- Watercare and Auckland Council Stormwater team to assess and **plan to improve Meola Creek end to end**. To mitigate for centuries of local authority utilisation as a drain, with flooding, associated stream bank damage and siltation, other damage and neglect, we believe the naturalisation and enhancement of the Meola Creek at all six project sites ( Lyon Ave and Haverstock Rd, Mt Albert War Memorial Reserve (MAWMR), Norgrove, Rawalpindi, and Motions Rd) is well overdue. Mitigations to be agreed with STEPS and to include:
  - 1) **Protect all large native trees** (say over 3 m high) and diverse native vegetation impacted by the construction works or the location of the access point, especially at Lyon Ave and Norgrove lava rock forest.
  - 2) State explicit measures to protect measures specified to **protect very rare and threatened aquatic moss ( *Fissidens berteroi* )** found at several locations along Motions creek and in Western Springs (see published references)
  - 3) Carry out detailed site survey at Norgrove Ave to confirm that one of only two last **Meola rock forest remnants** is protected and enhanced appropriately. (see published references)
  - 4) Replace grasses and rock forest vegetation species damaged in the Roy Clements Treeway, in conjunction with STEPS
  - 5) **Daylight the upper Meola Creek** between 96 Haverstock Rd and Kerr Taylor Park
  - 6) **Removal or reduction of concrete walls and stream floors**
  - 7) Plant appropriate native plants on the stream banks along the daylighted creek and **plan space for future walkway** during earthworks.
  - 8) Remove fill and gravel at Lyon Ave– ie restore the areas back to the natural lava rock and volcanic soil.
  - 9) STEPS does not support security fencing or shafts projecting above ground and requests clear statements of proposed access limitations and future visual impact photos wherever fences or large scale tree removal are planned.
  - 10) Please provide **future 2030 pictures of sites at Lyon Ave, Haverstock, Motions, Rawalpindi and Norgrove**. What high security fences? What projecting concrete buildings will be in these natural areas?

#### **9. Lyon Ave and Roy Clements Treeway**

STEPS deplores the potential **loss of the central 10% of the Roy Clements Treeway** vegetation including dozens of native canopy trees planted by local MAGS school and community volunteers 30-40 years ago. There are at least 6 mature totara and 2 mature nikau as well as libocedrus, karaka, kahikatea and hundreds of other mature and maturing trees within the site currently proposed. Loss of 50 years of growth can never be replaced

even over 100 year lifetime of this project. More than minor effects at this highly valued and highly used site are not acceptable.

We support the **recommendations regarding lizards** in this and other sites.

STEPS Recommendations:

- STEPS urges that Watercare Services reconsiders the **flat open grassed site** available on the west side of the creek.
- As a backup option **the rectangle of land covered in asphalt at the back of the old Philips factory and also owned by MAGS** should be taken before the wide destruction of Roy Clements treeway plantings is even considered.
- STEPS also seeks confirmation of the intention to **maintain public access** through the boardwalk from Fergusson Ave to Alberton Ave throughout the 2-5 years construction period and ongoing.

10. **Haverstock Rd**

STEPS applauds the apparent **public footpath access** between Camden and Haverstock Rds. If true then we thank Watercare Services and Plant and Food.

Destroying mature cabbage trees in the heart of Cabbage Tree swamp is disappointing, even if they were planted in recent decades. Bird species are missing from the list.

STEPS commends the mention of **stream naturalization opportunities** in 12.6.3 since it enables restoration of the upper Meola headwaters and associated ecology, but notes the project does not include them.

STEPS is concerned about disturbing possible contaminants and their introduction into stream hydrology.

STEPS does not want to see any more high security fences nor 3.5 m high control chambers at this site. 1150 sq m of impervious surface is not acceptable without LID.

STEPS also questions why the tunnel between Haverstock and Lyon Ave goes under so many private houses rather than through public land and open space (Kerr Taylor Reserve, MAGS playing fields).

STEPS Recommendations:

- Provide rationale for **tunneling under houses** rather than public open space
- STEPS' proposed **mitigation for cabbage tree destruction** is for Watercare provide funding for Plant and Food to work with STEPS to naturalise and enhance the remaining cabbage tree stands.
- STEPS requests **Watercare Services and Auckland Council to daylight the upper Meola Creek portion** along with naturalization, riparian planting, and space for future creekside walkway, in partial mitigation for the proposed centralization of future Auckland isthmus overflows to Meola Creek. STEPS would like to be involved in this and could also be involved in pollution monitoring etc
- **Request confirmation of the planned pedestrian access** between Haverstock and Camden Roads.
- Note the need for **“tag resistant” surfaces**, as tagging is a problem eg at Norgrove and Lyon Ave sites

- Confirm design will **preserve banks/ channel and leave space for walkway** on bank.

#### **11. Western Springs and Mt Albert War Memorial Reserve (MAWMR)**

STEPS commends the future photos of large mature trees are shown at both sites in Part B.

##### **STEPS Recommendation:**

Please confirm that Watercare Services is committed to fund the planting and management to maturity of native trees in these sites and in forest sites eg at Norgrove and Lyon Ave.

#### **12. Project Approach.**

There is very **limited assessment of alternative approaches** (Part A 7 pp 66-73).

As a local community group STEPS cannot assess the technical alternatives available.

However there appears to be no discussion of staging options – ie how can the Central Interceptor or an alternative approach be used to resolve the overflows in stages so that the project is funded and completed in steps. Each step or stage would be completed and bring benefits to the people of Auckland much earlier than waiting for one megatunnel to be completed.

##### **STEPS Recommendation:**

- Provide a **range of cost benefit and cash flow options** showing which technical approach is most suited to bringing early benefits while solving the combined sewer and overflow problems.
- **Share evidence of other large cities** which have a) taken the “Central Interceptor” approach and succeeded, and b) taken a staged approach and succeeded, and show benefits and duration.

## PUBLISHED REFERENCES

Auckland Botanical Society	Two rock-forest remnants at Meola Creek, Auckland City	62	2007	Rhys Gardner
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[http://bts.nzpcn.org.nz/bts\\_pdf/ABJ62%281%292007-75-76-MeolaCk.pdf](http://bts.nzpcn.org.nz/bts_pdf/ABJ62%281%292007-75-76-MeolaCk.pdf)

Auckland Botanical Society	Auckland regional threatened plant list	52	1997	Peter J. de Lange
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[http://bts.nzpcn.org.nz/bts\\_pdf/Auck\\_1997\\_52\\_1\\_1-4.pdf](http://bts.nzpcn.org.nz/bts_pdf/Auck_1997_52_1_1-4.pdf)

Auckland City Drainage System Resource Consents Assessment of Environmental Effects (2001) [ACDSRC AEE]

Meola Creek Watercourse Management Plan 2011 – Morhum Environmental and Auckland Council

<http://www.morphum.com/index.asp?pageID=2145886804>

Motions Creek Watercourse Management Plan 2011 – Morhum Environmental and Auckland Council

<http://www.morphum.com/index.asp?pageID=2145886975>

Auckland's Remarkable Urban Forest Mike D Wilcox, 2012



## Appendix 1 CENTRAL INTERCEPTOR RESOURCE CONSENT APPLICATIONS AND ASSESSMENT OF EFFECTS ON THE ENVIRONMENT – CORRECTIONS AND OMISSIONS

Additional information and corrections to the application are requested as follows

Item and impact	AEE Reference	Change requested	Note
Lack of maps/ tables which show frequency of CURRENT overflows.	Part A Exec Summary p xvii	Add map showing current overflow frequency by location to compare with projected 2030 maps and state 2030 assumptions.	
Lack of maps/ tables which show VOLUME of current or estimated future overflows before or after project completion. Without this there is nothing to back up the statement in A 12.14 p126 that future post-project volumes are ‘not significant’ and unlikely to generate significant stormwater.	-	Add table for each site/ creek and overall, with maps showing estimated current and future overflows, with and without the proposed interceptor	
Missing table of permanent new impervious surface areas built by Watercare Services IC project project will exceed the permitted area thresholds at many sites.  Impact: will add to runoff in creeks and watercourses; reduce natural seepage to aquifer; and likely to reduce base flows. No mitigations provided.	Various eg Part A 12.14 p126  A 13 p 129 And noted in Part B.	For each site calculate impermeable foot print area of a) roads and b) other such as buildings. Provide a table which summarises the total impervious area proposed by site and overall; along with estimated stormwater volumes. Also include mitigations and proposals to neutralise eg by low impact designs (LID) such as rain water gardens, roof gardens, wetlands and porous roading surfaces.	
Lyon Ave stormwater volume missing in Table 12.2	A 12.14 p126	Add to list	
Lack of detail on tree protection/ removal and also on carbon emissions and mitigations throughout.	Part A 13 p129	Need to add a table of estimated number of natives and exotic trees > 5 m high in each site to be removed. Then sum them all up and calculate carbon emissions and plan mitigations.	
No detail on future permanent fencing, visual impacts and planned plantings in mitigation at all sites.		State explicitly where any security fencing is to be put in place permanently. Provide indicative planting information, and provide future visual impact photos for all sites (as done eg for Western Springs and MAWMR).	
Meola Creek length incorrect – minimizing size	Part A p 88 9.3.3	ACDSRC AEE P121 stated the stream is 5 km long above the estuary, though only the lower 3km and the top 1 km were open in 2001.	
Missing end to end assessment of environmental impacts from	Part A 12.0 p115	Complete assessment of environmental impacts on Meola and Motions creeks,	References: Council Meola

Meola at Haverstock through to Te Tokaroa/ Meola Reef; also for Motions from Western Springs to Te Tokaroa. Lack of impacts of future 2030 overflows on Waitemata Harbour.		Western Springs and Harbour – ie receiving environments (not just sites). Consider 2030 overflows, additional runoff from impervious surfaces, impacts on wildlife and threatened aquatic vegetation.	and Motions Water course plans and ACDSRC AEE 2001
Common Meola Creek wildlife species missing  [Photos available of herons, pukeko and eels; also personal accounts of eels in STEPS wetland in 2012].	Part A p 88 9.3.3  Part B 3.5.5 p63	Add herons, also pukekos and swallows, mallard ducks and paradise ducks to list in both Lyon Ave and Haverstock Rd sites, along with proposed mitigations.  Add eels and mitigation measures at Norgrove, Motions and Lyon Ave sites	
Rare Western Springs vegetation not identified, possible damage / elimination of species identified as a threatened aquatic plant species	Part A 12.4 p117 13.1.4 P 130; 9.3.3 p88 Part B 1A p 29	Include very rare and threatened aquatic moss ( <i>Fissidens berteroi</i> ) found at several locations along Motions creek, including in Western Springs and state explicit measures to protect	Auckland Botanical Society Article by P.J. de Lange & E.K. Cameron
Unique Meola lava rock forest remnant not identified nor included in mitigation plans. Norgrove identified as one of only two remaining Meola lava rock forest remnants	Part B 14.5.2	Meola Rock Forest - Norgrove Avenue (see references). Need to ensure that rock forest is enhanced as mitigation and not unintentionally damaged	Auckland Botanical Society Article by Rhys Gardner
Motions Rd site stated as on Motions Creek when in fact it is on Meola Creek	Part B 11.2 and 11.5.3	Correct this and map relationship of ALL sites to creeks to understand and manage the inter-connections/ impacts eg on wildlife and plants	
Norgrove– stated to be on a tributary of Meola Creek	Part B 14.2	State Norgrove is on Meola Creek and consider impacts/ connections for wildlife	
STEPS consultations incomplete. No discussions have been held regarding alternative site locations at either Haverstock nor Lyon Ave to focus on future of Meola Creek with naturalization opportunities.	Part A pp75-86  Table 7-2 p 71  Landscape assessment figures p 97 Part A 8.10.3.1 p83	Hold discussions with STEPS, considering green space options for Lyon Ave site. Include Albert Eden Local Board and consider creek naturalization options similar to those in Landscape report for Oakley Creek/ Puketepapa Board.  Please note STEPS interest in Haverstock and other Meola Creek sites.	Watercare has presented at STEPS AGMs as stated.
Unclear why route under houses taken between Haverstock and Lyon Ave rather than going through grass covered green space.	Part A 8.12 p 84  7.3.1 p69	Hold discussions with STEPS, considering green space options for Lyon Ave site. Add outcome to table 8-3	
Have landowners on the tunnel corridor been notified directly?	Part A 8.9.2 p81	Confirm direct advice since none of the local landowners seemed aware.	

Missing impact on base flows of all creeks– response to Iwi needs supplementing	Part A 4.5 p 80	Assess and document the identified project risks in relation to Meola Creek especially reduction of base flow, natural amenity and ecological functions. Add to report along with mitigations/ low impact design measures, to enhance base flows not add to stormwater runoff.	Note that here the term ‘project risks’ is a standard Project Management term as defined by PMBOK <a href="http://www.pmi.org/PMBOK-Guide-and-Standards.aspx">http://www.pmi.org/PMBOK-Guide-and-Standards.aspx</a>
Land ownership incorrect/ missing	Part B 3.5.4 p63	MAGS and NOT Auckland Council own the proposed site at Lyon Ave	
Lyon Ave, Roy Clements Treeway; Species list omits griselinia and kahikatea. Lack of community/ LB and STEPS involvement.	Part B 3.5.4 p 63	Clarify exactly which trees would be destroyed, which retained and mitigations for ecological, visual and carbon impacts. Need to state replanting in conjunction with Albert Eden LB and STEPS.	
Lyon Ave, Roy Clements Treeway – future visual impacts unclear including exact loss of trees	Part B 3.5.4 p63	Protect mature trees; provide future visual impact photos at end of construction as done for Western Springs. Mitigate existing ugly concrete Watercare services spillway.	
Land ownership incorrect/ missing	Part B 4.3 p 69	Department of Conservation (DOC) own the Haverstock creekbed / overland flow path though managed by Auckland Council	
Unclear whether Haverstock visual impact will be neutral (4.5.1.2) since it also mentions control chamber 3.5 m above ground (4.4.1)	Part B 4.4.1, 4.5.2	Make consistent and provide future visual impact photos as done for Western Springs.	
Unclear whether Haverstock creek channel/ creek bed is built over.	Part B 4.3 p72	Confirm design will preserve banks/ channel and leave space for walkway on bank.	
Motions Rd is adjacent to Meola creek and requires sediment control	Part A 12.13 p 125	Add to list	

## Appendix 2 STEPS AND MEOLA CREEK BACKGROUND

### 1. STEPS

- 1.1 Our Society (STEPS) was established and incorporated in 2005. The major focus of STEPS is the Meola Creek, its surrounding wetlands and lakes and the underlying aquifer.

Goals:

- To enhance and improve the Kerr-Taylor Reserve as an open space for use by the people of the St Lukes-Mt Albert area, through working with the Community Board, the Auckland City Council, schools and other groups.
- To see the quality of the water in Meola Creek improved, and the public health, environmental and cultural values increased, through working to ensure that the Auckland Council and Watercare Services improve the water quality and upgrade inadequate drainage and sewerage systems.
- To maintain or expand the extent of the existing open spaces and walkways in the St Lukes area, through working with all groups who have an interest in the area.

In addition STEPS vision is for a clean, rehabilitated Meola Creek. We have advocated for Auckland Council and Watercare Services to “Daylight” the upper section of Meola Creek by Haverstock Rd, and we envisage in the future a “Mountain to Harbour walkway” which will highlight some of the key geological and hydrological features of Auckland’s cones, creeks and springs between Owairaka Mt Albert, linking to Chamberlain Park and Pt Chev along to the point where the creek enters Auckland Harbour at the protected Te Tokaroa Meola Reef.

- 1.2 In the past 7 years, STEPS has established several key partnerships and advocated on behalf of the Meola Creek and its community. STEPS is very active in the community and we have successfully planted the streamside along the upper Meola catchment in the area known as “Roy Clements Treeway” between Haverstock Rd Sandringham and Alberton Ave Mt Albert. Since 2005 planting has been done by STEPS members and local individuals from our community in conjunction with the Auckland Council, Albert Eden Local Board, Auckland City Council, Metrowater, various community groups including Rasheed Memorial Trust, Buchanan Rehabilitation, Bhaska, and Wai Care. STEPS has also replanted a wetland beside the Roy Clements Treeway.

### 2. Three Kings-Meola-Western Springs Aquifer and Creeks.

- 2.1 Meola creek is surrounded by lava flows, sits above the aquifer and its floor largely is impermeable. It is fed by springs and seepages from the surrounding aquifer so the middle to lower reaches have high water clarity. The natural landscape surrounding Meola Creek was lava flow and rock strewn wetlands with cabbage trees/ ti kouka and flax/ harakeke. Upper Meola and the area between Owairaka and Maungawhau was known as Cabbage Tree swamp.
- 2.2 Meola Creek and Motions Creek are inter-related stream systems, connected via Western Springs lake (where the aquifer surfaces). Motions Creek emerges on the East of Meola Reef. Baseflow in the lower reaches of Motions creek comes from the Western Springs Lake, and a very rare aquatic moss (*Fissidens berteroi*) is found at several locations along the creek, including in Western Springs. Both creeks provide a habitat for eels, pukeko, ducks, grey warbler, tui, heron and spur wing plover.
- 2.3 Auckland City Drainage System Resource Consents Assessment of Environmental Effects (2001) [ACDSRC AEE] stated that the catchment of Meola Creek is 1558 ha and roughly triangular with its apex at the Meola Creek estuary and the other two corners at Three Kings and Mt Eden... the catchment is 5% pasture, 1% forest, and the stream is 5 km long above the estuary, though only the lower 3km and the top 1 km were open in 2001. The intermediate 1 km is piped but overlain in parts by a stormflow channel. A wider catchment area ICS1 which included Meola was approximately:

45% residential; 11% open space; 53% impermeable. The same report stated that only 0.03% of land in Auckland remains as wetland.

- 2.4 As the largest catchment on the isthmus, Meola Creek pours the highest amount of combined storm water overflows and raw sewage of any creek on the isthmus into the Waitemata Harbour (Watercare advised STEPS of estimated overflows of 1,325,000m<sup>3</sup> (735 OSP)). The most degraded portion is the upper catchment where Watercare Services overflows occur at both Lyon Ave and nearby Haverstock Rd. This creek has very low base flows, especially in summer. After heavy rains the creek contains excrement, heavy metal and petro-chemical pollutants.
- 2.5 Every development including this proposal runs a high risk of burdening an already overburdened Meola stream system; for example by removing more water from base flows through adding impermeable surfaces; or by adding pollutants to either the creek (eg from stormwater runoff from impermeable surfaces) or to the aquifer (eg from seepage from toxic materials inadvertently exposed or moved during earthworks).
- 2.6 Over the last 10-20 years infill in the St Lukes, Mt Albert, Sandringham area has proceeded at a very high rate resulting in large new areas of impermeable surfaces and significantly higher volumes of stormwater running through combined sewers and into Meola Creek then flowing out to Waitemata Harbour along with road pollutants, rubbish and human waste. At the same time ground filtration reduced by a significant amount and the level of groundwater, the aquifer and base flow reduced.

No new trunk sewerage infrastructure has been put in place during this time. Neither Auckland City nor Auckland Council has limited the pace of development, infill and increases in impermeable surface area, so overflows are now a routine event and are increasing every year, along with the associated public health risks and environmental damage they cause to creeks and Waitemata Harbour. ACDSRC AEE (2001) stated on P37 Stormwater runoff ... increases significantly as the amount of impermeable surfaces increases with development. Urban development also reduces the availability of rain water soakage areas.... As urban development progresses the proportion of impermeable surface tends to increase and this generates increased volumes of runoff. In general terms every millimetre of rain falling on a square meter of impermeable surface gives rise to one litre of stormwater runoff...

### 3. **Roy Clements Treeway, STEPS Wetland Restoration project and the Aquifer.**

- 3.1 Roy Clements Treeway: This path by upper Meola Creek was planted by a range of volunteers over many years, starting in 1979. It contains many notable trees as featured in "Auckland's Remarkable Urban Forest". Roy Clements, then a teacher at MAGS constructed bridges and planted native trees beside Meola Creek together with MAGS pupils, PEP schemes, and local volunteers. Today there is a 2.3 Ha area covered in native canopy trees.  
(Note: The site labelled as "**Lyon Ave or AS2**" in the Watercare Services Central Interceptor Resource Consent Application is in the centre of this treeway and plantings).
- 3.2 Since 2005 STEPS and community volunteers have planted thousands more grasses, shrubs and ferns as an understorey and riparian planting areas. Dedicated volunteers have now removed the tradescantia, moth plant, woolly nightshade and kikuyu grass which continually threaten the plantings.
- 3.3 The wetland restoration depends on a spring from the Meola aquifer, and was facilitated by Metrowater's Roy Clements Treeway Boardwalk project (with support from Watercare Services). This project was an innovative solution which mitigated some immediate public health issues from the overflowing creek, and provides safe pedestrian access during periods of flooding for about 600 metres. The board walk is used every day by hundreds of school children and the local community, and provides a vital connection between Sandringham, St Lukes and Mt Albert.
- 3.4 STEPS is concerned at the potential for any contamination of the Western Springs-Meola-Three Kings aquifer and STEPS believes that protection of the aquifer is a key community objective. The Western Springs-Meola-Three Kings aquifer is extensive (approx 25 sq km) and we believe that this generation must actively protect, and not compromise the aquifer for our children and future generations. We

understand that the existing water is of high quality and that it has also been identified as a future source of potable water.

- 3.5 STEPS is also concerned at the existing and future threats to the very existence of Meola Creek and other urban creeks on the Auckland isthmus. It is widely understood at this time that clean water will become a more and more valuable world wide.

STEPS trusts that Auckland Council and CCOs particularly Watercare will include preservation and protection of water quality of creeks as a high objective in the Unitary plan and in project planning processes, particularly for large project investments with a life time of decades such as Central Interceptor.