

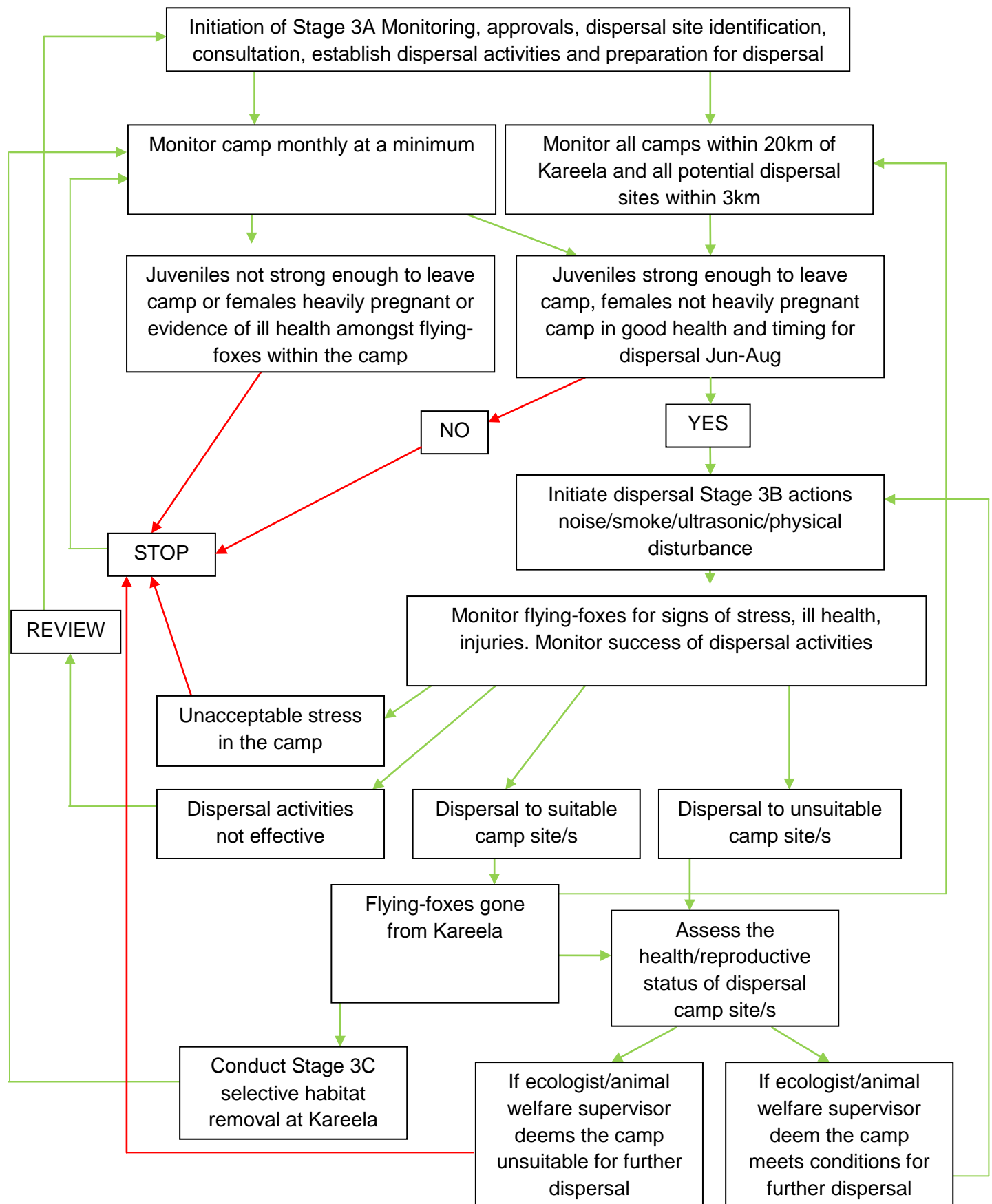
## 2.7. Potential flying-fox dispersal habitat within 600m of Kareela



Figure 5 Habitat within 600m of the Kareela camp is the area that Council need to monitor quite closely during dispersal activities. This is the most likely dispersal zone according to Roberts and Eby (2013). Figure 5 shows the areas at most risk of inappropriate roosting including Joseph Banks Native Gardens, Kareela Golf Course and the gully between Kendall Pl and Drysdale Pl in Kareela. None of these sites is an appropriate site for a GHFF camp due to the proximity of schools and residential properties. Ongoing dispersal from these sites is required should displaced flying-foxes attempt to occupy these and other inappropriate sites, this may take several attempts over more than one winter to achieve.

### 3. Dispersal Stage 3

#### 3.1. Dispersal Stage 3 Workflow



## 3.2. Dispersal Stage 3 Activities

The dispersal process has been divided into three stages to clearly identify activities. If any stage does not prove successful then the next stage will not be pursued. Stage 3A dispersal is the initial project establishment, approval application and pre dispersal monitoring phase, Stage 3B is the implementation phase and Stage 3C is activated assuming a successful dispersal has been achieved through Stage 3B.

### 3.2.1. Stage 3A Dispersal Establishment Actions

Stage 3A - Pre Trial Flying-fox Monitoring - 3 months	Responsibility	Timeframe
1. Preparation of State and Federal approvals – apply to OEH S91 and DotE EPBC licence to disperse a threatened species and selectively remove habitat to prevent their return	*ESPU	Feb to Apr
2. Allocation of sufficient funding to conduct dispersal	Councillors	Apr-Jun
3. Employment of a staff member to Council to supervise the dispersal activities for the first 12 months	ESPU	Apr-Jun
4. Field assessment of alternative habitat/camp sites - review all camps within 20km, all habitat within 3km and all 2 ha vegetation within 600m of the Kareela camp for potential roosting sites and appropriateness as dispersal sites	ESPU/ Ecologist	Apr-Jun
5. Ecologist to conduct pre trial dispersal monitoring at alternative habitat sites & Kareela – monitoring of population numbers, population health and breeding stage including presence of young	Ecologist	Apr-Jun
6. Community and stakeholder consultation – engage the community through workshops, email, social media and online regarding dispersal	ESPU	May-Jun
7. Purchase and installation of monitoring cameras - install monitoring cameras which will help to observe regular numbers, fly out paths, breeding cycle, response to dispersal activities and flying-fox presence/absence	ESPU/ Ecologist	May-Jun

\*ESPU = Council's Environmental Science and Policy Unit staff

### 3.2.2. Stage 3A Dispersal Establishment Barriers

Stage 3A dispersal will stop if the following barriers arise:

- approvals are not granted
- there is insufficient funding for Stage 3A and 3B
- stage 3A costs exceed budget by more than 20% or Stage 3B costs are predicted to exceed the costing provided in page 25.
- the ecologist and/or supervising Council staff deem the environmental and animal welfare conditions have not been met
- dependent young or heavily pregnant females are observed in the camp
- community consultation produces an insurmountable obstacle

Should any of these barriers arise works will cease and the Dispersal Workflow (page 19) is to be revisited or if the barrier is insurmountable dispersal will cease and could be declared unsuccessful or unable to be pursued by Council at this point in time.

### 3.2.3. Stage 3B Dispersal Implementation Actions

Dispersal will be trialed over a 30 day period and monitored strictly if all actions above are carried out successfully.

Stage 3B- Flying Fox Trial Dispersal Actions - 30 days	Responsibility	Timeframe
1. Clearing of paths through the vegetation to place equipment within camp – clearing of paths up to 1.5m wide for people to move and place disturbance equipment within the camp, works to be conducted after fly out	ESPU	Jun-Aug
2. Noise/Smoke/Light/Ultrasonic equipment purchase/hire – gain equipment and ensure that staff are familiar with its use and where and how it will be deployed.	ESPU/ contractors	May-Jun
3. Engagement of an animal welfare supervisor to be present during all dispersal activities – ensure they are impartial independent representatives of animal health and safety	ESPU	May-Jun
4. Engagement of an ecologist to supervise trial dispersal – ensure they have suitable experience and knowledge of GHFF	ESPU	May-Jun
5. Deployment of dispersal equipment – noise, smoke, light, ultrasonic and physical disturbances will be carried out at varied locations (in cleared pathways) within and around the camp area and at varied intervals disturbance will commence one hour prior to sunrise. Equipment will be placed in location prior to the start of dispersal activities. After sunset noise and physical disturbance will be the main methods deployed by staff walking through cleared paths and playing of industrial noise	ESPU/ contractors	Jun-Aug
6. Community and stakeholder consultation – engage the community through workshops, email, social media and online. Council will make available to the community on their website an online reporting for flying-fox sightings during the day over the 30 day dispersal period. A community engagement event will also be carried out at the end of the 30 day trial.	ESPU	May-Aug
7. Field visits to alternative habitat sites during dispersal to check on inappropriate roosting – daily checks of unsuitable habitat within 600m, twice weekly checks of sites within 3km and weekly checks of camps within 20km of the Kareela camp to determine occupancy and appropriateness for permanent occupation.	Ecologist/ Animal Welfare Supervisor	Jun-Aug
8. Contingency activities for disturbance at inappropriate occupation sites – if flying-foxes are found to inhabit sites declared inappropriate (as mapped above) then similar dispersal actions will be undertaken at these temporary roost sites at the next sunset and then the following sunrise as per Kareela in accordance with point 5 above (no vegetation will be removed). All portable disturbance equipment will be used or extra equipment hired if necessary to conduct dispersal actions at inappropriate sites. Sites will be documented and daily follow up of inappropriate sites that were found to be occupied will be undertaken. All works will be done in accordance with dispersal approval conditions or works will cease as per dispersal workflow page 19.	ESPU/ Ecologist/ Animal Welfare Supervisor	Jun-Aug
9. Assessment and reporting of results of Stage 3B. Review of the outcomes of Stage 3B by Ecologist and Council staff against success criteria on page 10 to determine if the Dispersal Workflow needs to be revisited, the dispersal is successful or the dispersal attempt has failed. Informal reporting to OEH will be conducted weekly with formal reports provided quarterly starting within one month of the end of the 30 day trial dispersal	ESPU/ Ecologist	Sep

\*ESPU = Council's Environmental Science and Policy Unit staff



### 3.2.4. Stage 3B Dispersal Implementation Barriers

Stage 3B dispersal will stop if the following barriers arise:

- stage 3B costs exceed budget by more than 20% when compared with costing provided in page 25.
- the ecologist and/or animal welfare staff and/or supervising Council staff deem the environmental and animal welfare conditions have not been met
- dependent young or heavily pregnant females are observed in the camp
- community consultation with directly affected property occupants produces an insurmountable obstacle

Should any of these barriers arise works will cease and the Dispersal Workflow (page 19) is to be revisited or if the barrier is insurmountable dispersal will cease and could be declared unsuccessful or unable to be pursued by Council at this point in time.

### 3.2.5. Stage 3C Dispersal Finalisation Actions

If the 30 day trial dispersal is successful and flying-foxes form a camp in an appropriate location and no flying-foxes return to Kareela then the following can commence:

Part 3C - Prevention of Flying Fox Return Actions - 3 years	Responsibility	Timeframe
1. Selective roosting habitat removal to minimise likelihood of flying-fox return – works to be conducted by appropriately qualified arborist on the previously most occupied roosting trees as assessed by Ecologist during Stage 3A monitoring.	ESPU/ contractors	Sep-Nov
2. Bush regeneration works required to restore the existing native vegetation at the site - weed removal, revegetation and ongoing maintenance works to be conducted by Council or Council contractors. The focus will be to remove weeds such as privet, with a focus on other non indigenous trees used as roosting habitat.	ESPU/ contractors	Oct - ongoing
3. Continued effective noise/smoke/ultrasonic dispersal actions daily for 3 years – to be carried out at Kareela and other sites deemed necessary to prevent camp re/establishment. Permanent means of disturbance should be employed during this stage of works to reduce labour requirements.	ESPU/ Ecologist	Ongoing for 3 years
4. Continued monitoring work at Kareela, dispersal site/s and inappropriate habitat locations for 3 years. This work is to be conducted by Ecologist and/or suitably qualified Council staff.	ESPU/ Ecologist	Ongoing for 3 years
5. Preparation of reports to State and Federal Government Quarterly for 3 years -. Reports should cover counts of the camps within 20km of Kareela, observations during dispersal, success of methods used and health of dispersed camp/s.	ESPU/ Ecologist	Ongoing for 3 years
6. Community consultation and feedback engage the community through workshops, email, social media and online. An online reporting page will be made available to the community during time following dispersal. Community engagement should also be carried out yearly or as long as is deemed necessary to ensure dispersal has had the desired outcomes.	ESPU	Yearly for 3 years
7. Ongoing maintenance of the remaining bushland reserve for 3 years – is to be conducted by suitably qualified bush regenerators until the conditions of Council's Kareela Flying-fox Camp Vegetation Management Plan (SSC 2015) have been met.	ESPU/ contractors	Ongoing for 3 years

\*ESPU = Council's Environmental Science and Policy Unit staff

### **3.2.6. Stage 3C Dispersal Finalisation Barriers**

If this stage is commenced the dispersal has been deemed successful to date. However continued activities and monitoring are required. Stage 3C finalisation will stop if the following barriers arise:

- Despite all efforts flying-foxes return to Kareela. Should this happen the Dispersal Workflow page 19 should be revisited. Several outcomes have resulted if this occurs as follows:
  - the dispersal could be deemed a failure
  - the dispersal could be re-attempted the following winter
  - Council could deem that it cannot pursue further dispersal actions at this time

### 3.3. Dispersal Timeline – Year One

TIMELINE	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Stage 3A - Pre Trial Flying-fox Monitoring - 3 months												
Preparation and submission of State and Federal approvals			Approvals	Approvals	Approvals							
Employment of additional Council staff to manage dispersal					Admin	Admin						
Field assessment of alternative habitat/camp sites					Monitoring	Monitoring						
Pre trial dispersal monitoring at alternative habitat sites & Kareela					Monitoring	Monitoring						
Purchase and installation of monitoring cameras					Field work	Field work						
Community and stakeholder consultation						Consultation	Consultation					
Stage 3B- Flying Fox Trial Dispersal Actions - 30 days												
Noise/Smoke/Light/Ultrasonic equipment purchase					Admin	Admin						
Clearing of paths through the vegetation to place equipment within camp					Field work	Field work						
Deployment of dispersal equipment						Dispersal	Dispersal	Dispersal				
Animal welfare supervision for all dispersal activities						Field work	Field work	Field work				
Field visits to alternative habitat sites during dispersal to check inappropriate roosting						Field work	Field work	Field work				
Community and stakeholder consultation									Consultation			
Contingency activities for disturbance at inappropriate dispersal sites						Dispersal	Dispersal	Dispersal				
Assessment and reporting of results of Stage 3B									Reporting			Reporting
Part 3C - Prevention of Flying Fox Return Actions - 3 years												
Selective roosting habitat removal to minimise likelihood of flying-fox return									Field work	Field work	Field work	
Bush regeneration works required to restore the existing vegetation at the site									Field work	Field work	Field work	
Continued effective noise/smoke/ultrasonic dispersal actions daily for 3 years									Dispersal	Dispersal	Dispersal	Dispersal
Continued monitoring work at Kareela/Dispersal Site/~7 other camps within 20km						Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Community consultation and feedback												Consultation
On going maintenance of the remaining bushland reserve for 3 years										Maintenance	Maintenance	Maintenance
Preparation of reports to State and Federal Government Quarterly for 3 years												Reporting

## 4. Costing

This costing was prepared in consultation with Eco Logical Australia and Sydney Royal Botanic Gardens staff John Martin April 2015.

DISPERSAL COSTING FOR 3 YEARS			
YEAR	Stage 3A - Pre Trial Flying-fox Monitoring - 3 months	Costing min.	Costing max.
First Year of Dispersal	Preparation and submission of State and Federal approvals	\$20,000	\$25,000
	Employment of additional Council staff experienced and/or qualified in flying-fox ecology to manage the dispersal process for the first 12 months	\$80,000	\$100,000
	Field assessment of alternative habitat/camp sites (2 people; 15 days; 7 hours/day; \$50/hour or 1 ELA ecologist @ \$130/hour)	\$10,500	\$13,650
	Ecologist to conduct pre trial dispersal monitoring at 7 alternative habitat sites & Kareela (1 ELA ecologist; 16 days; 7 hours/day; \$130/hour)	\$8,000	\$14,560
	Purchase and installation of monitoring cameras	\$4,000	\$8,000
	Community and stakeholder consultation	\$6,000	\$6,000
	<b>Stage 3B- Flying Fox Trial Dispersal Actions - 30 days</b>		
	Clearing of paths through the vegetation to place equipment within camp	\$5,000	\$10,000
	Noise/Smoke/Light/Ultrasonic equipment purchase	\$30,000	\$60,000
	Deployment of dispersal equipment (5 people; 30 days; 5 hours/day; \$50/hour or 4 people at \$50/hour and one ecologist @ \$130/hour)	\$49,000	\$60,000
	Engagement of an animal welfare supervisor to be present during all dispersal activities (1 ELA ecologist; 30 days; 5 hours/day; \$130/hour)	\$19,500	\$19,500
	Engagement of an ecologist to supervise trial dispersal (1 ELA ecologist; 30 days; 5 hours/day; \$130/hour)	\$19,500	\$19,500
	Field visits to alternative habitat sites during dispersal to check on inappropriate roosting (2 people; 15 days; 7 hours/day; \$50/hour or 1 ELA ecologist \$130/hour)	\$10,500	\$13,650
	Assessment and reporting of results of Stage 3B	\$10,000	\$10,000
	Community and stakeholder consultation	\$6,000	\$6,000
	Contingency activities for disturbance at inappropriate dispersal sites (3 people; 30 days; 5 hours/day; \$50/hour or 2 people @ \$50 & 1 ecologist @ \$130/hour)	\$22,500	\$35,000
	<b>Part 3C - Prevention of Flying Fox Return Actions - 1st Year</b>		
	Selective roosting habitat removal to minimise likelihood of flying-fox return (~\$5000 per day for 5 days)	\$25,000	\$40,000
	Bush regeneration works required to restore the existing vegetation at the site (~\$2000 per day for 30-60 days)	\$60,000	\$120,000
	Continued effective noise/smoke/ultrasonic dispersal actions daily for 1st year (2 people; 365 days; 3 hours/day; \$50/hour or 1 person; \$50 & 1 ecologist; \$130/hour)	\$109,500	\$197,100
	Continued monitoring work at Kareela/Dispersal Site/~6 other camps within 20km for 1st year (1 person; 2-4 days per month; 7 hours day; \$130/hour)	\$21,840	\$43,680
	Preparation of reports to State and Federal Government Monthly (max) or Quarterly (min) for 1st year	\$4,200	\$16,667
	Community consultation and feedback 1 event per year 1st year	\$3,000	\$3,000
	On going maintenance of the remaining bushland reserve for 1st year (\$5,000-\$8,000 per quarter)	\$20,000	\$32,000
<b>SUBTOTAL FOR FIRST YEAR OF DISPERSAL</b>		<b>\$544,040</b>	<b>\$853,307</b>
Second Year of Dispersal	<b>Part 3C - Prevention of Flying Fox Return Actions - 2nd Year</b>		
	Continued effective noise/smoke/ultrasonic dispersal actions daily for 2nd year (2 people; 365 days; 3 hours/day; \$50/hour or 1 person; \$50 & 1 ecologist; \$130/hour)	\$109,500	\$197,100
	Continued monitoring work at Kareela/Dispersal Site/~6 other camps within 20km for 2nd year (1 person; 2-4 days per month; 7 hours day; \$130/hour)	\$21,840	\$43,680
	Preparation of reports to State and Federal Government Monthly (max) or Quarterly (min) for 2nd year	\$4,200	\$16,667
	Community consultation and feedback 1 event per year 2nd year	\$3,000	\$3,000
	On going maintenance of the remaining bushland reserve for 2nd year (\$5,000-\$8,000 per quarter)	\$20,000	\$32,000
<b>SUBTOTAL FOR SECOND YEAR OF DISPERSAL</b>		<b>\$158,540</b>	<b>\$292,447</b>
Third Year of Dispersal	<b>Part 3C - Prevention of Flying Fox Return Actions - 3rd Year</b>		
	Continued effective noise/smoke/ultrasonic dispersal actions daily for 3rd year (2 people; 365 days; 3 hours/day; \$50/hour or 1 person; \$50 & 1 ecologist; \$130/hour)	\$109,500	\$197,100
	Continued monitoring work at Kareela/Dispersal Site/~6 other camps within 20km for 3rd year (1 person; 2-4 days per month; 7 hours day; \$130/hour)	\$21,840	\$43,680
	Preparation of reports to State and Federal Government Monthly (max) or Quarterly (min) for 3rd year	\$4,200	\$16,667
	Community consultation and feedback 1 event per year 3rd year	\$3,000	\$3,000
	On going maintenance of the remaining bushland reserve for 3rd year (\$5,000-\$8,000 per quarter)	\$20,000	\$32,000
<b>SUBTOTAL FOR THIRD YEAR OF DISPERSAL</b>		<b>\$158,540</b>	<b>\$292,447</b>
<b>TOTAL FOR 3 YEARS OF DISPERSAL ACTIONS</b>		<b>\$861,120</b>	<b>\$1,438,201</b>



## 5. Conclusion

Council's decision to disperse has not been made lightly as Council has significant understanding of the ecological and evolutionary value that GHFFs provide. However the need to find a more suitable site for the GHFFs currently camped at Kareela is essential to protect the health and wellbeing of the local residents as well as the staff and students at the adjacent special needs schools. If flying-foxes in urban areas are situated in appropriate locations away from residents, schools and other sensitive receptors this can only lead to an improvement in human flying-fox relations and a reduced need for dispersal of flying-fox camps which are in appropriate locations and effectively managed.

This dispersal plan provides adequate details of the methods of dispersal, monitoring of dispersal and measures of success of the dispersal. The plan emphasises the importance of protecting the health of the flying-foxes such that works will cease if the animal welfare or supervising ecologist deem the impact is too great. In accordance with Dispersal actions in Section 3A, 3B and 3C of this Plan Council intend to conduct dispersal in a staged way, in accordance with conditions, at the Kareela camp to ensure objectives are achieved. Dispersal actions will be undertaken until the GHFFs have established at a site deemed appropriate for a flying-fox camp which may take more than one winter to achieve. An examination of potential habitats and flying-fox camps within 10-20km of the Kareela camp indicates that there are substantial areas of appropriate habitat capable of supporting GHFF dispersed from the Kareela camp. This will provide a stable, long term, appropriate site/s for the GHFF to take up permanent residence.

## 6. References

Australian Research Centre for Urban Ecology (ARCUE) 2009. *Public Environment Report: Proposed relocation of a camp of Grey-headed Flying-foxes (Pteropus poliocephalus) from the Royal Botanic Gardens Sydney*. An unpublished report for the Royal Botanic Gardens Domain Trust.

Department of Environment and Climate Change (DECC) 2007. *Flying-fox camp management policy*

Department of Environment and Climate Change (DECC) 2009. *Draft National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus*.

Eco Logical Australia (ELA) 2014 *Kareela Flying-fox Camp Plan of Management (PoM)*

Hall, L., and Richards G. 2000. *Flying-foxes – fruit and blossom bats of Australia*, UNSW Press, Sydney.

Office of Environment and Heritage (OEH) 2015 *Flying-fox Camp Management Policy*

Roberts B and Eby P 2013 Review of past flying-fox dispersal actions between 1990-2013 (*unpublished?*)

Sutherland Shire Council (SSC) updated 2015 *Kareela Flying-fox Camp Vegetation Management Plan*

## 7. Appendix 1 – Previous Dispersal Attempt Summary by Roberts & Eby (2013)

Location	Species	FF population estimate at time of dispersal	Method	Did the animals leave the local area?	Did the local population reduce in size?	How far did they move?	Were new camps formed (number of new camps if known)?	Number of separate actions	Cost (if known)	Was conflict resolved at the original site?	Was conflict resolved for the community?	Source+
Barcaldine, Qld	R	>50,000	VN	no	no	≈2 km	yes (1)	trees in township felled		yes	no	12
Batchelor, NT	B	200	BNS	no	no	<400 m	yes (1)	2		yes	yes	34
Boyne Island, Qld	BR	25,000	LNS	no	no	<500 m	yes (2)	3		yes	no	567
Bundall, Qld	GB	<400	V	no	no	uk, but 4 camps were within 5 km	yes (3)	1		yes	uk	8,9,10
Charters Towers, Qld	RB	variable	HLNPOW	no	no	200 m	no (returned to original site)	repeated since 2000	>\$500,000	no	no	1,112
Dallis Park, NSW	BG	28,000	V	no	yes	300 m	yes (1)	2		yes	no	13
Duaringa, Qld	R	>30,000	VNFO	no	no	400 m	yes	1	\$150,000	yes	uk	14
Gayndah, Qld	RB	200,000	VN	no	no	600 m	yes	3 actions, repeated		yes	no	9
Maclean, NSW	BGR	20,000	NS	no	no	350 m	yes (7)	>23	>\$400,000 and ongoing	no	no	13

Matarank a, NT	BR	>200,000	BHLNOS W	no	no	<300 m	uk	>9		no	no	13
North Eton, Qld	B	4800	VNFB	uk	no	<1.5 km initially	yes (≈4 majority temporary )	2	\$45,000	yes	yes (conflict at one site)	10,15,16, 17
Royal Botanic Gardens, Melbourn e, Vic	G	30,000	NS	no	no	6.5 km	yes (2)	6 mths	\$3 million	yes	yes, ongoing managem ent required	13
Royal Botanic Gardens, Sydney, NSW	G	3,000	LNPOW	no	no	4 km	no	ongoing daily actions for 12 mths	>\$1 million and ongoing	yes	yes	131,819
Singleton, NSW	GR	500	LNUW	no	no	<900 m	no (returned to original site)	>3	\$117,000 and ongoing	no	no	1,320
Townsville , Qld	BR	35,000	BNS	no	no	400 m	no (returned to original site)	5		no	no	13
Warwick, Qld	GRB (dispersal targeted R)	200,000	NLBP	no	no	≈1 km	no (site known to be previously occupied by GB)	5 days	\$28,000	yes	uk (complain ts persisted until migration)	8,21,22
Young, NSW	L	<5000	VN	no	no	<600 m	yes (1)	uk		yes	no	23

\* G = grey-headed flying-fox; B = black flying-fox; R = little red flying-fox # B = "birdfrite"; F = fog; H = helicopter; L = lights; N = noise; P = physical deterrent; O = odour; S = sound; 1 Storm Stanford (Wildlife carer, pers comm. 2013); 2 Louise Saunders (Bats Qld, pers comm. 2013); 3 Phillips *et al.* (2007) Displacement of Black flying-foxes *Pteropus alecto* at Batchelor, Northern Territory *Australian Zoologist* 34: 119-124; 4 John McCarthy (Northern Territory Government, pers comm. 2010); 5 Roberts (2006) *Management of Urban Flying-fox Camps: Issues of Relevance to Camps in the Lower Clarence, NSW*. Valley Watch Inc., Maclean; 6 Information from Gladstone Regional Council in 2010; 7 Joe Adair (formerly DEHP, pers. comm. 2010); 8 Trish Wimberly (Australia Bat Clinic pers. comm. 2013); 9 Information obtained from Department of Environment and Heritage Protection (DEHP) in 2013; 10 Billie Roberts unpublished data; 11 Scott (2010); 12 Information from Charters Towers Regional Council in 2010 and 2013; 13 Roberts *et al.* (2012b) and additional references within; 14 Perry Deeds (Central Highlands Regional Council, pers. comm. 2013); 15 Jarman (2010) *Species Management Plan*, Mackay Regional Council; 16 Heidi Jarman (Mackay Regional Council, pers. comm. 2013); 17 Daryl Barnes (Walkerston resident, per comm. 2013) 18 Peggy Eby (Ecologist, pers comm. 2013) 19 John Martin (RBG, pers comm. 2013); 20 Singleton Council Meeting Minutes; 21 Information from the Southern Downs Regional Council in 2013; 22 Tim Low (pers. comm. 2013); 23 Young Shire Council.