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Identifying and implementing the right carpool program for Macquarie Park and North Ryde

An international review of carpool program options for Connect Macquarie Park + North Ryde identified and assessed best practice, web-based carpool programs and recommended a program that addressed the business centre's needs. This program, Co-Hop, has recently launched.

This paper presents the research, program selection process, and the results and learnings from the implementation of the program.

The first part of the paper details the review process, the identification of program features that address Macquarie Park and North Ryde's unique characteristics, and the multi-criteria analysis used to rate and select the program. The research-focused approach distinguished both program features and best practice factors that have been shown to be essential to the successful implementation of carpool programs.

The second part of the paper discusses the planning, testing, branding, and incentive offers that are reflected in the final program.

1 Introduction

Connect Macquarie Park + North Ryde is a Transport Management Association (TMA) which develops and implements transport initiatives for the growing centre and supports transport choices for employees working in Macquarie Park and North Ryde organisations. The TMA, a collaboration between business, local government and state government, is tasked with addressing the existing and anticipated traffic congestion throughout the precinct which affects productivity and employee well-being.

Connect Macquarie Park + North Ryde identified the opportunity to support ride-sharing to employment in the area. A successful carpool program would help to reduce congestion and the demand for parking.

Connect Macquarie Park + North Ryde engaged Cardno to undertake a review of carpool programs with the aim to recommend a program for the business precinct. The review considered a number of features of carpool programs to determine an effective program that will address the aims of the TMA. The recommended program provided Connect Macquarie Park + North Ryde with custom branding, trip logging for detailed reports of trips undertaken, the opportunity to incorporate incentives and the inclusion of other modes beyond private vehicles. The new program, Co-Hop launched in September 2015.

2 Background

2.1 Transport issues in Macquarie Park and North Ryde

Macquarie Park, one of Australia's largest employment locations, is around 12 kilometres north-west of the Sydney CBD. It is nominated as one of around 30 Strategic Centres by the NSW Government's 'A Plan for Growing Sydney' and forms part of Sydney's Global Economic Corridor. The 850,000 square metres of commercial space in Macquarie Park and Riverside Corporate Park is home to some of Australia's largest

employers, including Optus, Novartis, 3M, CSIRO, Microsoft, Macquarie University, Foxtel, Siemens and Sony.

Over the next 20 - 30 years, the Macquarie Park area is expected to undergo high and rapid growth in workers, students and residents. By 2031 the area could accommodate up to 68,000 employees, 50,000 students and staff at Macquarie University and many more residents. Macquarie Park will evolve from a business park to another CBD and is set to surpass North Sydney as the second largest contributor to GDP in NSW.

Macquarie Park was initially a car-oriented business park and it developed with a street layout that lacks the fine grain pedestrian and cycling networks found in other CBDs. The area also current lacks good public transport services. While some corridors have direct, frequent or express services, other corridors lack time-competitive services when compared with private car travel and bus (as well as T2) lane priority. Work to address existing issues on some corridors is slow and will not be undertaken in the near future.

While the Sydney Metro Northwest project will improve public transport services to the area, the planned rail shutdown as the train line undergoes upgrade to the metro infrastructure will disrupt existing rail journeys and reduces the value in referring employees to the rail system.

The business precinct already experiences significant road congestion and only 24% of people travel to work there by public and active transport. Recent studies by the City of Ryde Council have shown that the Macquarie Park area needs to evolve toward having 40% of peak-period trips occur through efficient travel modes (motorcycle, public transport, cycling or walking), if the transport network is to accommodate the rapid growth of the area over the next 20 years.

Employers are already well aware of the impact of current transport conditions on their businesses and their staff: in March 2011, four Macquarie Park employers asked their staff about how they travelled to work and the impact of this journey on their lives. The survey found that commuting choices are having strong negative impacts on staff; with 50% reporting their journey to work is the most stressful part of their day. This compares to other Australian workplaces where, on average, between 10 and 15% of staff report similar stress levels.

With 74% of staff driving to work alone, the resulting peak hour congestion represents a major threat to the ability of Macquarie Park employers to be able to attract and retain staff. Finding ways for staff to travel more easily and more sustainably is a major part of ensuring existing companies continue to be based in Macquarie Park and new companies are attracted to the area.

2.2 Connect Macquarie Park + North Ryde

The Macquarie Park Transport Management Association, Connect Macquarie Park + North Ryde, is New South Wales' first Transport Management Association (TMA), and only the second established in Australia.

Connect's purpose is to bring businesses and government together to improve the commute for Macquarie Park & North Ryde employees. Connect operate as a not-for-profit, investing membership fees and government funding into initiatives to reduce driving alone to work (which had 69% mode share in 2011).

Connect Macquarie Park + North Ryde is supported by:

- > Member organisations within Macquarie Park and Riverside Corporate Park.
- > Transport for NSW.
- > City of Ryde Council.

Connect develops and implements transport initiatives which support staff transport choices. It is a collaborative platform for member businesses to partner with government agencies and transport providers to support a holistic approach to transport and an efficient transport network within the Macquarie Park and North Ryde business precincts.

Connect Macquarie Park + North Ryde implements a range of programs designed to encourage travel behaviour change and increase public transport mode share, ride sharing and to reduce private vehicle dependency for journeys to work at businesses in the precinct. These include:

- > travel surveys, mapping and analysis;

- > transport access and parking strategies and studies;
- > new staff orientation packs;
- > personalised journey planning;
- > website and enewsletter for businesses and their employees to access travel information;
- > establish a central transport data and research hub for the precinct; and
- > other activities that are designed to promote travel behaviour change, transport management.

2.3 Decision to implement carpool program for the area

One of the sustainable transport initiatives proposed for Connect Macquarie Park + North Ryde was the investigation into, and implementation of a carpool program for employees and students. Given the constraints with public transport improvements, and current low rates of carpooling, Connect saw this area as one with potential to grow. Carpooling is an initiative that can be delivered quickly, helping to demonstrate the effectiveness of the organisation.

Connect Macquarie Park + North Ryde engaged Cardno to review existing carpool (ride share) programs, and obtain a full understanding of how web-based carpool programs operate around the world in order to establish best practice for a carpool program for Macquarie Park and North Ryde. The purpose of the review was to inform the General Manager and the Board in the selection of Connect Macquarie Park + North Ryde carpool providers.

3 Carpools

3.1.1 Definition

Also known as rideshare, carpool refers to two or more people with similar travel requirements sharing a journey by traveling together in a car. A carpool program is any process that facilitates a car driver giving a lift to another person, often involving arrangements between groups of people who may not initially know each other.

A traditional carpool program involves prearranged ride sharing; a driver and passenger will each search for someone with a compatible journey to them, typically similar origin, destinations, timings and behavioural preferences, for example no smoking. Once matched the driver and passenger agree on cost sharing, driving sharing and meeting points. This arrangement can be for a once off trip or an ongoing commitment.

Carpool programs can match regular commuters for long-term car sharing relationships or to simply match two people planning the same once-off long distance drive with similar timings. Carpool programs are typically web-based but the mediums for arranging ride sharing can also include smart phone applications, agencies and agencies and specific pick-up locations.

3.1.2 Terminology

The following list of terminology provides a definition for some of the common terms used in relation to carpooling.

Carpool	Individuals with similar itineraries and time schedules share a vehicle for a trip and share the costs or driving
Carpool program	A system that facilitates carpooling
Carpool program provider	An organisation that provides carpool programs for public or private users
Carsharing	Multiple people accessing a common vehicle or pool of vehicles for short-term use (not carpooling)
Real-time carpool	Carpool trips with no fixed schedule that are matched close to the time of departure dependant on geographic location
Rideshare	Same as Carpool

Slugging	A casual form of carpool where drivers and passengers meet at a specific location to find ride matches immediately before the trip occurs
Trip	An instance of travel from one geographical location to another
Vanpool	Employer provided van trips for employees commuting to work at the same location

3.2 Types of carpools

There are several distinct types of carpool programs, they each address different trip needs and have different characteristics. Each carpool typology is identified in **Table 1**.

Table 1 Types of carpools

Type	Description
Commuter	Commuter carpool programs cater for individuals and organisations looking for regular carpooling matches for work or other regular trips. These are the typical commercial carpool programs that provide free membership for individuals who register but if an organisation wishes to create a closed network available only to their employees or students it will typically be required to pay a fee for the service.
Long distance / once off	<p>Long distance carpool programs provide matches for people travelling long distances, typically as once-off trips. These programs are targeted towards travellers who have planned schedules well in advance but who may have some flexibility in terms of departure timings.</p> <p>As a form of pre-organised hitchhiking, these programs typically have less registration and security requirements than commuter carpool programs as the users only utilise the service occasionally. Travel to events and festivals would also be considered part of this category.</p>
Casual/ flexible	<p>Casual carpools, also described in the US as ‘slugging’, are carpool networks that operate without pre-organisation and contact. These carpool systems involve drivers and passengers simply turning up to the same departure location and matches are made on-the-spot for trips to a similar destination. They have typically developed as a means to use high-occupancy vehicle (HOV) lanes or to share toll payments. These carpools are not supported by public or employer organisations.</p> <p>Advantages of these carpools are the reduced commitment for participants; if they don’t turn up on the day they won’t be letting anyone down. The associated disadvantages are a lack of security and reduced ability to be replicated in other locations as these carpools arise organically to address a specific need in locations with a large number of participants making similar journeys.</p> <p>An example of this carpool in Australia occurs on weekdays at the intersection of Wisemans Ferry Road and the Central Coast Highway. Drivers and riders meet at a car park nearby and share the commute to Sydney for work.</p>
Real-time	Also known as dynamic carpooling, these carpool systems provide automatic ride-matching between participants at short notice or while the driver is already travelling. These carpool systems use technology such as Global Positioning Software (GPS), continuous internet connection and smart phone software to remove the requirement to pre-arrange trip schedules well in advance as matches are made based on current proximity. Because of the spontaneous nature of this system, the carpool program will typically suggest a cost per kilometre or a ridesharing fare. Payment can be made in cash in the car or also through PayPal on the carpool program’s mobile phone application. Registration is typically on a handset with less requirement for details as the current location will already be known through the phone’s GPS function.

Type	Description
	These systems can also include a post-ride rating for the driver or passenger which would be available to other program users to help them decide whether they want to share a ride with that person.
Back-end software	While not a distinct 'type' of carpool program, providers who simply sell a software package which can be adopted by an organisation have been considered in this review separately. These packages often allow clients to tailor the carpool program and reporting to their needs and will create a closed carpool network completely controlled by the client.

3.3 Benefits and challenges

Carpool programs for employees can benefit both the organisations and the employees who participate. There are also some challenges that need to be addressed for successful carpool results. Both the benefits and challenges of carpooling are discussed in this section.

3.3.1 Benefits

Benefits for organisations that support a carpool program can include:

- > **Lower traffic demand and reduced congestion:** Widespread uptake of carpooling in a location will reduce demand on the traffic network. This will improve both the attractiveness of the business location for potential employees and also access for clients and suppliers, improving efficiency of operations.
- > **Safer roads:** Long delays create frustration and risky behaviour in car drivers. A reduction in demand on the traffic network may reduce motor vehicle accidents.
- > **Reduced pollution:** Helps to demonstrate environmental sustainability credentials.
- > **Improved amenity:** Reducing the volume of motor vehicles in an area improves the amenity for users of other modes including walking, cycling and public transport.
- > **Reduce parking demand and costs:** A reduction in the number of car parking spaces required will reduce costs for an organisation.
- > **Improved productivity:** Driving in peak period congested traffic can be stressful, employers will benefit from fewer workers arriving to the office after a stressful commute.

Benefits for individual carpool users can include:

- > **Reduced travel costs:** Travel costs including fuel and tolls are shared between the driver and their passengers.
- > **Reduced travel time:** Widespread uptake of carpooling in a location will reduce demand on the traffic network.
- > **Reduced stress:** Driving in peak period congested traffic can be stressful, reducing the number of times a person drives to work each week will improve their wellbeing.
- > **Less vehicle wear and tear:** Sharing the driving with other people results in less wear and tear on an individual's car, this reduces maintenance costs and improves the resale price.
- > **Incentives:** Receipt of incentives for participating in carpooling. This could be monetary, in vouchers for fuel or car maintenance, guaranteed ride homes or through provision of preferential parking.
- > **Increased social interaction:** Sharing a ride with colleagues, or peers from other organisations,
- > **Increased travel options:** Access to a carpool increases the number of transport options available to individuals when making travel decisions.

3.3.2 Challenges

There are a number of economic, behavioural and institutional challenges that need to be addressed for successful carpooling. These include:

- > **Perceived lack of safety and security:** sharing a car ride with unknown people can be undesirable.
- > **Inflexibility:** Carpool programs based on pre-arrangement often do not accommodate unexpected changes of schedule, reducing their attractiveness.
- > **Lack of available matches:** A low uptake will not only reduce the potential pool of matches for the participants that initially signed up but will also discourage further individuals to participate due to low numbers of current participants. If a potential participant cannot find a carpool match after trying a few times they are unlikely to continue to revisit the program to check for new matches.
- > **Poorly targeted incentive programs:** Incentives that don't correlate with drivers and passengers wants will not encourage carpool participation.
- > **Preference for driving:** Trials of carpools in the US found that drivers are more comfortable offering rides than passengers requesting rides, causing an imbalance (Amey, 2010).
- > **Existing car parking provisions:** Provision of employer-subsidised or employer-paid car parking reduces the incentive to carpool.
- > **Accurate measurement:** While the number of registered participants and the number of rides offered and requested is easy to track, it is far more difficult to track the number of trips that actually occur. Measurement of trips generally relies on accurate post-trip reporting by participants.

4 Carpool program assessment

4.1 Review of long list of carpool programs

The initial investigation into carpool program providers for Connect Macquarie Park + North Ryde considered a wide range of available carpool systems in Australia and internationally and identified 25 programs for review. A comparison of this 'long list' of 25 programs allowed relevant programs to be identified and short-listed for further investigation. The reviewed carpool programs included a mix of Australian, international, commuter, long distance, casual, real time, and software programs. The long-list of reviewed carpool programs were:

- | | |
|--|---|
| > Western Sydney Carpool (Commuter - Australia) | > Road Sharing (Long distance – worldwide) |
| > Carpool World (Commuter / long distance - US and Europe) | > Ride Buzz (Long distance – US) |
| > Coseats (Long distance - Australia) | > eRideShare (Commuter / long distance - US) |
| > Carpool One (Commuter / Long distance - Australia) | > Share Your Ride (Long distance – North America, Australia, New Zealand and Germany) |
| > Carpooling (Casual / long distance – Australia) | > Carma Car (Real-time – US and Europe) |
| > South West Carpool (Commuter - Australia) | > Carpool (Commuter / long distance – Ireland) |
| > Northern Rivers Carpool (Commuter - Australia) | > Pathway / EnRoute (Software – Canada) |
| > UNSW Carpools (Commuter - Australia) | > RideShark (Software – based in North America, used globally) |
| > Smart Commute: Carpool zone | > Zimride (Commuter / long distance - US) |
| > My Carpools (Commuter - Australia) | > Reward Ride (Commuter – US) |
| > Lets Car Pool (Commuter / Long distance – New Zealand) | > Backseat Surfing (Long distance – worldwide) |
| > Catchalift (Long distance – Australia and New Zealand) | > JayRide (Commuter / long distance – worldwide) |
| > Lift Share (Long distance – worldwide) | |

4.2 Assessment criteria

Carpool programs underwent a high-level assessment against a range of criteria that included:

- > **Location:** Is it based in Australia or internationally?
- > **Ownership/partnership:** Is it commercial, government or not-for-profit run?
- > **Branding:** Is there the option to self-brand or must existing branding be used?
- > **Fee structure:** Cost
- > **Membership options:** Is it open to individuals or organisations?
- > **Trip types:** Commuter or long distance?
- > **Technology:** Website, mobile phone applications?
- > **Security:** Level of verification provided?
- > **Success metrics:** How are results reported?
- > **Member support:** Are communications, starter kits and administration support provided?

Each carpool program was assigned a score according to its achievement against the above criteria. The criteria were weighted according to the elements deemed to be the most relevant for a carpool program for Macquarie Park and North Ryde. The weightings for each of the criteria are shown in **Table 2**.

Table 2 Long list criteria weightings

Criteria	Weighting
Location	5%
Ownership/partnership	10%
Branding	10%
Fee structure	5%
Membership options	5%
Trip types	10%
Technology	15%
Security	15%
Success metrics	15%
Member support	10%

4.3 Assessment results

An overview of the long-list carpool program assessment is presented in a matrix in **Appendix A**. It shows the percentage score for each carpool program against the criteria and the final score for the program after weightings were applied. The programs shown highlighted in green were proposed for inclusion in the carpool program short-list with justification provided in *Column R*.

4.4 Short-list of carpool programs

Based on the assessment of the long-list of carpool programs, the following eight programs scored the highest:

- > Western Sydney Carpool
- > Carpool One
- > South West Carpool
- > UNSW Carpool
- > My Carpools
- > RideShark
- > Zimride

> Jayride

4.4.1 Refinement of short-list of carpool programs

The final carpool programs short-listed for further assessment included programs that scored highly in the long-list matrix and those that already operated in Macquarie Park. Any program that scored highly in the matrix but were not be able to operate in Australia were not investigated further as they could not be considered as an option for Connect Macquarie Park + North Ryde.

Of this short-list, Western Sydney Carpool and South West Carpool are provided by one organisation, (Community Carpooling Association Incorporated) so only one of these programs was selected. The UNSW Carpool was removed from the shortlist as it uses the My Carpools program so it was referred to as a case study instead of a standalone program. Zimride operates internationally and is not available in Australia so it was also removed from the short-list. Pathways/ EnRoute is currently used in Macquarie Park so it was added to the shortlist.

5 Review of short-listed programs

A number of carpooling programs are considered appropriate for Connect Macquarie Park + North Ryde based on the potential scale of users. The final shortlist of six carpooling programs is outlined below and include.

1. Community Carpooling Association Incorporated (Western Sydney Carpool)
2. Carpool One
3. My Carpools
4. RideShark
5. Jayride
6. Pathways / EnRoute

5.1 Detailed review of short-listed programs

The carpool programs were further investigated against the following criteria:

- > Governance arrangements and partnerships
- > Funding and income generation
- > Fee structure
- > Scale of operations / coverage
- > Matching system software
- > Security / screening
- > Resourcing requirements
- > Marketing recruitment and branding
- > Member support and collateral
- > Incentives
- > Program monitoring / results

5.2 Summary of review

The assessment of the short-listed carpool programs and their case studies highlighted the different features that each program offered. Key considerations for the selection of a carpool program for Connect Macquarie Park + North Ryde include:

- > Some programs provided only a closed network while others gave participants the option to search only within their organisation or to search on the program's public listings for matches.
- > All programs charged a fee, annual and set-up (except for Pathways), to host an organisation's carpool program.
- > Each carpool program provided security and verification for participants who joined up through an organisation using the organisation's email domain.
- > The carpool programs don't offer, or offer very limited, marketing, promotion and recruitment support. This is a role that would need to be undertaken by Connect Macquarie Park + North Ryde and representatives in the member organisations.
- > The programs varied on the level and reliability of reporting available. The best programs in this area included trip tracking requirements of participants, they included support software to provide incentives for recording trips.
- > Incentives are encouraged supported by the carpool programs, particularly those whose software provides sophisticated trip tracking. Incentives would be the responsibility of Connect Macquarie Park + North Ryde.
- > While the Australian-based carpool programs were simple to use their reporting capabilities were not as detailed as RideShark and Pathways/EnRoute.
- > Some programs had limited ability to adapt the interface for clients while others accommodated bespoke branding.

5.3 Recommended carpool provider

Based on the assessment of the car pool programs, RideShark, or a similar software package program, is recommended as an appropriate carpool program for Connect Macquarie Park + North Ryde.

Rideshare is a North American carpool program provider. The program includes options to easily implement features to improve the customer experience and the marketability of the program. The company provides support when technical issues are identified and allows customisation or changes to features but at an additional cost.

A RideShark carpool program could include:

- > An overarching URL for the carpool program website plus the ability to create custom branded sub-sites for individual organisations within Macquarie Park or North Ryde.
- > Custom branding – Connect Macquarie Park + North Ryde branding, text and image can used on the site. An example is provided in **Figure 1**.
- > Ability to run incentive programs using the software including contests and draws, earning reward points for 'shopping' for prizes and 'plateau rewards' where when a certain number of points are reached a prize is automatically awarded. The system will track points and deliver electronic prizes/certificates and it can also incorporate an Automatic Winner Selection tool for prize draws. An example is provided in **Figure 2**.
- > Ability to provide Emergency Ride Home claim forms on the site and track their usage, an example is provided in **Figure 3**.
- > Attractive trip logging calendar for detailed reporting of trips undertaken. The calendar can be linked to an incentives program. A preview of trip logging calendar is provided in **Figure 4**.
- > Ability to start tracking other transport modes (walking, cycling, public transport) using the trip logging calendar should Connect Macquarie Park + North Ryde wish to do this in the future.

As a ride-matching tool, the website's algorithm is designed for anywhere to anywhere carpool matching. The origin and destination catchments are set up so that each encompasses a radii of half of the member's commuting distance. Any trip within these two circles is considered a potential match.

Figure 1 Custom branded website: Connecting Wiltshire



Figure 2 Incentive points tracking

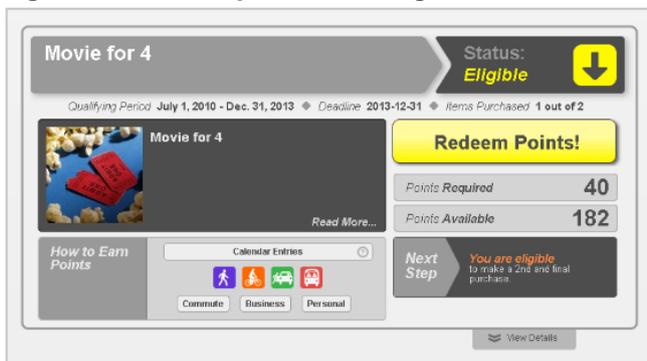


Figure 3 Emergency Ride Home claim form on website

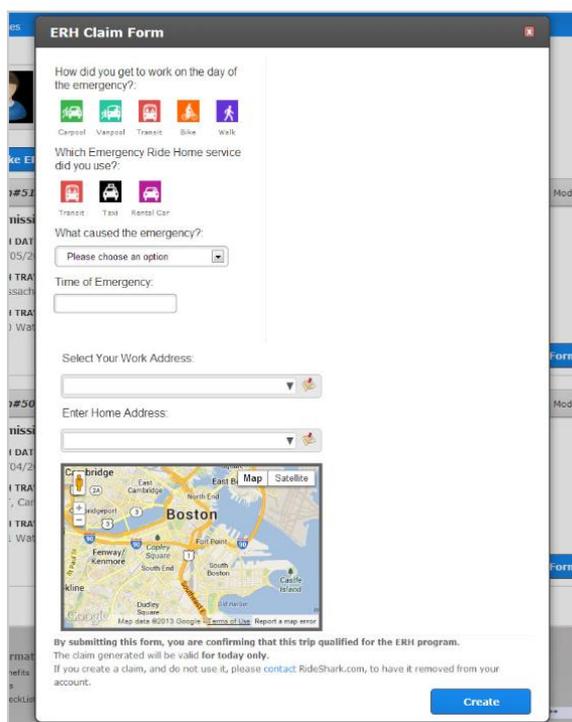
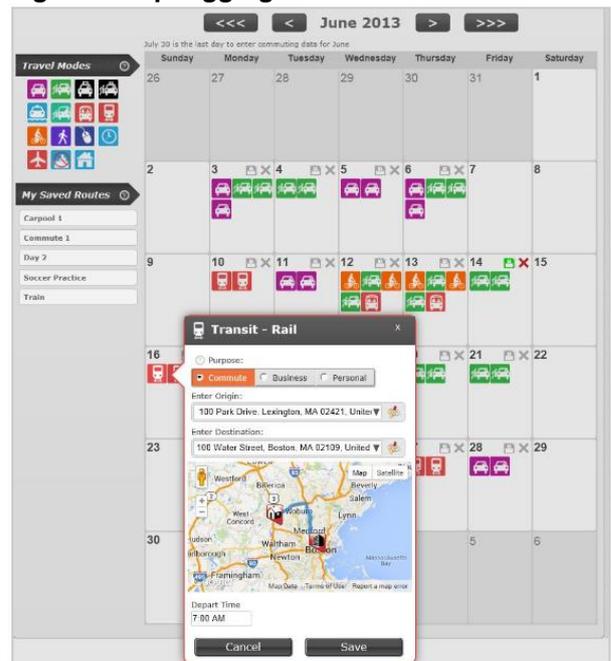


Figure 4 Trip logging calendar



6 Best practice factors

The review of the long list and short list of carpool programs, along with a review of literature, highlighted a number of factors that are important to consider when planning and providing carpool programs. These factors range from the design of ride matching services, the development of incentives programs and the use of marketing and communication strategies.

Some of the recurring best practice considerations for carpool programs, relevant to employee commuter programs are presented in **Table 3**.

Table 3 Best practice factors

Factor	Detail
Large employee centres	<p>A large employer or business park guarantees that many individuals will be commuting to this fixed destination daily, creating a 'many (origins) to one (destination)' scenario. People may be more open to participation if they can recognise a 'commonality' as a result of working at the same location.</p> <p>There is also a greater likelihood of a compatible match between people as work hours and employer expectations are generally similar.</p>
Role of the public sector	<p>The public sector has a role to play in the success of carpool programs. Encouraging carpooling through provision of T2 or T3 lanes where cars must have a minimum of two or three people in them to use the lane on congested roadways is one of the best ways the public sector can help to incentivise carpooling.</p>
Sharing with known people	<p>People are more likely to share a ride with someone they know or have a common attribute with, such as a workplace, rather than strangers. There is an expectation that the person sharing the ride will act more appropriately if they belong to the same organisation than a complete stranger and reduce the potential for complaint to the organisation.</p>
Smart technology	<p>A website or app with a good interface, easy-to-use, accurate matching and relevant for carpooling needs will support a successful carpool program.</p>
Management support	<p>Planning, implementation, promotion and management for a new carpool program must be supported by management teams who manages stakeholders, notes results and makes ongoing improvements to the program for increasing effectiveness.</p> <p>They need to demonstrate support to carpooling to all staff, recognising that staff may have carpool commitments that requires them to leave at a certain time.</p>
Measurement	<p>Measurement of carpool program results is important for program evaluation and improvement. This can be captured through technology, through offering incentives for participants to record their trips and by auditing use of carpool program parking spots if offered.</p>
Incentives	<p>Incentive programs have been shown to encourage higher participation in carpool programs in the US. Incentives can include rewards for carpooling as well as disincentives for not.</p>
Marketing and promotion	<p>Marketing and promotion of the carpool program is important to inform potential users about a new transport option, demonstrate the relevance for their commute, encourage travel behaviour changes and drive membership numbers for a sustainable program.</p>

Factor	Detail
	Ongoing communication with participants and feedback on their achievements, customised travel information, and promotion of their efforts to other staff will also be important actions.
Understand the target	An upfront survey of potential carpool users will provide valuable information about the different types of people best suited to carpooling, their motivation and fears and their travel behaviour. This will allow the creation of marketing material tailored to address their concerns and incentive programs targeted to their wants. Amey (2010) reported on analysis of rideshare surveys in Texas that found that sharing vehicle expenses and travel time savings were the most important reasons for sharing rides amongst the commuting respondents, followed by enjoyment of social interaction and decreased environmental impact.

7 Launching Co-Hop

7.1 Program planning and branding

The carpool program went through a few rebrandings, including First Connect Commuter Club, before adopting 'Co-Hop'.

The Co-Hop website is the portal to sign up as a new account, organise matches and log trips undertaken. The program allow trips to be logged against more than just carpooling, users are recording their public transport, walking and cycling trips as well.

The website also includes tips for successful carpooling and a calendar for keeping track of upcoming planned trips. The website homepage is shown in **Figure 5**.

7.2 Soft launch

An initial big marketing push for the program was not approved, resulting in a 'soft' launch approach to signing up carpooling members.

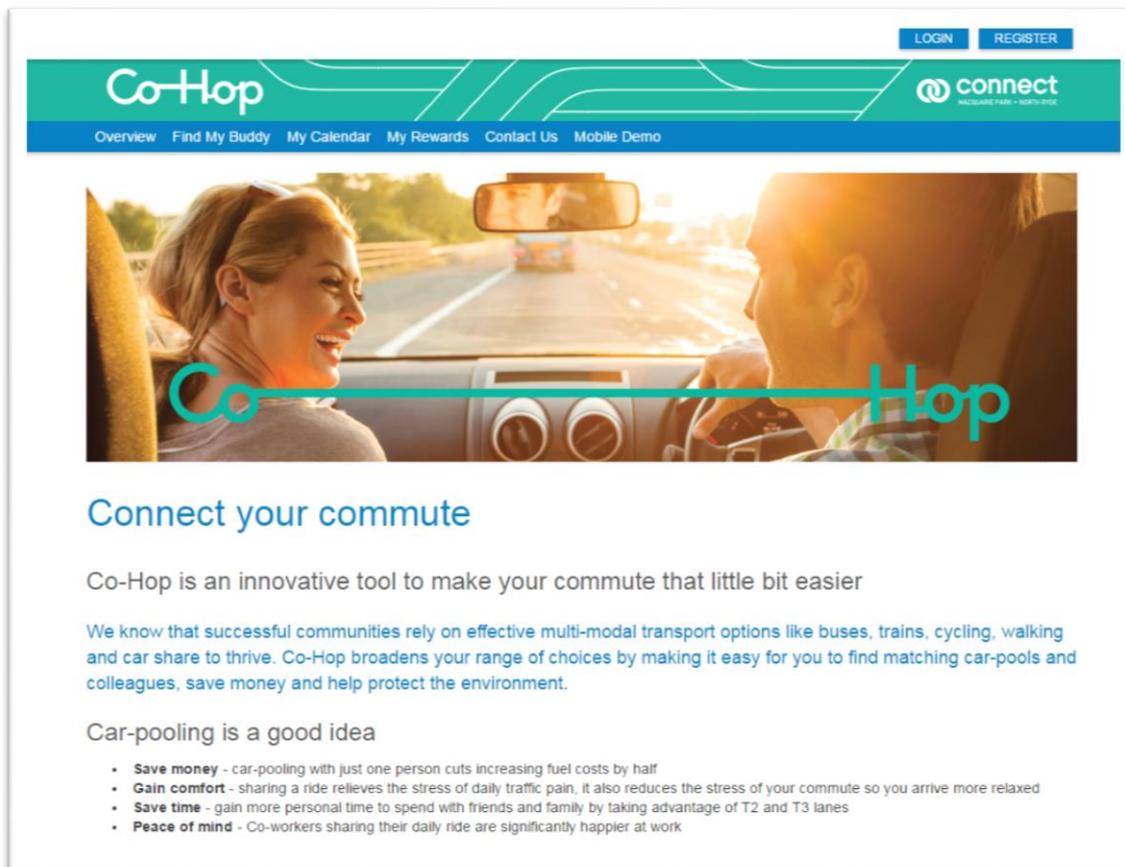
Connect works with employer organisations to promote the Co-Hop service to employees and encourage people to sign up. Co-Hop has a Co-Hop Champion in each company who acts as an administrator for employee accounts. Each Champion can view reports on their organisation's Co-Hop accounts and activity.

7.3 Communication and promotion and activities

Co-Hop is promoted to organisations who are members of Connect Macquarie Park + North Ryde. It is also promoted to commuters through the regular Connect enewsletter, press releases and a bus shelter promotional campaign. The bus shelter advertisements is two-prong. On the roads with high frequency bus services the advertisements promote the option to travel by bus. On the roads with low frequency buses or high traffic volumes the Co-Hop program is promoted.

The program is promoted to new employees of organisations who have signed up to Co-Hop and at transport planning events and other events organised in the area such as Ride to Work day.

The Co-Hop program has also been strongly promoted on the Macquarie University campus, see **Case Study No. 1**.

Figure 5 Co-Hop website


LOGIN REGISTER

Co-Hop connect
MACQUARIE PARK - NORTH RYDE

Overview Find My Buddy My Calendar My Rewards Contact Us Mobile Demo

Connect your commute

Co-Hop is an innovative tool to make your commute that little bit easier

We know that successful communities rely on effective multi-modal transport options like buses, trains, cycling, walking and car share to thrive. Co-Hop broadens your range of choices by making it easy for you to find matching car-pools and colleagues, save money and help protect the environment.

Car-pooling is a good idea

- **Save money** - car-pooling with just one person cuts increasing fuel costs by half
- **Gain comfort** - sharing a ride relieves the stress of daily traffic pain, it also reduces the stress of your commute so you arrive more relaxed
- **Save time** - gain more personal time to spend with friends and family by taking advantage of T2 and T3 lanes
- **Peace of mind** - Co-workers sharing their daily ride are significantly happier at work

CASE STUDY NO. 1: Promoting the program on campus

Macquarie University has started to strongly champion Co-Hop through the following promotional activities:

- Presentation to campus-wide sustainability champions
- Booth at the Orientation Week – manned by student volunteers
- Stocked site with rewards for those who record trips.
- The press release was picked up in local media

The promotional campaign has produced strong results with growth in both staff and student numbers:

- Staff: 9 before 1 Feb 2016, 63 now (6 April)
- Students: 1 before 1 Feb 2016, 232 now (6 April)

Several of the above have not yet confirmed accounts, demonstrating some evidence of not converting sign-ups to ongoing users.

8 Initial results and feedback

8.1 Companies on board

Co-Hop is being rolled out in a soft launch, to one organisation at a time. Companies who are promoting the service to their employees include Macquarie University and Novartis.

8.2 Results to date

Since Co-Hop first launched in September 2015, over 500 people have created an account. Of these, 190 people completed and confirmed their account with the program. 122 people made 3,093 searches for matches on the site. 62 messages were sent through the site to potential commuting partners.

Beyond carpooling, 30 people are offering Bike Buddy trips and nine people are offering the Walking Buddy trips. There are also 158 people who identify as vanpool passengers, and 17 people who are transit mentors.

8.3 Feedback

The program has received limited feedback to date from program participants. Of the feedback that has been received, the issues range from technology to safety. The key issues raised are:

- > Lack of a mobile application to use the software through, RideShark do have a mobile website but students at Macquarie University in particular have stated a preference for a mobile application.
- > It has been difficult to ensure members sign up to the program using their organisation's email address. If they use their personal account, their organisation will not know that they have joined and they may not be matched with people that they work with.
- > The subsite administrators (one is at every member organisation) have found the backend of the program's website difficult to use and some don't use it at all.
- > Safety concerns expressed about carpooling include:
 - How do I know the other person is safe?
 - How do I work out whether I should pay?

9 What we know now

9.1 Challenges experienced

The launch and implementation of a carpool program for Macquarie Park and North Ryde presented many challenges. These are set out in

Theme	Challenge	Detail
Lack of market research	Limited understanding of target market size and attitudes	Market research into the types of workers and their attitudes towards carpooling would have been useful in the development of the program.
	Macquarie Park employees are more willing to trade money to save time	<p>Carpooling not as good a fit for this market as typical markets. Macquarie Park and North Ryde businesses are B2Bs, not shopfronts or manufacturing. Demographically Macquarie Park is different from typical carpool markets:</p> <ul style="list-style-type: none"> > Primarily retail, property and professional services (salaried, not shift workers) > Macquarie Park salaries are 13% above national average > Live across Sydney > 44.3% aged 18-34 years

Theme	Challenge	Detail
Growing members		> Diverse range of ethnic backgrounds
	Soft launch	Soft launching the program, organisation by organisation means that the employees who signed up from the first few organisations had a limited number of people to be matched with. They may not have checked back months later to see if there were new people to match with. In the absence of a big launch, a geographical precinct launch is considered the next best alternative.
	Need for flexibility in arrival and departure times	Macquarie Park is a major high tech precinct with a large skilled, white collar workforce. They do not necessarily work the standard 9 to 5 hours and so could find it hard to commit to a set leaving time each day. Most people aren't shift workers with set finish times.
	Safety concerns	People raised concerns about the quality of their potential match's driving skills, a concern unable to be addressed by Connect Macquarie Park + North Ryde.
	Assumptions about the commitment	People assumed that signing up for carpooling is a twice a day, five times a week obligation and so are reluctant to commitment to it.
Matching	Macquarie Park destinations can be far apart	Macquarie Park is a large place with significant traffic congestion. It is not easy to drop or pick up someone who works at the other end of the precinct to your workplace. See Case Study No. 2 .
Reporting	Lack of incentives for logging trips	There is a lack of transparency on the number of carpool trips being undertaken. Incentives are a good way to encourage people to log their trips but they are being offered inconsistently across different organisations or not at all. This give Connect Macquarie Park + North Ryde little insight into the achievements of the program. Without the logged trips, Connect Macquarie Park + North Ryde cannot be certain of the number of successfully matched people, or the frequency and distance of trips they take.
Software	Expertise required for the software's backend	While the front-end of the RideShark software is use-friendly, the backend for administrators requires a knowledge of html. This is difficult for the organisations' champions who are not web designers.
	Lack of a mobile app	Students at Macquarie University would like to see an app version of the program made available, rather than a mobile website. Co-Hop does not live up to the expectations set by Uber as it is clunky and slow by comparison and there isn't a mobile app.
	Slow sign-up	Current signup is multi-step and can be a barrier to new users.
	Limitations	Inability to easily include employer shuttles in trip results for relevant sub-sites makes this feature less useful No simple way to exclude/include matches from outside company Difficult to onboard large group of users: Connect want to import employee lists as program users to bypass the need to get employees to sign up individually. This requires RideShark staff to action it and there is a substantial charge each time. Connect would need to do this every time a new member joins, which is unaffordable.
	Lack of good data reporting	There is a lack of a quality dashboard for the whole of site and also for subsite administrators > No documentation about what data/reports are available
Overseas supplier	Slow speeds on website	The website, particularly in early days took several seconds to load webpages, a frustrating experience that could discourage potential members attempting to sign up.
	Australian dollar performance	The poor performance of the Australian dollar against the US dollar means that the RideShark program's monthly costs became increasing expensive after award of the contract.

Theme	Challenge	Detail
Competition	Existing carpool programs	Optus already has its own carpool program which is only accessible to permanent employees.

CASE STUDY NO. 2: Matching algorithm issue

The geography of Sydney and the travel times within the Macquarie Park precinct means that potential matches are sometimes not workable. This can decrease the credibility of the tool with users. For example

Two people commuters from Castle Hill, one works at Macquarie Uni and the other at North Ryde which is the opposite end of the precinct to the university.

If the employee in North Ryde drives and drops off the Macquarie Uni employee first, it can add an additional 20-30 minutes to the trip each way due to traffic congestion, despite the two workplaces being less than four kilometres apart.

This match is not reasonable, but will still be shown by the software. Connect would not have noticed this issue if the carpool was focused on multiple activity centres, the whole metropolitan area or the entire state.

9.2 Advice for future precinct or activity centre Transport Management Associations

Connect's experience provides useful guidance for determining if a carpool program should be used, and how it should be implemented, in particular for similar business precincts. **Table 4** provides advice across a range of considerations.

Table 4 Advice for future precinct based carpools

Advice	Detail
Understand your market	Carpool does not work equally well for all populations <ul style="list-style-type: none"> > Percentage of shift workers can have a big impact > Demographic factors can influence willingness to carpool
	Different user groups have different expectations <ul style="list-style-type: none"> > Does your software meet the expectations of your users?
	Review your market to make sure carpooling is a good fit. Typical carpool markets: <ul style="list-style-type: none"> > Carpoolers are willing to trade time (slightly longer journey time) to save money usually shift workers, with set start and end times > In Australia 70% of car-pooling consumers are under 35, with declining numbers in the 35 – 54 age group (IBISWorld, 2013)
Develop a detailed plan for using the site	Are your target businesses going to be able to easily administer their subsites? <p>Subsite administration needs to:</p> <ul style="list-style-type: none"> > Be easy to use > Enable administrators to quickly add and award prizes > Allow for easy customisation of subsites - not require knowledge of HTML > Come with good training/resources <p>Key goal of ensuring company champions feel that they own their subsite</p>
	What do you need out of the site? <ul style="list-style-type: none"> > Data

Advice	Detail
	> Ease of adding new businesses
End user expectations are evolving:	> Users want an app > Integration with social media is important > Signup should be fast > Using the site to find a match should be fast > Matching algorithm should generate good matches (see Case Study No. 2)

9.3 Looking forward

9.3.1 Next steps for Co-Hop

Co-Hop will continue to be rollout out to member organisation of Connect Macquarie Park a+ North Ryde. The opportunity to offer a 'guaranteed ride home' is being investigated which will help to reassure workers on the days that they or their ride home have commitments at work or home that prevent them leaving at the agreed time.

There has been a recent effort to get companies on board on a precinct by precinct level. Co-Hop is working closely with two companies in North Ryde plus another that is preparing to move into the area. While it is too soon to see the impact of this effort this focus on joining up members who work very close to each other at the same time is expected to result in better quality matches through the program.

9.3.2 Changes in transport and land use in the precinct

The three train stations that service Macquarie Park and North Ryde will be closed for more than seven months in 2018-19 for the Sydney Metro Northwest construction to convert the existing suburban line into metro standards. This closure could see existing train commuters choosing to travel by car instead of the rail replacement buses, increasing the importance of an effective carpool program to reduce the number of single-occupancy vehicle trips to and from Macquarie Park in the peak hours.

The slow implementation of bus improvements and bus priority through the area means that it is necessary to continue to encourage people to move towards carpooling. As residential areas grow, carpooling from the precinct to other destinations may also become important

Changing parking restrictions and increasing prices are likely to affect the choice to drive alone to the precinct over time. Development controls will limit parking supply and charge a parking space levy as blocks are redeveloped. These changes will drive increased public and active transport use as well as a move towards carpooling.

9.3.3 Influence of Uber

The potential introduction of UberPool raises the question of whether traditional types of carpool matching tools will continue to be necessary. From UberPool, a potential improvement would be a system where drivers can sign in to an app, enter their commute destination and potentially be matched with someone going the same way.

Uber has also shown what can be done when it comes to transport app. Uber and other recent ride-matching apps set the standard for quick setup and ease of use and have changed customer expectations in this area.

10 References

- > Patterson, D (2004). Carpooling: Targeting for success. 27th Australasian Transport Research Forum, Adelaide, 29 September – 1 October 2004.
- > NZ Transport Agency. (2009). New Zealand Carpooling Guidelines. Online: <http://www.nzta.govt.nz/resources/carpooling/docs/carpooling-guide-no-trims.pdf>

- > Furuhataa, M., Dessouky, M., Ordóñez, F., Brunet, M, Wang, X and Koenig, S. (2013). Ridesharing: the State-of-the-art and Future Directions. Online: <http://idm-lab.org/bib/abstracts/papers/trb13c.pdf>
- > Amey, A. (2010). Real-Time Ridesharing: Exploring the Opportunities and Challenges of Designing a Technology-based Rideshare Trial for the MIT Community. Online: http://ridesharechoices.scripts.mit.edu/home/wp-content/papers/AMEY_Thesis_Final.pdf
- > Holloway, L. (2009). Carpool Websites Are Booming. Online: <http://www.entrepreneur.com/article/200818#>

11 Appendices

Appendix A – Summary of multi-criteria analysis of carpool programs

12 Presenters' Bio

12.1 Larissa Miller

Larissa is a Transport Planning Team Leader with 13 years' experience across the transport planning and communications industries. Larissa joined Cardno's transport team in 2011 after completing a Master of Planning from the University of New South Wales. Prior to this she held communications and program management roles in private and local government organisations.

Larissa's significant projects include active transport plans, strategic transport studies, pedestrian and traffic management plans, and concept design reports for precinct accessibility upgrades for transport interchanges across Sydney.

12.2 Kevin McClain

Kevin is a transport planner and manager with 10 years' experience working with public transport, travel demand management program delivery and providing transport for seniors and people with disabilities. With transport experience from the US and Australia, he is experienced in delivering travel behaviour change programs. He joined Connect Macquarie Park + North Ryde in January 2015 and is the project manager for the Co-Hop carpool and bike buddy ride matching tool. This includes setting up champions at member businesses, conducting webinars about the tool and setting up the portal for businesses.