

Benefits of Shared-Fleet Collaborations in Urban Logistics

Ismail Aydemir, Fraser McLeod, Matt Grote, Tom Cherrett

Using local authority managed fleets to undertake private work for hire-and-reward

Shared Concept for Municipal Vehicles

- Cities are becoming more crowded and therefore vehicle-related traffic congestion and carbon emissions are increasing.
- Policymakers are increasingly encouraged to consider collaborative solutions to decrease total costs, carbon emissions and traffic congestion. In this context, the UK Department for Transport has developed a plan for “delivering a zero-emission freight and logistics sector” by 2050.
- A shared-fleet operation could provide potential benefits (e.g., additional revenue generation for some of the parties involved, reductions in the total number of vehicles required). This is relevant for Local Government Authorities who often have many own-account vehicles that could benefit from such an approach to improve utilisation (Grote et al. 2021).
- The main aim of the project was to evaluate the benefits and challenges of adopting a public shared-fleet operation for the collection and delivery of consignments from suppliers of a private company (Carnival UK) based in Southampton using Southampton City Council’s 5 electric courier vehicles.



Fig.1: Benefits of shared-fleet collaborations

Results of the Project

- A shared-fleet collaboration involving 20 local suppliers serviced by five SCC vans performing 19 rounds/week could achieve reductions of:
 - 80% in supplier vehicles used
 - 56% in warehouse visits
 - 32% in vehicle kilometres
 - 89% in CO₂ emissions.
- A real-world trial is being planned to understand practical and real-world scheduling challenges.

Tab.1: Summary of net reductions over the survey week by implementing the shared-fleet operation.

	BAU	Intervention	Net Reduction	Decrease
N. of Vehicle	25	5	20	80%
N. of Visits	43	19	24	56%
Vkm	575	389	186	32%
CO₂ (kg)	239	26	213	89%
NO_x (g)	569	63	506	89%
PM₁₀ (g)	6.5	0.7	5.8	89%
CO (g)	100	11	89	89%

Case Study: Southampton City Council

- A one-week survey of business-as-usual (BAU) deliveries made by local suppliers to Carnival UK’s warehouse was undertaken to quantify consignment volumes, weights and receipt times.
- These data, together with Southampton City Council’s (SCC’s) current courier fleet schedules, were used to quantify the feasibility and benefits of merging operations.
- Route optimisation tools were employed to model an intervention scenario where council vehicles incorporated collections of Carnival UK’s consignments from local suppliers into their existing collection/delivery rounds.
- The intervention was compared to business-as-usual to quantify the potential reductions in vkm and CO₂ emissions, with suitable suppliers identified for a possible real-world trial.



Fig.2: Examples of deliveries from CUK’s local suppliers received at MGL’s warehouse.

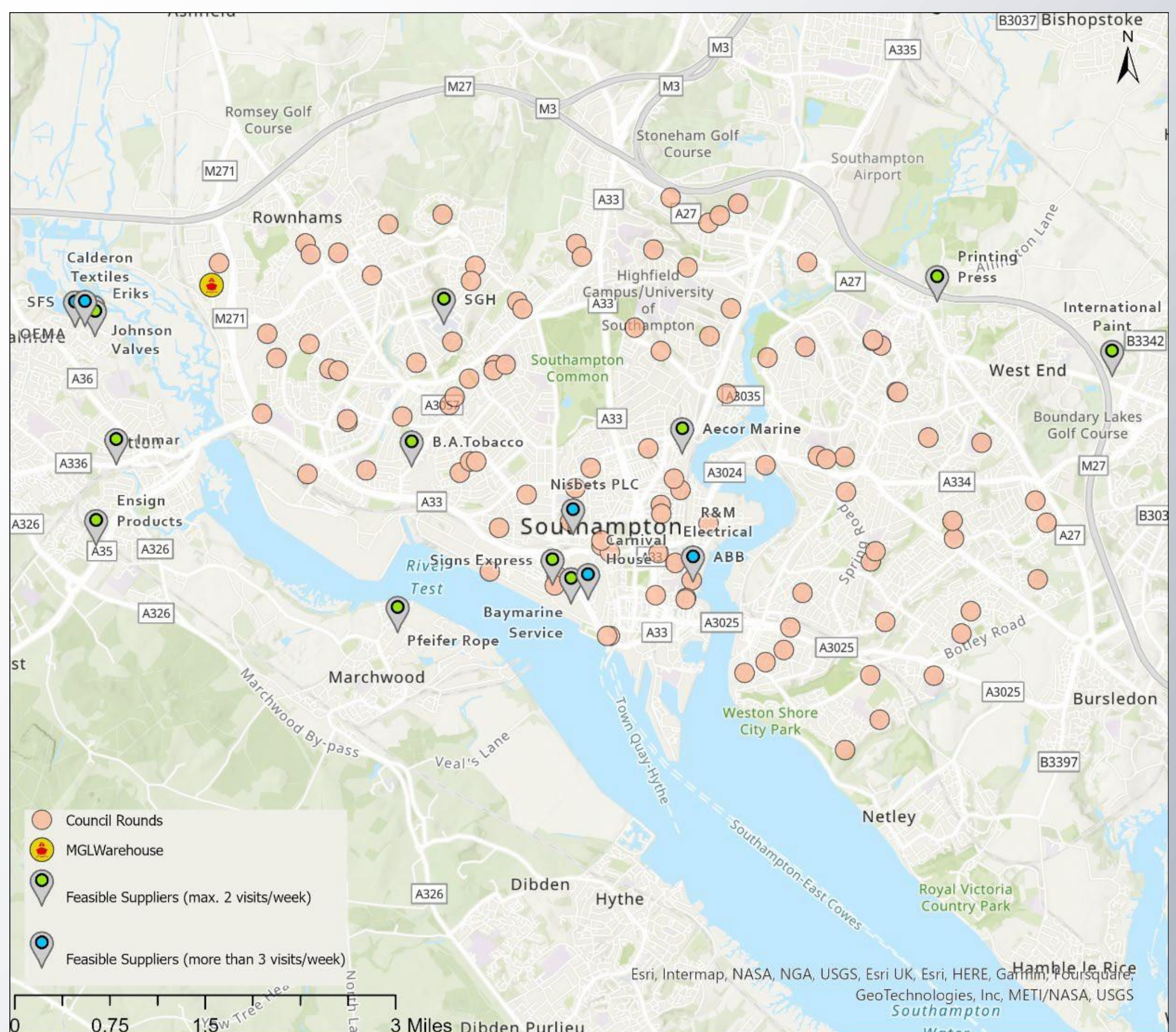


Fig.3: Suppliers of Carnival UK and council couriers’ locations. Blue pins represent the selected most feasible suppliers for a real-world trial, and green pins represent others.

References

- Grote M, Cherrett T, Whittle G and Tuck N (2021) 'Environmental benefits from shared-fleet logistics: lessons from a public-private sector collaboration', *International Journal of Logistics Research and Applications*, 1-27.