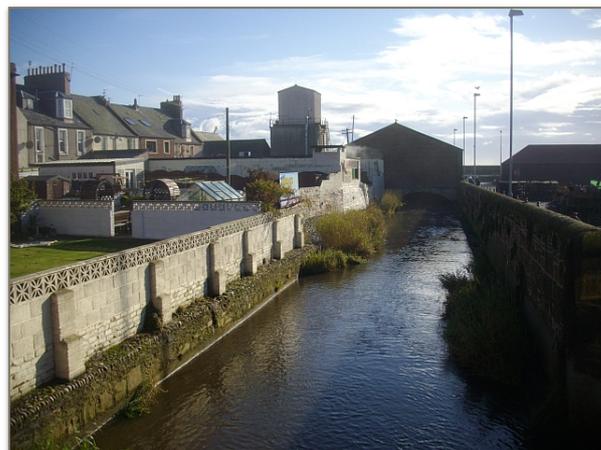


# ARBROATH HARBOUR

## LITTER PREVENTION ACTION PLAN



## OUTCOMES REPORT

**CLEAN HARBOUR AND CLEAN SEAS  
ANGUS CLEAN ENVIRONMENTS**

## DEDICATION

ACE would like to dedicate this report to the late Ralph Coutts who was passionate about environmental issues and contributed significantly to the Arbroath Harbour project.

# 1. ACKNOWLEDGEMENTS

Angus Council: Support and Intervention across all areas.  
Scottish Water: Generous legacy funding.  
Keep Scotland Beautiful: Analysis and Interpretation of survey data.  
Arbroath Football Club: Save our Seas Litter Champions.  
Sustrans: Various resources.  
Sea No Waste: Discount vouchers.  
Zero Waste Scotland: Nudge training.  
Colin Grant Trust: Funding for heritage sign post.  
British Council. Know You More: Active Citizens Training.  
Neighbourly Environmental Grants: Littoral Sci/Art project.  
Angus LEADER: Funded the Angus Litter Summit in 2017 and also 90% of the purchase of an ATV by East Haven Together



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### 3. Introduction

#### Angus Clean Environments

Angus Clean Environments (ACE) is a network of individuals, groups, businesses and organisations who care about the landscape and environment of Angus. ACE was established following the Angus community led litter summit of 2017 (1) and is motivated by a desire to reduce littering and ensure that future generations can enjoy clean, green spaces and healthy seas and wildlife. Angus is an area of outstanding natural beauty and there are many of its citizens who are passionate about the places in which they live and like to visit. ACE shares the Scottish Government's vision of a litter-free Scotland, laid out in the national litter strategy [Towards a Litter-free Scotland](#) (2), which recognises the social, environmental and economic benefits of a cleaner, greener Scotland.

#### Arbroath Harbour

Arbroath harbour is one of the most scenic harbours on the east coast of Scotland. It is important to tourism, fishing, local businesses and to the people of Arbroath and wider Angus. Thousands of people visit the harbour area every year via National Cycle Route 1 which extends along the coast and through the harbour.

The harbour itself is tidal and consists of an inner and outer harbour. It is used by inshore fishing boats, commercial vessels and leisure boats. The water in the inner harbour is maintained at a minimum of 2.5m. As a result, any litter escaping into the harbour is not easily retrievable.

Despite its picturesque appearance the area around the Harbour is ranked by the Scottish Index of Multiple Deprivation (SIMD) as being amongst the 10% of the most deprived areas in Scotland. A report by Keep Scotland Beautiful (3) in 2017 highlighted that environmental quality is declining more severely and at a faster rate in the most deprived communities.

Initially local residents raised concerns about the Harbour area. There were concerns about litter of all types but particularly food related items which were escaping into the sea. It was also known that large amounts of litter were being carried down the Brothock Burn. The Brothock burn is around 11km long and passes through Letham Grange and St Vigeans before falling into Arbroath Harbour. The United Nations Environment Programme (UNEP) states that 80% of litter in Scotland's marine environment is transported there from land by rivers, drainage or wind. More recent research has suggested that the amount of plastics in Scottish seas as a result of littering by the public could be as high as 90% (4).

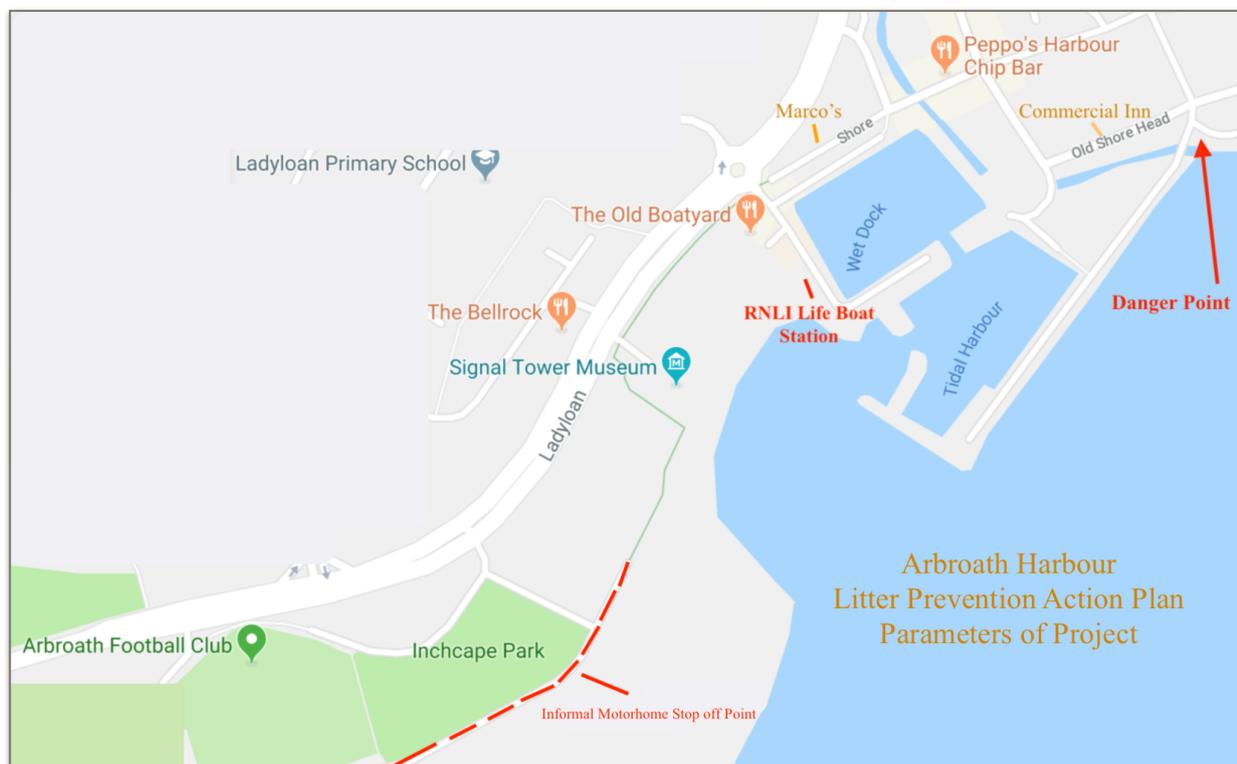


During late summer 2018 when social media posts began to appear many people laid the blame for the litter problems firmly at the door of the Local Authority. There were calls for the Council 'to do something' and get the area cleaned up. Whilst Angus Council certainly have a role to play, ACE recognised that the Council were only part of the solution and that there were many stakeholders who needed to take ownership of the problem. Individuals within ACE decided to use the skills and learning that they had developed over recent years to lead a community campaign which would enable and encourage others to work together and take personal responsibility to address the litter problem.

### Geographical Parameters of Project

The map below highlights the key areas covered by the project which extends from Danger Point in the Fit O'the Toon, through the harbour, along Queens Drive, Inchcape Park and as far west as the sea-front behind Gayfield football stadium and the area behind Pleasureland.

Fig 1: Map Highlighting the Geographical Parameters Of The Project



Although Angus Council has not designated the area at Queen's Drive, Inchcape Park, as a motorhome site, the public have established it as a hot spot for wild camping and it is heavily used nearly all year round. Whilst most motorhome users are responsible and take their litter away, a minority leave waste in the area.

Arbroath is renowned for fresh seafood and there are several restaurants and fast food outlets in the area. During the summer, visitors and locals alike enjoy sitting on one of the many benches in-front of the harbour or along the sea-front enjoying food and beverages. Some individuals remove their waste but others simply leave it where they stand or sit, risking litter and plastics escaping into the sea. In addition, smokers can be observed stubbing out cigarettes in various locations and leaving them to be picked up by wildlife or washed down drains and carried into the marine environment.

## 4. Methodology

A Litter Prevention Action Plan was developed in collaboration with a wide range of stakeholders. ACE is firmly of the view that resilient communities are developed when all stakeholders in an area work together to achieve common goals. It should be noted that key players may not always be located within the target area so careful consideration was needed from the start to identify all relevant stakeholders. This was an important part of the assessment and planning process.

One of the ACE co-ordinators had previously participated in an 'Active Citizens' social leadership programme funded by the British Council and nudge training funded by Zero Waste Scotland. This support provided ACE members with the confidence to undertake an evidence-based, whole systems approach to the project. The overall aim of the Arbroath Litter Prevention Action Plan is to create a clean healthy environment, reduce waste and prevent litter from escaping into the sea.

ACE worked collaboratively with all stakeholders and supporters. They shared knowledge, ideas and resources to enable delivery of the plan and influence others.

- Key stakeholders and supporters were identified and involved in the design and planning of the project. These included; Local residents, Managers/Owners of local food outlets, Arbroath RNLI, Arbroath Harbour Personnel, Ladyloan Primary School, Arbroath Football Club, Sustrans, Waste Management Services at Angus Council and Angus residents living outside Arbroath Harbour but with a strong interest in the area.
- The nudge BASIC framework was used to assess and identify behaviour change interventions
- The plan was dynamic in that it was kept constantly under review and updated on seven occasions throughout the course of the project.

- Richie Strachan, Waste Services Co-ordinator, Angus Council delivered training to five members of ACE to enable them to use a standardised approach to litter data monitoring. This method is a development of the Local Environmental and Audit Management System (LEAMS) which is widely used across Local Authorities in Scotland. An initial seminar provided insight into the process and a practical session enabled participants to carry out surveys under supervision thereby gaining confidence in the process.



Subsequently, the Harbour Project area was divided into five 100 m<sup>2</sup> zones to enable a baseline to be established by undertaking pre-and-post intervention surveys of litter. This provided a standardised approach to measuring change and impact. Surveys were undertaken at roughly the same time every week to establish whether there was any change in litter by volume and type.

## Data Surveys Carried Out In Five 100m2 Transects Across The Project Area

**Zone 1:** Harbour area along the car park in front of 'Marcos Fish&Chips' on the Shore.

**Zone 2:** Beach area up to the 3 posts in front of the pumping station at Inchcape Park.

**Zone 3:** 3 posts at the pumping station along to the first red dog bin.

**Zone 4:** Red dog bin along to end of rear wall Gayfield Football Stadium.

**Zone 5:** Back of Pleasure Land round to Chalmers Filmhouse.



Photo above: On-site training.



Photo Left: shows harbour in distance. Signal Tower to left. The three posts in-front of the pumping station delineating zones 2 and 3.

A total of 21 litter assessment surveys were undertaken prior to the project intervention phase and 20 post-intervention surveys were undertaken between 17 June and 21 October 2019. It was intended to undertake further litter assessment surveys in 2020 to provide comparable data based on the same periods in 2019. However, the social and lifestyle changes brought about by Covid 19 are such that it will not be possible to obtain any comparable data in 2020. However, independent analysis of the pre- and post-intervention surveys (phase 2 and 4) has been undertaken by Keep Scotland Beautiful and is discussed on pages 24 to 28.

## Project Phases

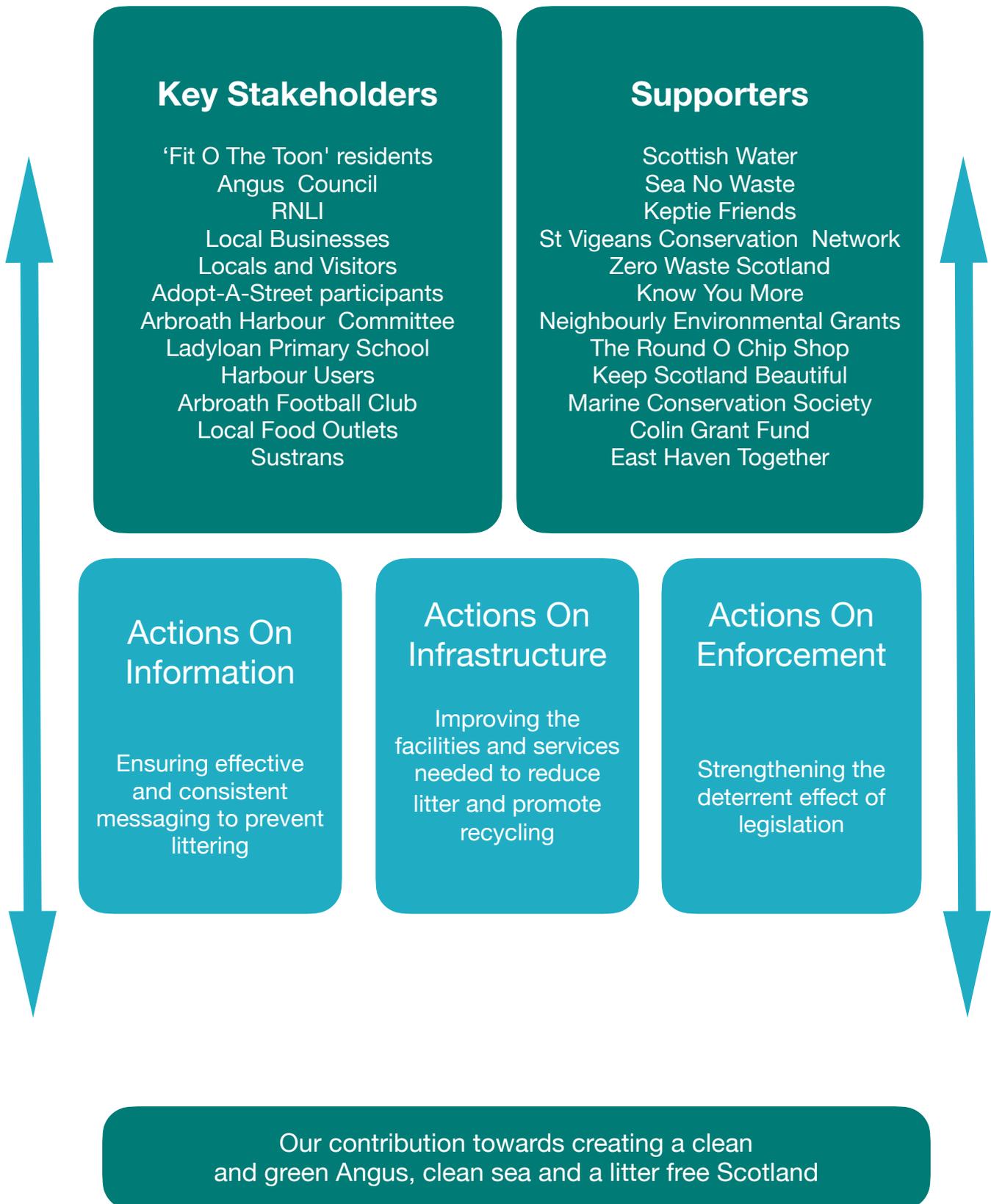
Project Phases	Timescales
<b>Phase 1</b>	
Assessment, Stakeholder Mapping, Consultation, Engagement, Design and Planning, Training and Fund Raising	Sept 2018 March 2019
<b>Phase 2</b>	
Baseline Pre -Intervention litter surveys over five 100m2 zones across the project area.	March - April 2019
<b>Phase 3</b>	
Intervention phase: Implementation of new infrastructure, nudge interventions and public engagement.	01 May 2019
<b>Phase 4</b>	
Post intervention; Litter surveys over the same five 100m2 zones as identified in phase 2. More detail about these areas can be seen on page 10.	June 2019 to October 2019
<b>Phase 5</b>	
A focus on enforcement to target individuals continuing to litter.	September 2019 onwards
<b>Phase 6</b>	
Save our Seas - Arbroath Football Club Litter Champions	October 2019 March 2020



The implementation phase of the project was launched on 01 May 2019

Picture: Graeme Dey MSP, the late Ralph Coutts (ACE), Cllr David Fairweather, Jean Stewart (ACE), Susanne Austin, Angus Council, Wendy Murray (ACE)

## The Arbroath Harbour Action Plan Was Structured Around The Three Cornerstones Of Intervention To Tackle Litter And Fly-Tipping As Highlighted In Scotland's Litter Strategy



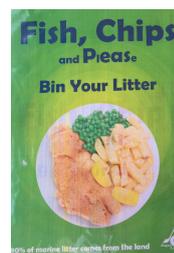
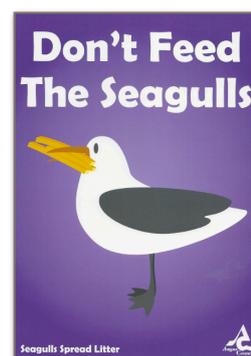
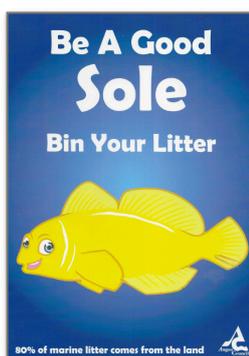
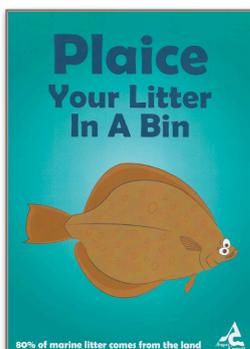
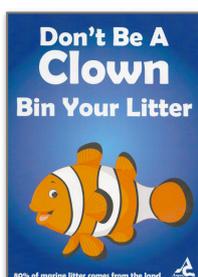
## 5. THE PLAN: Actions on Information

### ACTION ON INFORMATION. No 1.

#### Raise public awareness about littering in the local environment and the impact on marine life

Education and Communication: Connect with people's emotions and identities.

- Angus Council produced colourful eye catching posters which were displayed in local shops and wrapped on street furniture. The posters used a clever play on words to nudge people to change their behaviour and communicate key messages. (Appendix 1). They posters were installed on 01 May 2019.
  - Don't Feed the Seagulls
  - Bin Your Butts - Cigarettes Are Litter Too
  - Don't Be a Clown - Bin Your Litter
  - Plaice Your Litter in This Bin
  - Be A Good Sole - Bin Your Litter
  - Save Our Fish - Use your Fingers, Bin Your Litter
  - Fish, Chips and Please, Bin your Litter
  - Any Litter Bin Will Do (Clean up after your dog)
- An ACE member who had undertaken public engagement training with Angus Council in 2015 as part of the 'Collect and Pick up 3' initiative spent time engaging with members of the public to talk about littering. This was generally well received and there was high motivation amongst tourists and locals to reduce the amount of litter finding it's way into the sea. A small number of dog walkers and cigarette smokers were less inclined to engage positively in discussion about the correct disposal of their waste.



## ACTION ON INFORMATION. No 2.

Ladyloan Primary School overlooks the Arbroath Harbour area and therefore has a close relationship with the sea. The school was keen to become involved in the project both to aid the children's learning and to help make a difference to the marine environment.

- Education and Communication: To raise awareness amongst the children about the source of marine litter and the damaging impact on the environment
- Involve the children in activities to support their learning and help to reduce marine litter in the harbour area
- Brenda Carcary, Waste Strategy Officer at Angus Council delivered awareness training sessions to the children in the classroom environment. Ladyloan Primary School then adopted an area of beach near the former pumping station to carry out beach cleaning activities. Crawford Paris from East Grampian Coastal Partnership led on two beach cleans which were both coincided to launch the start of the Great Angus Beach Clean weekends held in April and September 2019. The work of the children was highlighted on STV and received wide press coverage.
- During the first major beach clean in May 2019 the children found a fairy liquid bottle lodged in the rock armour which was dated to the early 1960s. This was rescued from the waste and presented to the school by Councillor Marine Species Champion, Julie Bell.
- The children were subsequently awarded Marine Species Champion status by Angus Council.



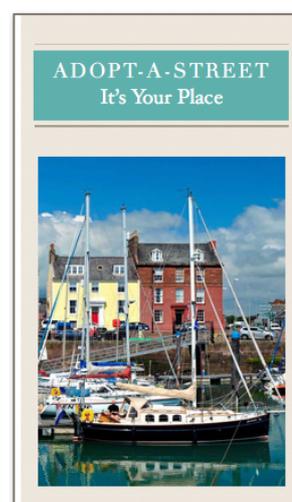
Children from Ladyloan Primary School helping with the Great Angus Beach Clean May 2019. Bottom Right; Councillor Marine Species Champion, Julie Bell presents the children with the old fairy liquid bottle that they found in the rock armour.

## ACTION ON INFORMATION. No 3.

### Incentivise and involve people on the Angus Adopt-A-Street scheme

Leading plastic free business, Sea No Waste, based in Arbroath donated 10% off vouchers to all those registered on the Adopt-A-Street scheme

The 10% off vouchers were distributed to Angus residents participating in the Adopt-A-Street scheme along with a newsletter. Adopt-A-Street is a partnership project with Angus Council and ACE. Members of the public are provided with a free litter picker and hoop if they commit to undertake regular litter picks in an area they care about. Several people on the Adopt-A-Street scheme contributed to clean-up efforts in the Arbroath harbour area.



More information about Adopt-A-Street can be found on the ACE website; [www.aceangus.co.uk](http://www.aceangus.co.uk)

## ACTION ON INFORMATION. No 4.

### Educate and raise awareness about the damaging effects of plastic marine litter through a creative art and science project

Education and Communication: Public art event at the harbour

A public art event led by littoral sci-artist Julia Barton was funded by Neighbourly Grants (TK Maax) and Tayside Biodiversity Partnership and held on Friday 13th September 2019.

Around sixty children from Ladyloan Primary school participated and helped to build litter cubes from plastic bottles and other items of marine litter. Amongst other things, the children learned about where plastic comes from and how much oil is required to make one plastic bottle. The children were involved in making and weighing cubes of plastic and making mathematical calculations. A large percentage of the plastic bottles used to make the litter cube had been collected during the beach clean carried out by the children themselves. Members of the public were also able to listen and ask questions. The following day, the plastic litter cubes were displayed during a school fayre to enable parents to understand more about the work their children were involved in. There was widespread interest amongst parents, carers and children who were very engaged and enthusiastic participants.



Above left; Julia Barton, Littoral Sci/Artist working with pupils from Ladyloan Primary School.  
 Bottom right; Crawford Paris speaking to children and parents about marine plastics at the School Fayre.

## ACTION ON INFORMATION. No 5.

### **Raise awareness about the need to dispose of fast food litter appropriately**

- Education: Work with local businesses to raise awareness about the link between food packaging and marine litter
- Posters were produced for local fish and chip outlets making a direct link between street litter and marine litter. We considered more explicit/graphic posters which would shock people (e.g injured marine wildlife or sea birds ingesting plastics) but decided against this. Building on nudge principles, we agreed with Angus Council who designed and printed the posters that ‘friendly, subtle and engaging’ was the most appropriate approach.
- ACE members visited food outlets not just in the harbour area but across Arbroath to engage them in the project. We were greatly encouraged that a couple of establishments had already worked hard to consider more sustainable forms of food packaging. All outlets were aware of the damage single use plastics cause, especially if allowed to escape into the sea. However, in the course of speaking to business owners and exploring more sustainable packaging options we became aware of the limitations of compostable and other so called sustainable items. For example, some alternative environmentally friendly packaging is at least three times as expensive and is unlikely to be either compostable or recyclable in Scotland. We were concerned that if we persuaded business owners to change their single use food packaging for something more expensive which ultimately still went to waste thereby creating more CO2 emissions then it would be damaging to all concerned. The focus of our intervention therefore changed to one aimed at simply obtaining the support of business owners to encourage customers to dispose of their food related litter either at home or in the bins provided.

## ACTION ON INFORMATION. No 6.

**Litter from Arbroath Football Club stadium within the Harbour project area is escaping into the sea.**

- Community Action: Explore ways in which to reduce litter escaping from the stadium into the sea.

ACE met with Club Director Brian Cargill and Cllr Derek Wann in February 2019 to discuss the Harbour project. ACE acknowledged that the challenges of managing litter within sports stadia are complex. In 2014, the SFA commented that, "due to security and health and safety, the management of waste and recycling was a major challenge for many clubs". For these and other reasons, it has become established practice for fans to drop their litter where they stand or sit. Food related litter is a major issue as pies, fast food and beverages are sold from outlets within grounds. As Arbroath Football Club is very close to the sea some litter inevitably escapes into the marine environment. Brian and the wider Board, were keen to support an initiative which would seek to both change littering behaviours and reduce the risk of litter escaping into the sea. A comprehensive assessment and plan 'Save our Seas' was implemented which resulted in the Club receiving an award from Keep Scotland Beautiful for their achievements. This is a summary of the key actions which took place;

- Two members of ACE attended a match on 16 March 2019 to observe littering behaviours amongst fans and carry out an assessment of the bin infrastructure within the stadium.
- The club installed new bins in areas of the stadium that would not previously have had bins. They obtained sponsorship to help fund the new infrastructure and promote the initiative. The club also produced colourful information wraps using football related slogans to engage fans (see images in red below).
- The club held a football anti-littering poster competition amongst its new 'Young Lichties Supporters Club'. ACE judged the submissions. It was an inspired idea as it provided an important opportunity to influence the next generation of fans.



**"Di di di di di di di di,  
di di di di di di Dink ...  
..... it in the bin"  
says McKenna**

Be a Litter Champion with 

**"Stick it in the bin"  
says Bobby Linn**

Be a Litter Champion with 

**"Every Little Helps"  
says Ricky Little**

Be a Litter Champion with 

### Arbroath Football Club - Save our Seas. Litter Champion

- ACE volunteers led on developing a Litter Champion scheme at matches. The Club provided free match tickets and pies at half time to volunteers who were willing to get involved.
- Helping Hand donated litter pickers and Angus Council donated hoops. Biodegradable waste bags were used.
- Litter Champions made themselves visible prior to the match by walking along the terraces allowing people to deposit their litter into bags. It was also an opportunity to engage with fans about litter issues and explain more about what the Club was trying to achieve.

During the game itself some Litter Champions either watched the game whilst others continued to discreetly and unobtrusively maintain a presence collecting litter where they could. After the game, Litter Champions carried out a sweep of the stadium to ensure that every item of litter was removed. Overwhelmingly, fans on all sides have welcomed the opportunity to do the right thing with their litter.

These are some of their comments;

- Thanks - I hate leaving my litter in the stadium.
- Thanks so much for doing this. It's really important.
- This is just brilliant. It's terrible for the kids to see adults leaving their litter everywhere.
- Thanks very much. All stadiums should be doing this.
- I hope the SFA know what you are doing?
- All clubs should be taking note.
- Please can I give you some money. I really want to show my gratitude.
- We don't want to leave our litter under the seats you know but there just haven't been any bins.
- We are going to go back and let our club know what you are doing. We should be doing this.

Restrictions imposed by Covid 19 brought the season to a premature end but all concerned agree that Save our Seas and the Arbroath Football Club Litter Champions is a very successful initiative with learning for other clubs and sports stadia.



## 6 The PLAN: Actions on Infrastructure

### ACTION ON INFRASTRUCTURE. No 1.

**An assessment was undertaken in late 2018 to consider the bin infrastructure and the way in which the environment influences human behaviours. Saliency - Prompts - Preferred actions.**

- A bin was missing from an area called Danger Point. Despite this, the public were leaving litter in the space where the bin used to be. Cigarette butts were also evident in large numbers.
- The public were leaving their used food box containers on benches and walls as the bins were filling too quickly due to the size of the packaging. Seagulls were also noted to be pulling food-related litter items out of bins.
- Some of the bins and street furniture were looking tired.
- Scottish Water agreed to provide legacy funding following completion of some work at Danger Point. This enabled two new weather and seagull proof bins to be purchased. They were installed at Danger Point filling the space left by the missing bin. Bins which also integrated cigarette trays on the top were selected to try and nudge people into disposing of cigarette butts appropriately.
- Three additional 140L brown wheelie bins were installed in key areas along shore road for large food waste packaging.
- All bins were wrapped in the new harbour project posters and maintained in the best condition possible to attract people to use them.
- A new 'Recycle on the Go' bin was installed near the Sustrans path to encourage people to recycle litter appropriately. Monitoring by Angus Council has highlighted a high degree of contamination on occasion. However, it is the first bin of this type in the area and perhaps an indication that more public education is required similar to the 'Right stuff Right bin' campaign.
- A meeting was held with Bruce Fleming, the Harbour Master, to obtain information about the contribution harbour staff make to keep the area clean and identify the problems they encounter. This was also an opportunity to explore ways in which commercial fishermen could reduce the amount of litter escaping into the marine environment. The Harbour Master makes three 1280L metal bins available for harbour users. These are continually monitored to ensure appropriate use by the right people. Incidents of fly-tipping are carefully monitored and reports shared with Waste Management Services at Angus Council. With hindsight more effort should have been made to engage Arbroath Harbour Joint Consultative Committee as they are a critical stakeholder with influence over other parties who are not necessarily located in the area but are potentially part of the solution. At the last count, 31 commercial fishing boats are berthed at the harbour along with 5 fare paying passenger boats and 9 pleasure boats. A significant number of private yachts and boats also berth in the harbour.
- ACE members made additional attempts to speak directly to boat owners and fishermen about marine litter.

## ACTION ON INFRASTRUCTURE. No 2.

### Council cleaning and bin emptying schedules were clarified

- Harbour Staff undertake a comprehensive clean-up every morning at 7am.
- Waste Management Services empty bins at 8am and during busy periods they will be emptied again later in the day
- The large harbour bins are emptied twice per week.
- ACE - Adopt-A-Street individuals undertake additional weekly cleans

It was useful to clarify roles and responsibilities to ensure best use of resources and reduce the risk of unnecessary duplication of action.



Councillor Lynne Devine, Crawford Paris (East Grampian Coastal Partnership) and Councillor Julie Bell raising awareness about the dangers of Cigarette Butts. September 2019

## ACTION ON INFRASTRUCTURE. No 3.

### Raise awareness that cigarette butts are litter

- Engage with members of the public. Raise awareness about plastic in cigarette butts.
- Ensure the public understand that cigarette butts are litter and are damaging to the marine environment.

Smoking related materials comprising cigarette packets, cigarette butts and e-cigarette materials were the most frequently littered item across the harbour area. During the pre-intervention phase they represented 43% of all items and 57% in the post-intervention phase. Despite these figures, littering of smoking related materials was reduced by over a third after the intervention phase which began on the 01 May 2019.. The interventions relating to cigarette butts was mainly around education and some changes to the infrastructure to nudge smokers into binning their butts.

- During discussions with members of the public it became apparent that very few smokers were aware that cigarette butts contain plastic.
- A poster highlighting that cigarette butts are litter too was produced by Angus Council and placed in areas noted to have a high levels of cigarette related litter.
- Opportunities were taken to raise public awareness about the dangers of cigarette butts. Smokers were generally more reluctant than other groups to engage in discussion about how they dispose of their butts.
- Smokers sitting on benches next to a bin with a cigarette ash tray on top were observed to be more likely to use it to dispose of their butt.

## ACTION ON INFRASTRUCTURE. No 4 .

### Reduce single use plastic and non-sustainable food packaging

Raise awareness amongst politicians about the need for industrial composting and recycling units to process sustainable forms of food packaging.

- As noted in Action on Information No 6, the intention that ACE would persuade all food outlets to use more sustainable food packaging was abandoned when it became clear that the issue of food packaging was complex. The evidence base around sustainable alternatives to single use plastic was found to be confusing and often misleading. Not everything that claims to be biodegradable, recyclable or compostable is so. This investigation led to a recognition that more work is required to consider how the transition from a single use to a reuse culture can be applied to food containers other than coffee cups. Also, the role of businesses in contributing to producer responsibility arrangements for managing packaging at 'end of life' requires clarification.
- The owner of the 'Round O' and Cairnie Fish and Chip shop in Arbroath deserves a mention in this report due to his ethical business approach as he strives to be sustainable and socially responsible in all aspects of the business. He has considered and reviewed all types of sustainable forms of food packaging. Although well aware of how expensive the alternatives are and that the infrastructure is not available to recycle and compost he has made changes. He takes the view that businesses are in a unique position to influence and change public attitudes and that businesses have a responsibility to think about the end use of their packaging. Switching to compostables has sent out a strong message to his customers and is helping to raise awareness about the environmental damage caused by single use plastics.

## ACTION ON INFRASTRUCTURE. No 5.

### We will make it easy for the public to pick up litter when they see it.

- The RNLI are stationed within the Harbour area and are therefore a key stakeholder. They were very keen to offer support and contributed towards the planning of the project.
- Subsequently, a 'Litter Share Station' was installed on the wall of the RNLI to encourage members of the public to get involved and pick up litter whenever they see it. Small biodegradable bags are kept within the box to enable the public to bag it and bin it.
- Alex Smith at the RNLI also provided inshore lifeboats with nets to enable their personnel to lift floating litter when out on the water.



Left: RNLI building. Right: RNLI representative, Ralph Coutts and Jean Stewart (ACE)

## No 6. ACTION ON INFRASTRUCTURE

**Area at Old Shore Head and around the harbour area to be enhanced to promote local heritage and send out a strong message about pride in place.**

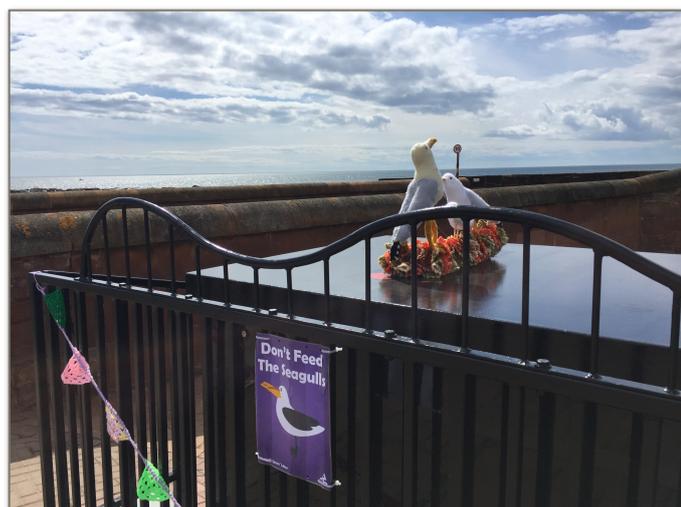
- Engage with local residents and those living in and around the Harbour area.
- Residents in Old Shore Head ('Fit O the Toon') area persuaded Scottish Water to provide legacy funding to enable the provision of new litter bins at Danger Point and enhance the area around the green with a rockery and new wash poles. The Colin Grant Trust paid for a heritage signage post and the planting of the rockery with an array of beautiful coastal plants.
- Scottish Water also arranged to freshen up paintwork around Danger Point and repair the metal seats.
- Angus Council agreed to re-paint benches along the harbour front
- Residents developed a new constituted group, Fit O The Toon Residents' Association (FIDRA) and also a 'Woolly Workers' group. A fabulous yarn bombing display took place in summer 2019 in recognition and celebration of their achievements. At Christmas, Woolly Workers also held a winter wonderland on the green decorating the wash poles and lighting up the area.
- Following consultation with members of the public, the Sustrans Milestone near the Signal Tower was repainted in the colours of Arbroath Football Club (Red Lichties) both to promote the project and also to celebrate the Club being promoted into the Championship League.



Above; Wendy Murray and Laura White (Sustrans) painting the milestone with Chairman of Arbroath Football Club, Mike Cairns.



Above Right; Jilly Henderson, Woolly Workers and Claire Walmsley with residents from the Fit O' the Toon at the celebratory event.



## ACTION ON INFRASTRUCTURE. No 7.

### Prevent litter entering the Brothock Burn upstream and travelling down to the harbour.

- Source to Sea
- A massive clean up exercise was undertaken along the Brothock Burn in May 2019 by St Vigeans Conservation Group and Keptie Friends to prevent plastics and fly-tipped items floating further down the burn and into the sea. A massive amount of littered materials were removed during a mammoth exercise which involved people climbing down the walls of the Brothock and wading through water. Many items had clearly been fly-tipped and included old bikes and household objects.
- Additional work was carried out upstream talking to vendors and other stakeholders to help prevent items being thrown into the burn. Source to sea.
- Ralph Coutts was passionate about cleaning the Brothock Burn both to protect wildlife and to prevent debris from flowing down to the sea. He regularly led on events to clear the burn up-stream in the St Vigeans area. During the planning phase of the Arbroath Harbour project he undertook investigatory work to explore various methods of installing structures to collect litter at the mouth of the burn in the harbour. However, these structures were found to be costly, required careful consideration to avoid damaging wildlife and also involved work schedules to continue to clear them. Consequently, this option was not progressed further at this time. Instead, Ralph focussed his efforts on preventing items from entering the burn at source which involved engaging with a range of individuals and also businesses who operate near to the Brothock.



Ralph Coutts along with others from St Vigeans and Keptie Friends clearing out items from the Brothock Burn. (May 2019).

## ACTION ON INFRASTRUCTURE. No 8.

### Members of the public and stakeholders to be encouraged to participate in maintaining a clean environment

- 2 minute clean ups to be promoted in the area.
  - People to be encouraged to participate in beach cleans
  - More people to be encouraged to register with Adopt-A-Street
- 
- The first Great Angus Beach Clean took place from 10th to 12th May 2019. AngusLEADER provided 90% grant funding to the community group, East Haven Together, to purchase an All-Terrain Vehicle to uplift heavy items of marine litter. This acquisition enabled the transition from small local beach cleans to an event on a much larger scale involving more than 200 individuals representing local businesses, community groups and members of the public. Over three tonnes of litter was removed from the beaches between Carnoustie and Victoria Park Arbroath. East Grampian Coastal Partnership helped launch the event with pupils from Ladyloan Primary School who undertook a beach clean on a 100m stretch in front of the former pumping station within the harbour area. Angus Council supported the event by removing and weighing all the waste which also included items removed from the Brothock Burn.
  - Sustrans donated a large number of 2 minute clean up bags which were handed out to local volunteers and also to children at Ladyloan Primary School. Some of these children and their parents have continued to beach clean in and around the harbour area in their own time. During the Covid 19 lockdown period it has been encouraging to observe that children from Ladyloan Primary have continued to engage with East Grampian Coastal Partnership 'Turning the Plastic Tide' marine education programme.
  - A further twelve people have registered with Adopt-A-Street during the project period bringing the total number of individuals/groups to 88.



Great Angus Beach Clean May 2019

Left: Members of the Salvation Army

Below left; Angus family

Below Right. Members of the Arbroath Oot N' About group



## 7. The PLAN: Actions on Enforcement

### ACTION ON ENFORCEMENT. No 1

#### Enforcement is one of the cornerstones of Scotland's Litter Strategy

The overall aim of the Arbroath Litter Prevention Action Plan is to create a clean healthy environment, reduce waste and prevent litter from escaping into the sea. In delivering a project with such an ambitious aim it was important to take a whole systems approach and start with actions on Information and Infrastructure before moving to Enforcement.

In summary, these were to;

- Identify and engage with all stakeholders
- Consult and Plan
- Connect with people's emotions and identities - educate and provide information
- Make it easier for people to dispose of litter appropriately by making improvements to infrastructure - Salience
- Change the default choice to ensure that preferred actions are taken - nudge
- Enhance the environment to send out a strong message about 'Pride in Place'.
- Provide feedback - updates of the plan
- Ensure people are aware that dropping any kind of litter is a criminal offence

The plan initially in phase 5 was to focus heavily on enforcement. Although a few spikes in littering had been observed over the summer period ACE agreed with Angus Council that a strong enforcement initiative involving the issuing of multiple Fixed Penalty Notices (FPNs) might be counterproductive. There was evidence that positive behaviour change was still taking place and we did not want to risk losing public support by employing a more punitive approach at this time. Instead, Council staff were visible in the area and along with ACE remained actively involved in engaging with locals and visitors. Talking to people in this way provided opportunities to share information and increase public awareness about the link between terrestrial litter and marine litter. Despite the fact that there had been a reduction of over a third in the amount of cigarette butts being littered they remained the most littered item across the project area. This was not entirely surprising as the Council had identified cigarette butts as the most frequently littered item across Angus as a whole. As a result, Waste Management Services decided to launch a new initiative to focus entirely on cigarette butts. Ballot style bins were installed in the high street close to the Harbour area and ACE was invited to contribute ideas for the ballot. Following awareness-raising about the initiative, Angus Council then moved to issuing Fixed Penalty Notices to those who persisted in littering these items despite all other efforts to change behaviour. Three Fixed Penalty Notices were issued in January 2020 which reminds people that littering cigarette butts is a criminal offence which carries consequences. Had the flu pandemic of 2020 not impacted life in such a way then it would have been a useful exercise to establish whether a new focus on enforcement would have helped to sustain a reduction in littering.

Ballot Box style bins installed by Angus Council in Arbroath High Street.



## 8. RESULTS: Analysis of Data

Table 1 illustrates that there was a halving of litter between the pre- and post-intervention phases. This equates to 33 less items of litter per 100m<sup>2</sup> counts between the two phases and was consistent across all areas for both small and large items of litter. Small items of litter are defined as being slightly less than the size of a credit card and include items such as cigarette ends and sweet papers. Large items are defined as being larger than the size of a credit card and include items such as food packaging and drinks containers. Dog waste whether bagged or un-bagged is classed as a large item.

Table1: Difference In Overall Litter Count Pre- and Post- Intervention

	Large	Small	Total
Average Litter Count Pre-intervention	12.05	51.76	63.81
Average Litter Count Post-intervention	5.95	24.80	30.75
Difference	-6.10	-26.96	-33.06
% Difference	<b>-50.6%</b>	<b>-52.1%</b>	<b>-51.8%</b>

As can be seen in Table 2 overleaf the greatest percentage difference in litter between the pre- and post-intervention surveys was a 65.6% reduction and this occurred in Zone 3. However, there were only two surveys undertaken in the pre-intervention phase in this zone and whilst there was some variance between the small items counted (31 and 52) there was more consistency with regard to the large items (29 and 23). Zone 5 showed the smallest difference in litter with a 26.2% reduction. This is an interesting outcome as Zone 5 was the area of least intervention and indicates that there may be benefit in undertaking more work in this area. It should also be noted that in January 2019, the outer harbour wall collapsed necessitating the closure of an area of car park in Zone 1. It is not known what impact this had on visitor numbers but a 56.5% reduction in litter was evidenced in this area.

**Table 2: Percentage Difference in Litter Reduction By Zone**

Zone 1	Large	Small	Total
Average Litter Count Pre-intervention	10.50	68.83	79.33
Average Litter Count Post-intervention	2.75	31.75	34.5
Difference	-7.75	-37.08	-44.83
% Difference	-73.8%	-53.9%	-56.5%

Zone 2	Large	Small	Total
Average Litter Count Pre-intervention	8.20	35.00	43.20
Average Litter Count Post-intervention	4.50	18.75	23.25
Difference	-3.70	-16.25	-19.95
% Difference	-45.1%	-46.4%	-46.2%

Zone 3	Large	Small	Total
Average Litter Count Pre-intervention	26.00	41.50	67.50
Average Litter Count Post-intervention	6.00	17.25	23.25
Difference	-20.00	-24.25	-44.25
% Difference	-76.9%	-58.4%	-65.6%

Zone 4	Large	Small	Total
Average Litter Count Pre-intervention	23.00	45.50	68.50
Average Litter Count Post-intervention	7.50	19.00	26.50
Difference	-15.50	-26.50	-42.00
% Difference	-67.4%	-58.2%	-61.3%

Zone 5	Large	Small	Total
Average Litter Count Pre-intervention	8.50	54.17	62.67
Average Litter Count Post-intervention	9.00	37.25	46.25
Difference	0.50	-16.92	-16.42
% Difference	5.9%	-31.2%	-26.2%

Tables 3a, 3b and 4 highlight the impact of the interventions on individual litter types. It is noteworthy that cigarette related materials were the most littered category comprising 43% during the pre-intervention phase and 57% post-intervention. Despite the fact that this item remained the most frequently littered, there was still a reduction of over a third after the intervention phase. Food and drink related litter accounted for 34.5% of the total items in the pre-intervention phase and fell to 29.5% in the post intervention phase.

Table 3a and Associated Diagram: Litter By Type. Pre-Intervention Phase

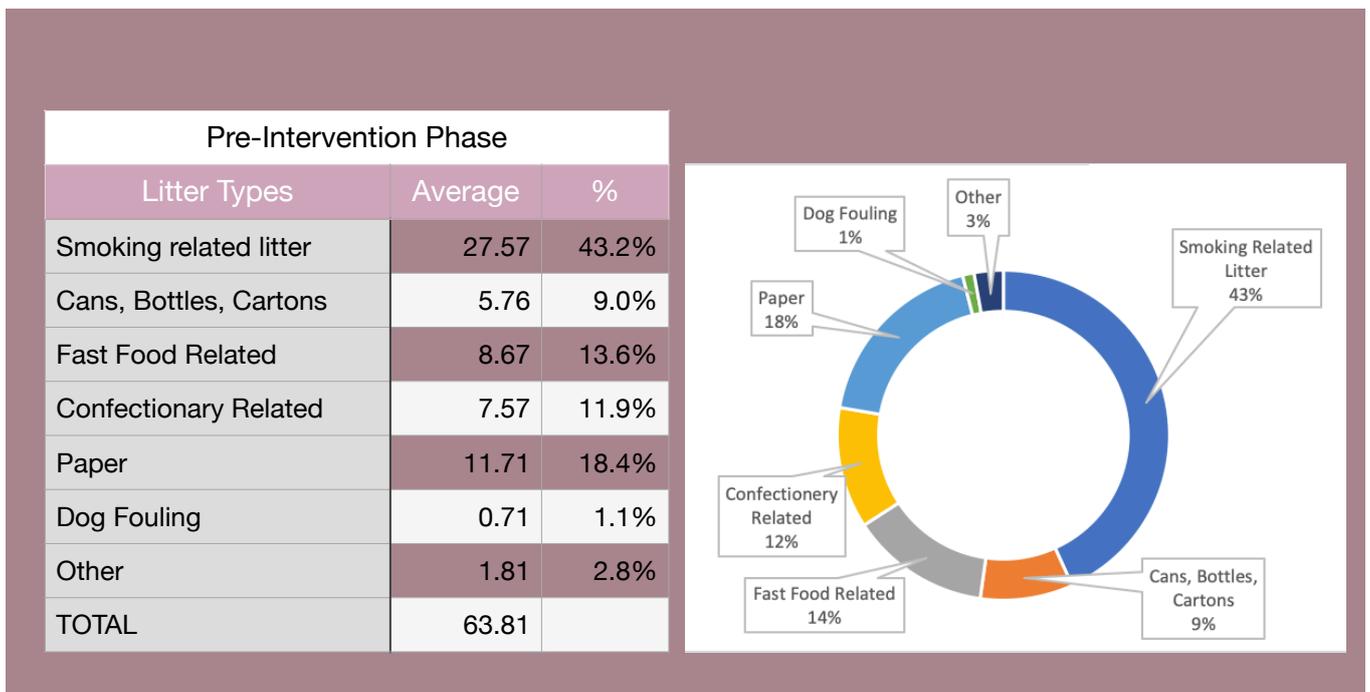


Table 3b and Associated Diagram. : Litter By Type. Post-Intervention Phase

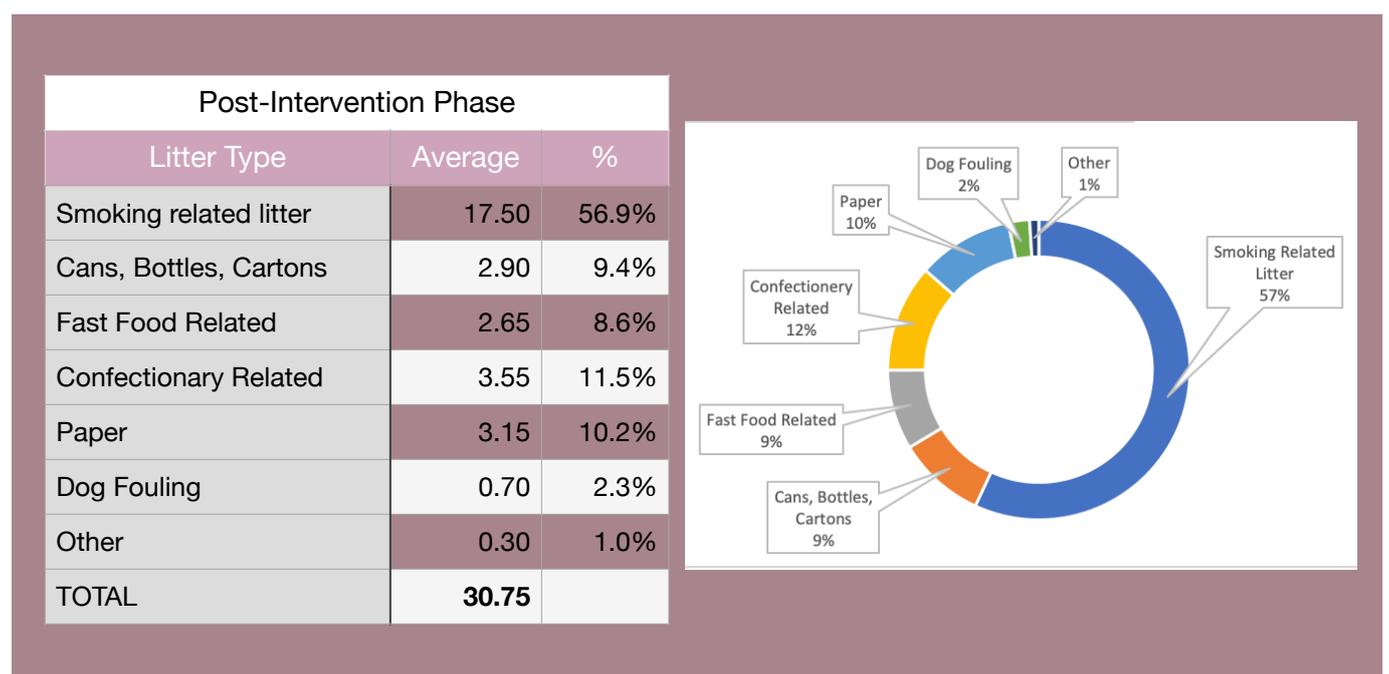


Table 4: Reduction of Litter By Type.

Smoking Related	Large	Small	Total
Average Litter Count Pre-intervention	0.33	27.24	27.57
Average Litter Count Post-intervention	0.35	17.15	17.50
Difference	0.02	-10.09	-10.07
%Difference	5.0%	-37.0%	-36.5%

Cans, Bottles, Cartons	Large	Small	Total
Average Litter Count Pre-intervention	2.38	3.38	5.76
Average Litter Count Post-intervention	1.30	1.60	2.90
Difference	-1.08	-1.78	-2.86
%Difference	-45.4%	-52.7%	-49.7%

Confectionary related	Large	Small	Total
Average Litter Count Pre-intervention	1.19	6.38	7.57
Average Litter Count Post-intervention	1.35	2.20	3.55
Difference	0.16	-4.18	-4.02
%Difference	13.4%	-65.5%	-53.1%

Fast Food Related	Large	Small	Total
Average Litter Count Pre-intervention	3.43	5.24	8.67
Average Litter Count Post-intervention	0.95	1.70	2.65
Difference	-2.48	-3.54	-6.02
%Difference	-72.3%	-67.5%	-69.4%

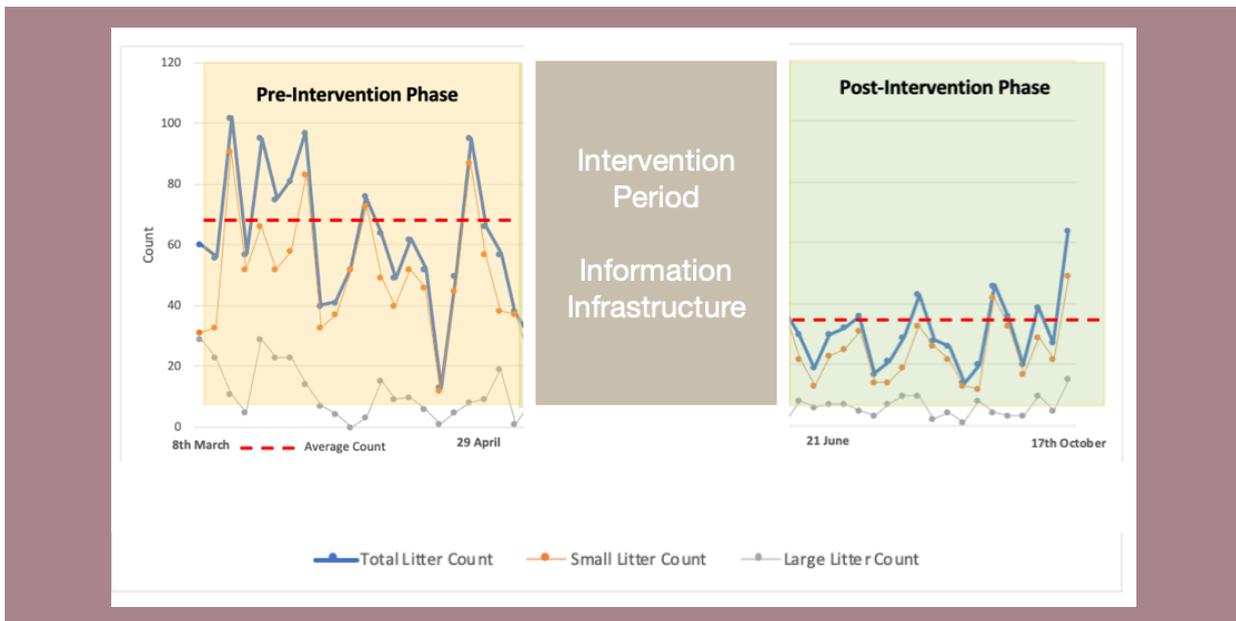
Paper	Large	Small	Total
Average Litter Count Pre-intervention	3.52	8.19	11.71
Average Litter Count Post-intervention	1.20	1.95	3.15
Difference	-2.32	-6.24	-8.56
%Difference	-65.9%	-76.2%	-73.1%

Dog Fouling	Total - Large
Average Litter Count Pre-intervention	0.71
Average Litter Count Post-intervention	0.70
Difference	-0.01
%Difference	-2.0%

Other	Large	Small	Total
Average Litter Count Pre-intervention	0.48	1.33	1.81
Average Litter Count Post-intervention	0.10	0.20	0.30
Difference	-0.38	-1.13	-1.51
%Difference	-79.0%	-85.0%	-83.4%

Fig 2 highlights a high level of variance in counts ranging from 13 to 102 in the pre-intervention phase to 14 to 64 in the post-intervention phase. There was a significant reduction in litter immediately after the commencement of the intervention on 1st May 2019. In the post-intervention period, it appears that the counts start on average, to gradually increase from the initial counts in June to the final count on 17th October where the peak coincides with the October school holidays.

Fig 2: Variance In Counts



Further analysis shows that the perception of litter in each of the zones improved between the two phases by an overall 17 points. This was replicated across all five zones but was most notable in Zone 1 at the harbour, where the perception rating improved by 37 points. This finding might be explained by the fact that there was a significant reduction in large items of food packaging and drink containers (69.4% and 49.7% respectively across the whole area). Large littered items make more immediate visible impact. Although the smaller items are less visible from a distance they can be equally damaging to wildlife and the marine environment.

Table 5: Difference in Perception of Sites between Pre-and Post-Implementation phase

	Overall	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
<b>Pre-Intervention Phase</b>	64	63	72	50	70	60
<b>Post Intervention Phase</b>	81	100	80	80	80	65
<b>Difference</b>	17	37	8	30	10	5

## 9. Recommendations

9	Recommendations	Links to Action
1	<p><b>Litter Data Monitoring</b></p> <p>ACE is extremely grateful to Angus Council for providing training into the methodology normally used by Local Authorities for collating data about terrestrial litter. Also, to 'Keep Scotland Beautiful' for their assistance in analysing and interpreting the pre- and post- intervention surveys. The project has highlighted the benefits to communities of being able to survey litter in the same way as the MCS marine litter surveys. ACE is very pleased to learn that Keep Scotland Beautiful has developed a new system for collating survey data about terrestrial litter which will be available towards the end of June 2020. This will enable individuals and communities across Scotland to analyse information about litter in their area and measure change over time.</p>	Methodology and Results
2	<p><b>Fast Food Packaging</b></p> <p>There is a need to provide businesses with clear guidance to enable them to make the right kind of changes to food packaging at 'Fast Food' outlets. The Expert Panel on Environmental Charging and other Measures (EPECOM) has already made recommendations to the Scottish Government on single use beverage cups (4). It accepts that it will take some time to shift the 'on the go convenience culture' and establish reuse as the social norm. It recommends clear messaging and labelling along with wider recyclability of items. Reforming producer responsibility arrangements which will require businesses to take greater responsibility for environmental impact and for the cost of managing packaging at the end of life is also recommended. Both businesses and consumers are confused and most people want to do 'the right thing'. It would be helpful if best evidence guidance could be made available as soon as possible and updated as developments and improvements take place.</p>	Action on Information 5  Action on Infrastructure 4
3	<p><b>Stakeholders and Partnerships</b></p> <p>The project highlights the importance of taking time to identify and map out all the stakeholders in a particular area. As highlighted in this report, key stakeholders may not be located in the area but may have high influence and power which can effect change. There are many examples in the report of partnerships being developed as stakeholders work together to achieve the key aims of the project.</p>	Action on Information 2, 3, 4,5, 6  Action on Infrastructure 1, 4,7,8

9	Recommendations	Links to Action
4	<p><b>Arbroath Football Club</b></p> <p>The 'Save our Seas Litter Champion' initiative with Arbroath Football Club far exceeded expectations. It also completely achieved the goal of preventing litter escaping from the stadium. Other football clubs and sports stadia might wish to take learning from this project</p>	Action on Information 6
5	<p><b>Cigarette Butts</b></p> <p>Perhaps there is a need for a new national campaign to educate the public about the safe disposal of cigarette butts. The Scottish Government introduced a ban on smoking indoors in March 2006. An unintended consequence of this legislation is that it pushed smokers out of doors and a culture of disposing of cigarette butts outside has developed. A large proportion of these end up in the drainage system contaminating waterways and the marine environment. Cigarette butts are now the most commonly littered item in Scotland which also makes them the most common item of single use plastic to be littered.</p>	Action on Infrastructure 3.
6	<p><b>Brothock Burn</b></p> <p>The clean-up of the Brothock Burn in May 2019 highlighted the amount of fly-tipped items and plastic bottles travelling down-stream and entering the sea at the mouth of the Brothock at the harbour. It is recommended that more work is undertaken to prevent items entering the Brothock upstream and recovering such items before they reach the sea.</p>	Action on Infrastructure 7
7	<p><b>Multiple Interventions Sustained Over Time</b></p> <p>Following a dramatic drop in littering immediately following the intervention phase the data highlighted a number of small spikes in littering and evidence of a slight upward trend. This indicates a need to remain vigilant and maintain a strong presence in the area engaging with both visitors and locals. Had the project maintained impetus in 2020 it would have been interesting to see whether or not a greater focus on enforcement would have helped to maintain the reduction in littering at June 2019 levels.</p>	Data Analysis. Fig 5.

## 10. Conclusion

The Arbroath Harbour project illustrates what can be achieved when people work together across communities, businesses, schools and organisations to make a difference and achieve common goals. Analysis of the data evidences that litter was reduced by half as a result of the interventions around information, infrastructure and enforcement. The Litter Prevention Action Plan has achieved its stated aim of creating a cleaner healthy environment across the harbour area and prevented a large volume of litter from escaping into the sea. Community capacity and resilience was strengthened through new partnerships and engagement with a wide range of stakeholders. The time and energy committed to building relationships at an early stage was time well spent as everybody had a crucial role to play in the overall success of the project.

The action plan highlighted the value of using a range of planned interventions to change default behaviours by altering the environment and nudging people in desired directions. Being visible as an Adopt-A-Street volunteer and engaging directly with members of the public about littering was also a powerful way of influencing behaviour. However, it is clear that continued effort is required long after the initial intervention period to ensure that desired behaviour changes are sustained over time. Also, that further education linked to enforcement might have a key role to play at certain stages to reinforce key messages.

ACE hopes that the Arbroath Harbour Project inspires other communities to take action and make a difference in the places that they care about.



## 11. REFERENCES

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