

FLOOD DATA COLLECTOR'S HANDBOOK

• A PRACTICAL GUIDE TO FLOOD DATA COLLECTION •

BAILE ÁTHA CLIATH
ARNA FHOILSIÚ AG OIFIG AN TSOLÁTHAIR
LE CEANNACH DÍREACH Ó
FOILSEACHÁIN RIALTAIS,
52 FAICHE STIABHNA, BAILE ÁTHA CLIATH 2
(TEIL: 01 – 6476834 NÓ 1890 213434; FAX 01 – 6476843)
NÓ TRÍ AON DÍOLTÓIR LEABHAR.

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OPW FRAM SECTION

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1 INTRODUCTION

BACKGROUND

The years 2009, 2011 and 2012 saw major flood events in Ireland, which resulted in the loss of life, impacted a large number of homes, commercial properties and farms, and disrupted rail and road travel. The Office of Public Works (OPW) received flood data for these events from a number of sources, including Local Authorities, members of the public and consultants working on the Catchment-based Flood Risk Assessment and Management (CFRAM) Programme. In Ireland, flood information is used to populate a national database of historic flood events, available to all at www.floodmaps.ie.

Accurate information relating to flooding impacts, causes and mechanisms is of great value when managing and understanding flood risk. Better flood records help to inform

future planning and development and can assist emergency response preparation. Data collected is also used to calibrate hydraulic models for flood studies. Information captured during or after flood events is used to help protect communities, homes and businesses and to save lives.

The EU 'Floods' Directive (2007/60/EC) and S.I. No. 122 of 2010 that transposed the Directive into Irish law set out certain requirements for flood risk assessment and management in Ireland. The collection and recording of information on flood events and their adverse impacts on human health, the environment, cultural heritage and economic activity are requirements of the Directive. Public authorities in Ireland will need to assist in this duty

to collect the relevant information and to submit it to the OPW which is the competent authority under the Directive.

INTRODUCTION

While the OPW greatly appreciates the time and efforts of those people who have collected and submitted flood data, the format and accuracy of flood data submitted in the past has been variable. To standardise and improve the quality of information gathered, the OPW has prepared this handbook, “A Practical Guide to Flood Data Collection”, as a guidance document outlining best practice methods in the capture of flood data in Ireland.

The purpose of this handbook is to set standards for flood data capture and to endorse best practices for data collectors, which will ensure that valuable information is collected effectively and

efficiently in a safe environment.

The primary audience of this handbook is Local Authority staff, and consulting engineers who would be required to collect flood data as part of their professional duties and responsibilities. The guide may also be of use to interested or concerned members of the public. However, while the OPW appreciates all efforts by members of the public to collect and record flood information particularly in the vicinity of their own properties, it does not advise or encourage members of the public to actively visit flood sites for the purpose of collecting data.

We hope you find the tips and advice in this handbook clear and concise. We aim to provide adequate and accessible guidance that will be of practical help for all flood data collectors. Any feedback and comments on the content of this handbook will be gratefully received.

2 HEALTH AND SAFETY

THE RELEVANCE OF THE RECOMMENDATIONS BELOW MAY VARY DEPENDING ON WHO YOU ARE – LOCAL AUTHORITY STAFF, AN ENGINEERING CONSULTANT, OR A MEMBER OF THE PUBLIC. OTHER INFLUENCING FACTORS INCLUDE THE CHARACTERISTICS OF THE AREA YOU ARE VISITING AND EXISTING CONDITIONS, E.G. A RURAL AGRICULTURAL AREA OR AN URBAN HOUSING ESTATE; PROXIMITY TO FAST FLOWING WATER AND THE TIMING OF THE PEAK FLOOD; WEATHER AND GROUND CONDITIONS. HOWEVER, IN ALL CASES IT IS ESSENTIAL THAT YOU ENSURE YOUR OWN SAFETY OR THAT OF OTHERS IS NOT PUT AT RISK BY GATHERING FLOOD DATA. APPLY YOUR OWN CAREFUL JUDGEMENT AND BE AWARE AND HAVE FULL REGARD TO ANY RELEVANT HEALTH AND SAFETY LEGISLATION WHEN OUTDOORS GATHERING FLOODING INFORMATION. ALL SUGGESTIONS BELOW ARE INCLUDED AS GUIDANCE ONLY.

If you feel that you are at unnecessary risk when on-site, stop what you are doing and return to a safe environment. Use common sense at all times, be aware of other flood response workers, such as clean-up or evacuation crews, and do not impede or hinder their work. You can always return to site at a later date if you feel you are in the way or at any risk.

YOUR HEALTH AND WELL-BEING ARE FAR MORE IMPORTANT THAN FLOOD DATA COLLECTION.

The best way to minimise the dangers you are exposed to on a site visit is by careful consideration of the risks and thorough preparation. This chapter contains three sections:

BEFORE YOUR SITE VISIT

WHILE OUT ON SITE

SAFETY EQUIPMENT

Aerial photograph of flooding in Ireland



**BEFORE YOU LEAVE TO
COLLECT FLOOD DATA
REMEMBER TO WATCH IT!**

W WEATHER

A AREA

T TIDES

C CREW

H HEALTH

I INVENTORY

T TELL SOMEONE

W – WEATHER

Obtain up-to-date weather conditions from Met Éireann, on radio, television or on-line (www.met.ie). Review the rainfall radar on http://www.met.ie/latest/rainfall_radar.asp

Is it likely that the river or flood levels may be still rising? You should prepare and act accordingly to the weather conditions forecasted, and do not collect flood data if there remains a significant risk of heavy rainfall and high winds, which present specific dangers during and after a flood even if the floodwater has subsided.

A – AREA

Before going to a flooded area, Familiarise yourself with the location you will be travelling to and know

what to expect when you get there. To help you with this, you should:

- Look up maps both current and historical. OSi website is a good source <http://maps.osi.ie/publicviewer/>
- Speak to someone with local knowledge of the area. Do they think that any structures, bridges, culverts or walls could have been undermined or their integrity compromised during the flooding event? Fallen trees present potential risk during and after stormy weather, are there any fallen trees?
- Closely monitor local media reports e.g. local radio, and social media.
- Identify access and exit routes. Consider alternative approaches in case of road closures.
- Identify the local watercourses, where you expect flooding may have occurred. Consider if you will be close to a water channel, near to fast flowing water or stagnant water.
- Consider the terrain and topography (hills and hollows). If you notice any potential hazards e.g. ditch, steep sided embankment or cliff, record them or mark them on a map and bring this to site with you.
- Consider the hazards that may exist under flooded conditions e.g. hidden ditches, invisible road margins, a missing or dislodged manhole cover, fallen electric cable, washed up debris.
- If available review any flood risk maps for the area, paying particular attention to predicted flood extent, depth and velocity.

T – TIDES AND LEVELS

In a coastal area, be aware of the local tide times. Avoid getting stranded by a flooding tide and try to understand any impact the tide may have on the area. Predicted tide levels and times are available in tide timetables booklets or on-line. A storm surge can also be an issue and will not be covered by tide tables as it is caused primarily by high winds and low pressure at the coast, and you should check if there is a surge warning in effect.

Be aware that in inclement weather conditions that often accompany coastal flooding, large powerful waves may surge and break over sea walls and other defences. Do not put yourself in a dangerous position near breaking waves.

If working near a river, check the current level of the water in the channel on the website www.waterlevel.ie. If there is no water level gauge at the location you are visiting, a nearby gauge may give you some indication of the likely flow or water level/height at the location you are visiting. Looking at the recent water level record will also give an indication if the level is falling or rising.

C – CREW

If you are in a team collecting data, ensure everyone has the correct

equipment, clothing and footwear. Make sure everyone has a partner or buddy and that at all times your buddy knows where you are; preferably keep each other in view. If you are collecting data away from your buddy, ensure to check in with them at regular prearranged intervals.

Don't forget to agree a time and place to regroup. Do not rely on mobile phones to make these arrangements as coverage or batteries may be insufficient.

H – HEALTH

Drowning is the most serious risk posed by water. If you feel that drowning is a risk leave the site immediately and return at a later stage when safer. Be aware of the nearest life buoys, if present.

It is extremely important to avoid any contact with floodwaters. Sewage, human and animal faeces, pesticides, fertilisers, oil, asbestos or rusting building materials can contaminate floodwater. After floodwaters recede, traces of these pollutants may remain. You should also consider potential health risks such as water borne diseases and bacteriological hazards caused by contaminated floodwaters e.g. Leptospirosis (Weil's Disease). If you feel unwell after your site visit seek medical attention immediately.

I – INVENTORY/EQUIPMENT

Personal Protective Equipment (PPE) should be worn where appropriate. Please see section on safety equipment at the end of this chapter. It is important if you are wearing protective equipment that you are familiar with how it works and any operational requirements.

Ensure all equipment is in full working order before heading out on site. Make sure your mobile phone is charged and that you can receive a good signal so that regular contact can be maintained with your colleagues.

Ensure that you are appropriately dressed for the conditions expected on site, bring enough warm clothes so that you are not cold and to avoid hypothermia. Bring a spare change of clothes for your journey home, in case you get wet while collecting data.

T – TELL SOMEONE

Tell someone who is not part of your flood data collection team:

- **Where you are going and when,**
- **What you are doing,**
- **When you will be back.**

Be certain you tell your point of contact when you have arrived back safely, to avoid a false alarm.

WHILE OUT ON SITE

DO

1. Keep in regular contact with your “buddy”.
2. Wear appropriate Personal Protective Equipment.
3. Wear high visibility clothing and if working in dusk conditions use a torch.
4. Seek medical advice if you are wounded during your flood data collection exercise, you may need a tetanus injection.
5. Contact a doctor immediately, if you feel unwell at any stage or if you ingest floodwater.
6. Listen to local radio station for further information and updates.
7. Take care when entering soft or boggy land. The ground should be tested first e.g. with a stick, before you place all your weight on the ground.
8. Take care when entering a field where there is livestock. Animals can be easily frightened or distressed and may be dangerous.
9. Be aware of where life buoys are located.

DO NOT

1. **DO NOT WALK OR DRIVE THROUGH FLOODWATER.**
-
- 150mm (six inches) of flowing water can sweep you off your feet and 600mm (two feet) of water can float your car.
 - During a flood, items can get dislodged and carried along in the floodwater – you do not know what dangers are lurking under the surface.

- Manhole covers may have come off and there may be other underwater hazards.
- Flooding at dips in roads, bridges and low spots can be deceiving. Floodwater can be deeper and faster flowing than it appears. It can contain debris and contaminants such as sewage, chemicals and dead animals. Floodwater can erode road surfaces. Entering floodwater is the major cause of death during floods.
- Driving through flooded residential areas (and some rural spots) may actually cause extra problems for partially defended properties and utilities. The vehicle can cause a bow wave that can reach a higher level than the floodwater, therefore causing additional damage to homes and gardens.

2. DO NOT COLLECT FLOOD DATA IF WEATHER CONDITIONS ARE HAZARDOUS.

- Use common sense; if weather conditions are bad take photographs of the flooding from a distance. If it is raining heavily, river levels may be still rising. Caution should also be taken in high winds particularly in coastal areas. It is possible to be blown from safe land into a watercourse. High winds may also result in fallen trees.

3. DO NOT WORK ALONE IF POSSIBLE.

4. DO NOT WALK ON SEA DEFENCES, RIVERBANKS OR UNSAFE BRIDGES. DO NOT ASSUME THAT DAMAGED STRUCTURES, GROUND OR EMBANKMENTS ARE STABLE.

- They may collapse or you may be swept off by large waves.

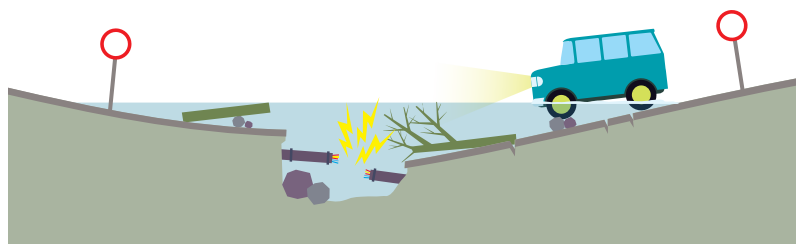
5. AVOID CONTACT WITH FLOODWATER.

- It may contain sewage or be contaminated by other chemicals and pollutants.

6. DO NOT TAKE UNNECESSARY RISKS.

7. DO NOT GET IN THE WAY OF EMERGENCY RESPONSE CREWS, OR LOCAL AUTHORITY STAFF.

- If you are parking a vehicle be sure that you are not blocking access routes.
- Stay away from underground car parks, car tunnels and basements until heavy rainfall and all other risks have passed, and until you are confident that water levels in adjacent or nearby rivers or watercourse are no longer rising.



Do not drive through flood water.

ISSUES TO CONSIDER

URBAN:

- Chemicals
- Missing manhole lid
- Electric cables
- Emergency services

RURAL:

- Barbed wire
- Hidden ditches
- Invisible road margins
- Boggy ground
- Livestock

SAFETY EQUIPMENT

PLEASE CONSIDER BRINGING EACH OF THE FOLLOWING ITEMS WITH YOU FOR YOUR FLOOD DATA COLLECTION VISIT:

- Warm clothes
- Fully charged mobile phone and car charger
- High visibility jacket
- Hard hat
- Life jacket/buoyancy aid
- Safety shoes/boots (EN 345 S3)
- Gloves (EN388) – disposable latex gloves are useful
- Hand sanitizer
- First aid kit
- Torch



3 FLOOD DATA COLLECTION

FLOOD DATA REFERS TO ANY INFORMATION RELATING TO A FLOOD SUCH AS THE TIME AND DATE OF THE FLOOD, THE LOCATION, THE WATER LEVEL, AND THE SOURCE OF THE FLOODING. AS FLOODS ARE LIKELY TO BECOME MORE FREQUENT IN IRELAND IT IS VERY IMPORTANT THAT DETAILED RECORDS ARE KEPT OF ALL SIGNIFICANT FLOOD EVENTS. THIS CHAPTER SETS OUT WHEN AND WHAT FLOOD INFORMATION SHOULD BE COLLECTED, WHAT SHOULD BE DONE IN ADVANCE OF GOING OUT TO SITE, AND ALSO WHAT OTHER FACTORS NEED TO BE CONSIDERED TO ENSURE ACCURATE AND USEFUL FLOOD DATA IS COLLECTED IN A SAFE AND EFFICIENT MANNER.

PREPARATION

BEFORE GOING ON SITE TO COLLECT FLOOD DATA, YOU SHOULD:

1. Read *Chapter 2* of this document, on Health and Safety. For your own safety check the expected conditions for the day of the site visit. Consider access and egress to the site. Local radio may have information on current conditions.

2. Familiarise yourself with the area you are going to. Study maps of the location, both historic and current maps. Ordnance Survey Ireland have an excellent interactive map available on their website which allows you to view both historic and current maps so that you can understand the characteristics of the area before visiting the flood site: <http://maps.osi.ie/publicviewer/> If available review any flood risk maps for the area, paying particular attention

to predicted flood extent, depth and velocity. Be aware of any hidden or “non-obvious” watercourses.

3. Bring copies of the OPW Flood Data Collection form (Appendix A). Bring a copy of the Data Types table (shown on the next page). These can be used as checklists.

4. GATHER AND CHECK ALL THE EQUIPMENT YOU WILL REQUIRE;

- Maps
- Pencils
- Note book
- Camera/Video recorder with full battery
- Fully charged mobile phone
- High visibility vest
- Appropriate clothing and footwear
- Torch
- Surveying Equipment
- Staff Survey Rod - Ruler
- Gloves
- First Aid Kit

SITE VISIT

TIMING

It is preferable to visit the site as soon as possible after a flood event, but this may be difficult for a number of reasons including road closures and Health and Safety issues. If full access is not possible when you visit, photographs can be taken from a safe distance to capture the flood extents. It is very useful to record the date and time of the visit, as this can help identify if the flood information relates to the peak of the event, or some time before or after.

In some cases, Local Authority staff or members of the public may, for other reasons, already be present during a flood event, e.g. emergency works, or members

of the public who live in the affected area. In such instances, capturing relevant flood information during the flood can be very valuable, provided of course that this is done safely, and that this in no way interferes with the health and safety of others or yourselves.

CONTACT WITH LOCAL AGENCIES AND THE PUBLIC

Where appropriate, contact should be made with other flood response staff working in the area e.g. Local Authority area staff or OPW regional staff. The local Garda Station may have information as to the areas affected by the flood and the impacts. It is also good practice to make Gardaí aware that you are working in the area.

If entering private land, permission

Where appropriate, contact should be made with other flood response staff working in the area.





Gathering data after a flood.

to access the land should be sought from landowners in advance of entering the land. Remember witnesses and other members of the public may have photographs/videos, which they took during the event or information they are willing to share. In this case, having a laptop may be useful to download photographs and videos. The local Gardai should be notified if you come across any damaged structure or dangerous situation which might be perilous to members of the public. Similarly, consider contacting utility companies if you witness any damaged infrastructure that may not have been previously reported.

APPROACHING MEMBERS OF THE PUBLIC

- Introduce yourself and show your identification.
- Explain the purpose of your visit. Consider mentioning that you are;
 - (1) gathering information on the flooding that has occurred in the area;
 - (2) that it is very important that detailed records are kept of significant flood events; and
 - (3) this will improve the understanding of flooding causes and may be used to develop effective flood risk solutions and to allow planning and development decisions.
- Be aware that those affected by flooding may be under significant stress and not in a position to discuss flooding at that time. They may have suffered trauma or injury, loss of property and the distress of displacement from their homes or business.
- If appropriate ask people if they are aware of anyone else who could provide more information or may have records of previous floods.
- Inform those you speak to that the information they have provided may be displayed on www.floodmaps.ie.

There is a wide range of valuable flood information, which can be collected. The type of data and the possible sources of this information are listed in the table on P.16. Much of the data can be recorded in the Flood Data Collection form available in Appendix A of this report.



Emergency response workers on-site.

PHOTOS

- Photographs can capture very useful information during and after a flooding event.
 - Digital photography with a time and date stamp (an option you can enable in your camera's settings) is preferred. Ensure time is correct – winter time or summer time?
 - Target areas that have been affected by the flood e.g. damaged properties, flooded roads and access routes, damaged infrastructure, waterlogged areas etc.
 - Target relevant locations, which may have impacted on the flood, e.g. blocked culverts/drains, bridges restricting flow of the river, low lying areas, flow routes etc.
-
- TIP!** IT IS GOOD PRACTICE TO CONTACT OR CALL INTO THE LOCAL GARDA STATION BEFORE VISITING
- Record photos looking at both upstream and downstream side of any structures.
 - Take photographs, which identify the location e.g. street signs or shop fronts.
 - When you take a photo, mark on a map where you were standing when you took it and in what direction your camera was pointed. Alternatively, if it is possible to geo-reference your photographs by enabling a GPS setting in your camera, this is particularly useful. Most smart phones have this functionality.
 - Ensure there is a scale visible in photo. This can be simply achieved by ensuring there is a person visible in the photograph if it is a large-scale photo incorporating a large area. If the photo is a close up of an object, place a ruler, survey rod or other easily identifiable object of fixed length flush against a wall or next to the object etc.
 - Ensure photos are of sufficient quality to allow necessary detail to be seen clearly e.g. dampness on concrete wall showing level of recent flood.

DATA TYPES AND POSSIBLE SOURCES

DATA TYPE	INFORMATION	SOURCE OF DATA
Date and/or time of site visit	Date of the visit	Data collector
Date and/or time of flood event	Date of the event Time of start, finish and peak of flow	Local residents, Local Authority, Gardaí
Description of event	Cause of flood Flood mechanism	Local residents, Local Authority, Gardaí
Location	Address of the area flooded Irish National Grid Co-ordinates	Data collector
Description of location	Rural or urban Residential or commercial Grasslands or paved Agricultural e.g. Type of crops grown/Livestock Bog land or forestry	Data collector
Weather conditions	Weather for the days preceding the flood Prolonged rainfall, high winds or extended dry period Soil Moisture Deficit	Met Éireann website, Local Radio
Flood sources	River, stream, tidal or coastal Heavy rainfall – pluvial Drainage – Site flat/low and poorly drained Drainage system overwhelmed. Undersized blocked culverts Backup from sewer system	Local residents, Local Authority, Gardaí
Flood mechanisms	Overtopping of the riverbank Wave over topping Collapse of flood wall	Local residents, Local Authority, Gardaí
Flood water flow paths	Water flows from high level and collects at lower level Follow a road Flow along flood plain	Local residents, Local Authority, Gardaí
Flood extents/levels	Extent of floodwaters Edge of floodwaters at key locations Level at furthest extent	Local residents, Local Authority, Gardaí, Aerial Imagery
Tide levels	Tidal impact on flood level Tide level	Tide Tables, Local Sailing/ Rowing Clubs
No. of people affected	Death or injury Nature of injuries sustained Number of residents	Local residents, Local Authority, Gardaí

HOW TO COLLECT	WHERE TO RECORD	WHY IS THIS USEFUL
Write this down. Also set time and date on camera.	Flood Data Collection Form	Helps understand possible limitations of flood data, and if data relates to the peak of a flood
Write this down.	Flood Data Collection Form	Critical - Identifies the flood that the flood data relates to
Gather this information from observations or conversations. Take into consideration any existing media reports available etc.	Flood Data Collection Form	Helps fully understand what happened, and how data should be used
Check address and location on map.	Flood Data Collection Form (grid reference or mark on a map). Photo or video.	Identifies where flood occurred, and where exactly data relates to – This is very important for calibrating models and flood maps
Confirm on site. Compare to any reports received.	Flood Data Collection Form. Photo or video.	Helps understand flood event
Check any relevant sources of information available. If possible collect information from residents during site visit.	Flood Data Collection Form	The weather preceding the flood can be a major factor in determining how severe a flood is. This data is useful to help calibrate models and flood maps
Confirm on site. Walk the impacted area, discuss with residents and compare to any reports received.	Flood Data Collection Form. Annotate map / sketch of area	Important information needed to understand the flood, and it's cause
Confirm on site. Walk the impacted area, discuss with residents and compare to any reports received.	Flood Data Collection Form	Important information needed to understand the flood, and it's cause
Confirm on site. Walk the impacted area, discuss with residents and compare to any reports received. Observe where there are signs of flooding, e.g., old sandbags, trash marks etc.	Flood Data Collection Form. Annotate map. Photo	Important information needed to understand the flood, and it's cause
Levels and extents can be marked on the roads, walls, poles, etc. with paint (if permissible). Take photos of any floodwater, damp or trash marks you see, include tape measure for scale. Information can be provided by residents or from other reports.	Flood Data Collection Form. Annotate map. Photo or video	This is critical information for calibrating models and maps, which in turn helps more accurate design of possible flood measures. It is also useful for planners in land zoning
Check tide tables or gauges to confirm.	Flood Data Collection Form. Photo or video.	The tide level during a flood can influence flood levels and extents
Confirm on site. If possible collect information from residents during site visit.	Flood Data Collection Form	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme

DATA TYPES AND POSSIBLE SOURCES

DATA TYPE	INFORMATION	SOURCE OF DATA
No. of properties affected by flood	Type of properties: Residential – apartments, single storey, terrace; Commercial – shops, offices, factory unit; Community; Health; Cultural. Depth of water in property Impact on the residents/occupiers Buildings vacated Are there any basements in the area?	Local residents, media reports, Local Authority, Gardaí
Other property damaged	Cars or other vehicles damaged Outbuildings or garden furniture damaged	Local residents, media reports, Local Authority
Roads	National Primary, National Secondary, Regional or local road Length of the road impacted, both directions Road closure – time	Local Authority, AA Roadwatch website, local residents, media reports
Rail transport: National Route, DART or Luas service	Mainline, Dart or Luas Trains cancelled / delayed	Local Authority, Iarnród Éireann, Veolia-transport
Electricity, Gas and communications infrastructure	Supply Company Area impacted – no of properties and residents Length of disruption	Local Authority, electricity, gas and communications companies, local residents.
Water Quality	Impact on potable water supply and water treatment facilities Impact on sewage treatment facilities. Impact on the water quality in other water bodies Affects on fish stocks Length of time impact lasted Effects of flooding on water quality of water bodies may not be evident for sometime after the flooding event	Local Authority, Farmers, Anglers
Agricultural and Forestry	Damage to crops or livestock Trees or shrubbery damaged	Local residents, IFA, Dept. Agriculture, Food and the Marine, Coillte, NPWS.
Noteworthy Sites	Historic buildings, monuments, famous gardens	Dept. of Arts, Heritage and Gaeltacht, Local Authority, OPW, staff of these sites if any.
Date/year of previous floods	Information from local residents Memories of flooding in the area Location flooded and possible causes More/less severe than current flood Development in the area, impact on the flood for better or worse Old flood marks	Local residents, Local Authority, Media reports
Extent of previous floods	Flood marks Damaged areas	Local residents, Local Authority, Media reports

HOW TO COLLECT	WHERE TO RECORD	WHY IS THIS USEFUL
Walk the impacted area and confirm each address. If possible collect information from residents.	Flood Data Collection Form. Annotate map. Photo or video	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
Walk around the impacted area and observe any signs of flood damage to other properties.	Flood Data Collection Form. Photo or video.	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
Check relevant sources of information available. Confirm on site.	Flood Data Collection Form. Annotate map / sketch of area	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
Check relevant sources of information available. Confirm on site.	Flood Data Collection Form	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
If possible collect information during site visit, speak to businesses and residents.	Flood Data Collection Form	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
If possible collect information from local residents during site visit.	Flood Data Collection Form. Photo or video.	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
Visit any noteworthy sites in the immediate area and inquire if they experienced any flooding during the event.	Flood Data Collection Form. Photo or video.	Understanding damages caused is very important to assess risk and help justify a flood risk management scheme
If possible collect information from local residents during site visit. Look for any visible signs of past flooding, flood marks on walls etc.	Flood Data Collection Form	Allows comparison between flood events, and helps determine how severe the recent flood is
If possible collect information from local residents during site visit.	Annotate map	Allows comparison between flood events, and helps determine how severe the recent flood is

VIDEOS

- Video footage can be very useful to capture flooding information during an event, and can reveal how the water interacted with the landscape, the speed of the flow and the paths the water followed.
- Please ensure that there is a date and time stamp visible on the footage, and that the location of the camera and the direction it was pointing in is clearly recorded in either the video file name or in accompanying records or metadata.
- Identify potential operators of CCTV in the area, which may have captured the flooding event and request a copy e.g. commercial properties.
- Search the internet for videos recording the flood e.g. Youtube, social media and news sites may be of use. Record links or download and save the files. Consider any copyright issues.

POINTS TO NOTE WHEN RECORDING PHOTOS AND VIDEO

Photographs can record how far floodwater spreads (extents) and how high the water reaches (levels), the path the water takes and the visible impacts of the flood. Videos are also excellent for capturing the flood as it progresses. If you bring a laptop it may be possible to request a copy of digital photographs or videos from local residents. If this is not possible you can leave a business card or contact details and ask for any information to be sent on. When taking a photograph to record water levels, it is important to

include something in the shot that will provide scale (e.g., a staff rod) or clearly point to a permanent object (e.g., top of second step) that can be surveyed at a later stage.

SURVEY

IF USING SURVEY OR GPS EQUIPMENT IT IS IMPORTANT TO RECORD:

- Make of instrument, e.g. Trimble R8 Series2, Leica DNA03 Elec. Level
- The type of instrument (NRTK, RTK, GPS, DGPS).
- The Coordinate Reference System used to record points.
- HDOP, VDOP, PDOP for each point – quality control facility on most loggers provide a method of outputting this information.
- If data is transformed, what method was used for transformation (software, e.g. Grid Inquest).
- Data to be provided in CSV format with the following columns; Pt. ID, Name, Easting, Northing, Elevation, Remarks.
- Ensure that your GPS receiver is set to the correct level above your ordnance datum, preferably Malin.

METHODS OF RECORDING POINTS

It is especially valuable to mark or record the floodwater level on a permanent structure, as this will allow you to return to survey levels at a later date and also permit the comparison of the flood

level against levels of future floods. After flooding, the water height may be determined from flood marks on walls or windows, local knowledge or from debris or wrack marks. Pick an item that is unlikely to be removed and ensure that you have permission from the relevant person if you are using spray paint. At a later date when the flood has fully receded you can return to survey levels. (Please see note in chapter 5, common sources of error related to perching.)

Similarly, flood extents can be recorded by marking how far water spread along a road or pavement. This may involve asking someone who witnessed the flood to mark the extents with chalk (or spray paint if permissible) on the ground. Photograph this flood extent and if possible survey and record the locations coordinates.

After a flood, it may be useful to

carry out a level survey of finished floor levels inside properties that were impacted by floodwater.

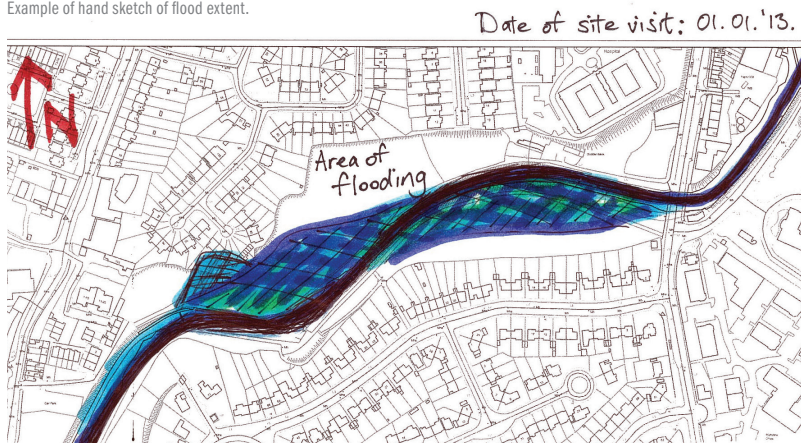
Be sure that you record everything that you need. Take your time and carefully consider what pieces of information will be useful.

If you are aware of existing survey drawings e.g. river cross sections, refer to these cross section locations when gathering flood data and record flood depths/heights relative to surveyed features as much as practicable. This will give a good indication of flood levels and profiles instantly without the need for follow up surveying.

DRAWINGS

Use the printed map you have brought to site to sketch areas that you are aware have flooded. Draw a line around the perimeter of the area. If you are unsure of areas that have flooded you can sketch

Example of hand sketch of flood extent.



it with a broken/dashed line. Annotate all sketches with any associated information, which may include:

- Direction the floodwater was flowing and where it originated.
- Depths of water on the streets and if possible inside individual properties and information on any known damage.
- Exact address of property.
- Locations of drains, culverts or drainage channels.
- Locations of walls that have collapsed or been undermined during the flood event.
- Locations of possible blockages – trees or debris in river channels, blocked trash screens.
- Locations of existing flood defences.
- Locations of unintentional flood defences – e.g., garden walls acting as flood defences by holding back flood waters.

TIP! IF A NUMBER OF FLOOD EVENTS ARE BEING REPORTED, CREATE A REGISTER OF ALL DATA SUBMITTED – LISTING ALL DOCUMENTS, PHOTOGRAPHS AND MAPS AND RELATING THEM TO THE RELEVANT FLOOD EVENT.

SOURCE OF FLOODING

IDENTIFYING THE SOURCE OF FLOODING CAN BE CHALLENGING. FLOODING CAN BE CAUSED BY A COMBINATION OF SOURCES INCLUDING:

FLUVIAL

From nearby river or medium/minor watercourse

COASTAL

Flooding from the sea (tidal, wave over-topping)

PLUVIAL

Ponding or overland flow from an intense rainfall event

GROUNDWATER

Flooding from a saturated water table

BURST PIPE/CULVERT

Floodwater leaking from a conveyance source

URBAN STORM WATER DRAINAGE SYSTEMS

An urban form of Pluvial flooding – This might be evident from flow erupting from a manhole nearby, or ponding due to the inability of storm water to drain into gulleys

Recording the direction of flow can be helpful in determining the source of flooding at a later date. If you know the flooding source, it is best to record the water level as close to that source as possible to avoid the recorded water level being influenced by other factors. For example if you know the flooding source to be fluvial, record the water level as close to the river as possible without putting yourself or others in danger.

A blocked culvert, screen or pipe can be described as a mechanism of flooding rather than a source.

4 PROCESSING DATA CAPTURED

ONCE FLOOD EVENT DATA HAS BEEN COLLECTED AND YOU ARE BACK AT YOUR DESK, IT IS IMPORTANT TO PRESENT IT IN AN EASY-TO-USE AND ACCESSIBLE WAY. THERE ARE A NUMBER OF STEPS YOU CAN TAKE TO MAKE THE DATA MORE USER-FRIENDLY AND THIS SECTION OUTLINES SOME OF THESE.

The information you submit to the OPW will serve as a valuable record in all flood risk assessments and flood relief design projects for the area. Therefore, spending some time on processing and tidying up the data you have captured will add value and ensure its usefulness in future work to reduce the flood risk in the area.

RECORDING A FLOOD EVENT

To help record flooding information in an orderly and efficient way, the OPW has produced a Flood Data Collection Form (see Appendix A).

This form (hard copy) can be filled out when on-site or after the data collection exercise when back at your desk (electronic copy). The electronic version of this form is an easy to use spreadsheet, accompanied by comprehensive help notes. Email flood-data@opw.ie if you wish to receive an electronic version of the Flood Data Collection form.

When the form is completed it should be submitted to OPW along with any associated data. When received, OPW review the form and present it as a report on www.floodmaps.ie (unless otherwise requested). If possible submit forms to OPW saved in an editable format, i.e. leave spreadsheet in original format, as the information submitted is added to a national database.

At all stages it is important to state any assumptions you have made. For example, depending on your method of data collection, you may directly observe the extent of a flood or you may be sketching an approximate flood extent based on post-flood evidence (e.g. trash marks, water marks). Please state which

The image shows a sample of the Flood Data Collection Form. It is divided into several sections:

- SECTION 1: TO BE COMPLETED BY PERSON SUBMITTING REPORT**
 - Name of Person: _____
 - Name & Address of Organisation: _____
 - Signature: _____
 - Report Date: _____
- SECTION 2: LOCATION OF FLOOD EVENT**
 - 2.1 Location of Flood Event
 - Grid Letter: _____
 - Grid Easting: _____
 - Grid Northing: _____
 - Grid Easting: _____
 - Grid Northing: _____
 - 2.2 Flood Dates & Time
 - Flood Start: _____
 - Flood Peak: _____
 - Flood End: _____
- SECTION 3: SOURCE & CAUSE OF FLOOD EVENT**
 - 3.1 Additional Information
 - Is the cause obvious? (If not, please describe the location and extent of the flood.)
 - 3.2 Source & Cause of Flood Event
 - Flood Source: _____
 - Flood Cause: _____
- SECTION 4: FLOOD DATA**
 - Flow Volume: _____
 - Flow Depth: _____
 - Flow Time: _____
 - Flow Velocity: _____
 - Flow Direction: _____
 - Flow Duration: _____
 - Flow Frequency: _____
 - Flow Intensity: _____
 - Flow Duration: _____
 - Flow Frequency: _____
 - Flow Intensity: _____



Deposited debris and sand give an indication of the extent of flood waters.

one of these methods you have used to develop your flood extent as it may help explain any discrepancies that may arise between multiple records of the same event.

TIP! TO HELP COMPARE VARIOUS FLOOD EVENTS OVER TIME, CHOOSE A PERMANENT FIXTURE ON WHICH TO MARK THE DEPTH OF FLOODING FOR EACH FLOOD E.G. STONEWALL, PILLAR, RAILINGS.

FLOOD OUTLINES (LOCALISED)

Where aerial photography is not feasible or flooding is localised, a partial outline using photos, videos and/or surveyed levels can be adequate to represent the

impact and extent of the flood event.

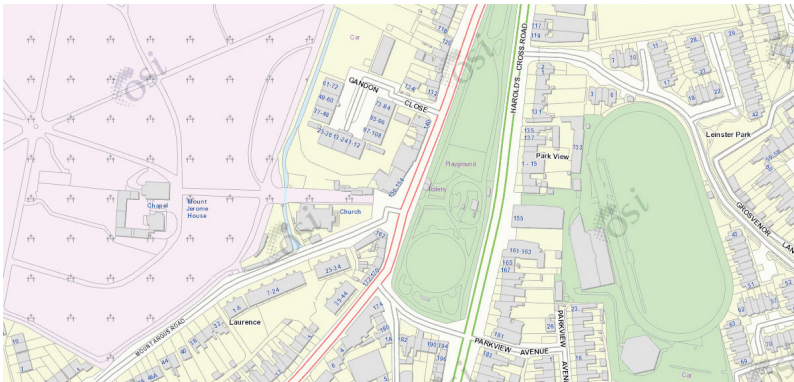
Once the information is gathered, the spatial extent of the flood together with important attribute information such as date, time, depth, source and location can be digitally recorded using Geographical Information System (GIS) or geo-spatial software (e.g. open source Quantum GIS). Mapping the information can help the end user as lots of information is stored together and also can be directly uploaded to www.floodmaps.ie.

The GIS file should be referenced in the report but also submitted electronically in an editable format to OPW with the report so that further analysis can be carried out.

If you do not have access to GIS or mapping software, you can navigate to a free map viewer and print a map of the area in question e.g. see below left from www.openstreetmap.org.



Example of mapping from www.openstreetmap.org



Example of mapping from <http://maps.osi.ie>

OSi map viewer (<http://maps.osi.ie/>) can also be used in a similar way and is advantageous in that the footprint of each property is mapped (see above right). However, in order to use the OSi map viewer in a report, you must have an OSi licence and this licence number must be provided with the map.

The examples on the following pages demonstrate important aspects of mapping a flood event and ways to present the information gathered.

TIP! ANNOTATE YOUR MAP TO SHOW WHERE PHOTOS, LEVELS AND ANECDOTAL INFORMATION WERE CAPTURED. THEN, AT A LATER STAGE FURTHER DETAILS CAN BE ADDED TO THESE POINT LOCATIONS.



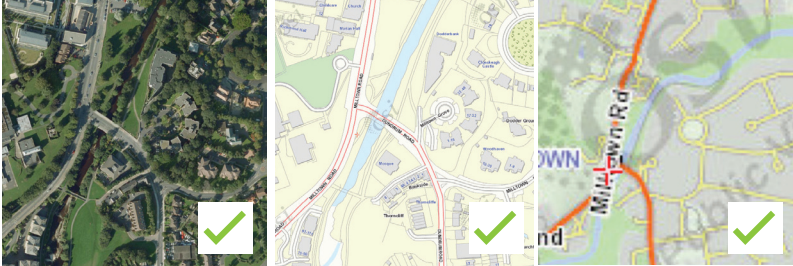
Photographs which give an indication of the depth of flood water.



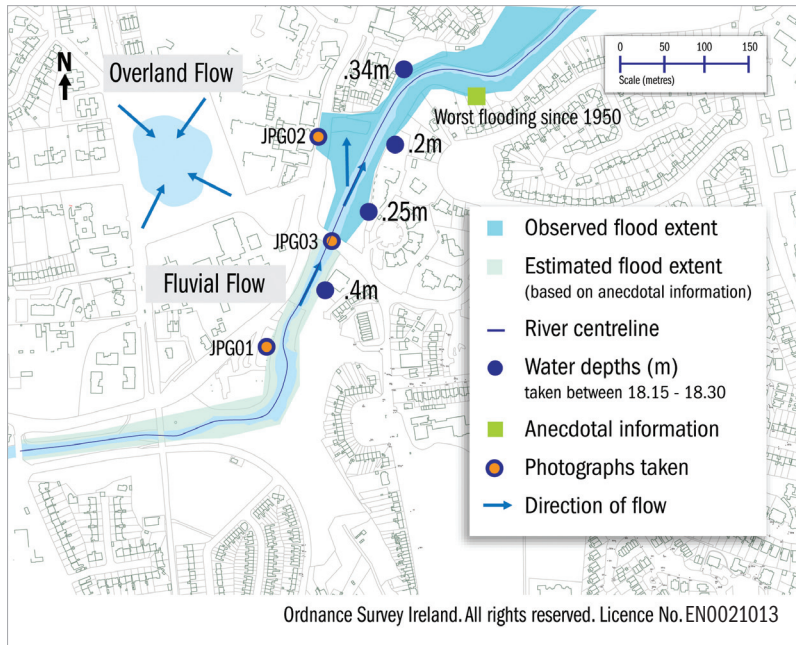
Photographs which show the power and impact of flood water.

MAPPING SCALES

Consider various mapping scales to illustrate the flood extent and choose the most appropriate



MAPPING A FLOOD EVENT



Example of map showing flood location, extent, depth and photographs.

Name	Date taken	Time	Comment	Photo Facing
JPG01	11/01/2012	09:00	Water level Left bank	Left Bank
JPG02	12/01/2012	15:15	Water mark on wall Left bank	Left Bank
JPG03	11/01/2012	08:20	Flows at bridge Downstream	Downstream



In a photograph, it is good practice to clearly indicate the height the flood water reached.

FLOOD EXTENTS (WIDESPREAD)

If flooding is widespread, the best way to capture and record extents is from a helicopter/fixed wing aircraft (Chapter 6 gives some tips in gathering this type of data) Although there is benefit in viewing the video footage gathered for overland flow paths etc, there is also great benefit in having the flood extent digitised.

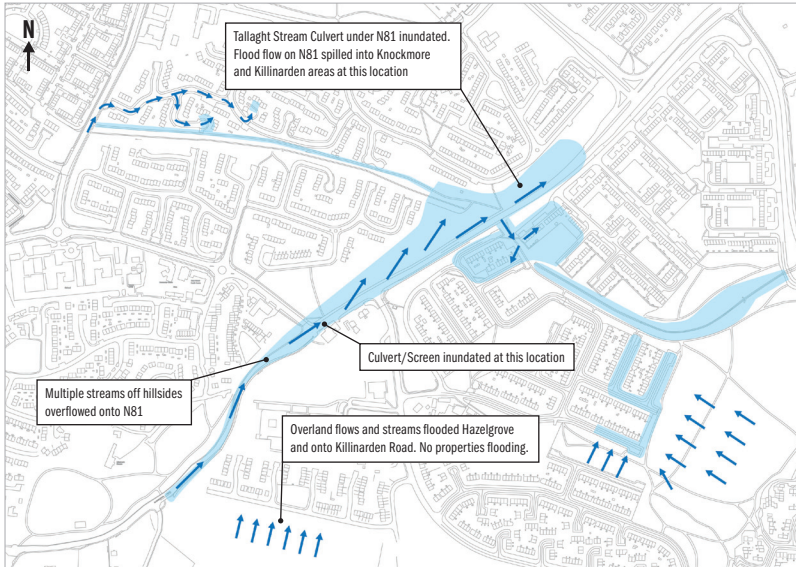
More information on this is detailed in Chapter 6 – Aerial Photography.

VIDEO AND PHOTO

VIDEO FOOTAGE AND PHOTOGRAPHY ARE EXCELLENT WAYS TO RECORD FLOOD EVENT DATA.

In the processing stage, it is important to ensure that the flood level captured is clearly identifiable. This may mean that a line or arrow be added to a photo to help draw attention to the observation in question, as shown in the photo on the left. Note the difference in the two photos. In the photo below, on the right no flood level is immediately apparent to the viewer.

The purpose of certain photos may not just be limited to extent and level, but also to demonstrate the velocity of the water, show blockages in key structures, highlight overland flow paths, flag gaps in defences. Please consider non-proprietary software in saving files, e.g. jpg, vlc.



Example of mapped flood extent and explanation notes.

TIP! SHOW DIRECTION OF FLOW

OTHER INFORMATION SOURCES

ONCE THE DATA COLLECTOR HAS FINISHED PROCESSING THEIR OWN DATA, IT CAN BE USEFUL TO IDENTIFY OTHER KEY SOURCES OF FLOOD EVENT RECORDS, E.G.

- **CCTV footage:** This is an excellent source of information, particularly if the camera is facing a key structure or is capturing an hydraulically significant feature. Generally CCTV is time stamped thus allowing anybody to re-examine the flood event and identify potential causes. This may be available from commercial properties, Local Authorities or the Gardai.
- **Media reports:** Press articles or television reports are often compiled including

interviews with people affected by the flooding. These reports may contain valuable information such as date, time, duration and properties affected by the flood.

- Check **www.waterlevel.ie** for information on the height of the water and flow in a river channel at an OPW hydrometric gauge. Record what the water level was at the nearest upstream or downstream gauging station.
- **Soil Moisture Deficit, SMD** (the amount of rain needed to bring the soil moisture content back to field capacity) can be found **www.met.ie/agmet/default.asp**
- **Social media:** reports, photos and videos from people close to the event can provide excellent additional information.

5 COMMON SOURCES OF ERROR

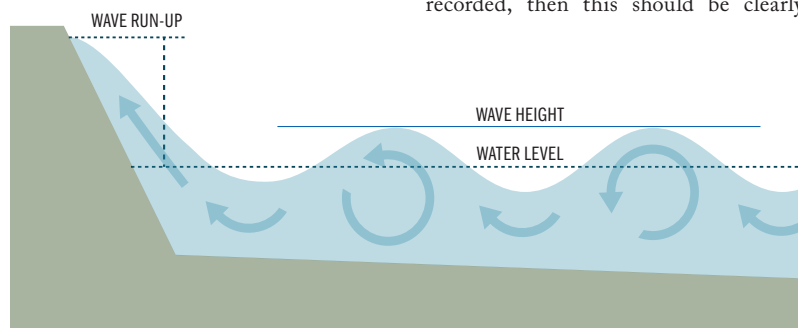
IT IS IMPORTANT THAT ANY FLOOD DATA COLLECTED IS AS ACCURATE AS IT CAN BE, AS IT MAY BE USED FOR THE CALIBRATION AND VERIFICATION OF HYDRAULIC MODELS. YOU SHOULD BE AWARE OF COMMON ERRORS IN FLOOD DATA COLLECTION, SOME OF WHICH ARE OUTLINED BELOW, SO THAT YOU CAN AVOID THEM IF POSSIBLE, AND ALSO REPORT ON POTENTIAL ERRORS OR UNCERTAINTY WHERE THEY MAY AFFECT THE DATA PROVIDED.

PERCHING

A perched or raised water level can result locally from water flowing around obstacles, or debris, such as a collapsed wall; water flowing up a side street in an urban setting; or just from a high water velocity. To avoid inaccurate recordings, consider your surroundings and record water levels at a wide, open area where possible. Perched water levels should also be recorded but ensure they are clearly labelled as such.

WAVE RUN-UP

When marking or recording the level of the floodwater it is the level that the floodwater would settle at that is of particular interest, i.e. still water level, rather than (or as well as) the highest level wetted by the floodwater. This is relevant to all floodwaters, not just coastal waters, as run-up can also be caused by high winds, moving traffic or the collapse of a wall or structure. Figure 5.1 below illustrates the difference between still water level and wave run-up. Where it is suspected that it is the highest water level that has been observed and recorded, then this should be clearly



Wave run-up.

marked / noted to avoid confusion with the still water level during later use of the information.

SUBMITTING FLOOD DATA TO THE OPW

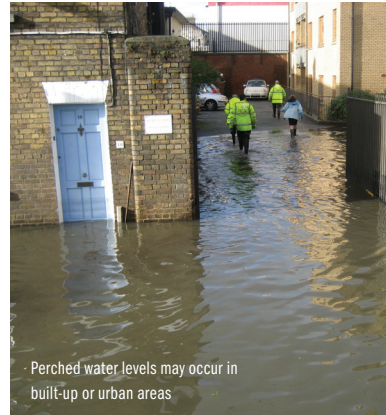
The most common errors are usually very simple. Errors which occur when submitting flood data collection forms (appendix A), and associated files to the OPW include attaching the wrong photographs to the Flood Data Form or incorrectly recording date, time, location or coordinates. These are simple errors, which can be avoided by applying some quality assurance checks, and paying careful attention. Always review data and re-read all content before submission to the OPW.

PHOTOGRAPHS

A SINGLE AERIAL PHOTOGRAPH (E.G. TAKEN FROM A HELICOPTER) AT THE PEAK OF A FLOOD CAN CAPTURE A VAST AMOUNT OF IMPORTANT FLOOD EXTENT DATA. COMMON ERRORS ASSOCIATED WITH PHOTOGRAPH AND AERIAL PHOTOGRAPHY INCLUDE:

1. Providing no means by which to identify the area photographed.

Ensure you can identify the area photographed. If available, make use of the camera geo-referencing function to record the location and direction of the camera for each photograph. If on a plane/helicopter, ask the pilot if a record is kept of the flight path and if



it can be made available. Another way to avoid confusion over the location is to capture a distinguishing landmark in the photograph.

2. Missing the extents of flood

Remember to include the edges of the floodwater in your photographs. This is vital information to assist determining flood extents and estimating levels.

3. Providing no detail of record

Metadata is data about data, in this case that could mean the date and time the photograph was taken. To ensure you do not forget to record these details, it is recommended that you have the time and date stamp enabled in the camera settings and set for the correct date and time. Other metadata to include are the photographer, their organisation and contact details, the weather conditions, and the town and county.

Have a look at Chapter 6 for examples of good aerial photographs.

SURVEYING

THE MAIN ERRORS ASSOCIATED WITH SURVEYING MAY VARY DEPENDING ON THE EQUIPMENT YOU ARE USING. BEFORE YOU GO OUT ON SITE IT IS RECOMMENDED TO UPLOAD SOME LARGE AND/OR SMALL-SCALE MAPS OF THE AREA TO BE SURVEYED TO YOUR DATA LOGGER.

- Make sure all points recorded have a fixed position (GPS).
- Make sure that the point at the bottom of the staff neither penetrates the terrain, nor is raised from the ground surface by resting on a stone or a surveyor's boot, but rather, it rests on top of the ground surface or at a

mark indicating flood level to be recorded, as appropriate.

- It is best that your instrument is set to record in ITM coordinates (Irish Transverse Mercator) as ITM is set up for GPS

TIP! DOUBLE-CHECKING THAT ALL INFORMATION IS PRESENTED AND SAVED LOGICALLY ENSURES THAT ALL THE TIME SPENT IN PREPARING, GATHERING AND PROCESSING DATA IS NOT WASTED.

Aerial photograph showing extensive flooding in rural Ireland



6 AERIAL PHOTOGRAPHY

DURING A LARGE FLOOD EVENT THE BEST WAY TO CAPTURE KILOMETRES OF FLOODING INFORMATION, PARTICULARLY IN RURAL AREAS, IS THROUGH AERIAL DATA CAPTURE FROM A HELICOPTER OR PLANE. A SINGLE PHOTOGRAPH TAKEN AT THE PEAK OF THE FLOOD CAN CAPTURE A VAST AMOUNT OF IMPORTANT FLOOD EXTENT DATA. IN VERY BUILT UP AREAS AND CITIES, DUE TO DENSITY AND HEIGHT OF BUILDINGS AERIAL IMAGERY CAN BE SUPPLEMENTED WITH SITE VISIT INFORMATION.

If procuring aerial imagery ensure the pilot and aircraft comply with all relevant aviation and health and safety requirements. In the past, the OPW has commissioned aerial flood event capture. No standing arrangements are currently in place for this but the position will be kept under review.

OPW recognises that with emerging technologies, the equipment and post-flight processing currently available are continually improving and new approaches are being taken.

CHECKLIST

THE FOLLOWING MAY BE USED AS A CHECKLIST:

- Camera for photographs
- Camera for video
- Fully charged batteries and spares
- Notepad and pen
- Printed maps, at appropriate scales
- Sat-nav or other geo-referencing device (if GPS not built into camera)
- Can flight path be recorded?
- Watch

- Agree a logical flight path with pilot
- Consider weather forecast and visibility for time of planned flight
- Consider any tidal influences and levels
- Check pilot and aircraft compliance with all aviation and health and safety requirement

WHAT TO CAPTURE?

- If capturing a fluvial flood event, start the flight at the one end of flooding along the river channel and move progressively upstream or downstream. This is to ensure the outputs – photographs or video – follow a logical sequence and will avoid confusion for the end-user.
- Try to capture flood data at or near the peak levels.
- Flood extents are visible at the edges of the flood; important information can be conveyed by also paying special attention to bridges, weirs and any structures that may influence flow.
- Look out for and capture any significant parallel watercourses e.g. around islands which act as by-pass flow channels during a flood.

Aerial photograph showing extensive flooding.



- Try to capture any lake inflows/outflows, as well as the length and breadth of the lake.
- Try to capture still images of towns, bridges and weirs from upstream and downstream direction.
- Fly as low as possible to get the best level of detail, particularly at towns, structures, gauging stations, a split in channels. Flight heights will however primarily be dictated by aviation regulations.

WHAT EQUIPMENT TO USE?

- Obtaining geo-referenced images and video is extremely beneficial, particularly for rural areas and areas of groundwater flooding. A simple way to do this is to bring a sat nav on board so that the flight path can be tracked and then imported into a geo-spatial/GIS file.
- There is a date/time function on all cameras and it is critical that this function be switched on and correctly set so that all recordings and images are time stamped.
- An externally mounted camera linked to a monitor on board has worked well in the past. Using this set up, the on-board controller and additional observer can change the direction of the camera to ensure the full extent is captured.
- The video and image outputs must be of sufficiently high quality so that flood extents can be easily identified by the end-user.



GIS can let you link a photograph, map and associated flooding details together.

WHAT TO DO DURING THE AERIAL CAPTURE?

IT IS VERY IMPORTANT TO BRING A NOTEPAD AND PEN ALONG TO RECORD THE FOLLOWING INFORMATION AND TO ALLOW USEFUL CROSSCHECKING LATER.

- Once in the air and the camera has started recording, it is very important to record the start date, time and location.
- Often an additional observer will be accommodated on board and it is beneficial that this observer record the name and time at which towns/townlands are being captured. These notes serve as a very useful tool when the video/imagery is being reviewed, e.g. by a hydraulic modeller who is unlikely to be familiar with the area.
- The date, time, co-ordinates and brief description of aerial photographs captured should also be recorded.
- It may be difficult to maintain your sense of location while in a helicopter or plane, so pay special attention to monitoring your location by marking the location and time on a printed map regularly during the flight.

As technology is constantly evolving, it will become more common for data to be captured and digitised through an automated process e.g. with the use of infrared cameras which can differentiate water bodies from other land cover types.

TIP! LINK YOUR MAP TO YOUR PHOTO THROUGH THE GIS ATTRIBUTE TABLE AND PHOTO NAME.

CHAPTER 7: CONCLUSION

THE COLLECTION OF INFORMATION AFTER A FLOODING EVENT IN A SAFE AND EFFECTIVE MANNER GREATLY IMPROVES OUR UNDERSTANDING OF FLOODING AND HOW BEST THIS RISK CAN BE MITIGATED IN IRELAND. FLOOD INFORMATION CAN INFORM DEVELOPMENT PLANS, EMERGENCY RESPONSE PLANS, FLOOD RISK ASSESSMENTS AND PLANNING DECISIONS.

Public authorities have a key role to play in ensuring that useful and detailed flood data is gathered and provided to the OPW for inclusion in the database of historic flood events, which can be accessed at *www.floodmaps.ie*.

In order to assist the comprehensive collection of flood data, the OPW have created this handbook and a flood data collection form, which is in Appendix A and can also be downloaded from *www.floodmaps.ie*. Completed forms should be submitted to the address below.

If you have any queries regarding this handbook or flood data collection, please contact the OPW at the address below.

CONTACT DETAILS

TEL: 046 942 6000

email: flood-data@opw.ie

www.floodmaps.ie

www.opw.ie

OR POST TO:

Flood Data Collection

FRAM Section,
OPW Head Offices,
Trim,
Co. Meath

OPW FLOOD DATA COLLECTION FORM

SECTION 1: TO BE COMPLETED BY PERSON SUBMITTING REPORT

Name of Person: Signature:

Name & Address of Organisation:

Report Date: Date of visit:

e-mail: Telephone:

NOTE:- Note: Please forward this form along with any additional information to flood-data@opw.ie

SECTION 2: LOCATION OF FLOOD EVENT

2.1 Location of Flood Event

2.2 National Grid Reference

National Grid Reference

IG Easting IG Northing

2.3 Flood Dates & Time

	Flood Start	Flood Peak	Flood End
Date	<input type="text"/>	<input type="text"/>	<input type="text"/>
Time	<input type="text"/>	<input type="text"/>	<input type="text"/>

2.4 Additional Information

(If a map is available it would be of great assistance if you could include a copy of this map showing the location and extents of the flooding incident.)

SECTION 3: SOURCE & CAUSE OF FLOOD EVENT

Flood Source (i.e. from where the flood waters originated)

Flood Cause (i.e. what caused the flood to occur)

Name of Catchment (if applicable)

Name of Waterbody (if applicable)

Flood Source Flood Cause

Please give a brief description of the flooding cause and source

OPW FLOOD DATA COLLECTION FORM

SECTION 4: FLOOD DATA

Flood Parameter	Max Value	Typical Value	Comments
Flood Level (metres OD Malin) <i>Where known please enter the maximum recorded flood level and the typical flood level as metres OD Malin Head.</i>	<input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>
FLOOD DEPTH (METRES) <i>Where known please enter the maximum recorded flood depth and the typical flood depth in metres</i>	<input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>
FLOOD FLOW (M³/S) <i>Where known please enter the maximum recorded flood flow and the typical flood flow as cubic metres / sec.</i>	<input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>
FLOOD VELOCITY (M/S) <i>Where known please enter the maximum recorded flood velocity and the typical flood velocity in metres / sec</i>	<input type="text"/>	<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>

Has this location flooded previously? Yes ☐ No ☐ Not Known ☐

Details of Flooding Frequency

<input type="text"/>
<input type="text"/>

Frequency	Comments
<input type="checkbox"/> Never Before <input type="checkbox"/> Once Before	<input type="text"/>
<input type="checkbox"/> Occasionally <input type="checkbox"/> Every Year	<input type="text"/>
<input type="checkbox"/> Many Times Every Year <input type="checkbox"/> Other	<input type="text"/>
<input type="checkbox"/> Always after Heavy Rainfall	<input type="text"/>

SECTION 5: FLOOD IMPACT

5.1 IMPACTS TO PEOPLE

- (i) Was there any loss of life ? Yes ☐ No ☐ Not Known ☐
- (ii) Were there any serious injuries ? Yes ☐ No ☐ Not Known ☐

(iii) Please give details of any loss of life or personal injuries

(e.g. number of persons, types of injuries, risk of death or serious injury etc)

Comments

<input type="text"/>
<input type="text"/>
<input type="text"/>

OPW FLOOD DATA COLLECTION FORM

5.2 IMPACTS TO PROPERTY

5.2.1 RESIDENTIAL

Were any residential properties affected by the flooding event and if so please give details ?

Property Type

Residential Yes ☐ No ☐
Number of Properties Affected
Number of People Affected

Details

5.2.2 COMMUNITY

Were any of the following community properties affected by the flooding event and if so please give details ?

Number of Properties Affected

Property Type

Hospital / Care Home ☐ School ☐
Gov / Local Administration ☐ Fire Station ☐
Garda Station ☐ Other ☐

Details

5.2.3 COMMERCIAL

Were any of the following commercial properties affected by the flooding event and if so please give details ?

Number of Properties Affected

Property Type

Office ☐ Shop/Retail ☐
Fast Food/Restaurant ☐ Public House ☐
Garage/Vehicle Service Ind. ☐ Leisure Facility ☐
Warehouse / Storage ☐ Other ☐

Details

5.3 TRANSPORT INFRASTRUCTURE

5.3.1 ROAD

Were any roads affected by the flooding event and if so please give details ?

Road Category

☐ None ☐ Motorway
☐ National Primary ☐ National Secondary
☐ Regional ☐ Urban
☐ Local ☐ Other

Road Name

Length of Road Affected (km)

Details

5.3.2 RAIL

Was any rail infrastructure affected by the flooding event and if so please give details ?

Rail Category

☐ None ☐ Intercity
☐ Suburban ☐ Commuter
☐ DART ☐ Luas
☐ Local ☐ Other

Rail Name / Description

Length of Rail Affected (km)

Rail Infrastructure

☐ Station / Platform ☐ Signals
☐ Power Supply ☐ Other

Details

5.4 COMMUNICATIONS INFRASTRUCTURE

Was any of the following communication infrastructure affected by the flooding event and if so please give details?

Type

☐ Telephone Overhead Cables ☐ TV Mast Intercity
☐ Telephone Underground Cables ☐ Radio Mast
☐ Telephone Exchange ☐ None
☐ Mobile Phone Mast ☐ Other

OPW FLOOD DATA COLLECTION FORM

Spatial Impact

- ☐ National ☐ Regional
☐ Local ☐ City
☐ Town Village

Disruption Period (Days)

Details

5.5 ELECTRICAL INFRASTRUCTURE

Was any of the following Electricity Generation and/or Distribution Infrastructure affected by the flooding event and if so please give details?

Electrical

- ☐ None ☐ Overhead Cables
☐ Underground Cables ☐ Switching Stations
☐ Mini Pillars ☐ Sub Stations
☐ Generation

Spatial Impact

- ☐ National ☐ Regional
☐ Local ☐ City
☐ Town Village

Disruption Period (Days)

Details

5.6 GAS INFRASTRUCTURE

Was any of the following Gas Distribution Infrastructure affected by the flooding event and if so please give details?

Gas

- ☐ Underground Pipes ☐ Storage Tanks
☐ Pumping Stations ☐ Other

Spatial Impact

- ☐ National ☐ Regional
☐ Local ☐ City
☐ Town Village

Disruption Period (Days)

Details

5.7 WATER & WASTE WATER INFRASTRUCTURE

5.7.1 Water Supply

Were any of the following Water Supply facilities affected by the flooding event and if so please give details?

Water Supply

- ☐ Supply Borehole ☐ Abstraction
☐ Treatment Facility ☐ Pumping Station
☐ Reservoir ☐ Pipe Network
☐ Other

Spatial Impact

- ☐ National ☐ Regional
☐ Local ☐ City
☐ Town Village

Disruption Period (Days)

Details

5.7.2 Wastewater

Were any of the following Wastewater facilities affected by the flooding event and if so please give details?

Water Supply

- ☐ None ☐ Treatment Plant
☐ Domestic Treatment ☐ Pumping Station
☐ Pipe Network ☐ Other

Spatial Impact

- ☐ National ☐ Regional
☐ Local ☐ City
☐ Town Village

Disruption Period (Days)

Details

5.8 WATER QUALITY & HERITAGE

5.8.1 Water Quality

Was Water Quality affected by the flooding event, if so please give details ?

Water Supply

- ☐ None ☐ IPPC Licence
☐ Licenced Discharge ☐ Recreational Water
☐ Fisheries /Angling ☐ Other

Water Body Affected

OPW FLOOD DATA COLLECTION FORM

Details

5.8.2 Heritage

Were any Built or Natural Heritage sites affected by the flooding event, if so please give details

Type

- ☐ Natura Site ☐ NHA
☐ National Monument ☐ Protected Structure
☐ Other

[illegible]

Details

5.9 AGRICULTURAL & FORESTRY

Agricultural Land

- ☐ None
 ☐ Tillage (Root Crop)
- ☐ Tillage (Grain Crop)
 ☐ Horticulture
- ☐ Pasture
 ☐ Forestry
- ☐ Bog
 ☐ Other

Was any Agricultural Land affected by the flooding event, if so please give details

5.9.1 Land Type

Land Quality

- ☐ Very Good
 ☐ Good / Moderate
- ☐ Poor
 ☐ Very Poor
- ☐ Not Known

Area of Land (Hectares)

Details

5.10 ENVIRONMENTAL IMPACTS

Describe environmental impacts e.g oil spillage

SECTION 6:- ADDITIONAL INFORMATION

If you have any additional information regarding the flood event please give details in the box below.

Do you have any additional information?

Yes ☐ No ☐

- ☐ Map of Location & Extent ☐ Video Footage
☐ Photographs ☐ Press Articles
☐ Rainfall Data ☐ Other

[illegible]

Should you consider any of this information to be sensitive and not suitable for public display on the Flood Hazard Mapping Website (www.floodmaps.ie) please give details in the box below

Details



FLOOD DATA COLLECTION,
FRAM SECTION,
OPW HEAD OFFICES, TRIM, CO. MEATH.

TEL: 046 942 6000 EMAIL: FLOOD-DATA@OPW.IE

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