PCA Geospatial Data Documentation

Pre-Costruct Archaeology Ltd

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CONTENTS

This documentation is intended to offer support on the different innovations introduced by the **PCA Geospatial Data Department** making available quick access to guides, tutorials (and soon video tutorials!!!).

Attention: This documentation is currently under active development and some sections are to be considered not stable.

The documentation is constantly updated and it can be viewed online or downloaded in PDF format (see below).

The choice of a ReadtheDocs documentation format has been dictated by the intention to offer a *simple* and *intuitive* interface, which guarantees a collaborative space where everyone can add information and correct possible errors.

If you are new to this documentation, the table of contents below and in the sidebar should let you easily access the documentation for your topic of interest. You can also use the search function in the top left corner

Besides the online access to this documentation, this pages can be downloaded for offline reading. They are accessible from the *Read the Docs* menu at the bottom of the sidebar, as:

- HTML zipped files that you can extract and use as paths from within the software
- PDF files

Note: The documentation is constantly updated and new sections are added frequently. Requests for new sections and guides are welcome, as is your feedback. If something isn't clear enough, or you can't find what you're looking for in the docs, help us improve them by letting us know by contacting us to geospatialdata@pre-construct.com

Please have a look into one of the sections below.

CHAPTER

ONE

DIGITAL RECORDING SYSTEM

1.1 Digital Recording System Guides and Tutorials

One of the key elements of PCA's integrated GIS system is represented by the digital data recording system (DRS) which allows all archaeological data to be recorded directly in the field in digital format. The current configuration of the PCA DRS is based on a simple Google Form accessible by mobile devices (tablets and phones). All the data inserted are automatically (and instantly) converted into a spreadsheet record.

In addition to eliminating the need to manually compile a database in the post-excavation phase, the recorded data is immediately available on the GIS project (and on Mergin) and, being linked to the site plan data, they can be managed, edited and interrogated.

Currently, the PCA Digital Recording System comprises all the sheets, from the context sheet to the specialistic sheets (cremation sheet, skeleton sheet, masonry sheet, timber sheet), all available in the same form, which, based on the basic answers provided (type, category), adapts automatically, showing specific questions available for the type of feature registered. A dedicated form covers the Trench sheet.

In the current DRS configuration, all the registers are still in paper format. This limitation depends on the current Google Form solution.

Important: A dedicated PCA DRS web application is currently under development and it will solve all the current limitations.

1.1.1 DRS Initial Configuration

This chapter provides a quick overview of how to configure the DRS on Cloud and tablets for a new project.

Configuring a new folder on the cloud DRS storage account

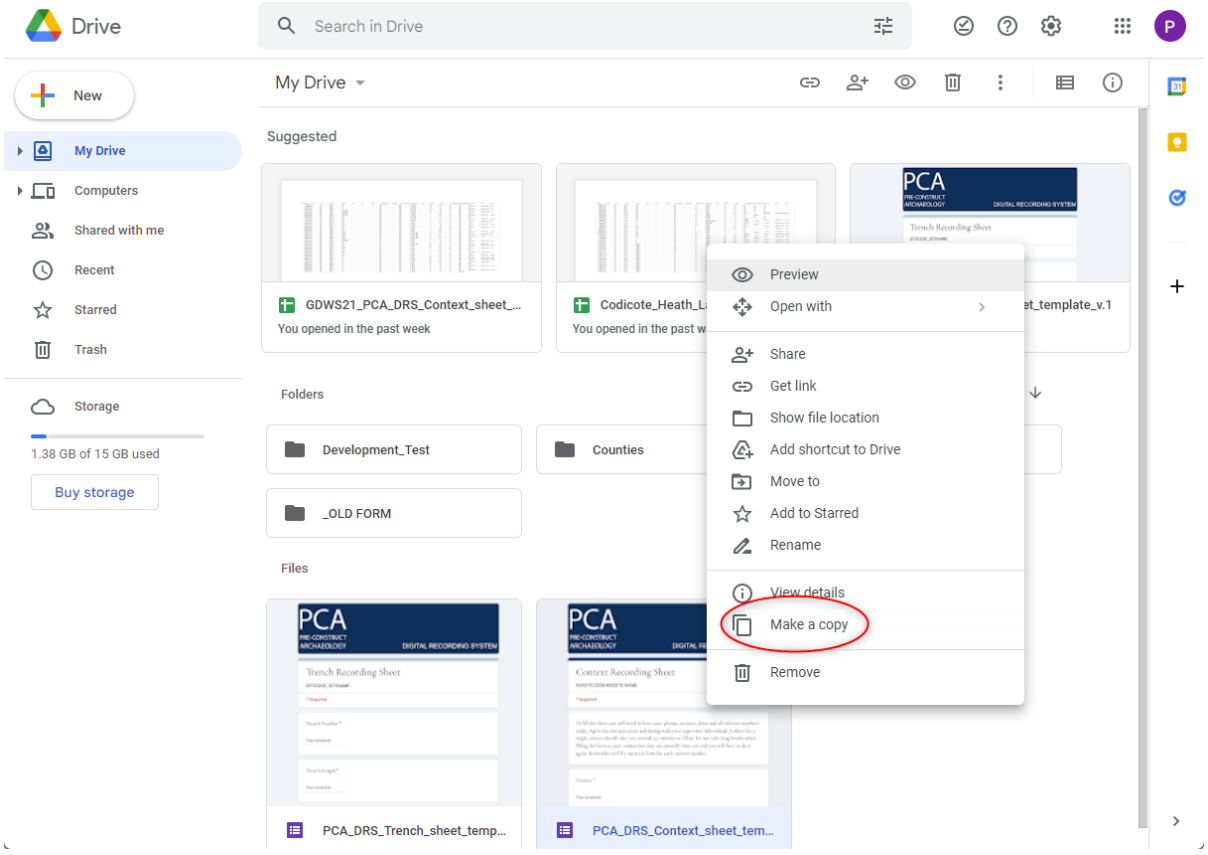
The current DRS data is stored in a main Google Drive account.

Note: Contact geospatialdata@pre-construct.com for the credentials.

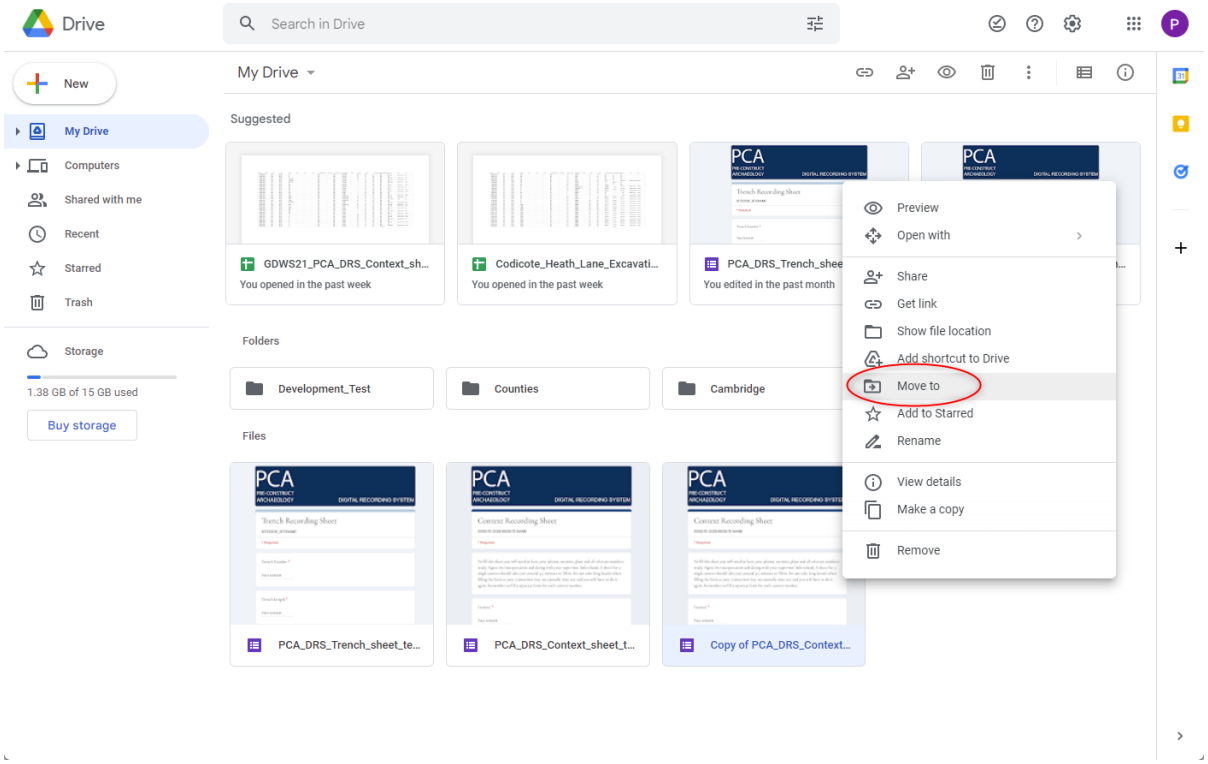
1. Open Google Drive DRS main account.

The internal folder structure of Google Drive is the same as that used on the local server project folder, with a subdivision in counties, towns and sites.

2. Create a new Project folder for your project. If a subdivision in areas is planned, consider using the same subdivision in the folder structure.
3. Right-click on the DRS Form template located in the home and select **Make a copy**



4. Move your copy into the project folder. Right-click on the form and select **Move to**



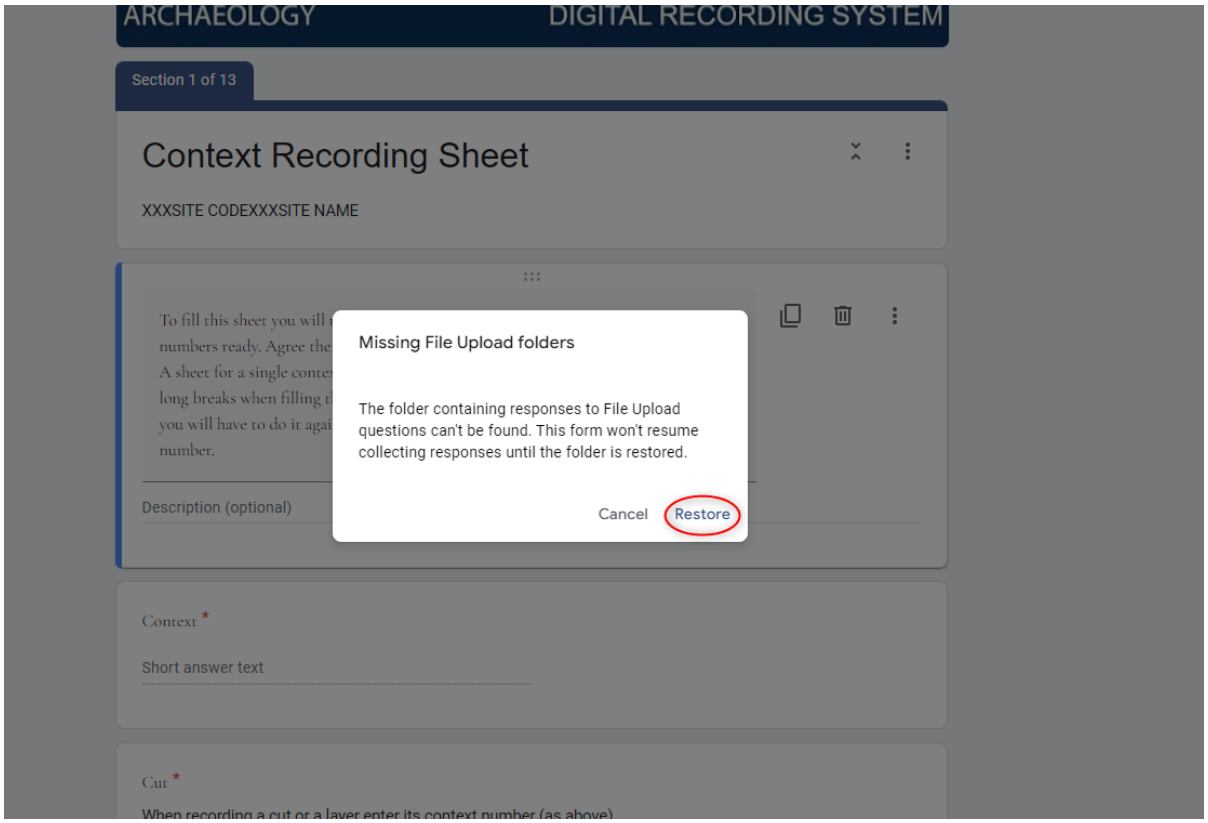
5. Go to your project folder and rename your copy of the Form template with your Site Code and Site Name (e.g., *LNDBKP22_London_Buckingham_Palace_PCA_DRS_Trench_sheet* or *LNDBKP22_London_Buckingham_Palace_PCA_DRS_Context _sheet*)

Configuring the Google Form and the Google Spreadsheet

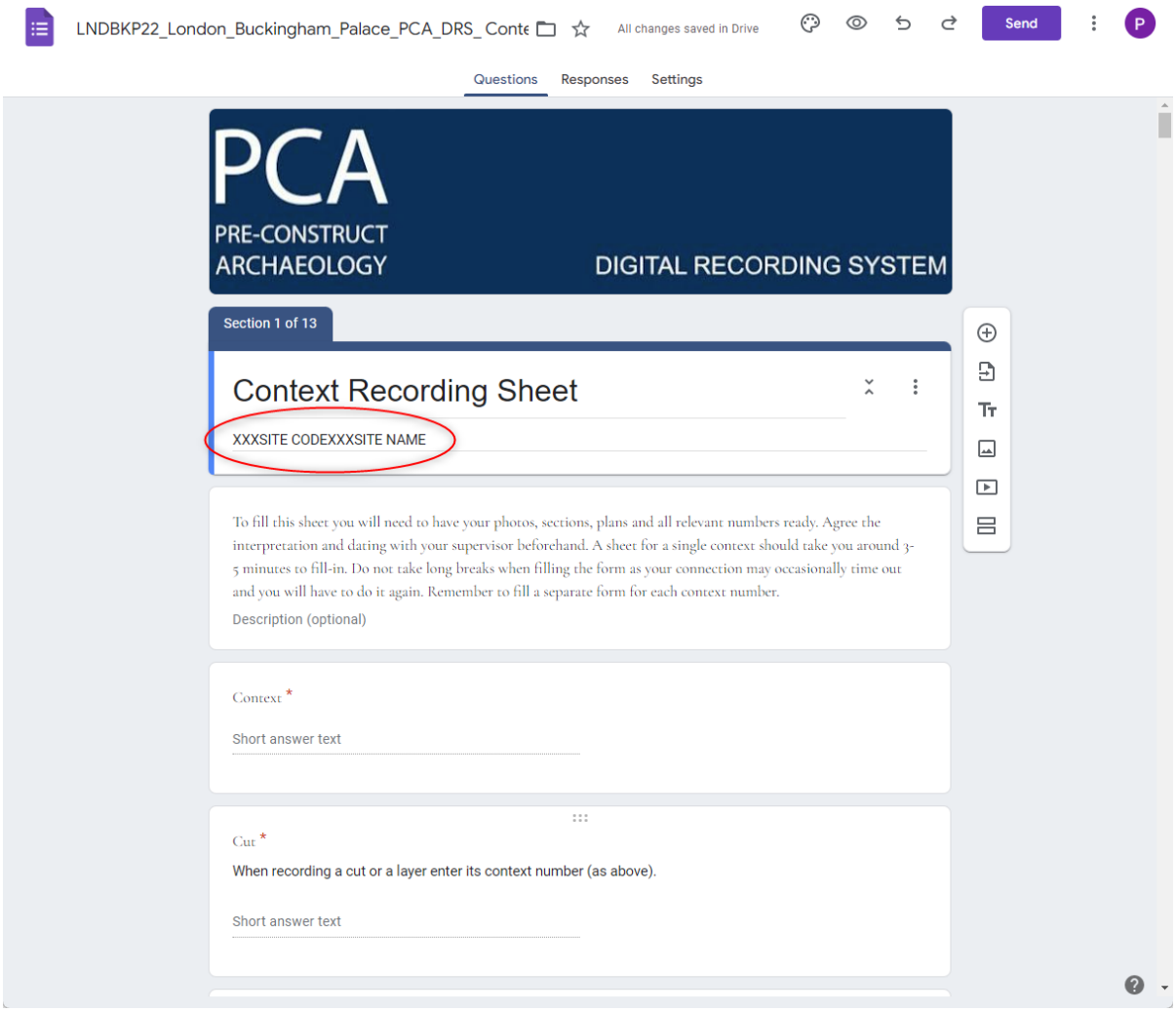
6. Open the form. When the Form is being opened for the first time, a message will appear asking to restore the *Missing File Upload folders*.

   Those are the folders where the images used as attachments (e.g., sketches or feature overview photos) will be stored.

7. Press **Restore** to allow Google to automatically create the required subfolder structure.

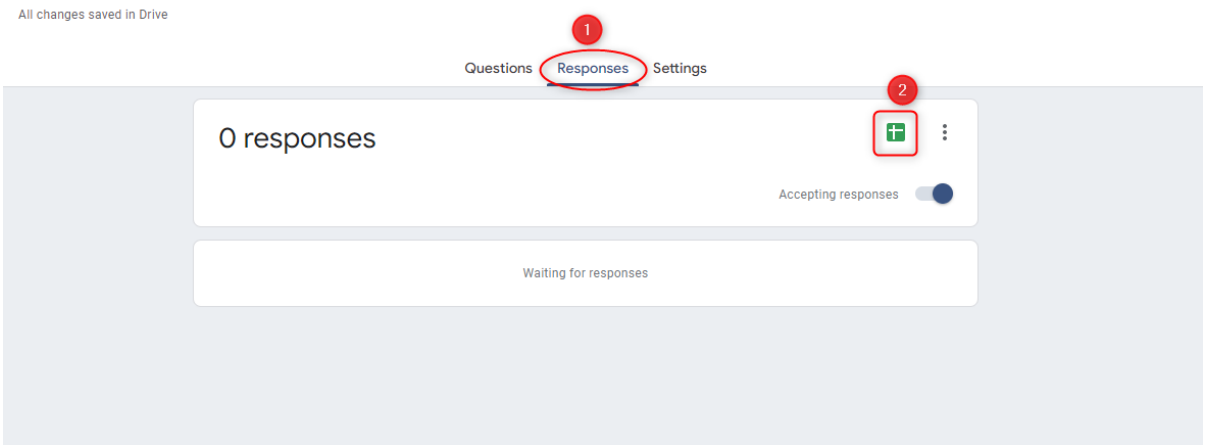


8. In the top part of the Form, add your SITECODE and SITENAME.

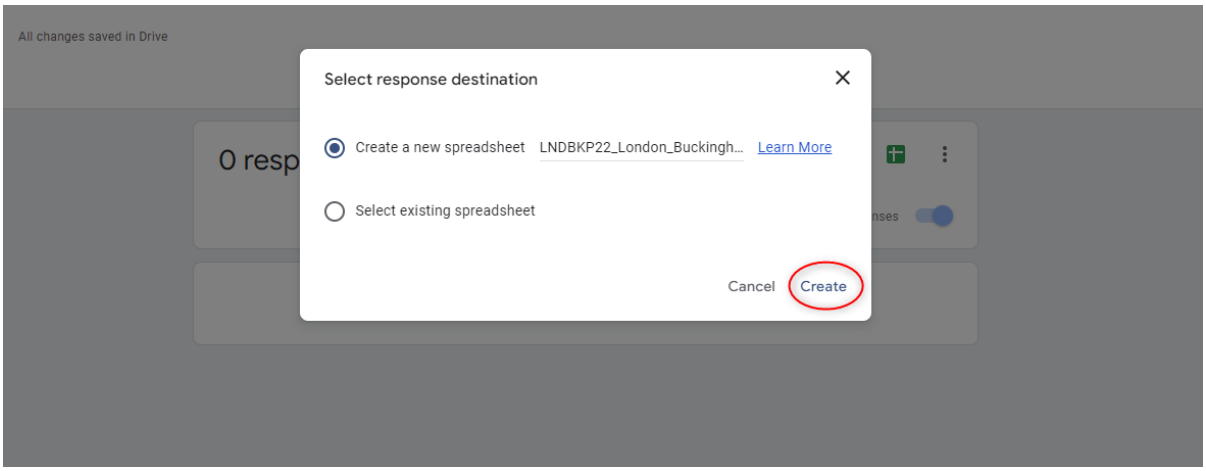


The form is now ready. The next step is to create the associated Google spreadsheet that will collect all the data generated by the form.

9. On the form, select the tab Responses and click on the Spreadsheet icon



10. In the new popup window check that the first option is selected (*Create a new spreadsheet*) and click on **Create**.

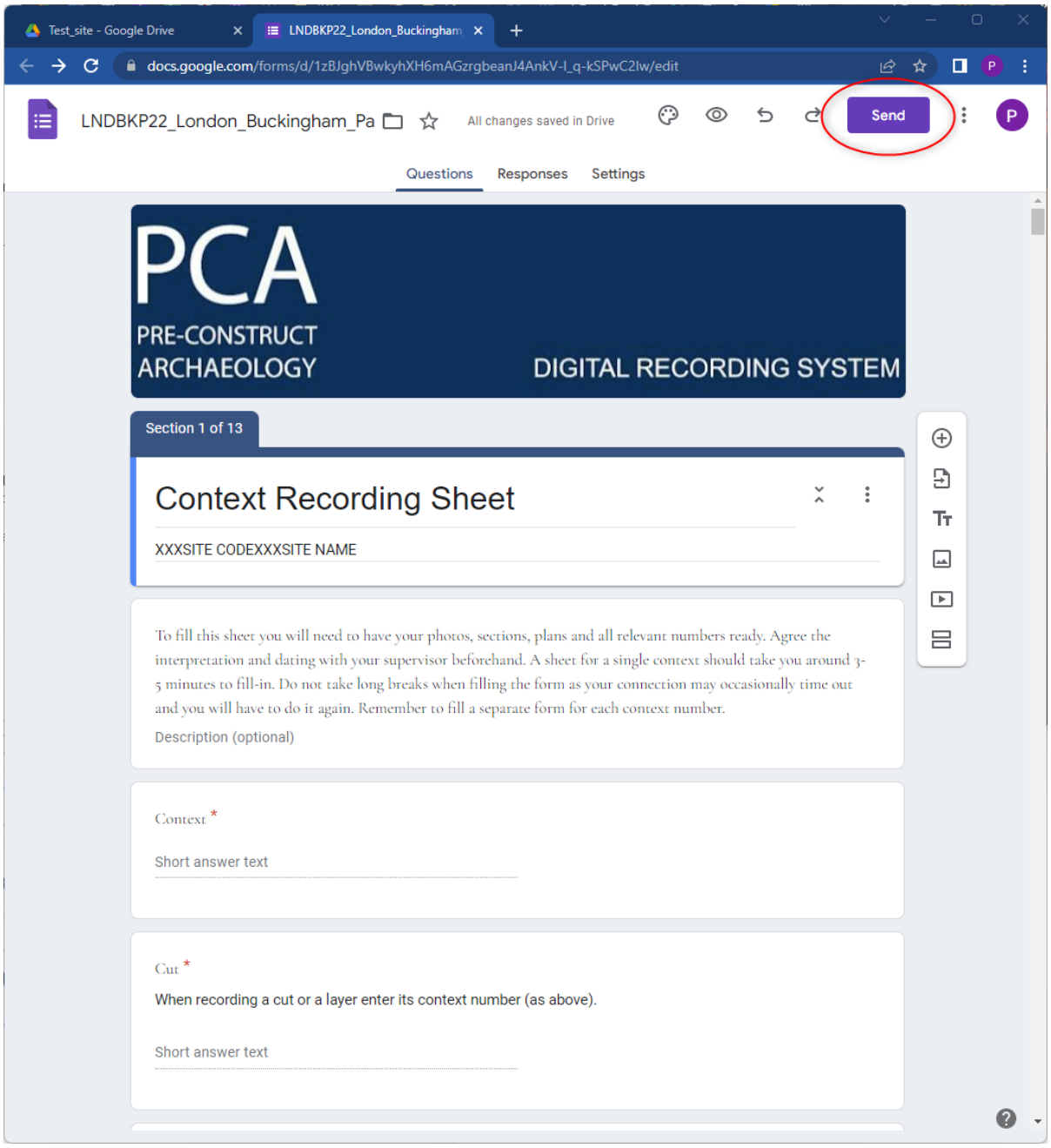


Our files are now ready on the main Google Drive account. They need to be sent or shared to be used on site on the tablets.

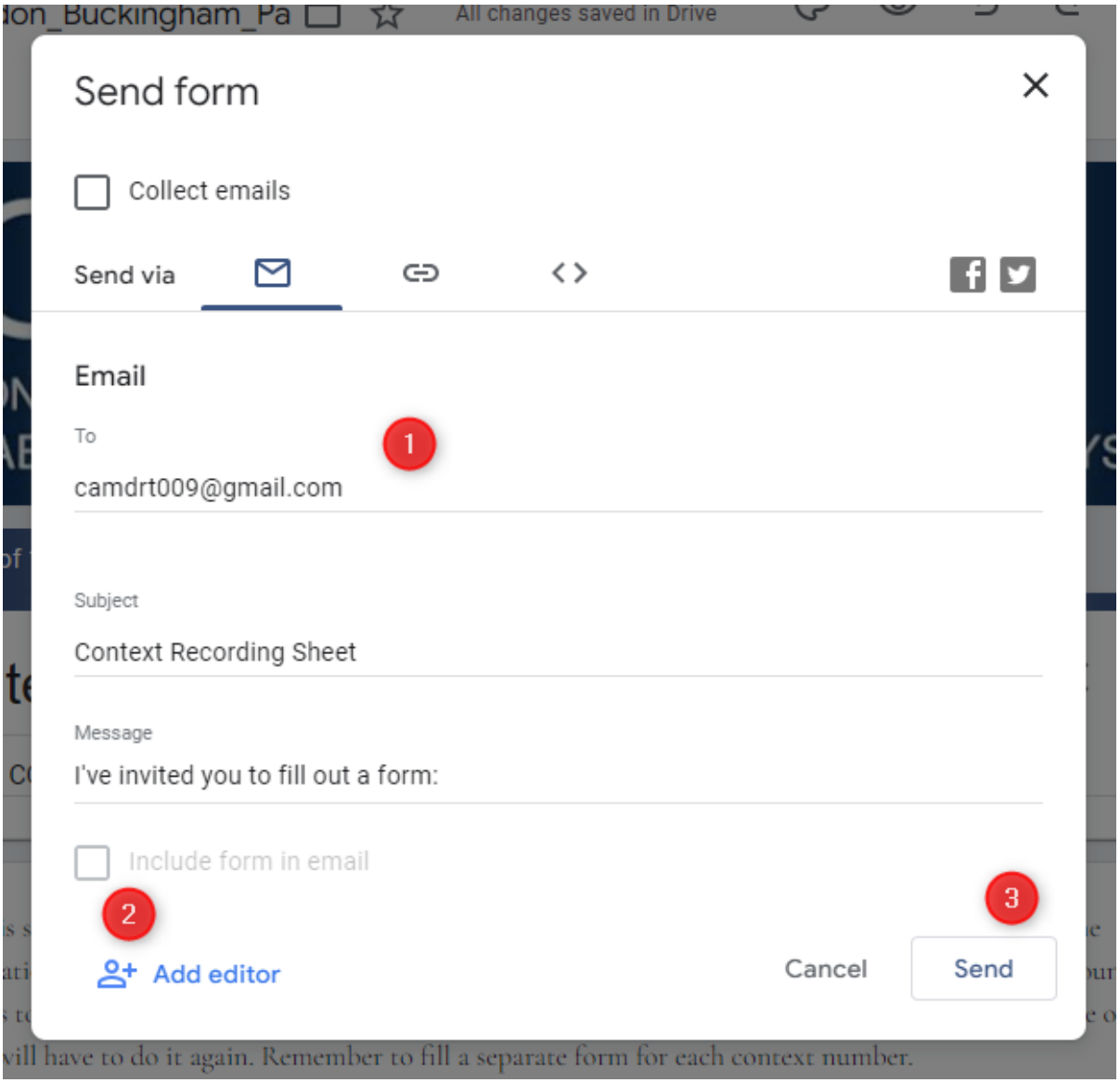
Configuring the tablets

Sending the Google Form to the tablets

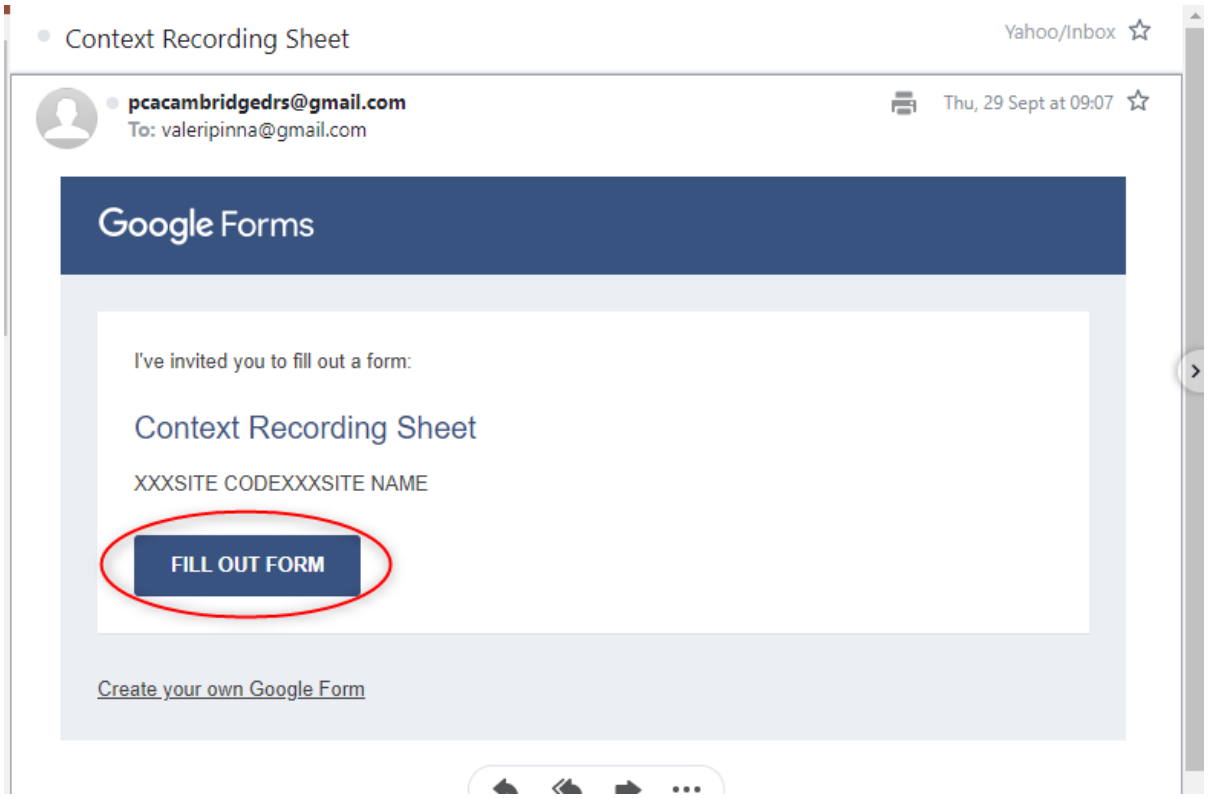
11. As we want people on site to be able to fill out the form, but not modify it, we just send an email an invitation to fill out the form. On the open form, click on **Share**.



On the new opened popup window, add the tablet Google account email (1) (it is possible to add more than one email for time). Check that the option *Include form in email* (2) is unchecked and then, press **Send** (3)

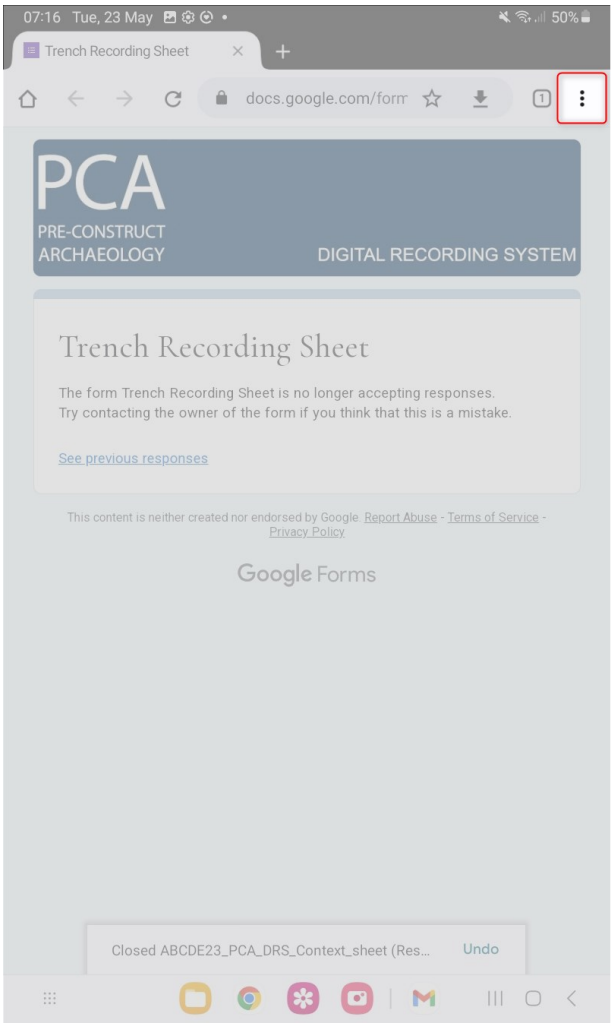


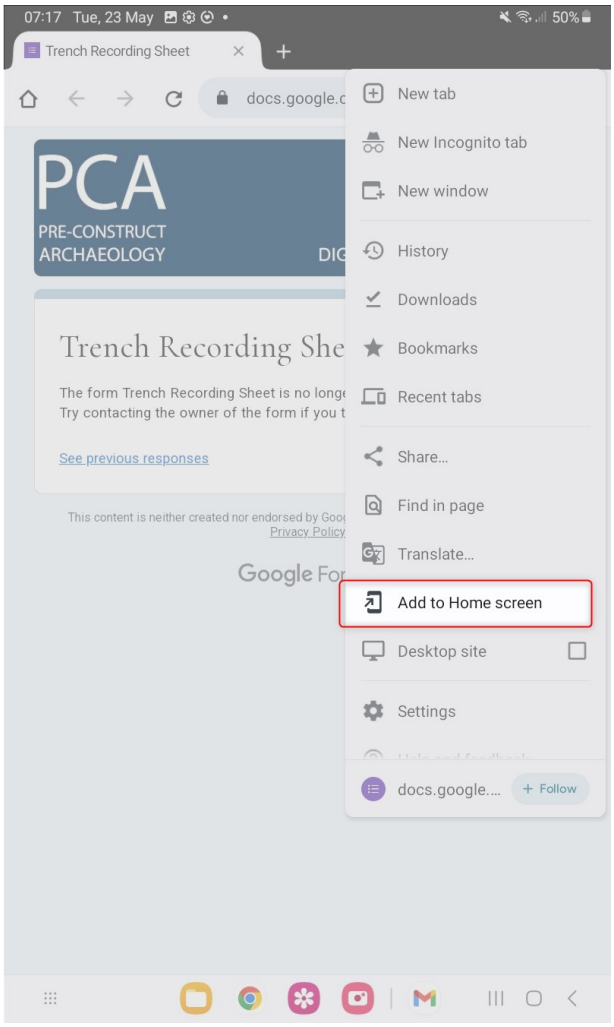
12. On the tablet, open Gmail to access the received email and click on Fill out Form to open it on the browser.



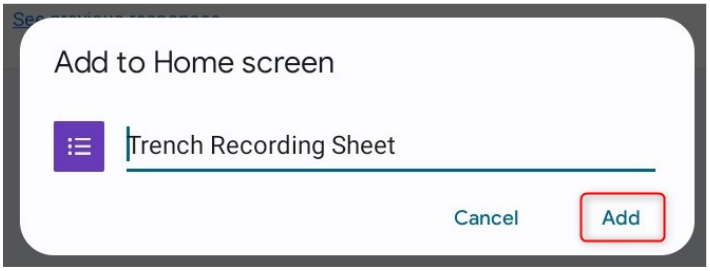
On the browser (usually Google Chrome), on the open form, is possible to send the page as a bookmark on the home screen, to have quick access to it.

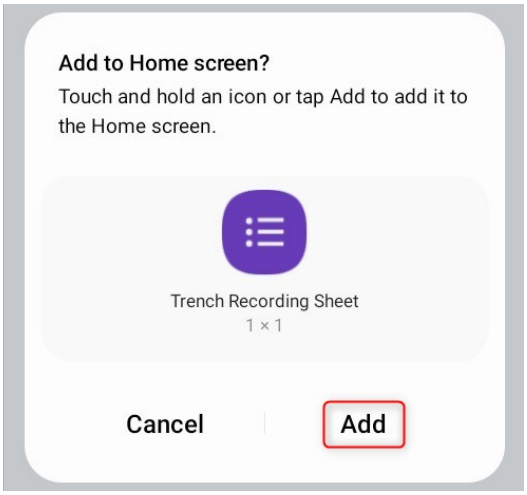
To create a bookmark, press the three dots icon on the top right corner and then, select Add to Home screen.





Confirm the operation by pressing Add in both dialogues that will appear





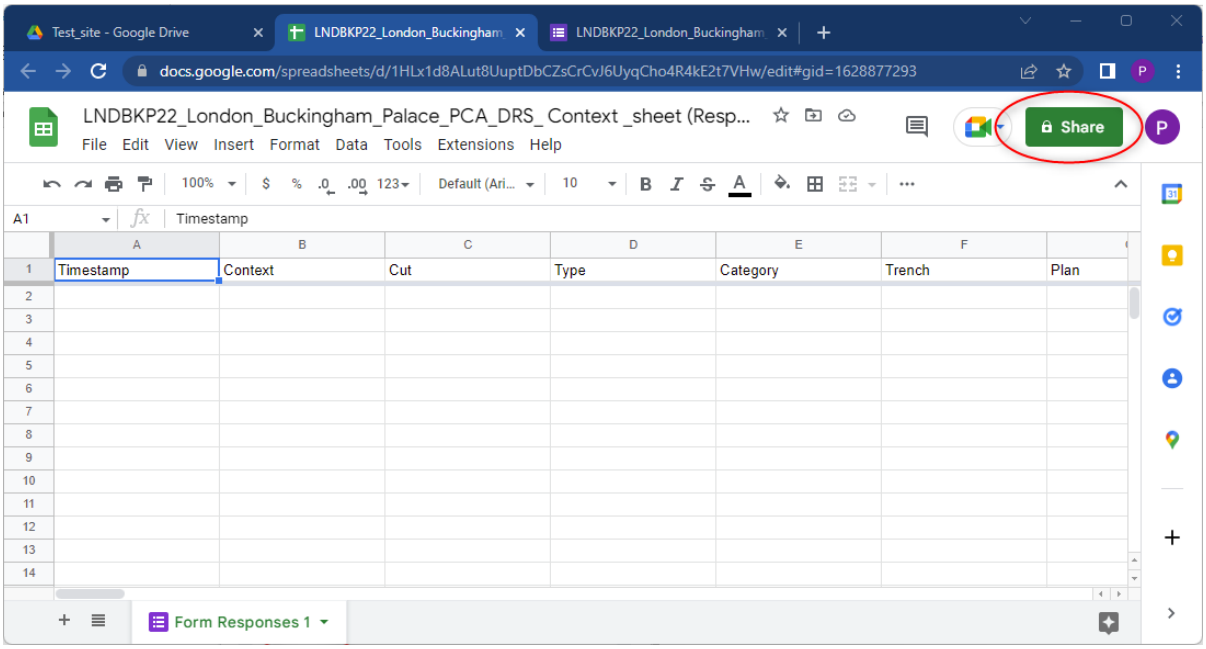
and the bookmark will be available on the home screen.

Sharing the Google Spreadsheet with the tablets

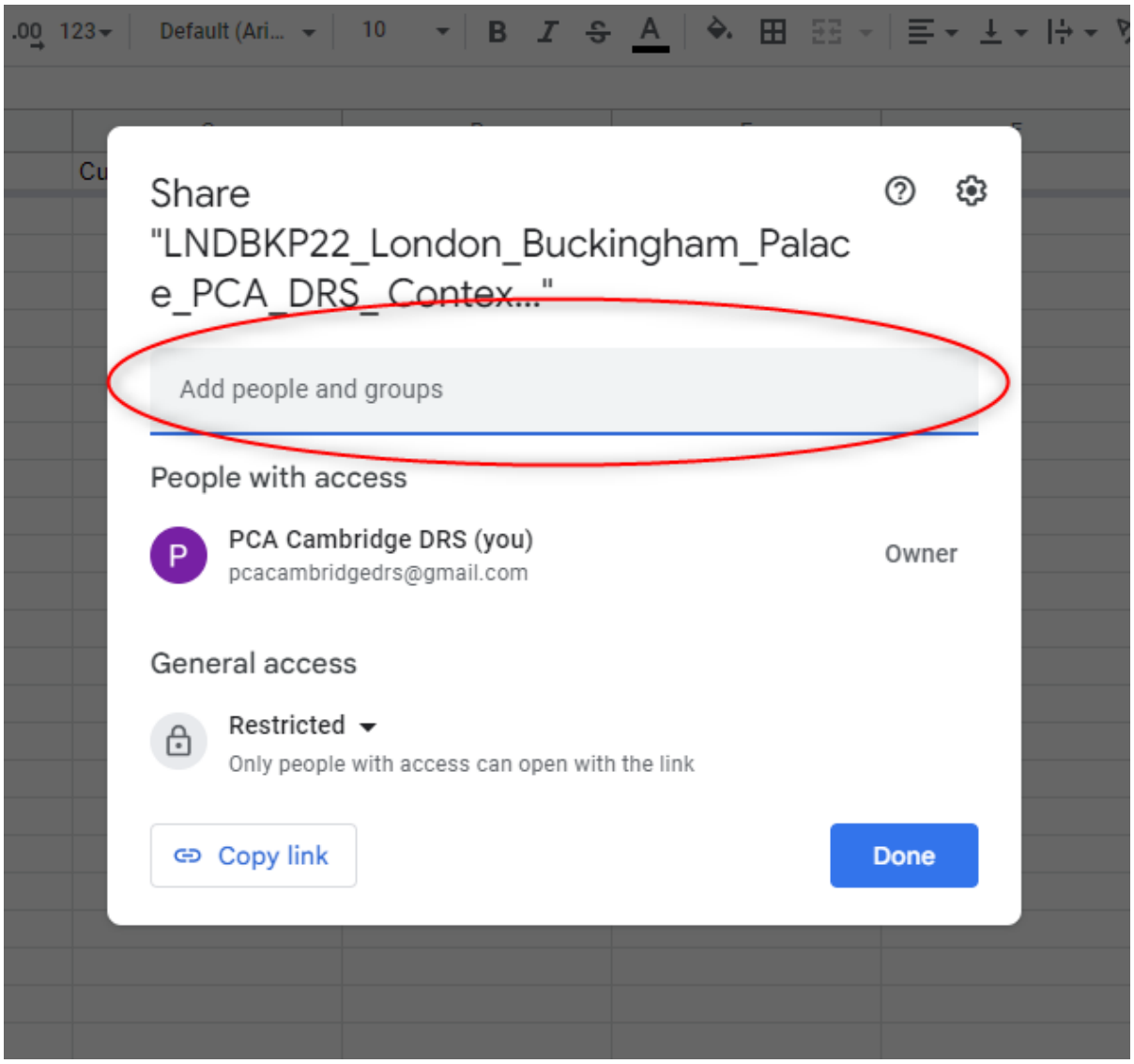
13. Unlike before, we want people to be able to access the table for comments and changes.

In this case, therefore, instead of sending a link, we will share the table with the tablet Google account.

Open the Spreadsheet and click on *Share*



In the new popup window click on **Add people and groups** and add the tablet Google Account.



A new window will open. Here you can define the level of permit that you want to give to the tablet's account. Click on **Editor** and select the desired option.

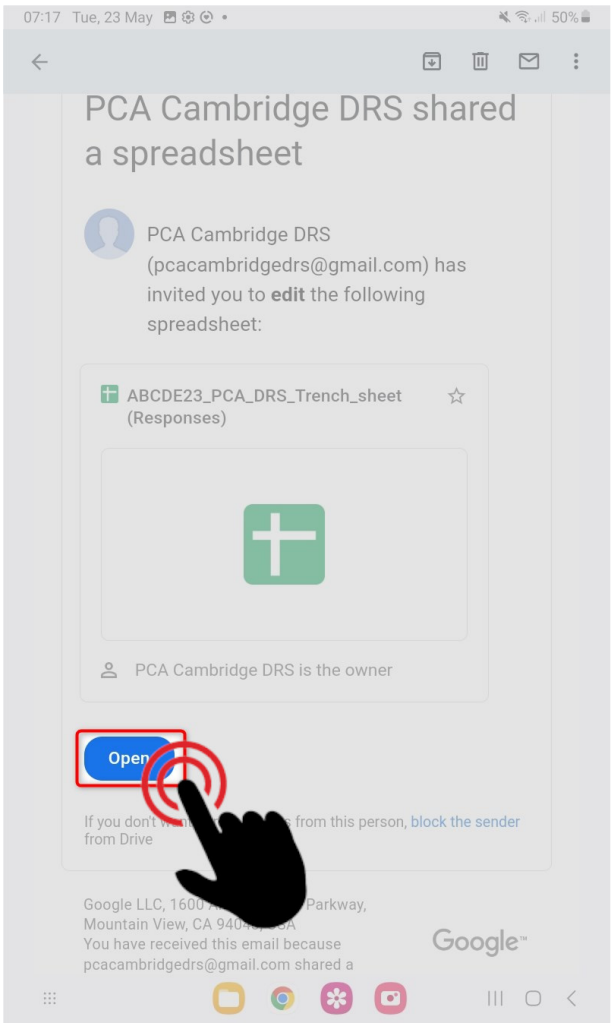
Usually, all the tablets need at least Commenter permits to allow people to add a comment to request a correction or an amendment on the data they inserted through the form. Only one tablet, used by the PO/Supervisor, will have Editor permits to allow corrections.

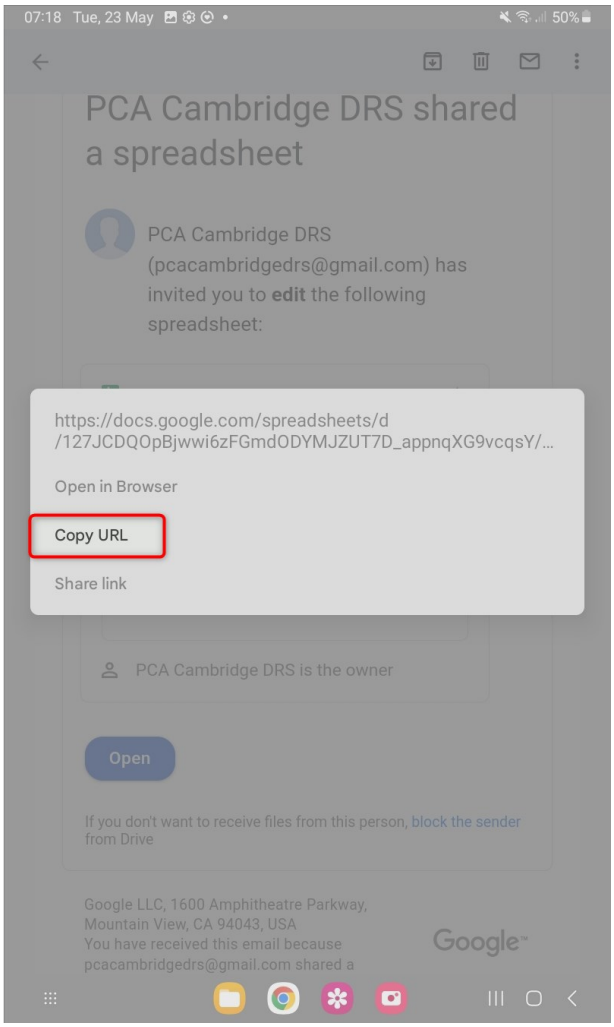
Configure the sharing according to the chosen strategy and press *Send* to share the spreadsheet. Repeat the operation for all the tablets in use on-site.

14. On the tablet, open Gmail to access the shared copy of the spreadsheet. The procedure to create the bookmark on the home screen is slightly different from the one used for the form.

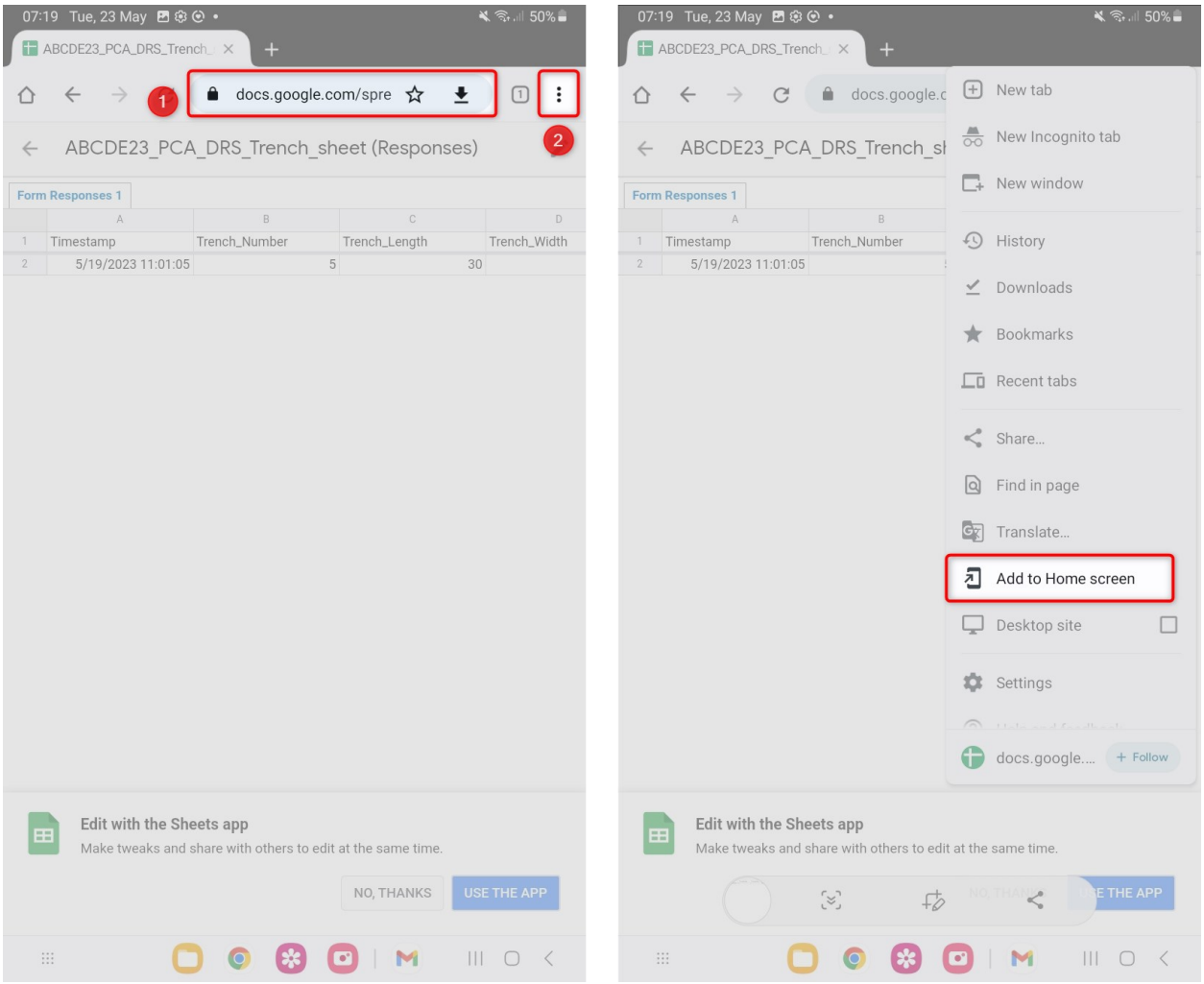
This is because we will normally access the spreadsheet using a dedicated app (Google Sheets) but in order to create the bookmark it is necessary to open manually the link via Chrome.

On Gmail, access to the received email and press and hold Open to open the options dialogue. *Select Copy URL*





Open Google Chrome and paste the address on the Browser address bar [1]. Then, press on the *three dots* icon [2] on the top right corner and then, select *Add to Home screen*.



This operation will create the bookmark on the home screen.

Finally, if available, press Use the app in the bottom right to see the spreadsheet using Google Sheets.

NB. This last step will appear only the first time, so if you already choose it before, you can ignore this step.


07:19 Tue, 23 May
50%
ABCDE23_PCA_DRS_Trench
docs.google.com/spre
ABCDE23_PCA_DRS_Trench_sheet (Responses)
Form Responses 1
A
B
C
D
1
Timestamp
Trench_Number
Trench_Length
Trench_Width
2
5/19/2023 11:01:05
5
30
Edit with the Sheets app
Make tweaks and share with others to edit at the same time.
NO, THANKS
USE THE APP

1.1.2 Project Data Folder Structure

This chapter provides a quick overview of the new Project Data folder structure.

Introduction

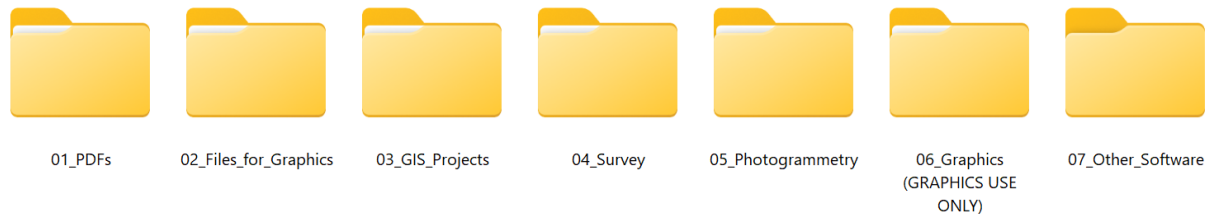
The introduction of the new PCA geospatial data recording and management system required a different approach to data storage.

A good data organization in folders and subfolders, together with consistency in the data storage location (and file names!) is an indispensable requirement to ensure the functioning of an integrated system.

Moreover, compliance with the rules of a shared data storage system drastically reduces the time of data management (finding a file correctly named in the correct folder saves a lot of time) and allows the use of automated processes for data processing.

The new Project data folder structure is a container for all the geospatial data generated during all the phases of a project, from the project set out to the final graphical outputs.

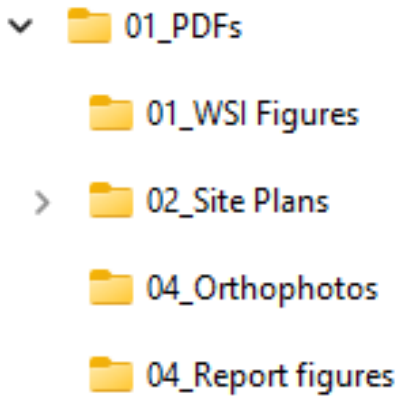
As can be seen in the figure below, all folders are named in a self-explanatory way and pre-numbered to keep the order of the structure unaltered.



01_PDFs

01_PDFs contain all the produced PDFs (site plans processed survey, WSI figures, orthophotos outputs, etc….).

There are already some predefined subfolders to facilitate organized storage, but, if necessary, you can create additional ad-hoc subfolders.

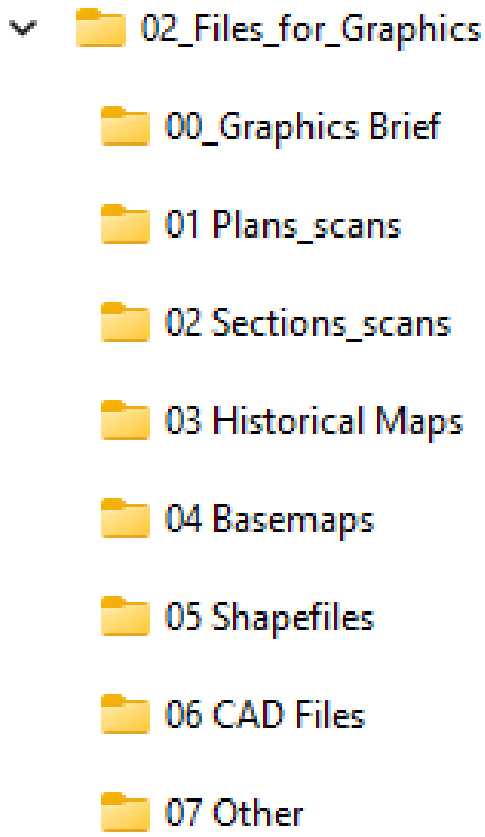


02_Files_for_Graphics

02_Files_for_Graphics is a container that each person involved (Manager, PO) can use to store the data they want to share with Graphics (for example, PDFs, images, shapefiles or CAD files for setouts or WSIs).

Graphics will be responsible for moving the various files to the most suitable place depending on their use (e.g., GIS project folders).

There are already some predefined subfolders to facilitate organized storage, but, if necessary, you can create additional ad-hoc subfolders.

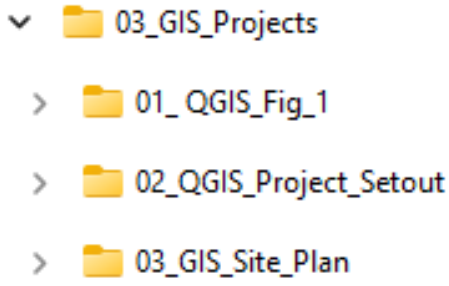


03_GIS_Projects

03_GIS_Projects is the container for all the GIS projects, organized in subfolders. Some of the projects are for internal Graphics use only (*01_QGIS_Fig_1_Template* and *02_QGIS_Project_Setout*).

The subfolder 03_QGIS_Site_Plan contains the active site plan project and can be used by graphics, supervisors and managers.

For more specifications on this folder, you can refer to the dedicated guide.



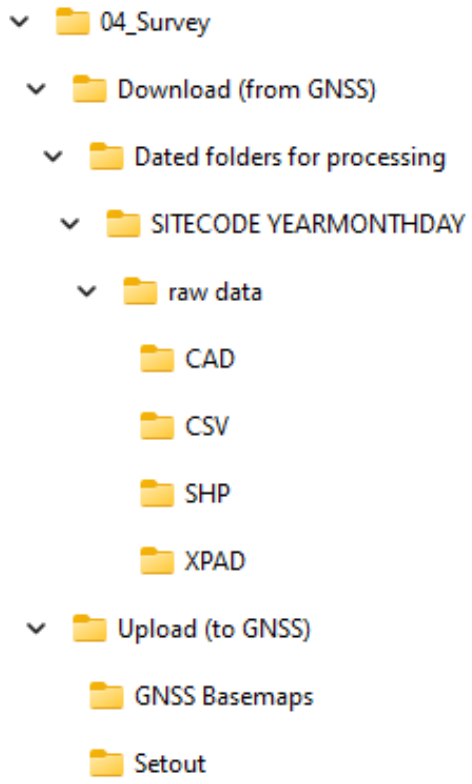
04_Survey

04_Survey contains all survey data, both incoming and outgoing.

Download (from GNSS) contains dated folders for processing, where all survey data (from raw data exported from GNSS/GPS to processed files) are organized into daily dated subfolders (for example, *XFRE22_220821*). It is primarily maintained by Graphics but is accessible to anyone involved to verify the raw survey data if necessary.

Upload (from GNSS) is the container for all the data prepared in the office by Graphics to be imported into GNSS.GPS.

Most of these files will also be available in the cloud so you can access them directly from your GNSS tablet.



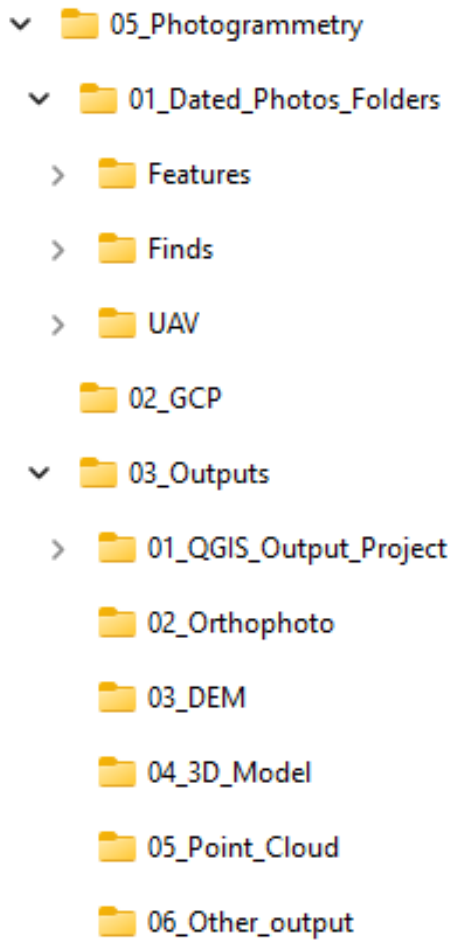
05_Photogrammetry

05_Photogrammetry is the container for all the photogrammetric data, from the raw photos to the final outputs (e.g., orthophotos, Digital Elevation Models (DEM), 3D models). The parent folder contains the Agisoft Metashape project file.

01_Dated_Photos_Folders contains all the raw photos, organised in subfolders (*Features, Finds, UAV*).

02_GCP contains the ground control points .csv files.

03_Outputs is where all the photogrammetry outputs are saved. It is organised in subfolders for easier file management. Here is also located a dedicated QGIS project used only for the conversion of orthophotos and DEMs to PDF.



06_Graphics (GRAPHICS USE ONLY)

06_Graphics (GRAPHICS USE ONLY), as his name suggests, is a folder for internal Graphics Dept use only. It contains all the processing data files used for the final figures output.

07.Other_Software

07.Other_Software is a generic container for all the files generated by unusual software. Create a subfolder with the software name to keep the folder organised.

CHAPTER

TWO

QGIS

2.1 QGIS Guides and Tutorials

Note: Some parts of this guides are inspired by the original QGIS User Manual

If you want to learn more about some of the topics covered here, it is advisable to visit the official documentation.

2.1.1 Getting Started

This chapter provides a quick overview of installing and configuring QGIS.

On any PCA workstation, you will find an updated version of QGIS (if you need to install the software on a new computer, you can refer to our IT department or to our Geospatial Data department for support).

Whether you are using a pre-installed version of QGIS or installing a new version from scratch, it is very important to know how QGIS versions work.

QGIS is a very prolific software with frequent updates and new version releases (every 4 months). This allows the developers to provide the community with constant support, introducing new features and fixing bugs and issues in short time.

This means that in a single year, 5 different versions of QGIS are available for download, but only one of them will be labelled as LTR (Longe Term Release), which is the suggested version for business use and that guarantees a more extended continuity of features and tools along all the year, without big changes.

Furthermore, PCA's current QGIS workflow makes extensive use of add-ons and plugins specifically developed for our integrated DRS/GIS system. For the functionality of each plugin to be guaranteed, it is important that all workstations use a version of QGIS previously tested by the Geospatial data department.

For these reasons, it is essential that all the workstations are using the same QGIS LTR version and that each update is previously authorized by the geospatial data team.

Currently, the version used is the *3.28.8-1*.

Installing QGIS

As just described, several versions of QGIS exist simultaneously and, often, the one currently chosen as the one to be used in our company is no longer among the versions available for download on the official software site.

On the understanding that the management of QGIS versions in corporate workstations is the responsibility of IT departments or geospatial data, to which reference can be made for any request for help, if, for a specific reason, you need to install a copy of QGIS in your own workstation, you can access to the current installation files in our server at the address `Z:\GeoSpatialData_Resources\QGIS_Resources\Current_QGIS_Installer`

Configuring QGIS

Adding the PCA custom Profile

QGIS offers great flexibility for customization.

To ensure that all the company workstations have the same basic QGIS configuration and access to the PCA Plugin Repository, it is possible to add a custom QGIS profile to your workstation.

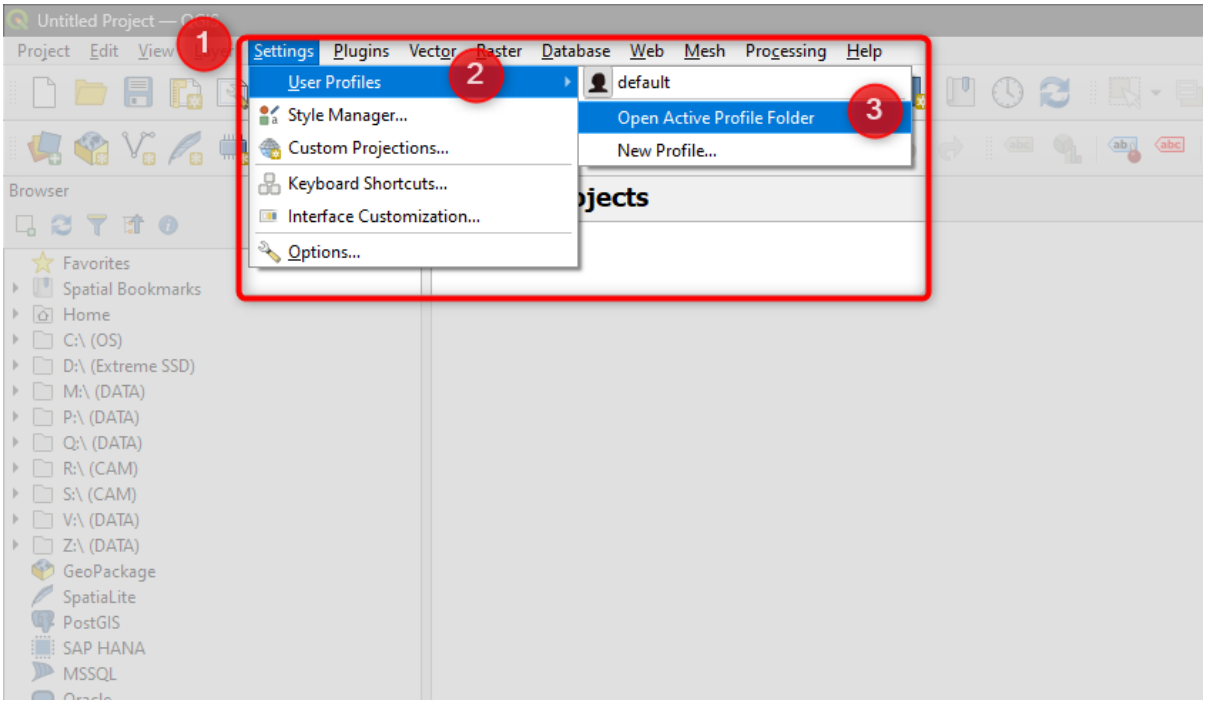
The procedure is quite simple and requires only copying a prepared folder into your QGIS configuration folder.

On Windows, the QGIS profile folder is located at `C:\Users\your_username\AppData\Roaming\QGIS\QGIS3\profiles`

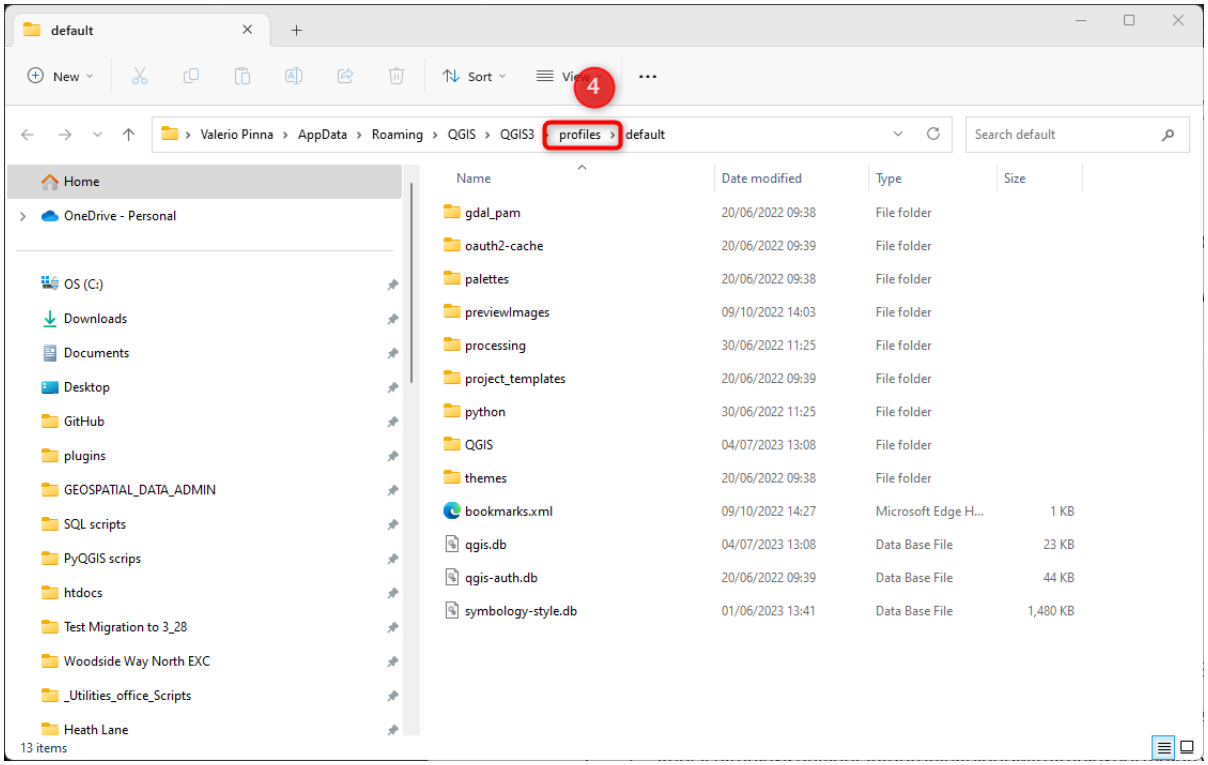
Is also possible to access it directly by QGIS.

Open QGIS

1. In the Menu Bar select *Settings*
2. Choose *User Profiles*
3. Click on *Open Active Profile Folder*



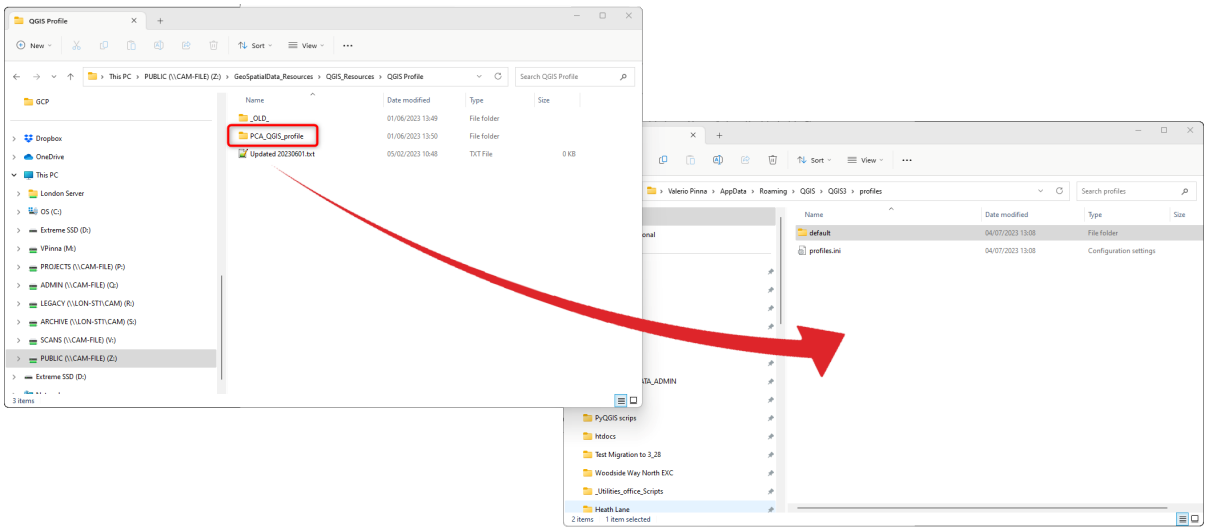
This will open a File Explorer. In this new window, navigate one level down to *Profiles* [4]: this is where the custom QGIS Profile folder must be copied.



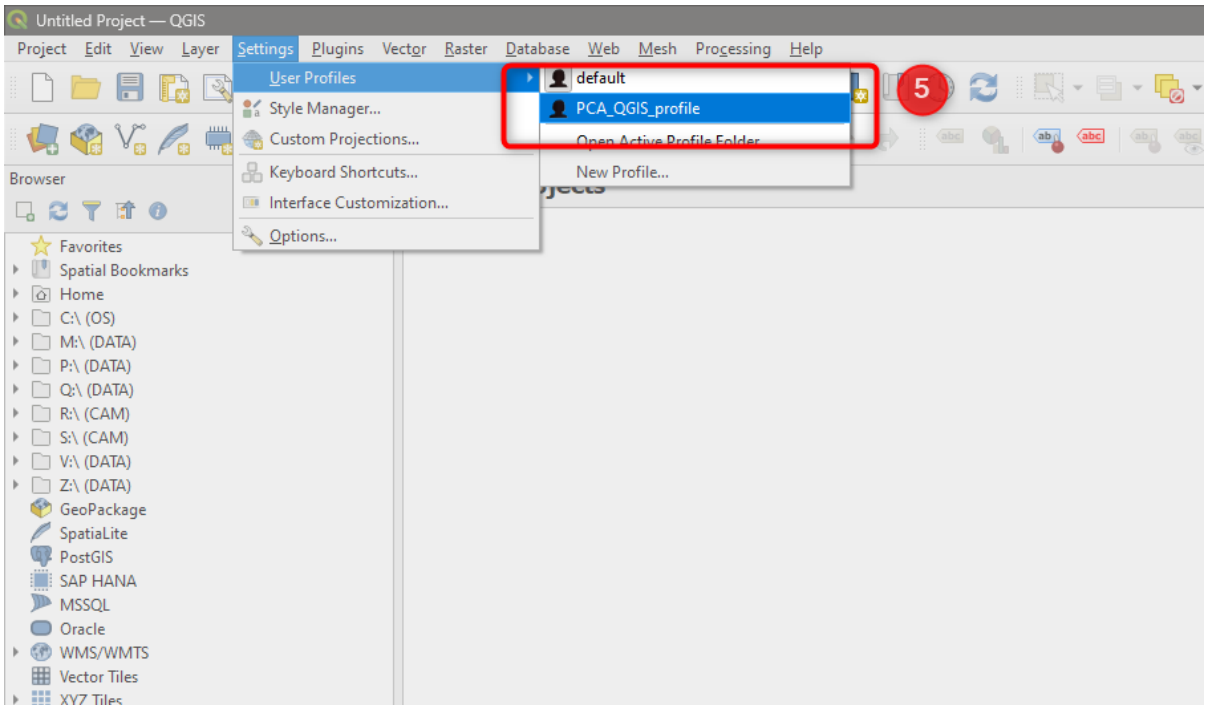
Open another Windows File Explorer and navigate to `Z:\GeoSpatialData_Resources\QGIS_Resources\QGIS Profile`. Here, you will find the folder PCA_QGIS_profile.

Alternatively, you can download the folder from here PCA QGIS Profile

Copy and paste this folder into your QGIS Profiles folder.



The new QGIS profile will be now available. Reopen QGIS. In the Menu Bar reselect *Settings* → *User Profiles* Click on the *PCA_QGIS_Profile*



This will start a new QGIS session with the PCA customised profile settings and configurations.

Close the previous QGIS session with the older profile and start using the new PCA Profile.

QGIS keeps in memory which profile was in use in the last session and reuses it at any new launch. From now on, QGIS will start using the custom PCA profile. As a final step, after this procedure, it is a good habit to check for Plugin updates to ensure you are using the last version of our PCA QGIS tools.

> **Attention:** Since the QGIS configuration folders are saved within your own profile, this operation will need to be repeated every time you first access your profile on a new workstation.

For your information, the customised options are:

Coordinate system

PCA plugin repository

Suggested basic interface configuration

2.1.2 Frequently Asked Questions

This chapter provides answers to the most frequent help requests on simple tasks in QGIS.

If you can't find the answer you're looking for, you can always request to be covered at geospatialdata@pre-construct.com

How to import a delimited text file

QGIS official documentation at https://docs.qgis.org/3.28/en/docs/user_manual/managing_data_source/opening_data.html#importing-a-delimited-text-file

Delimited text files (e.g. `.txt`, `.csv`, `.dat`, `.wkt`) can be loaded using the dedicated tools. You can also drag and drop Delimited text files from the system file manager into the map canvas, but the procedure described below will allow you to configure each aspect of the importing.

Also, more important, if the Delimited text file contains geometric information (fields containing coordinates), the only way to process and visualise the geometric data is by adding the file to the project by importing it through the dedicated tool.

How to import a DXF file

QGIS official documentation at https://docs.qgis.org/3.28/en/docs/user_manual/managing_data_source/opening_data.html#importing-a-dxf-or-dwg-file

CHAPTER

THREE

MERGIN

3.1 Mergin Maps

3.1.1 Installation

The Mergin mobile app is part of the DRS/GIS integrated system.

It allows us to visualise and interrogate on mobiles (phones and tablets) the GIS interactive site plans, where both survey data and DRS data are stored and integrated.

In simplest words, it can be considered a valid alternative to a Webmap system and, unlike this, it also allows us to edit site plans and DRS data on mobile devices.

3.1.2 How to use it

CHAPTER

FOUR

PHOTOGRAMMETRY