



# CENTRE OF ARCHAEOLOGY

NON-INVASIVE ARCHAEOLOGICAL  
RESEARCH TO DEFINE THE  
BOUNDARIES OF WWII MASS GRAVE  
SITES IN  
ROHATYN, UKRAINE

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## 1. INTRODUCTION

*“Every Jew has his memorial days, when he reunites with the memories of dear ones and friends who have passed away...At least we know how and when they left us. We ourselves brought them to burial, and we are able to visit their graves and pour out our tears on both happy and sad occasions. To our sorrow, we are now in a period characterized by an entirely different type of memorial, not at all of the usual type. We do not even know when and where their holy souls were taken from them...To paraphrase what is written in the Torah – “And no one knows their place of burial to the present day”.<sup>1</sup>*

During World War II, the town of Rohatyn in Ukraine became a killing and burial place for thousands of Jewish people. Rohatyn is located in western Ukraine, approximately 80km south-east of Lviv (Figure 1). Until 1919, Rohatyn lay at the heart of the Austro-Hungarian province of Galicia. Following a period where it was part of Poland (1919-1939), shortly after the outbreak of the Second World War Rohatyn was occupied by the Red Army. On 2<sup>nd</sup> July 1941, the German army entered the town.

The Jewish community in Rohatyn dates to the 16<sup>th</sup> century. Prior to the outbreak of the Second World War, the town had a mixed population of c. 10,000 people made up of Poles, Ukrainians and around 3000 Jews.<sup>2</sup> During the periods of Polish and Soviet rule, many Jews moved or fled from the surrounding towns and villages, and arrived in Rohatyn. Some were sent to the Soviet Union, others fled both before and after the German army arrived. By June 1941, it is estimated that the pre-war Jewish population of the town doubled.<sup>3</sup>

In June 1941, approximately 500 Jews from Rohatyn and more from the surrounding towns and villages were rounded up and sent to the main market square. They were then taken to the synagogue where they were locked inside. The Germans threatened to burn down the synagogue and those locked inside were beaten and forced to hand over their valuables. Following negotiations by a Jewish doctor and provision of goods, the captors eventually allowed the Jews inside to go free and they did not burn down the building.<sup>4</sup>

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<sup>1</sup> Nurok, M. 2015. “A City in Life and in Destruction” in Zahav, L. *Remembering Rohatyn and its Environs*. Cape Cod: Fields Publishing, 11

<sup>2</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. “Rohatyn” in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html);

<sup>3</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. “Rohatyn” in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html)

<sup>4</sup> Spector, S. and Wigoder, G. 2001. “Rohatyn” in *The Encyclopedia of Jewish Life Before and During the Holocaust*, New York: NYU Press, 1086; NasHofer, R. and NasHofer, M. 2015. “The Community of Rohatyn Destroyed” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 287; Wohl, T. 2015. “The Destruction of Rohatyn”

However, persecution against the Jewish community rapidly escalated. A Judenrat was established in the town at the end of July 1941 and a ghetto was formed. As Nashofer and Nashofer report:

*"The real trouble began on August 1<sup>st</sup>, 1941, when eastern Galicia came under control of the general government. Rohatyn became the regional city. The regional commander, Ausbach, was among the worst of the murderers. Orders were immediately issued which later led to the complete annihilation of the Jewish community.*

1. A "Jewish quarter," in which the Jews lived in overcrowded conditions.
2. All refugees from Poland hiding in the town had to leave immediately.
3. The Jews had to pay a penalty of 1,000,000 rubles.
4. A "Jewish council," and "Jewish police force" were formed".<sup>5</sup>

Anti-Jewish measures were levied against residents, becoming more and more severe as time went on. These included forcing Jews to wear armbands bearing the Star of David, limitations upon Jewish business and curfews. Disease, poor living conditions, ill-treatment and deaths because of these circumstances characterized life in the ghetto from this time until its liquidation on 6<sup>th</sup> June 1943.<sup>6</sup>

On the 20th March 1942, approximately 3500 of the town's Jewish residents were rounded up and shot at two pits to the south of the town by members of the German Gestapo, the police and others.<sup>7</sup> Thousands more from Rohatyn and nearby towns and villages were killed in ad hoc executions throughout 1942-1943, and during a "Final Aktion" in June 1943.<sup>8</sup> The victims of the latter aktion were reportedly buried in a mass grave north of the town. Most of those who survived these aktions were deported to the death camp at Belzec.<sup>9</sup> The two Jewish cemeteries in the town were also desecrated as a way of further attacking the cultural and religious identity of the Jewish community (see section 6.2), resulting also in the damaging and removal of matzevot (tombstones), and a lack of knowledge concerning the locations of pre-war graves.<sup>10</sup>

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in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 306; Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 435

<sup>5</sup> NasHofer, R. and NasHofer, M. 2015. "The Community of Rohatyn Destroyed" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing 287

<sup>6</sup> Many survivors and witnesses discuss life in the Rohatyn ghetto in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing and Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: <https://www.jewishgen.org/yizkor/rogatin/Rohatyn.html#TOC-Eng>

<sup>7</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. "Rohatyn" in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html);

<sup>8</sup> Lederman, S. 2013. *Sheva's Promise: Chronicle of Escape from a Nazi Ghetto*. Syracuse: Syracuse University Press; NasHofer, R. and NasHofer, M. 2015. "The Community of Rohatyn Destroyed" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 299

<sup>9</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, xx; Lederman, S. 2015. "A Rohatyn Girl's Road Through Hell" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 311-319.

<sup>10</sup> See Rohatyn Jewish Heritage website at: <http://rohatynjewishheritage.org/en/projects/old-jewish-cemetery/>  
<http://rohatynjewishheritage.org/en/projects/new-jewish-cemetery/>

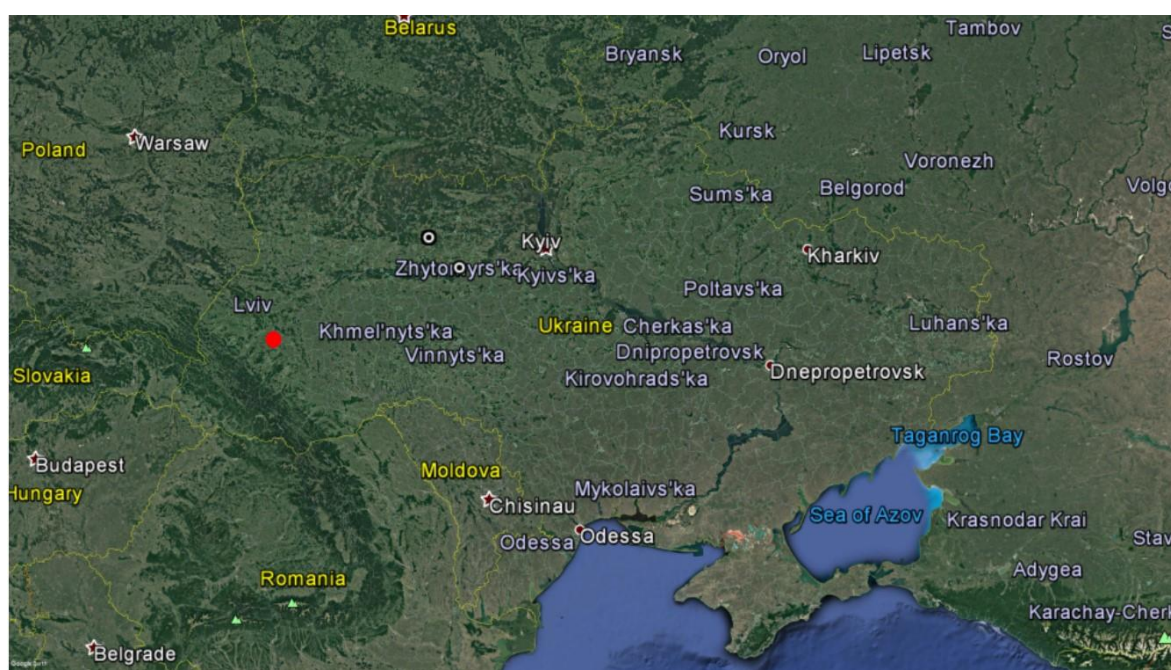


Figure 1: Location plan showing Ukraine and Rohatyn (red marker) (Copyright: Google)

Many of those who escaped the first execution in Rohatyn were deported from the ghetto to the death camp at Belżec. On 2<sup>nd</sup> September 1942, 1000 Jews were reportedly sent to the camp.<sup>11</sup> In her witness statement, provided to the Extraordinary State Commission to Investigate German-Fascist Crimes Committed on Soviet Territory, Blek Tsilia stated that during a second action on the 21<sup>st</sup> and 22<sup>nd</sup> September 1942, 1000 Jews were taken out of the ghetto, 700 of whom were deported to Belżec.<sup>12</sup> The remainder were reportedly shot and buried near the hospital. In December, further deportations to Belżec occurred.<sup>13</sup> Some sources suggest that, at this time, the patients and staff at the hospital were murdered in the town instead of being deported.<sup>14</sup> In the period between the two aktions in Rohatyn (March 1942-June 1943), witnesses report that many people died in the ghetto, either as a result of poor working and living conditions, or because of the regular shootings that occurred.<sup>15</sup> Early 1943 was “characterized by sporadic killings” and “in April the wave of executions grew bigger”.<sup>16</sup> Details about the locations where these people were buried are vague. Some witnesses report burials took place in the town, others that the corpses of the

<sup>11</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, xx; Lederman, S. 2015. “A Rohatyn Girl’s Road Through Hell” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 311-319.

<sup>12</sup> Testimony of Blek Tsilia, USHMM, RG-22.002M

<sup>13</sup> NasHofer, R. and NasHofer, M. 1962. “The Community of Rohatyn Destroyed” in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: <http://www.jewishgen.org/yizkor/rogatin/roh213.html>

<sup>14</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. “Rohatyn” in *Encyclopaedia of Jewish Communities, Poland* (Volume II) Eastern Galicia. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html)

<sup>15</sup> *Ibid*; Schtertzer, A. 1962. “How Rohatyn Died” in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: <http://www.jewishgen.org/yizkor/rogatin/roh032e.html#page40e>

<sup>16</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. “Rohatyn” in *Encyclopaedia of Jewish Communities, Poland* (Volume II) Eastern Galicia. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html)

deceased were loaded onto trains by German soldiers and taken “in an unknown direction”. Because of the vague nature of the witness testimonies relating to these killings, determining the locations of the burials is extremely difficult.

In May-June 2017, a team from the Centre of Archaeology at Staffordshire University undertook a non-invasive archaeological survey at the south and north memorial areas, as well as in the two Jewish cemeteries in the town (Figure 2). At the suspected mass grave sites and new Jewish cemetery, systematic walkover, topographic and geophysical surveys were employed in order to locate above- and below-ground evidence of the atrocities perpetrated there. At the old and new Jewish cemeteries, photogrammetry techniques were used to digitally document and preserve surviving matzevot fragments. This work was accompanied by a review of historical material connected to the persecution of the Jewish community during World War II, including witness testimonies, aerial photographs, maps, documents and other archive sources. The project was commissioned by Rohatyn Jewish Heritage, a volunteer-led NGO that works to reconnect the history of Rohatyn’s now-lost Jewish community with the people and places of the modern town via heritage and education programs.<sup>17</sup> Rohatyn Jewish Heritage initiated the archaeological survey due to a desire to determine the precise locations of the mass graves resulting from the massacres in the town, thus ensuring their protection and commemoration in the future. This report outlines the results of the historical and archaeological work in Rohatyn. It is intended to inform Rohatyn Jewish Heritage and the wider public of the findings of the archaeological survey. It is intended as both a scientific document and an educational aid in order to raise awareness of the crimes perpetrated in Rohatyn and commemorate those who died there.

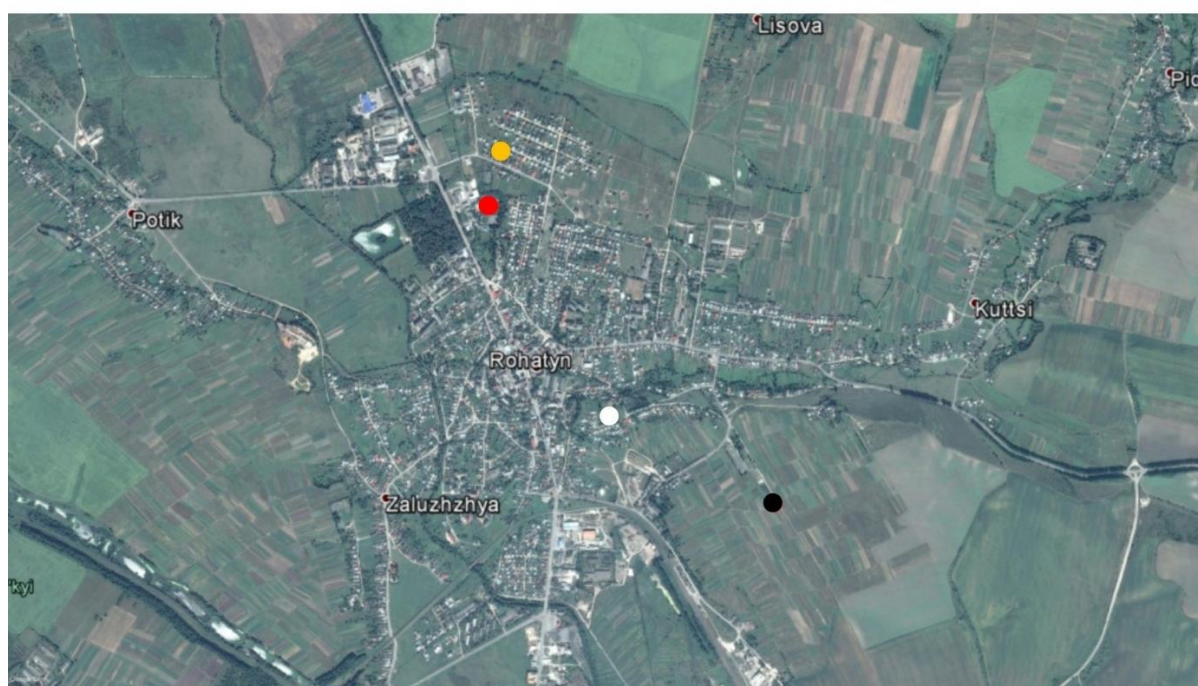


Figure 2: Location plan showing the location of the new Jewish cemetery (orange marker), the north memorial survey area (red marker), the old Jewish cemetery (white marker) and south memorial survey area (black marker) (Copyright: Google and Centre of Archaeology, Staffordshire University)

<sup>17</sup> [www.rohatynjewishheritage.org](http://www.rohatynjewishheritage.org)

## 2. PROJECT BRIEF AND AIMS

On the 1st June 2016, Dr Caroline Sturdy Colls at Staffordshire University received a Request for Proposal (RFP) from Rohatyn Jewish Heritage.<sup>18</sup> This proposal outlined how, during the Second World War, the Jewish population of Rohatyn was systematically persecuted by the Nazis and their collaborators. Specifically, ‘in several actions through 1942 and 1943, thousands of Jews from Rohatyn's ghetto were variously deported to Bełżec, shot on the streets, shot in the hospital, or marched to pits at the edges of town and shot, then buried in mass graves’.<sup>19</sup> The proposal provided a comprehensive summary of the history of mass violence against Jewish citizens in Rohatyn and documented the uncertainty surrounding the locations of the mass graves in which they were reportedly buried. In order to scientifically determine the locations of these mass graves and investigate claims made by witnesses with regards to potential unmarked burial sites, this RFP invited Staffordshire University to prepare a proposal for an archaeological investigation of several sites in Rohatyn. The RFP identified three potential burial sites within the town. A fuller description of these areas is provided in the RFP and the historical review below, but in summary:

- The southern memorial markers – In an area of farmland to the south-east of Rohatyn, a post-war memorial indicates the purported location of a mass grave. However, the RFP observes that survivors disagree about the location of the mass killings and burials in this area;
- The northern memorial markers – In an industrial area to the north of the town, a second memorial marks the purported location of a mass grave. The discovery of human remains by workers constructing a greenhouse approximately 20 years ago suggests that unmarked burial sites may exist in this area;
- The “new” Jewish cemetery – The RFP observes that one witness testimony refers to Jews being rounded up and executed in the Jewish cemetery to the north of Rohatyn.

Based on observations made from the RFP and initial desk-based research, our archaeological proposal outlined a programme of archaeological work in Rohatyn that aimed to:

- Perform non-invasive archaeological research and analysis at the southern and northern WWII-era mass grave sites in Rohatyn, Ukraine;
- Where possible, clearly define the physical boundaries of the actual burials at those sites;
- Perform non-invasive archaeological research and analysis at the new Jewish cemetery in Rohatyn, in order to confirm whether rumours relating to the presence of a mass grave here were accurate;

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<sup>18</sup> Rohatyn Jewish Heritage. 2016. RFP. Available at: [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601\\_rfp\\_rjh\\_mass\\_graves\\_e.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601_rfp_rjh_mass_graves_e.pdf) in English and [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601\\_rfp\\_rjh\\_mass\\_graves\\_u.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601_rfp_rjh_mass_graves_u.pdf) in Ukrainian

<sup>19</sup> Rohatyn Jewish Heritage. 2016. RFP. Available at: [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601\\_rfp\\_rjh\\_mass\\_graves\\_e.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601_rfp_rjh_mass_graves_e.pdf) in English and [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601\\_rfp\\_rjh\\_mass\\_graves\\_u.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160601_rfp_rjh_mass_graves_u.pdf) in Ukrainian

- Publish a report containing the data and results of the analysis, and the conclusions drawn.

### 3. METHODOLOGY

In May and June 2017, this archaeological work was carried out using the methodology outlined below:

#### 3.1. A Non-Invasive Approach

In order to achieve the project's aims, a non-invasive archaeological investigation was undertaken in Rohatyn. This methodology was developed based on well-established principles founded as part of the project team's ongoing research at Holocaust sites across Europe, and based on the unique circumstances of the project (as outlined in the RFP).<sup>20</sup> Utilizing a range of advanced surveying methods in conjunction with archival research it was hoped that a detailed investigation of potential mass graves could be carried out, culminating in new insights into the extent and nature of mass violence in Rohatyn. A non-invasive approach was also proposed due to the large areas of land that would be investigated within each of the survey areas (described below) and because of the requirement to locate mass graves without disturbing the ground. The latter was essential in order to comply with Halacha Law, which strongly discourages the disturbance of human remains buried within a grave.<sup>21</sup> The proposed methodology was designed with the wishes of the descendants of those who perished in Rohatyn in mind. It was designed to locate and record unmarked mass graves with a view to facilitating the marking, protection and commemoration of them in the future.<sup>22</sup>

The following methodological stages were implemented at all three potential mass grave sites to fully meet the aims of the project. Further information about each of the methods and approaches can be found in Chapters 5-7 of *Holocaust Archaeologies: Approaches and Future Directions* as the fieldwork drew upon the unique, interdisciplinary approach outlined in this volume.<sup>23</sup>

#### **Stage 1: Desk-Based Assessment**

A thorough desk-based assessment was carried out in relation to the acts of mass violence perpetrated in Rohatyn. This included a review of witness testimonies, documents, maps, photographs, aerial imagery, satellite imagery and other archival sources already sourced by Rohatyn Jewish Heritage. This review was undertaken in line with guidance provided in *Holocaust Archaeologies: Approaches and Future Directions*

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<sup>20</sup> Sturdy Colls, C. 2015. *Holocaust Archaeologies: Approaches and Future Directions*. New York: Springer.

<sup>21</sup> See Chapter 3 in Sturdy Colls, C. 2015. *Holocaust Archaeologies: Approaches and Future Directions*. New York: Springer for a detailed overview of Halacha Law in relation to burials and human remains.

<sup>22</sup> The original proposal for the work in Rohatyn was outlined in the Centre of Archaeology's research proposal. Available at: [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160721\\_archaeo\\_proposal\\_e.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160721_archaeo_proposal_e.pdf) in English and [http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160721\\_archaeo\\_proposal\\_u.pdf](http://rohatynjewishheritage.org/wp-content/uploads/2016/09/160721_archaeo_proposal_u.pdf) in Ukrainian

<sup>23</sup> Sturdy Colls, C. 2015. *Holocaust Archaeologies: Approaches and Future Directions*. New York: Springer, Chapters 5-7

and that provided by the Chartered Institute for Archaeologists.<sup>24</sup> A summary is provided in Figure 3 below. As observed in *Holocaust Archaeologies: Approaches and Future Directions*, archaeologists can utilise historical materials to inform search locations, reveal new information about the extent and nature of violence, and provide new insights into body disposal practices. Therefore, conducting such a review as part of this project was essential and extremely beneficial given the uncertainty surrounding the locations of mass burials relating to several massacres in Rohatyn. Additional archive research was undertaken by the project team to source new material where possible (within the budgetary and time constraints of the project). This phase of the project also involved in-depth analysis of the wartime aerial images and maps of Rohatyn, all of which were assimilated into a Geographical Information System (GIS) (see below) to facilitate the analysis of burial indicators visible from the air and a review of how the landscape at each of the sites to be surveyed has evolved over time. Further information about the ways in which the project team analysed this material can be found in Chapter 5 of *Holocaust Archaeologies: Approaches and Future Directions*.

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<sup>24</sup> Sturdy Colls, C. 2015. *Holocaust Archaeologies: Approaches and Future Directions*. New York: Springer, Chapter 5; Institute for Archaeologists. 2012. *Standard and Guidance for Historic Environment Desk-Based Assessment*. Available at: <https://www.archaeologists.net/codes/cifa>

**Table 5.1** Suggested methodology for conducting desk-based assessments in advance of archaeological fieldwork at Holocaust sites. (Copyright: Caroline Sturdy Colls)

Suggested methodology for desk-based assessments		
<i>Rationale:</i>		
This methodology will allow the following to be derived:		
Information concerning the historical context of the site in question, e.g. why and how it was constructed, who administered it and how it fitted into the Nazi regime as a whole		
Information concerning the known or 'official' histories of the site in question		
Material concerning the extent and nature of site in question (in the past and present)		
Material that can be compared to archaeological data		
<i>Methods/techniques used</i>	<i>Sources used</i>	<i>Outputs</i>
(a) Documentary research	(a) Scholarly research and historical records located in worldwide archives and libraries including but not limited to witness accounts, plans and architects' drawings; administrative documents, letters, notices, drawings, court transcripts and other evidential material; reports of post-war investigators	(a) Analysis and presentation of primary research material; comparisons of witness plans; cross-reference key dates and information with aerial photographic analysis (below); overlay plans onto aerial images; identify likelihood that features will survive below the ground; identify possible locations of features
(b) Cartographic analysis	(b) Maps (contemporary and modern)	(b) Georectification of maps with other data types (historical and archaeological); map regressions using historic, contemporary and modern maps
(c) Photographic analysis	(c) Ground-based photography; aerial reconnaissance (contemporary and modern); satellite imagery	(c) Dataset of georectified aerial images (contemporary and modern); annotated aerial images; annotated satellite imagery; 3D visualisations of ground-based imagery and aerial images
(d) Analysis of video footage	(d) Video footage recording during World War II and afterwards, including that created by post-war investigators and documentary filmmakers	(d) Identification of possible features and their locations, e.g. structures, mass graves and boundaries; analysis of practices of post-war investigators
(e) Analysis of other forms of media and art	(e) Examples include sculptures, artwork, drawings and models	(e) Identification of the appearance of individual sites and structures. Analysis of stories/events to which the physical evidence relates

Figure 3: Methodology employed for the desk-based assessment phase of the Rohatyn mass graves survey in advance of archaeological fieldwork (Copyright: Caroline Sturdy Colls, reproduced from Sturdy Colls 2015: Table 5.1).

## Stage 2: Interviews and Discussions with Members of the Local Community

During the fieldwork in Rohatyn, several members of the local community approached the project team in order to share information about the crimes perpetrated at the southern and northern mass grave sites. Much of this information was provided by people who claimed to have encountered human remains at the sites due to post-war looting or construction activities. Reference is made to these testimonies in the discussion section of this report.

### **Stage 3: Landscape and Topographic Survey**

The landscape and topographic survey was undertaken using a combination of walkover survey, Global Positioning Systems (GPS) and Total Station Electronic Distance Meurers (EDM). Walkover surveys were completed at each of the three sites under investigation to identify any vegetation change, depressions or other indicators which might suggest the presence of buried remains. The fieldwork team were also looking for any human remains that might be visible on the surface during these walkover surveys (Figure 4). As residents and the Rohatyn Jewish Heritage project team had witnessed looting and other digging activities at the southern and northern sites, this work was an essential step prior to the use of digital survey techniques.



*Figure 4: Forensic walkover survey at the southern mass grave marking the location of surface remains (Figure copyright: Centre of Archaeology, Staffordshire University: Photograph courtesy of Jay Osborn)*

GPS and EDM devices (Figure 5) have the ability to record exact locations on the earth's surface by a combination of satellite signals and laser technology to facilitate the production of 2-D and 3-D maps, plans and elevation models.<sup>25</sup> During the walkover surveys, these devices were used to plot any discoveries made on the surface and to record other landscape features with sub-millimetre accuracy in order to link the survey to modern maps and historic aerial imagery. After this was completed, the positions of the Ground Penetrating Radar survey grids were also recorded so that these results could also be overlaid onto maps

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<sup>25</sup> Howard, P. 2006. *Archaeological Surveying and Mapping: Recording and Depicting the Landscape*. London: Routledge.

and aerial images. As the primary purpose of the Rohatyn Jewish Heritage project was to define the location of the probable boundaries of the Rohatyn mass graves (in a form suitable for use by Rohatyn city engineers and others for the eventual development of boundary-protecting memorials at the sites), the use of GPS also ensured that precise geographic coordinates linked to a reference network could be provided. This information is presented in the results section and will be provided for use by Rohatyn Jewish Heritage and the Rohatyn city engineers department.



*Figure 5: Measured topographic survey at the northern mass grave site using an Electronic Distance Measurer or Total Station (Copyright: Centre of Archaeology, Staffordshire University: Photograph courtesy of Jay Osborn)*

#### **Stage 4: Ground Penetrating Radar (GPR)**

Once visible remains or indicators above the ground were recorded, it was necessary to investigate what remains were buried below ground. Archaeologists now have several geophysical methods at their disposal to record buried remains. Different geophysical techniques are suited to different investigations based on the nature of the terrain being examined, the nature of the remains being sought, the overall aim and timeframe of surveys, and whether two- or three-dimensional data is required. The use of Ground Penetrating Radar (GPR) was recommended for use at the proposed sites in Rohatyn to map (in as much detail as possible) any mass graves. GPR can assist with the characterization of buried remains by recording reflections or attenuations of electromagnetic (radar) signals that are continuously emitted from a roving

antenna.<sup>26</sup> These reflections or attenuations are affected by the physical properties of the subsurface and any buried features within it. These reflections are then recorded and visualized in two- and three-dimensional data plots that can be analysed to determine the presence, size and nature of buried remains. An advantage of GPR is that the signal emitted can propagate through most materials and, therefore, this method can be used over concrete and in rural areas, providing the vegetation is not too high and there are not too many obstructions. This was a necessary trait for the proposed sites in Rohatyn given their diverse ground cover. Two GPR systems were used for the work at Rohatyn, a GSSI SIR- 3000 with 400 MHz and a MALA ProEX GPR with a 500 MhZ antenna (Figure 6).



Figure 6: GPR systems used to complete the surveys at Rohatyn. The Mala Ground Explorer is on the left and the GSSI SIR 3000 system is on the right (Copyright: Centre of Archaeology, Staffordshire University: Photograph courtesy of Jay Osborn)

### **Stage 5: Data Assimilation and Analysis**

The results from the fieldwork were processed using a number of software packages including Radan (GPR), Geo Office (Surveys), and Leica Geo Suite (GPS). Utilising state-of-the-art Geographical Information Systems (GIS) programmes, the results were integrated into a single resource which also includes the collated material from the desk-based analysis phase. This allowed site interpretation to be completed by comparing all the data sets – for example the locations of the survey grids for the GPR surveys were accurately placed onto contemporary aerial images to help with the analysis of the survey results. Each of the stages of the methodology described above was adapted for the site-specific circumstances at each of the survey locations. This is outlined below in relation to each site.

<sup>26</sup> Utsi, E.C. 2017. *Ground Penetrating Radar : Theory and Practice*. Oxford: Butterworth-Heinemann; Conyers, L.B., 2013. *Ground-Penetrating Radar for Archaeology*. Berkeley: AltaMira Press.

### 3.2. Public Engagement

It was evident from the RFP and from additional research concerning Jewish Heritage in Rohatyn that the descendants of Jews that lived in Rohatyn are extremely committed to ensuring that the crimes perpetrated during World War II are not forgotten and that the burials of their ancestors are protected. It is also evident that many members of the local community are committed to ensuring that known sites are protected and to recovering the memory of the once thriving Jewish community. The archaeological team gladly welcomed the input of descendants and local volunteers in the proposed fieldwork. These volunteers assisted with the clearance of obstructive vegetation at the sites selected for archaeological survey, something which greatly assisted the archaeological team in completing their work. Of particular note was the work of the Lviv Volunteer Center, who undertook extensive clearance work at the new Jewish cemetery.

### 3.3. Permissions and Other Requirements

Prior to the commencement of the fieldwork, permissions were obtained from local landowners and the local council in Rohatyn to undertake the work. Rabbinical advice was also sought before and during the fieldwork to ensure that the archaeological team's actions complied with Halacha Law. Rohatyn Jewish Heritage also engaged in several meetings with local stakeholders to keep them informed about the work. Further information can be found on Rohatyn Jewish Heritage's website <http://rohatynjewishheritage.org>

### 3.4. Connected Projects

As part of an ongoing commitment to documenting Holocaust killing sites, Dr Caroline Sturdy Colls is currently supervising a PhD focused on mapping and disseminating information about sites of mass violence that exist outside of Nazi camps. This doctoral project, undertaken by Czelisie Weston (one of the assistants on the Rohatyn project), will use forensic methods to explore several Jewish cemeteries in Poland along with a number of other potential mass execution sites. Hence, only provisional results regarding the work in the new Jewish cemetery will be included in this report and the remainder of the results will be presented in Miss Weston's thesis in 2019.

The Centre of Archaeology has recently received funding to work on a project entitled "Recording Cultural Genocide and Killing Sites in Jewish Cemeteries", from the International Holocaust Remembrance Alliance.<sup>27</sup> The project is a collaboration between Staffordshire University, The Matzevah Foundation and Fundacja Zapomniane. This project aims to raise awareness of the causes and consequences of cultural and physical genocide (using Jewish cemeteries desecrated by the Nazis as a pilot case study), directly tackling racism, xenophobia and hostility in the present. This will be achieved by: (1) Conducting new research into relationships between the destruction of property by Nazis and their collaborators, and the use of religious spaces as killing sites; (2) Undertaking a series of "social action projects" at selected Jewish cemeteries where cultural and physical genocide occurred in the past, and where neglect and vandalism is occurring presently. (3) Disseminating the results of (1) and (2) via a state-of-the-art digital platform. The project adopts a unique interdisciplinary methodology to achieve its aims, utilising techniques from history, archaeology, digital humanities, conservation and community engagement. Although this pilot project

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<sup>27</sup> [www.holocaustkillingsites.com](http://www.holocaustkillingsites.com)

focuses on sites in Poland, in the longer term the project team would like to extend this research to incorporate other sites in other countries in Europe. Hence, the Centre of Archaeology established a longer-term collaboration whereby Rohatyn Jewish Heritage became partners in this project.

### 3.5. Equipment summary list

To conclude, before, during and after the fieldwork, the following software and hardware were used to complete this investigation.

- ArcGIS Geographic Information System V10.2.2
- Google Earth Professional
- Google Maps
- GSSI SIR- 3000 with 400 MHz antenna
- MALA ProEX GPR with a 500 MhZ antenna
- RADAN GPR processing software
- ReflexW GPR processing software
- Leica TS06 Total Station EDM
- Leica Base and Rover Global Positioning System
- Leica Survey Office
- Canon Eos 5D Mark iv, full frame camera 30 Mpx resolution (5.36  $\mu$  pixel size)
- Sigma Lens 20 mm F1.4 DG HSM and a Sigma Lens 50 mm F1.4 DG HSM.
- Agisoft Photoscan software

## 4. DESK-BASED ASSESSMENT: 20TH MARCH 1942: SOUTHERN MASS GRAVE SITE

### 4.1. Historical Review

Utilising the methodology outlined in section 3 above, a desk-based review was first carried out in relation to events of the 20<sup>th</sup> March 1942. Between 3000 and 3600 Jews were murdered in Rohatyn on this day in what has become known as the first action in the town. Witness testimonies provide vital insights into the extent and nature of this action, as well as details about the mass graves in which the victims were buried. It should be noted that conflicting information and recollections exist in these sources and that the majority of testimonies come from Jewish survivors as oppose to Ukrainian and other non Jewish sources. Also, not all of the testimonies represent first-hand, primary accounts of the events. Indeed the language used in most of these testimonies makes it difficult to ascertain if it's a direct, primary account of what occurred or a second-hand description. What follows is a review of archive materials and witness testimonies that refer to the killings and burials at the southern mass grave site.

#### 4.1.1. Excavation of the Graves

Long before the aktion took place, it appears that the occupying German forces were planning for the large-scale mass killing and burial of Rohatyn's Jewish population. Many witnesses describe how groups of Jews were made to dig the pits that would later become mass graves for those killed on the 20<sup>th</sup> March 1942. Some of these witnesses participated in this work themselves. Tsvi Wohl described these events:

*"In the middle of February 1942, the digging of anti-tank pits began now far from the city. Every day, around 200 men were driven out to work in the lime hills on these ditches...The work consisted in preparing two gigantic pits – forty meters long, twenty meters wide and very, very deep. We wished onto the Germans that these "tank defences" would serve them as graves. We never even considered that we were digging our own mass graves, graves for all of the Jews in the city. The work went on until the twentieth of March, 1942".<sup>28</sup>*

Regina Hader Rock also participated in this work:

*"In February 1942, the Germans ordered us to dig two huge pits not far from Rohatyn. We didn't know why; only later did we realize the purpose of these pits".<sup>29</sup>*

One witness, who would later be part of a group forced to bury those shot in the 20<sup>th</sup> March action in these pits, indicates that this excavation activity began as early as September and October 1941:

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<sup>28</sup> Wohl, T. 2015. "The Destruction of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 309-310

<sup>29</sup> Hader Rock, R. 2015. "From Hiding Place to Hiding Place" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 320-321

*"In the months September and October 1941, the Germans brought some heavy equipment and dug ditches for defence purposes, as we thought (but these ditches were for graves, as we found later)".<sup>30</sup>*

The rumour that these pits were anti-tank ditches is mentioned by several survivors and witnesses.<sup>31</sup> However, others referred to these excavations as the suspected foundations of a brick or tile factory:

*"Now I recalled that for the past several weeks they had rounded up the men from the ghetto to do forced labor, to dig trenches. No one knew for what purpose, but no one thought it would be for themselves. There were many rumors; some said it was to make foundations for a new brick factory; others supposed that the trenches would serve to offset attacks if the Russians returned".<sup>32</sup>*

Rosette Faust was one of several survivors to suggest that a tile factory was the cover used for the excavation of the pits:

*"In the beginning of January 1942, our minds were frozen with fear when we heard the news that the German SS would be visiting. What next? To ease the paralyzing news, engineers with blueprints and all sorts of paraphernalia searched for a site to build a tile factory. Finally, a spot was selected, and a brigade of workers was ordered to report daily to the Judenrat".<sup>33</sup>*

Abraham Sterzer also refers to the tile factory:

*"Without giving any reason the Germans had ordered the Rohatyn Jews to dig a big pit, 50 meters long and five meters in width and depth. We thought that the pit was needed for a tile factory. When the pit was finished work stopped and those who had worked on it forgot about it".<sup>34</sup>*

Although some witnesses suggest that the work was finished before the mass killings occurred, other indicate that it was still taking place right up to the day of the murders:

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<sup>30</sup> Glotzer, J. unpublished memoir

<sup>31</sup> Defence works are also mentioned in: Glotzer, J. unpublished memoir

<sup>32</sup> Lederman, S. 2013. *Sheva's Promise: Chronicle of Escape from a Nazi Ghetto*. Syracuse: Syracuse University Press, p25; other references to the brick factory include: Lewenter, I. 2015. "The Rohatyn Way" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 127; Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. "Rohatyn" in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html); Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, page xxx

<sup>33</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press

<sup>34</sup> Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 444. The supposition that the graves were for a tile factory is also mentioned in: Faust, R.H. 1962. "A Diary of the Rohatyn Ghetto" in Amihai, M. *The Community of Rohatyn and its Environs. Yizkor Book*. Available at: <http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>

*"All the able-bodied Jewish men of Rohatyn worked at those excavations (rumoured by the Nazis to be the foundations for brick factories) until the morning when the first trucks arrived! Caught unawares at dawn, these men were the first ones executed. Only a few escaped!"*.<sup>35</sup>

Several witnesses describe how the work was carried out under the watch of two engineers, thus reaffirming the myth that the pits were being dug for a military or industrial purpose.<sup>36</sup>

#### **4.1.2. The Executions and Burial Practices**

Reports concerning the day of the execution are more detailed. Some witnesses could describe the exact nature of the killings and body disposal, because they were present at the time of these events or because they were able to visit the grave site(s) after burial.

On the 20<sup>th</sup> March 1942, the ghetto inhabitants were rounded up and the executions began.<sup>37</sup> If they did not follow orders or they tried to escape, Jews were reportedly shot on the spot.<sup>38</sup> Elderly people, the sick, pregnant women and children were also reportedly killed in the ghetto.<sup>39</sup> Several survivors state that remaining inhabitants were forced to go to the town square, where they were made to "form precise rows" or lie down in the freezing cold weather.<sup>40</sup> Some originally thought they would be deported to labour camps and so "stood with valises, waiting" but soon "with blows and curses they were dragged to the market place

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<sup>35</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, page xxx; This is also suggested in Wohl, T. 2015. "The Destruction of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 309-310

<sup>36</sup> Blech, A. and Blech, C. 2015. 'Rohatyn In the Occupation Years' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 299; Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. "Rohatyn" in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html); Faust, R.H. 1962. "A Diary of the Rohatyn Ghetto" in Amihai, M. *The Community of Rohatyn and its Environs. Yizkor Book*. Available at: (<http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>); Wind Fox, S. 2015. "Giving Testimony at the Gravesite of March 20, 1942" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 480.

<sup>37</sup> Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. "Rohatyn" in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html); <sup>37</sup> Wohl, T. 2015. "The Destruction of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 309-310.

<sup>38</sup> Lederman, S. 2015. "A Rohatyn Girl's Road Through Hell" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 311; Dabrowska, D., Wein, A. and Weiss, A. (eds). 1980. "Rohatyn" in *Encyclopaedia of Jewish Communities, Poland (Volume II) Eastern Galicia*. Jerusalem: Yad Vashem. Also available at: [http://www.jewishgen.org/yizkor/pinkas\\_poland/pol2\\_00506.html](http://www.jewishgen.org/yizkor/pinkas_poland/pol2_00506.html);

<sup>39</sup> Blech, A. and Blech, C. 2015. "Rohatyn In the Occupation Years" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 302

<sup>40</sup> *Ibid*; Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 443-444; Wohl, T. 2015. "The Destruction of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 310;

and ordered to kneel”.<sup>41</sup> Many froze to death or were shot for not remaining still.<sup>42</sup> Aryeh and Cyla Blech described the scene:

*“The murderers stood around with pointed rifles, looking for a chance to shorten a human life. They also allowed themselves a number of sadistic acts and, meanwhile, photographed many of their atrocities”.*<sup>43</sup>

Some selections took place. Skilled craftsmen were separated from the rest of the group and were spared death.<sup>44</sup> However, very few people survived.

Mid-morning, some witnesses suggest that trucks arrived to transport the remaining people to the mass grave site.<sup>45</sup> Some people died in the trucks on the way to the graves because they suffocated inside the vehicles.<sup>46</sup> Others state that the victims were forced to walk.<sup>47</sup>

Aryeh and Cyla Blech described what they believed happened after arrival:

*“First, the pockets of the unfortunates were emptied and everything of value was taken away. Then they were ordered to get into the graves that they themselves had dug several days earlier. There, on their knees, they had to wait for death, which came very quickly from machine-guns and rifle volleys. Then the mass graves were covered up, even though by this time, the souls of some had not yet ascended”.*<sup>48</sup>

Tsvi Wohl describes how people were lined up in groups of five “on a little bridge above the graves” before being shot into the pits.<sup>49</sup> The sound of the shooting could be heard for miles. Sylvia Lederman, who survived the execution because she had been sent to work outside the ghetto, recalled hearing the sound and wondering “why the sounds carried so far”, until she was told of the scale of the massacre.<sup>50</sup>

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<sup>41</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press. Faust also refers to these events in Faust, R.H. 1962. “A Diary of the Rohatyn Ghetto” in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: <http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>

<sup>42</sup> Hader Rock, R. 2015. “From Hiding Place to Hiding Place” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 320-321

<sup>43</sup> Blech, A. and Blech, C. 2015. ‘Rohatyn In the Occupation Years’ in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 302

<sup>44</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press

<sup>45</sup> Blech, A. and Blech, C. 2015. ‘Rohatyn In the Occupation Years’ in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 302

<sup>46</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press

<sup>47</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing

<sup>48</sup> Blech, A. and Blech, C. 2015. ‘Rohatyn In the Occupation Years’ in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 302

<sup>49</sup> Wohl, T. 2015. “The Destruction of Rohatyn” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 310

<sup>50</sup> Lederman, S. 2013. *Sheva’s Promise: Chronicle of Escape from a Nazi Ghetto*. Syracuse: Syracuse University Press

Once at the grave site, it appears that almost everyone perished. The total number of people killed is estimated at between 3000 and 3600, around 1000 of which were from neighbouring towns and villages. The rest were from Rohatyn. Around a quarter of these victims were children.<sup>51</sup>

A few people did manage to survive to provide testimony relating to what they saw. Abraham Sterzer recalled:

*"When the church bells struck five, the shooting stopped, and the naked Jews who were still alive were told to go home. Three thousand adults and six hundred children were murdered and buried in the mass grave on that Friday".<sup>52</sup>*

Many of the victims were also reportedly pushed alive into the grave, resulting in an agonizing death. Some apparently jumped into the grave before being shot in order to try and survive.<sup>53</sup> Some witnesses report that the graves were still moving in the days that followed as people remained alive inside.<sup>54</sup>

For most people, escaping from the graves was not an option:

*"The walls of the graves were filled so high with the corpses that the wounded couldn't possibly get out on their own".<sup>55</sup>*

However, a very small number of these people did manage to escape:

*"Nearly fifty Jews, whom the bullets had not killed, and who had lain in the piled layers of the murdered on the mountain had, on their own power, though wounded and in utter exhaustion, climbed out of the two mass graves".<sup>56</sup>*

Rachel and Moshe NasHofer witnessed how:

*"Jewish blood flowed in streams two kilometres long. On the second day, the earth still shook, because some of the victims had been buried alive, and shouts were even heard from the graves. Two Jewish girls managed to get out of the graves alive, but*

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<sup>51</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, xx

<sup>52</sup> Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 443-444

<sup>53</sup> Faust, R.H. 1962. "A Diary of the Rohatyn Ghetto" in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: (<http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>)

<sup>54</sup> For examples that refer to people being buried alive, see Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press; Wohl, T. 2015. "The Destruction of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 310

<sup>55</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press.

<sup>56</sup> Blech, A. and Blech, C. 2015. 'Rohatyn In the Occupation Years' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 303

*died two days later...On the 21<sup>st</sup>, hundreds of corpses still lay in the street, among them mothers with little children in their arms".<sup>57</sup>*

Many escapees did not survive in the long term however because of the injuries that they had sustained. Several witnesses refer to the case of one girl who escaped from the grave but who was then recaptured and sent back there to be executed.<sup>58</sup> Others died in the later executions or deportation actions. One man who managed to escape from the grave was able to inform others about what he had witnessed. His daughter, Tyla Nemeth relayed the details to her friend Sylvia Lederman:

*"Her father had been rounded up with the others in the marketplace, brought to the pits, stripped naked, shot, and thrown into the mass grave. During the night, when all was quiet, he had summoned the last remnants of his strength and had thrown off the corpses that had fallen on top of him in the pit. Then, naked as he was, he had run to the nearest house for shelter. The Gentile owner of that house had taken pity on him. In the morning he had gone to the ghetto to let the Nemeth family know that he was alive and that they should bring him some clothes".<sup>59</sup>*

A few people managed to survive because:

*"First the Germans picked three men; they told them that they will stay alive, but they must strip [collect the people's] the people of clothing, money, gold teeth; two large cases were filled".<sup>60</sup>*

In the days that followed the executions, witnesses report that burials continued to take place because of the large number of corpses that existed in the town and en route to the graves:

*"The road from the center of town to the graves was littered with hundreds of corpses of people who had been shot, crushed or frozen by the cold weather. Many had been snatched from their beds and so had not had time to dress".<sup>61</sup>*

The Gestapo also left the graves open on the 20<sup>th</sup> March, since they left abruptly at 5pm (as described above).<sup>62</sup>

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<sup>57</sup> NasHofer, R. and NasHofer, M. 1962. "The Community of Rohatyn Destroyed" in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: <http://www.jewishgen.org/yizkor/rogatin/roh213.html>

<sup>58</sup> Ibid

<sup>59</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press; Other instances when people managed to escape from the mass graves are described in Faust, R.H. 1962. "A Diary of the Rohatyn Ghetto" in Amihai, M. *The Community of Rohatyn and its Environs*. Yizkor Book. Available at: (<http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>

<sup>60</sup> Wind Fox, S. 2015. "Annihilation of Rohatyn" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 521

<sup>61</sup> Wohl, T. 2015. 'The Destruction of Rohatyn' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 310; See also Blech, A. and Blech, C. 2015. 'Rohatyn In the Occupation Years' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 302

<sup>62</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press; Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 443-444

#### 4.1.3. The Number and Size of the Graves

As shown above, almost all of the witnesses who saw the pits that would later become mass graves agree that two pits were excavated. Only a few of these witnesses provide dimensions for the pits. Aryeh and Cyla Blech described them as being *“twenty meters long, fifteen meters wide and three meters deep”*.<sup>63</sup> Tsvi Wohl suggests that they were *“forty meters long, twenty meters wide and very, very deep”*.<sup>64</sup> Rosette Faust stated that:

*“Stadhauptman Freitag personally supervised the plan to dig pits fifty meters long and five meters wide and deep”*.<sup>65</sup>

Abraham Sterzer, who only describes one pit, suggests that it was *“50 meters long and five meters in width and depth”*.<sup>66</sup> Others are less precise, describing them simply as *“huge”*. There is little consistency in the dimensions given, although the ability to accurately judge distance varies between individuals.

#### 4.1.4. Location of the Graves

Various geographic reference points are provided by witnesses to describe the locations of these graves. One witness suggests they were *“near a brick factory and road towards [village] Putiatintsy”*, another *“on Putiatyńce mountain by the brick factory”*.<sup>67</sup> Others also refer to Putiatintsy as well as the railway station.<sup>68</sup> Onufriy Brodovoy specifically mentions the Ukrainian cemetery that was situated nearby; this cemetery is still in existence and burials still take place there today.<sup>69</sup>

The purported location of these graves was marked by two memorials; one erected by the Jewish community, the other by the Soviet government. At a memorial service in 1998, Sabina Wind Fox reported that:

*“After the liberation on the 28<sup>th</sup> of July 1944, a few of us Jews survived; and the first steps we took were to the graves. We saw that the high grass grew over the graves, and they sank lower than the surface of the ground”*.<sup>70</sup>

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<sup>63</sup> Blech, A. and Blech, C. 2015. ‘Rohatyn In the Occupation Years’ in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 299

<sup>64</sup> Wohl, T. 2015. “The Destruction of Rohatyn” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 309-310

<sup>65</sup> Faust, R. 2013. *A Journey Through Grief: An Autobiography of a Holocaust Survivor*. Online: LULU Press

<sup>66</sup> Sterzer, A. 2015. “How Rohatyn Died” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 444

<sup>67</sup> Witness statement of Brodovoy Onufriy, USHMM, RG-22.002M; Blech, A. and Blech, C. 2015. “Rohatyn In the Occupation Years” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 299

<sup>68</sup> Witness statement of Blek Tsilia, USHMM, RG-22.002M - “not far from the railway station in direction of village Putiatintsy”; Lewenter, I. 2015. “The Rohatyn Way” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 127 - “beside the brickyard, in front of the area of the train station, to the left, lie our dear ones, the thirty-three hundred victims of the first “action””

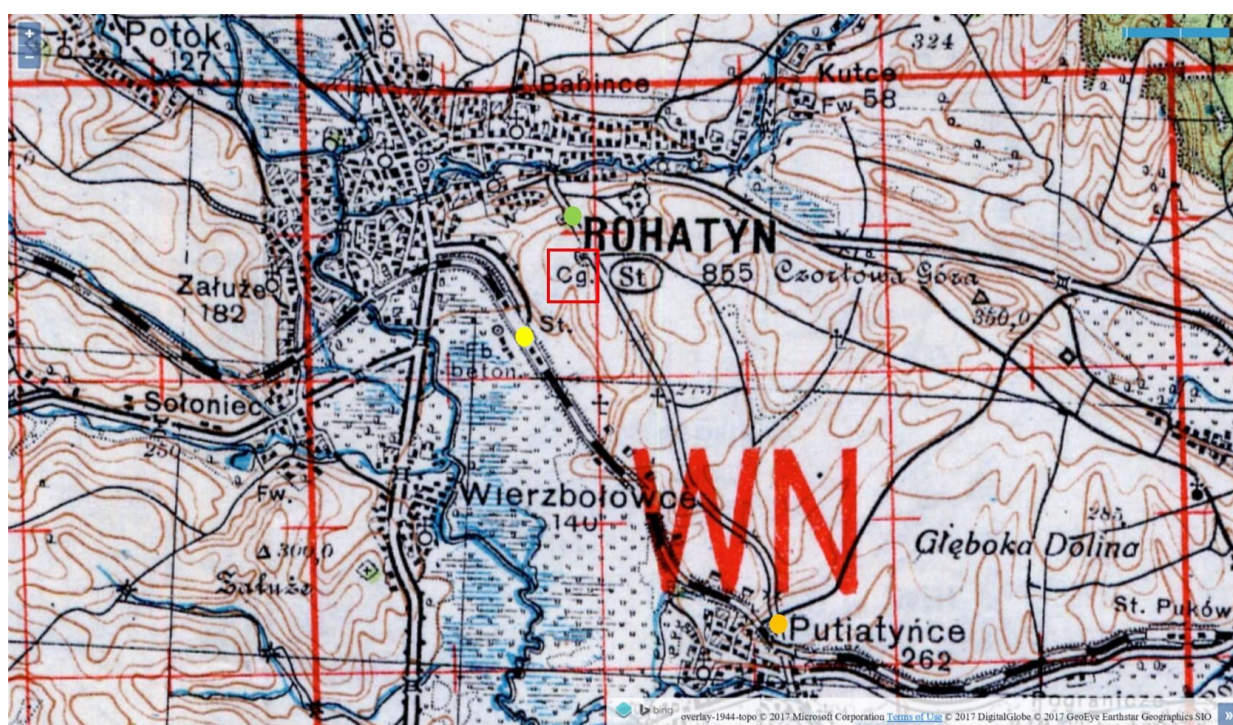
<sup>69</sup> Witness statement of Onufriy Brodovoy, USHMM, RG-22.002M

<sup>70</sup> Wind Fox, S. 1998. “Giving Testimony at the Gravesite of March 20, 1942” in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 481

A photograph contained within the testimony of Dr Isaac Lewenter, a former resident of Rohatyn, indicates that the locations of the graves were known by residents and that they remained visible (in the form of vegetation and topographic change):

*“beside the brickyard, in front of the area of the train station, to the left, lie our dear ones, the thirty-three hundred victims of the first “action”.”<sup>71</sup>*

This indicates that the brick factory alluded to by witnesses who saw the mass graves being excavated (see 4.1.1 above) was constructed. This is confirmed by a 1944 map of Rohatyn produced by the German army, which shows a “brickyard” close to the area where the mass grave memorials are located. Figure 7 shows the locations of the reference points most commonly referred to by witnesses, all of which exist within the vicinity of the memorials that were erected post-war. Based on this information and the fact that at least one of the memorials was erected by those with knowledge of the graves’ locations, it is likely that the graves exist within the vicinity of the memorials.



Key: ■ Cegielnia (Polish) – brickyard (English) ● Stacja (Polish) – station (English)  
● Putiatynce village ● Ukrainian pre-war cemetery

Figure 7: Locations of features / places mentioned by witnesses in relation to the position of the mass graves dating to the 20<sup>th</sup> March 1942 massacre. These are shown on a 1944 map of Rohatyn produced by the Germany army (Copyright: WIG map archive and Centre of Archaeology, Staffordshire University)

<sup>71</sup> Lewenter, I. 2015. ‘The Rohatyn Way’ in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 127

#### 4.1.5. Post-Execution

After the mass killings took place, several witnesses suggest that attempts were made to hide the traces of the crimes and the clean-up operations took several weeks.

Tsvi Wohl described how:

*"The Gestapo selected twenty Jews to clean the streets. In the morning, Jews were forced to cover the graves. This work went on for several weeks because the soil covering the slain kept sinking. It seemed as though the earth was seething and boiling in flowing blood".<sup>72</sup>*

Lye was then reportedly bought to cover the graves in an attempt to prevent them from sinking and to mask the decay. Some of the victims were reportedly still alive when this occurred.<sup>73</sup> Jack Glotzer provides the most detailed and reliable testimony on the post-execution activities at these burial sites because he was part of a clean-up crew tasked with burying the corpses that littered the streets, covering the bodies already buried in the graves and preventing the sinking of the graves. Because of its significance, his testimony on this subject is provided in full below:

*"On March 21, 1942, the Judenrat received an order to recruit about ten young people (I was among them) to go to the outskirts of the town (the area where the Germans had previously brought in equipment and dug ditches, as I mentioned before). Some older people came along to observe and to help out. This place was about 4 km (2-1/2 miles) from our town. The Germans gave us shovels and told us that we were going to bury the people who were taken to this place alive and were shot there on March 20, 1942. On the way to this place (where the ditches were) we had to gather the dead people who were shot in the ghetto (on March 20, 1942) and put them on sleds driven by horses. It was a very cold day. We saw frozen bodies scattered all around. Some old people could not walk, so they shot them. We had to gather them on sleds and bring them to the ditches. When we finally came to the area where the ditches were, we could not believe our eyes at what we saw. First, we started to vomit and we blacked out. There were about 3,000 people dead, frozen one to another. In order to bury them, we had to separate them. Children were holding on to their mothers; their fingers were frozen and we were unable to separate them. We had to throw them into the ditches (there were two ditches). We kept burying them. The soil was frozen. Hands, arms and legs were protruding from under the soil. It was impossible to cover them completely. Most of them had open eyes. I recognized some of them. Fortunately there was nobody from my immediate family. We had to take breaks. It was impossible to do it continuously. It was very cold but I did not feel it. We were numb. We worked for a few hours. After this*

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<sup>72</sup> Wohl, T. 2015. 'The Destruction of Rohatyn' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 310

<sup>73</sup> Wind Fox, S. 2015. "Giving Testimony at the Gravesite of March 20, 1942" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 480

*experience I was never the same. A Jewish policeman came with us. He told us that it was enough for one day. For the next two weeks we had to go back there. As the soil started to thaw, the bodies started to rise to the top of the ditches. We had to cover them over and over. As the time progressed, we became completely numb; we did not have any feelings".<sup>74</sup>*

Rosette Fauste described the situation in Rohatyn after the executions:

*"At night distracted mothers wandered about looking for their children. Men looked for their wives. Sometimes a live person was found among the corpses... Every house had its victims and had suffered the tragedy. In the morning and for the next few days a group of Volksdeutsche rode about the ghetto gathering the furniture and other belongings of the murdered people. In secret the Jews gathered the dead bodies and attempted to bring them to a Jewish grave. The order was to throw them into mass graves, to pour on gasoline and to burn them!".<sup>75</sup>*

#### 4.2. Initial Aerial Photograph Analysis

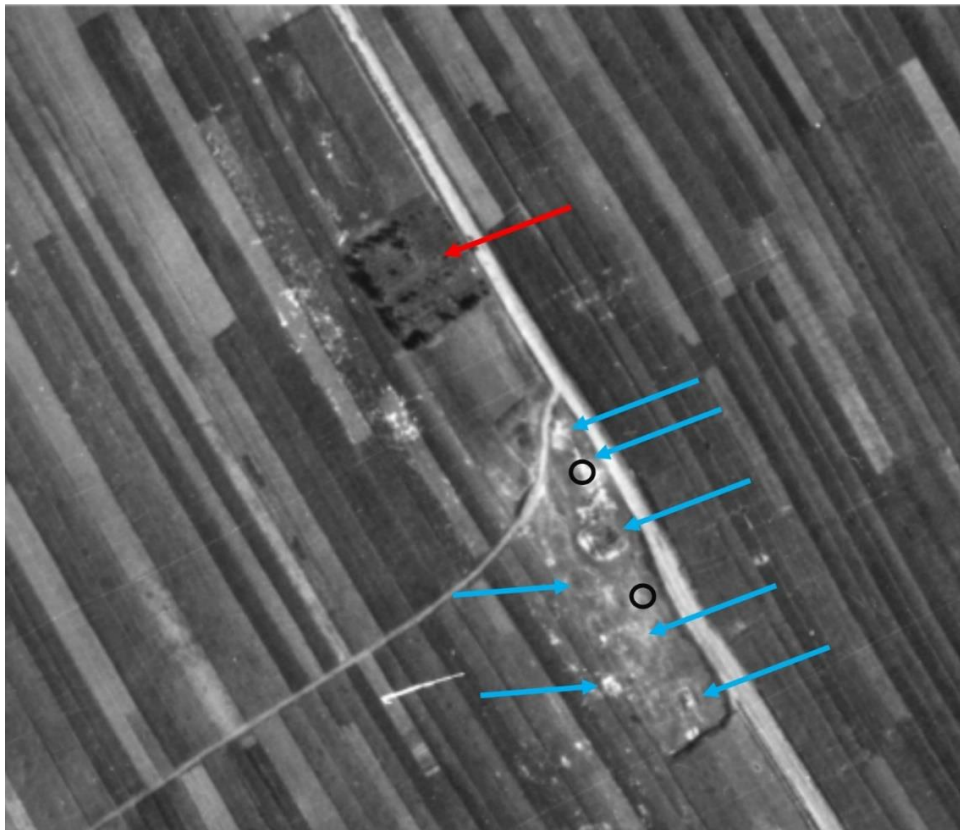
Luftwaffe aerial images of Rohatyn reveal additional information concerning the nature of the landscape around the south site in 1944, whilst a comparison of these images with modern satellite imagery illustrates how the landscape has evolved in the years since the Second World War. The aerial images reveal that several disturbances and visible depressions existed in this area in 1944. Figure 8 shows seven areas of visible ground disturbance. The most notable is a large, sub-circular feature – measuring approximately 18 x 18m, in the centre of the area of interest but the other features also indicate the potential for subterranean remains to exist. Ground scarring suggests that this sub-circular feature may be part of a larger feature which extends to the north and south.




Using a process of georectification, it was possible to accurately overlay the 1944 aerial photograph onto modern satellite imagery. This demonstrated that the positions of the road and trackway visible in the 1944 image are not reflected in the modern roads and pathways at the site. This is shown in Figure 9. The modern roads are evidently much narrower than the road that existed in 1944, and thus at the time when the mass grave(s) were excavated in this area. The modern farm track that runs to the south-west is also not in the same position as the 1944 trackway.

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<sup>74</sup> Jack Glotzer, unpublished memoir

<sup>75</sup> Faust, R.H. 1962. "A Diary of the Rohatyn Ghetto" in Amihai, M. *The Community of Rohatyn and its Environs. Yizkor Book*. Available at: (<http://www.jewishgen.org/yizkor/rogatin/roh007e.html#page27e>)



Key:  Visible ground disturbance  Turkish World War I memorial  
 Locations of the post-war memorials commemorating the 20<sup>th</sup> March 1942 killings and suspected locations of the mass grave(s)

*Figure 8: An annotated aerial image of the south site in Rohatyn, taken by the Luftwaffe in 1944 showing the locations of possible buried remains and memorials (Copyright: US National Archives and Centre of Archaeology, Staffordshire University).*



Figure 9: The roads and pathways of 1944 (blue lines) overlaid onto a modern Google Earth image of the south site in Rohatyn, illustrating the landscape change that has occurred in the years since the Second World War (Copyright: Google and Centre of Archaeology, Staffordshire University).

#### 4.3. Field Survey

A review of the RFP provided by Rohatyn Jewish Heritage and initial desk-based research revealed uncertainty regarding whether the memorial accurately indicates the position of a mass grave under the southern memorial markers. Clearly the analysis of the witness testimonies in section 4.1 demonstrates that conflicting information regarding the nature and locations of the burials exists. As also indicated above, there are some commonalities in the testimonies with regards to certain details. For example witnesses, many of whom were involved in the excavation of the pits that later became graves, suggest that there may have been more than one mass grave located here, thus presenting the possibility that one or more graves may be unmarked and unprotected. The aerial imagery analysis revealed several areas of disturbance in this area, all of which require further investigation. Given the uncertainty surrounding the location, nature and extent of burials in this area, further research was clearly needed. Following the detailed desk-based research described above, a detailed non-invasive survey of the area surrounding the southern memorial markers was then carried out.

### 4.3.1. Field Survey Area

A total survey area of 120 x 40m was defined for detailed search in order to incorporate disturbances visible in a 1944 Luftwaffe photograph of the site (Figure 10).



Figure 10: The area of investigation at the southern mass grave site (red rectangle) and the current memorials illustrated on a modern Google Earth image (left) and the 1944 Luftwaffe aerial image (right). On both images the black rectangle depicts the location of the smaller 30m by 39m GPR grid surveyed by the GSSI system (Copyright: Google Earth (left), US National Archives (right) and Centre of Archaeology, Staffordshire University (annotations)).

Much of the survey area consisted of short grass with a strip of crop down the southwestern edge of the site and an area of ploughed field at the southern end. Within the area occasional trees were present as well as the two memorials commemorating the burials that reportedly exist close by (Figure 11). The size of the survey area was also influenced by the presence of surface detritus to the north that could not be moved, crops on three sides and a road (which was present in 1942) to the east. The road was incorporated into the walkover survey undertaken in this area, but not in the GPR survey.



Figure 11: Photographs of the southern mass grave site showing the northern-most memorial (top left), the northern part of the survey area (top right), the southern ploughed field within the site (bottom left) and the southern-most memorial (bottom right). Copyright: Centre of Archaeology, Staffordshire University (annotations).

Within this survey area, a Differential Kinematic GPS was used to accurately record the positions of the memorials, pathways/roads/tracks, differing vegetation and other visible above-ground features. The latter included a large number of scattered human remains visible on the surface which were identified during a walkover survey of the area by the archaeological team. This data was then presented within a Geographic Information System (GIS) platform for comparison with modern and historic maps and aerial photographs. The 120 x 40m area was surveyed using the MALA GPR. Following the identification of several looting holes and the discovery and mapping of a large number of scattered human bones on the surface, a smaller GPR grid, measuring 39 x 30m, was established towards the northern end of the survey area (Figure 10). This survey was completed using the GSSI GPR. Individual 5m transects were also completed with the same system over the area with visible looting activity and the highest concentration of human remains in an attempt to better define the edges of any corresponding subterranean features that may be present. A 0.5m interval was used at the Jewish cemetery to account for the smaller targets being sought e.g. individual graves as well as potential mass graves. The locations of these grids and transects were recorded using GPS to allow the data to be incorporated into the GIS system. During the survey, attempts were made to minimize damage to the surrounding crops and extreme care was taken not to damage the memorials that currently exist at the site. As much data as possible was collected on and around the existing memorials in order to determine whether a mass grave lies underneath it but the railings and elevated condition of the memorials did prevent access to a small portion of these areas.

#### 4.3.2. Surface Remains

The walkover survey of the field survey area allowed several important features to be observed on the surface. Most importantly, 98 human bones or bone fragments were discovered. Small clumps of hair, fabric, shoes and a bullet casing were also found mixed in with these remains (Figure 12). The remains were disarticulated and had been unearthed from their original locations.

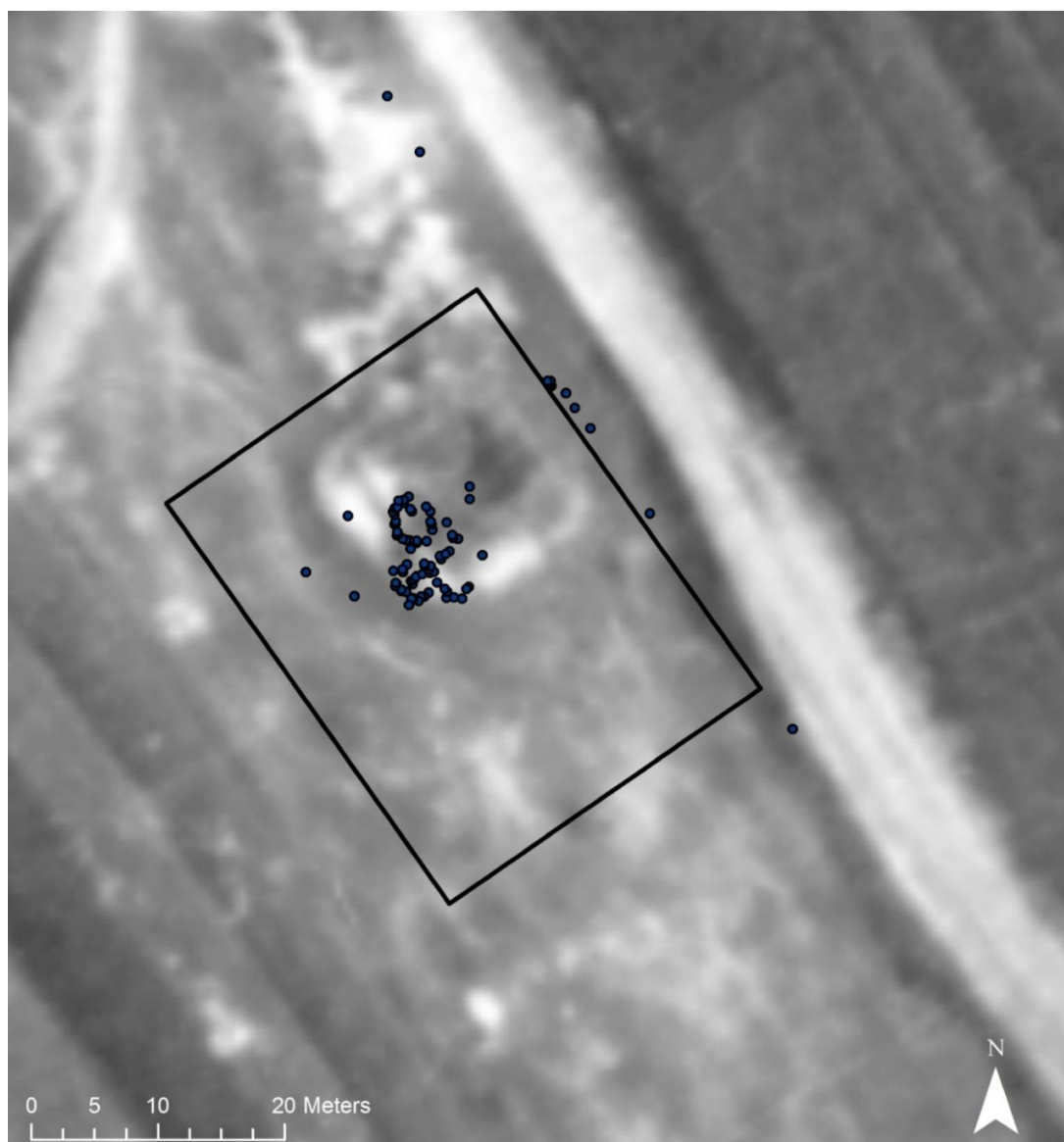


Figure 12: Some of the human remains, fabric (shoe) and a bullet casing found on the surface in the vicinity of the memorials at Rohatyn's south mass grave site (Copyright: Centre of Archaeology, Staffordshire University).

The positions of these remains were recorded using a DGPS system and these are shown in Figures 13 and 14. The majority of the bones/fragments were found within the north-east of the survey area, in the vicinity of several fully or partially back-filled looting holes (Figure 13-16). The largest of these looting holes was first observed by Rohatyn Jewish Heritage and other local experts in 2014, leading to its subsequent backfilling by the Council in Rohatyn shortly after (Figure 17). The human remains and other items found on the surface were therefore likely unearthed initially by looters but remained on the surface because the excess soil from the looting holes was spread over the area when they were backfilled. The discovery of human remains, which are known to have been previously buried in this area, confirms the existence of burials in this location. When the locations of the bones/fragments were overlaid onto the 1944 aerial photographs, this revealed that the bones were distributed in the centre of the large depression and area of disturbance in the centre of the survey area (Figure 14). Nine bones/fragments were located in the modern road and appeared to have been exposed as a result of vehicles driving over them. Based on the analysis of the 1944 aerial image of the site (Figures 8 and 9), it is possible that the modern road encroaches onto the area where human remains were buried. This was investigated further using GPR and is described in Section 4.3.3. In order to comply with Halacha Law - which forbids the excavation of human remains buried in a grave - and in order to protect the remains discovered, systematic collection of human bones and fragments that existed on the surface took place. This was only undertaken after consultation with the local Rabbinical authorities in Ukraine. Only remains that were totally exposed were lifted and they were then reburied within existing holes present on site: (1) to ensure that they remained in the vicinity of the location in which they were found and (2) to avoid excavation. Any remains that were partially buried were left in situ and covered with earth, based on advice given by the Rabbinical authorities.

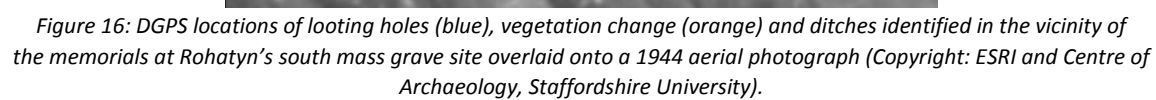
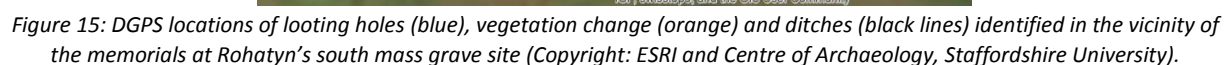


Figure 13: DGPS locations of human remains found on the surface in the vicinity of the memorials at Rohatyn's south mass grave site overlaid onto a modern satellite image (Copyright: ESRI and Centre of Archaeology, Staffordshire University).



*Figure 14: DGPS locations of human remains found on the surface in the vicinity of the memorials at Rohatyn's south mass grave site overlaid onto a 1944 aerial image (Copyright: ESRI and Centre of Archaeology, Staffordshire University).*

Two parallel ditches were also observed within the survey area, running north-south and measuring approximately 32m on the east side and 40m on the west side (Figure 15 and 16). Four areas of vegetation change were also located to the west of the known looting holes. These possibly represented past, back-filled looting holes. Like the surface remains, they were also located on the western edge of the large feature visible in the 1944 aerial image (Figure 16).





*Figure 17: One of the backfilled looting holes located during the walkover survey of the south site shown when it was still open in 2014 (Copyright: Jay Osborn)*

#### **4.3.3. Buried Remains**

The GSSI GPR data from the south grave site revealed a significant quantity of important information. The data was first analysed as 2D profile lines (cross sections through the ground along the lines of collection) and secondly by stacking these profile lines together to form a 3D dataset which represents a bird's eye view of the results that can be analysed at varying depths (called timeslices). Both analytical techniques successfully identified anomalous signal returns consistent with the presence of buried features, layers and materials. It is important to note however, that the soil in the region appeared to have a high clay content, thus it was highly reflective. This had the effect of creating a lot of "background noise" in the data which may, in some cases, have masked other subterranean features. It also made estimating the edges and depth of some features difficult or impossible.

Starting with the GSSI GPR data from the smaller 30m by 39m grid (Figure 10), several areas of interest were identified in the 2D profiles. Of these, three demonstrated clear features – on the X axis, the 20m profile line, the 25m profile line, and the 35m profile line (Figures 18, 19 and 20). Figure 18 illustrates the results from the 20m profile line. The location of the survey line is shown on the image (blue line) as are the location of the two existing memorials. These are overlain onto the 1944 aerial image. The 2D profile at 20m is characterised by the presence of a large feature located across the middle of the line. The feature, although subtle, has near vertical sides and a depth of 2.5 to 3m (this is impossible to finalise as the velocity of the GPR signals was difficult to calculate). Within the feature, at the lower level, were layers of uniform material with weaker GPR signals. At the upper levels, the presence of more mixed deposits was identified which produced stronger GPR reflections. This difference may be a result of post war disturbance and looting of the upper deposits.

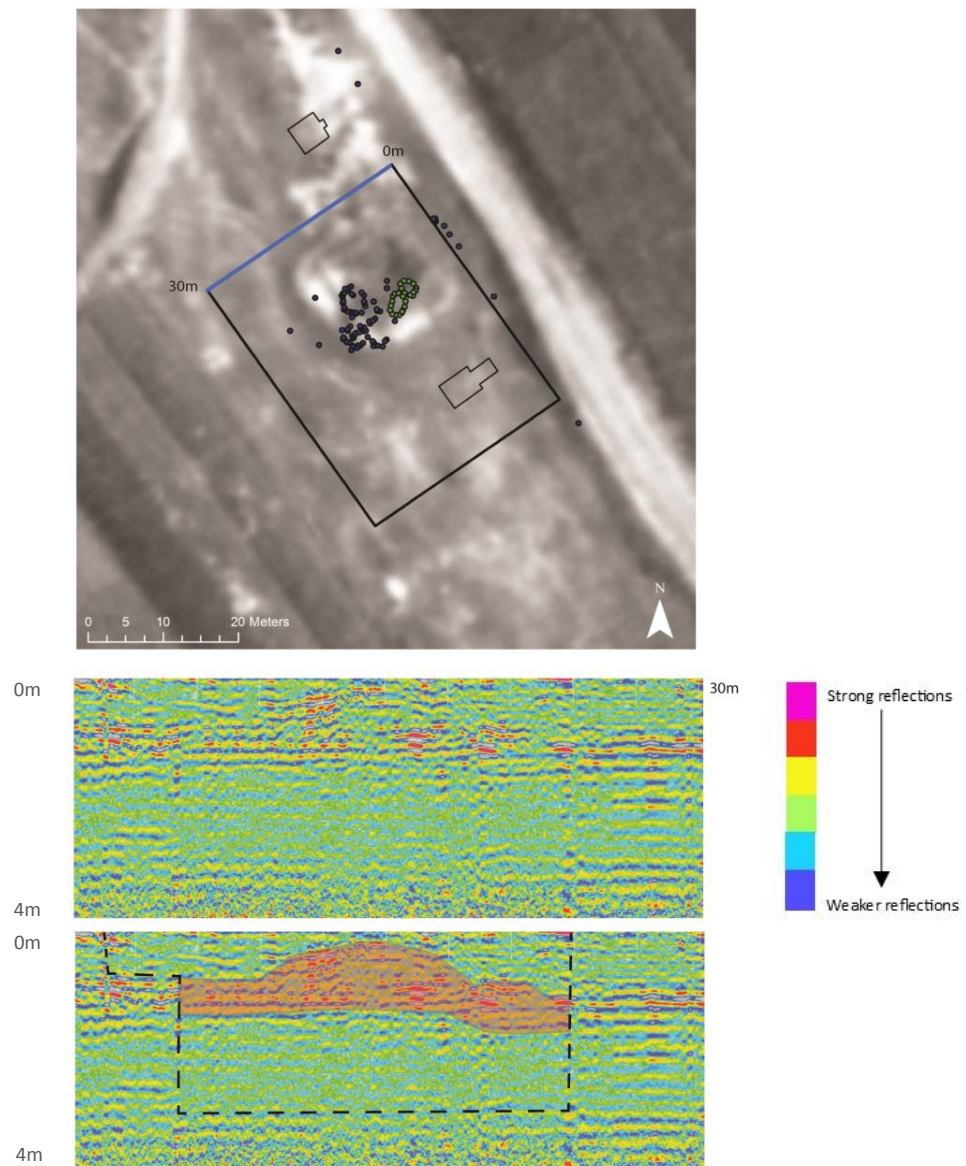


Figure 18: Section profile results from survey line 20m. The location of the survey line in relation to the 1944 image and the existing memorial, the location of surface bone (blue dots) and the surface depressions (green dots) (top), followed by the profile results (middle) and with annotation (bottom). Subtle signal responses forming a near vertical sided pit or trench was identified (black dash line) with areas of stronger signal responses at the upper levels. (Copyright: The Centre of Archaeology, Staffordshire University)

Profile line 25 (Figure 19) represents the GPR results as the equipment passed over the area of the large circular anomaly visible on the 1944 aerial image. As with line 20, the subtle outline of a pit like feature is identifiable within the cross-section data profile. Although the pit appears shallower in depth, it is more likely that this is not a true reflection of the feature and that the deeper levels are just not visible on this profile. One area of strong signal responses was identified (red shaded area; Figure 19) at a depth of approximately 1m and it is likely that that this represents extremely compacted material or layers of material. The locations of the two ground level ditches are also present within this profile plot (arrows: Figure 19).

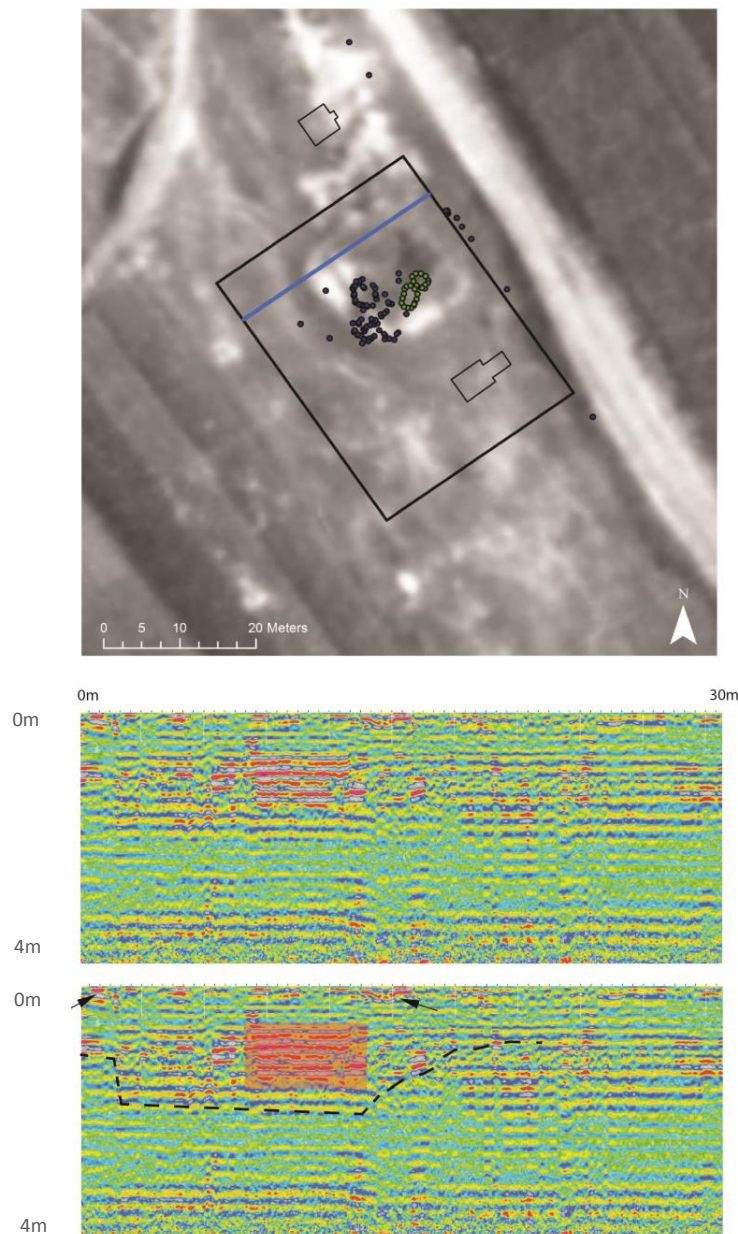


Figure 19: Section profile results from survey line 25m. The location of the survey line in relation to the 1944 image and the existing memorials (top), followed by the profile results (middle) and with annotation (bottom). The two ditches visible at ground level are marked by the black arrows. Subtle signal responses forming a pit or trench was identified (black dash line) with an area of stronger signal response within this feature (red shading). Copyright: The Centre of Archaeology, Staffordshire University.

Profile line 35 (Figure 20) represents the GPR results as the equipment passed over the area of the large circular anomaly visible on the 1944 aerial image. At present ground level, this line passed through the area of surface human remains and several previous looting holes. As with lines 20 and 25, the subtle outline of a pit like feature is identifiable within the cross-section data profile. One area of strong signal responses was identified (red shaded area; Figure 20) at a depth of approximately 1.3m and it is likely that that this represents extremely compacted material or layers of material. The location of the two old looting pits are visible in the data (black arrows, with one of these being the location where the surface human remains were reinterred) as well as the area of unstable ground close to the location of the surface human remains (interpreted as recent looting holes; Figure 20).

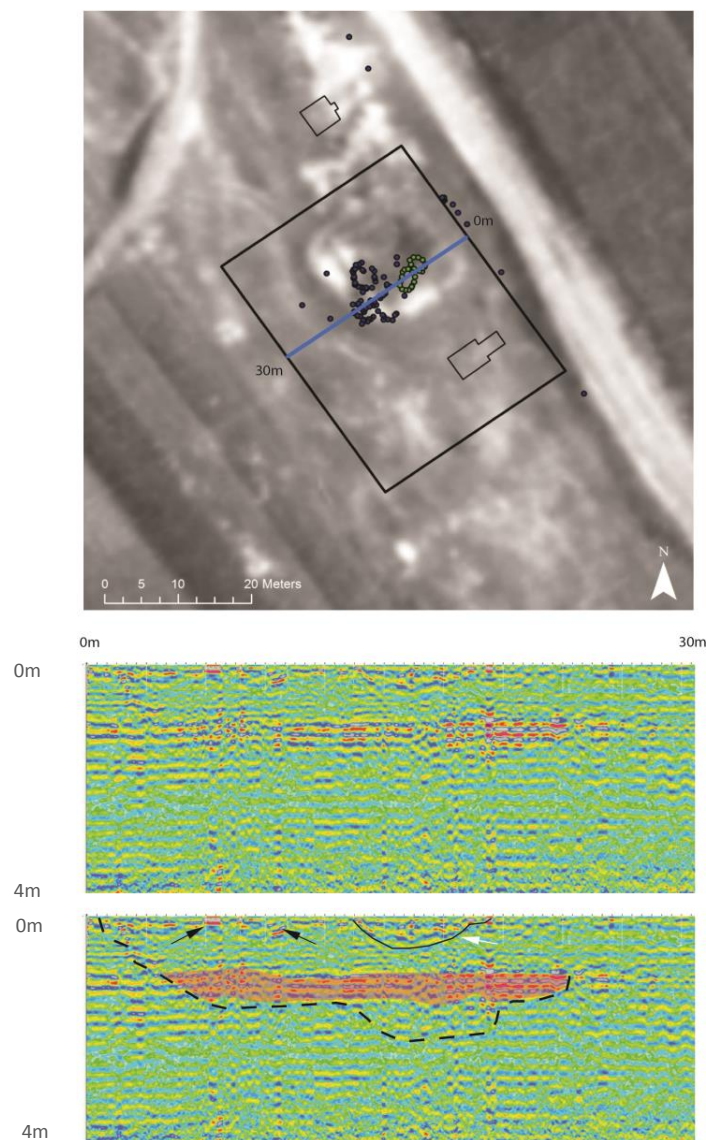


Figure 20: Section profile results from survey line 35m. The location of the survey line in relation to the 1944 image and the existing memorials (top), followed by the profile results (middle) and with annotation (bottom). The location of previous looting holes are visible (black and white arrows) as well as the outline of a possible pit (dashed line) containing a layer or layers of compacted material (red shading). (Copyright: The Centre of Archaeology, Staffordshire University).

The data was then used to generate a 3D file and analysed as depth timeslices (birds eye view). The presence of a large, irregular shaped anomaly was visible on most of the timeslices from 0.24m to 2.2m (Figure 21). In essence this provides a plan view of the compacted layers of material identified in the 2D profile lines (Figures 18, 19, and 20). At depths of 0.24m and 0.48m, the looting holes encountered during the survey (open voids covered with wooden planks) are easily visible (red areas; Figure 21). Further high response signals were prevalent within the anomaly at a depth of 1.18m. It is possible that these signals mark the start of the in situ human remains within the possible grave. Figure 21 also confirms that the feature does not appear to exceed the area of the smaller GPR grid, hence the southern memorial is situated in the vicinity of this grave.

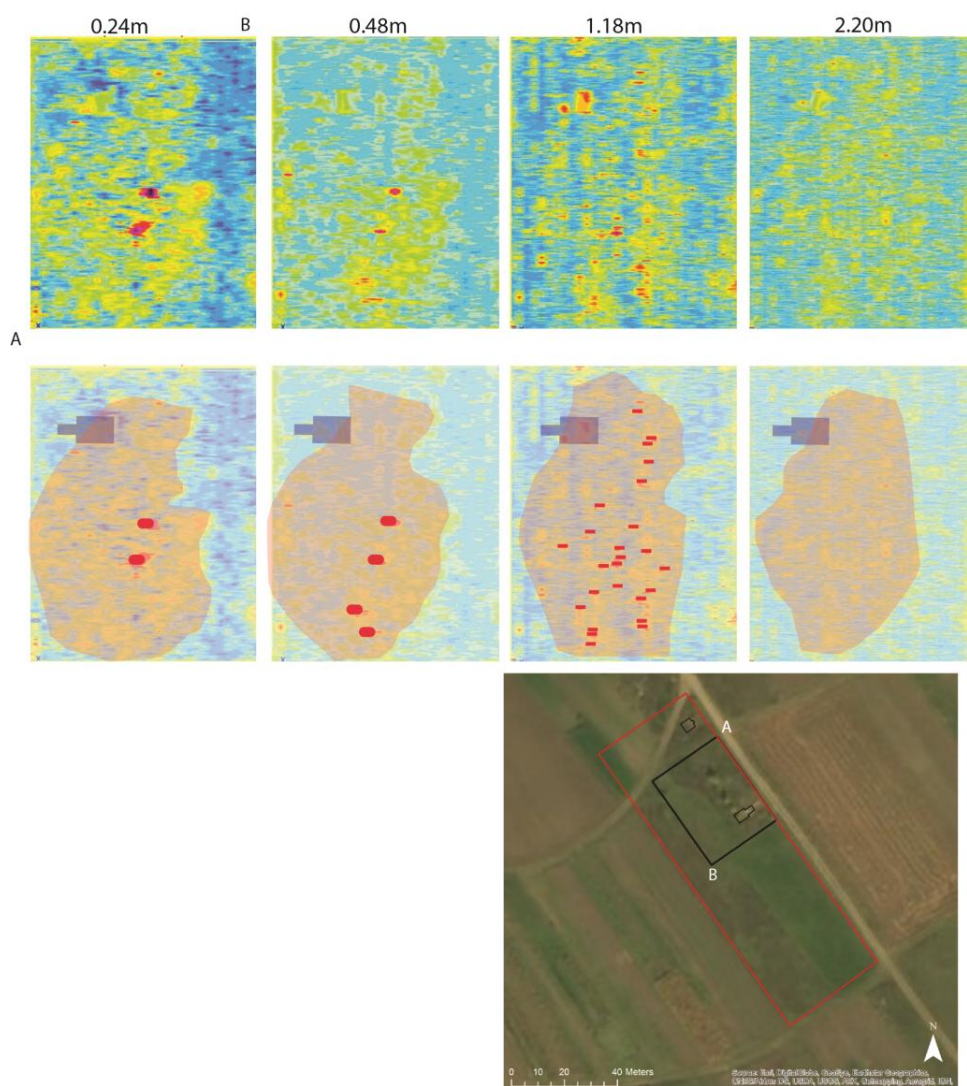


Figure 21: The time-slice (birds eye view) GPR data for the smaller GPR area at depths of 0.24m, 0.48m, 1.18m and 2.20m (top), repeated with interpretations (middle), and photographs of the area and grid location (bottom). The possible grave is highlighted in light brown on the interpretative image. The red dots on the 0.24m and 0.48m depth slices represent looting holes. The smaller red dots on the 1.18m depth slice represents areas of compacted materials and could signify the beginning of the in situ layers of human remains. Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)

When geo-rectified over the 1944 aerial image, the northern section of the anomaly identified from the 3D timeslices corresponds to the circular feature visible on the photograph (Figure 22). When comparing the locations of the surface human remains, these also fall within the area of the GPR anomaly and the feature on the aerial image. However, the GPR data suggests that the feature is larger than this, particularly to the southeast. Therefore, it is highly likely that the circular anomaly on the aerial photograph does not show the full extent of the grave but rather surface disturbances (possibly resulting from the distribution of spoil left over from the grave backfilling, the sinking of part of the grave or post-burial activities). It should be noted that the edges of the grave (as opposed to the material contained therein) were very difficult to identify in the GPR results because of the soil conditions.

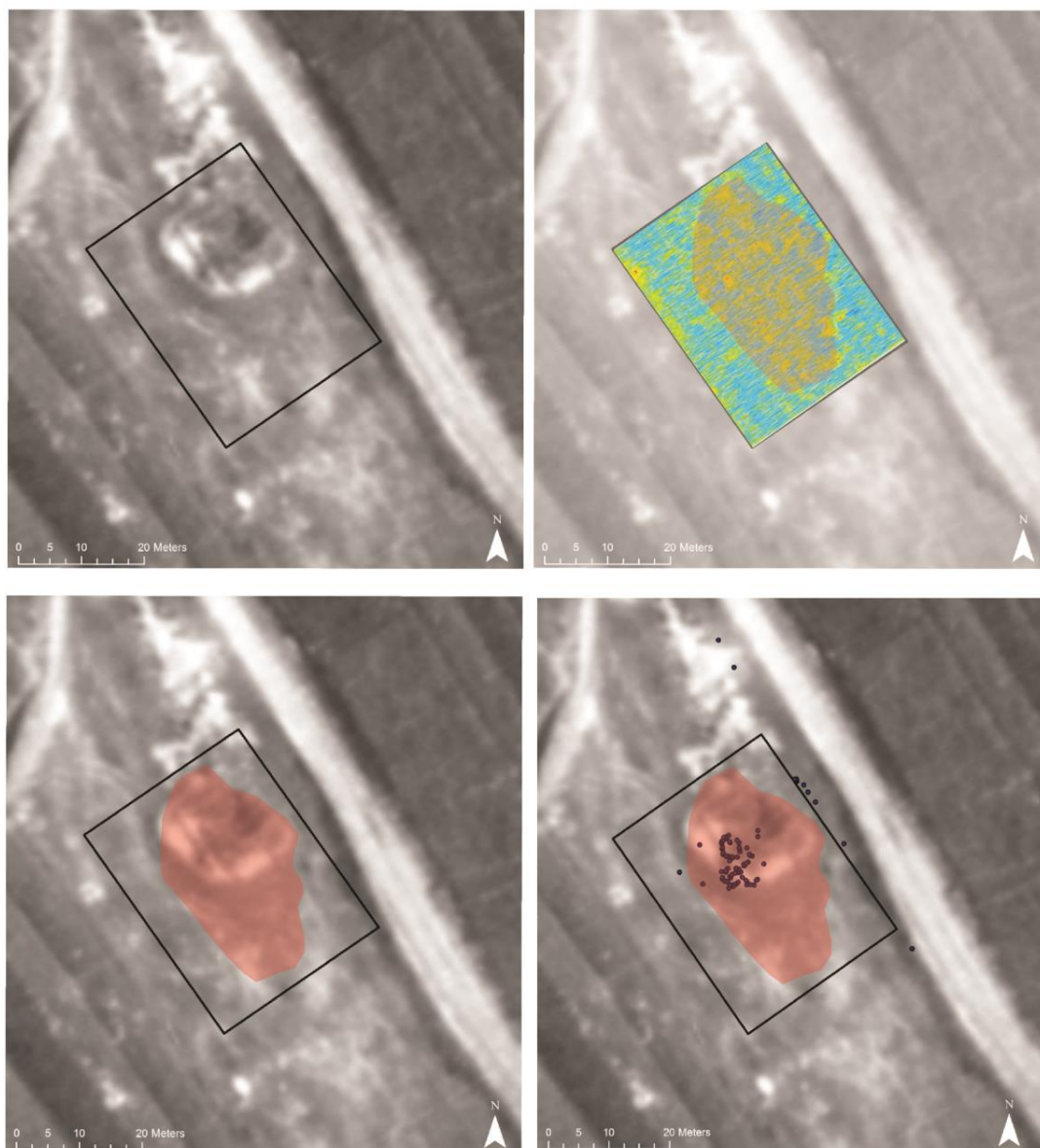


Figure 22: The 1944 aerial image with GPR grid (top left), the time-slice (birds eye view) GPR data for the smaller GPR area at depths of 2.20m (top right), the annotated pit feature overlain onto the aerial image (bottom left) and the same feature annotated with the location of the surface human remains (bottom right). Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)

The GPR survey across the rest of this site proved less successful. The data collected from the GSSI system proved to be clearer and more useful than the MALA data. The northern most area of the survey grid (the north side of the track-way that bisected the grid) could not be surveyed with either system due to the presence of large piles of building rubble and rubbish. Therefore, this area could not be investigated further. To the south of the grassed area that contains the two memorials, a GPR survey was attempted with the MALA system across the ploughed fields and vegetation that formed the topography in this area. However, the combination of extreme topography and the clay rich soils across this area resulted in poor GPR data. Although this data is still being worked on at the time of writing this report, it is highly unlikely that detailed interpretations can be formed from this data set. It is our recommendation that this area is not suitable for Ground Penetrating Radar and that other geophysical methods should be considered for future investigations, with the most beneficial being ground resistance survey as topography and uneven ground does not impact upon the data quality.

In conclusion, the forensic survey of the southern mass grave site has proved successful in identifying one probable mass grave which is mainly situated between the two current memorials. The discovery of human remains in this area also confirms the presence of burials in this location. These human remains, which were identified on the surface during the survey, were deposited via looting and subsequent backfilling activity at the site. After Rabbinical permission, these were reinterred on the site within an open looting pit which was subsequently backfilled using soil imported from off site. Each bone, bone fragment, and artefact was recorded and photographed in situ before reburial. These photographs are not included in full in this report but are available as part of the project archive.

The GPR data suggests that within the feature, a layer exists at a depth of 1m that consists of compacted material, which is markedly different from other material across the site. It is proposed that this layer represents the start of the human remains within the mass grave and is the likely source of the human remains on the surface as none of the looting holes appear to be much deeper than this.

Research questions which remain relate to the location of the possible second pit alluded to by witnesses. As noted above, some further data analysis is being attempted to confirm whether this exists in the southern part of the site. However, given some of the obstructions and ground conditions at the site, some areas are impossible to search using non-invasive approaches.

## **5. DESK-BASED ASSESSMENT : 6<sup>TH</sup> JUNE 1943: NORTHERN MASS GRAVE SITE**

In June 1943, another execution aktion occurred in Rohatyn and the town was declared Judenfrei (free of Jews).<sup>76</sup>

### **5.1. Historical Review**

As these executions, and the ones prior, resulted in the deaths of the majority of Rohatyn's Jewish population and the murder of thousands of people from neighbouring towns and villages, the number of witnesses left to testify to these atrocities is limited. It should be noted that conflicting information and

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<sup>76</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, xx; Lederman, S. 2015. "A Rohatyn Girl's Road Through Hell" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 434

recollections exist in these sources and that the majority of testimonies come from Jewish survivors as oppose to Ukrainian and other none Jewish sources. Also, not all of the testimonies represent first-hand, primary accounts of the events. What follows is a review of archive materials and witness testimonies that refer to the killings and burials at the northern mass grave site.

### 5.1.1. The Execution and Burial Practices

Rachel and Moshe NasHofer provide a vivid description of the events of the 6<sup>th</sup> June 1943, when the aktion began, and the days that followed. Their account was provided in the Yizkor book of Rohatyn but it should be noted that it is unclear from this testimony whether Rachel and Moshe NasHofer witnessed any of the events first-hand.

*"On the way there, they were beaten cruelly, and beside the pits they had to wait their turn to be shot. This lasted three days. On the second and third days, Jews were forced to dig their own graves, and whoever did not strip off their clothes fast enough before death was tortured cruelly, shot in the legs or even thrown living into the graves. Children were generally not shot at all, but thrown living into the pits. On the third day, silence prevailed. There was no one left to shout".<sup>77</sup>*

Around 3000 people, the remaining inhabitants of the ghetto, were executed.<sup>78</sup> Due to the speed with which the aktion was initiated, few people had time to escape or hide.<sup>79</sup> During the archaeological fieldwork in Rohatyn, residents told the fieldwork team that a small baby was saved from the execution when his mother threw him to local non-Jewish residents who then subsequently raised him. An attempt was reportedly made to save a second child but one of their parents went to reclaim the child and they subsequently both perished. The significance of the day of the executions was observed by the Jewish community, further heightening the trauma they experienced:

*"The Nazis loved to play G-d. It was not quite satisfying enough to kill the Jews, but one had to defile them and demoralize them. So many survivors recall the Aktion on Yom Kippur, when on the most sacred day of the year, when religious Jews believe that their fate is sealed for the New Year and when judgement is passed, the Nazis came to execute the judgement and they, not G-d, determined who shall live and who shall die".<sup>80</sup>*

Prior to the execution of the ghetto inhabitants, it is reported that members of the Jewish police were first rounded up and killed. Aryeh and Cyla Blech, who were in the Rohatyn ghetto at the time, stated that these

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<sup>77</sup> NasHofer, R. and NasHofer, M. 2015. "The Community of Rohatyn Destroyed" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 290; A similar account of the round ups being accompanied by the throwing of grenades and fires in the ghetto can be found in Lederman, S. 2013. *Sheva's Promise: Chronicle of Escape from a Nazi Ghetto*. Syracuse: Syracuse University Press

<sup>78</sup> Sterzer, A. 2015. "How Rohatyn Died" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 453

<sup>79</sup> Hader Rock, R. 2015. 'From Hiding Place to Hiding Place' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 322

<sup>80</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, page xx.

individuals were suspected of organising resistance activity, their bodies were mutilated and displayed near an electrical power station in the town as a warning to others considering partaking in such actions.<sup>81</sup>

### 5.1.2. The Number of Graves

The testimony provided by NasHofer and NasHofer (cited above) as well as those provided by others do suggest that more than one grave was present. However, the exact number of graves is unclear as they are based only on second hand accounts or they were provided by people who visited after the executions.<sup>82</sup>

### 5.1.3. The Location of the Graves

As with the southern grave site, a number of geographical features are referred to when witnesses describe the locations of the mass graves. Witnesses Rita Khader, Brodovoy Onyfriy and Tsilia Blek all told that the graves were located near to the hospital.<sup>83</sup> Others refer to the existence of the Polish monastery and Jewish cemetery nearby.<sup>84</sup> Two memorial markers, surrounded by a single fence, now exist in the area where it was suggested that the graves were located (after the war). However, further investigation is required to confirm the accurate placement of these markers. Figure 23 shows the location of the memorial markers and Figure 24 illustrates this location on the 1944 aerial image.



Figure 23: The location of the grave markers (left) and a photograph (right) (Copyright: Centre of Archaeology, Staffordshire University).

<sup>81</sup> Blech, A. and Blech, C. 2015. 'Rohatyn In the Occupation Years' in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 305

<sup>82</sup> After the events, Jack Glotzer visited the area and stated (in his unpublished memoir) that: "The Ukrainians pointed out that mass grave to us since we were not present in town at that time. (I escaped to the woods and the Stryjers were in hiding.) The grave was so huge, we could not believe our eyes". As he was viewing the area after the executions, it is possible that what he saw was the general area of all of the graves combined which, by this time had been covered over. If this was the case, this does suggest the graves were in close proximity to each other. Alternatively, perhaps he only witnessed one of the graves.

<sup>83</sup> Witness testimonies of Rita Khader, Brodovoy Onyfriy and Tsilia Blek, USHMM, RG-22.002M

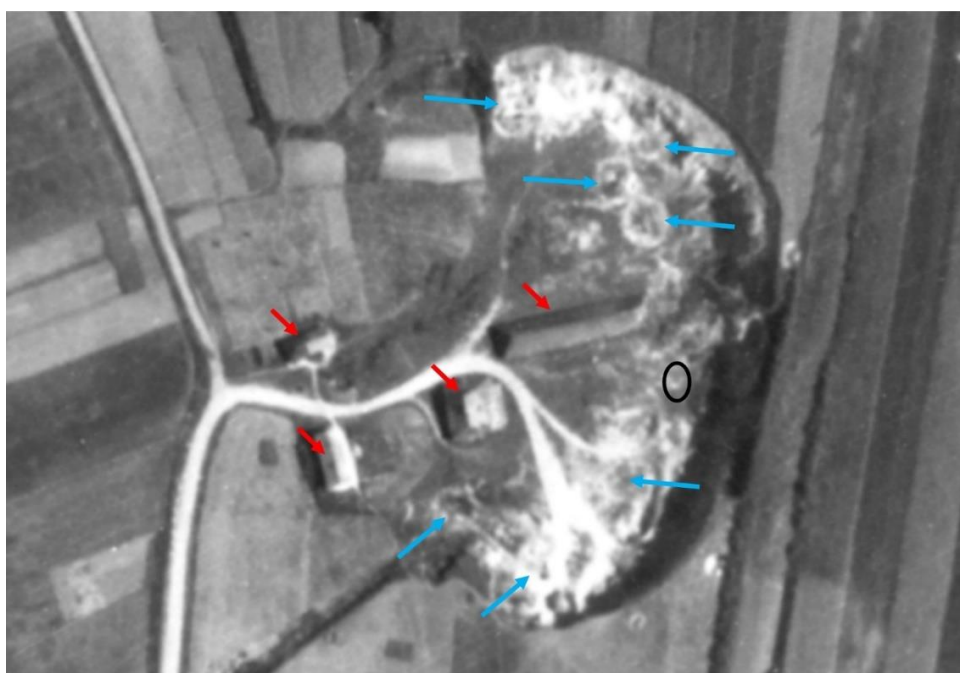
<sup>84</sup> Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, xx; NasHofer, R. and NasHofer, M. 2015. "The Community of Rohatyn Destroyed" in Zahav, L. *Remembering Rohatyn and Its Environs*. Cape Cod: Fields Publishing, 290

#### 5.1.4. Post-Execution

Unlike for the massacre of 20<sup>th</sup> March 1942, no detailed information concerning what happened to the graves after the executions were carried out was uncovered during the desk-based review of historical material. It is not known whether attempts were made to hide the graves or whether lye was used to cover the remains, as was reportedly carried out at the southern mass grave site. Again, this testifies to the extent to which the Germans and their collaborators eradicated the Jewish population in the region at this time.

#### 5.2. Initial Aerial Photo Analysis

An aerial photograph taken by the Luftwaffe in 1944 shows that the area in which the mass grave(s) pertaining to the June 1943 massacre was/were located was heavily disturbed (Figure 23). Many areas of exposed earth can be seen across the site, especially around the edges of the embankment that surrounds the area to the north, east and south. Several of the disturbed areas have trackways leading to them, suggesting regular traffic through the area, possibly connected to the factory that was located on the site. However, the possibility that one or more of these features was used as a grave cannot be ruled out. The amount of activity and ground disturbance in this area, both during the war and after, makes identifying the potential locations of mass graves difficult from the air. Two distinct sub-circular features can be seen in the northern part of the area and two similar features can be observed, one in the north and one in the south of the area. However, determining whether these features represent graves or distinguish other features amongst the other areas of disturbance is extremely difficult.



Key:      —→ Disturbed ground      —→ Structures      ○ Post-war memorial

Figure 24: An annotated aerial image of the north site in Rohatyn, taken by the Luftwaffe in 1944 showing the locations of possible buried remains, structures and the post-war memorial (Copyright: US National Archives and Centre of Archaeology, Staffordshire University).

### 5.3. Field Survey

#### 5.3.1. Field Survey Areas

As with the southern memorial site, the RFP states that the accuracy of the memorial markers in this area is not clear. Additionally, the discovery of human remains approximately 20 years ago by workers constructing a greenhouse and witness statements suggest that further burials may exist in this area. The methodology outlined in section 3 was followed in this area in order to record and identify any buried remains. Following the detailed desk-based research described above (which was carried out in accordance with the methodology described in section 3 (Stage 1)), non-invasive survey work was carried out. This facilitated the creation of a three-dimensional record of the survey areas as well as two-dimensional data plots that were overlaid onto modern and historic maps, aerial photographs and other survey data within the aforementioned GIS platform. The findings were then compared to information provided by witnesses, documents and other archival materials collated during the desk-based assessment phase of the project. This provided the best chance of confirming whether burials exist within this area, determining their exact location and documenting their overall dimensions (length, width and depth).

The survey in this area was more logistically challenging than the southern site due to the following issues:

- The industrial nature of the site
- The current land use and presence of surface detritus
- The changes and developments of this land over time
- The presence of obstructive vegetation.





Substantial clearing work was undertaken by Rohatyn Jewish Heritage and local contractors prior to and during the fieldwork. However, it was not possible to remove all of the obstructive materials in the time available for the survey. Hence, total coverage of all areas was not always achieved.

At the northern mass grave site, seven separate survey grids were established to give the best coverage of the site and given the complex nature of the terrain as shown in Figures 25, 26, 27 and 28.



*Figure 25: Photographs of the southern mass grave site showing survey area A (top left), greenhouse survey area C (top right), greenhouse survey area E (middle left), survey area F (middle right), survey area G (bottom left) and the memorial (bottom right) (Copyright: Centre of Archaeology, Staffordshire University)*



Key:  Area A  Areas B-E (south to north, inside greenhouses)  Area F  Area G

*Figure 26: The GPR locations at the northern mass grave site. In order of data collection these are: Area A (blue), Areas B to E greenhouse grids (black), Area F (yellow), Area G (red) (Copyright: ESRI and Centre of Archaeology, Staffordshire University)*



Key:  Area A  Areas B-E (south to north, inside greenhouses)  Area F  Area G

*Figure 27 Close-up of the GPR locations at the northern mass grave site. The blue arrow marks the location of the current memorials on the site. (Copyright: ESRI and Centre of Archaeology, Staffordshire University)*



Key:   Area A   Areas B-E (south to north, inside greenhouses)   Area F   Area G

*Figure 28: The GPR locations at the northern mass grave site shown over a 1944 Luftwaffe photograph (Copyright: ESRI and Centre of Archaeology, Staffordshire University)*

All of the GPR surveys were undertaken using a GSSI SIR-3000 GPR with 400MHz antenna. A parallel survey methodology with a 1m traverse interval was adopted in all areas. Within these survey areas, a Differential Kinematic GPS was used to accurately record the positions of geophysical survey grids. The standing buildings close to this site did impact upon the satellite signals during the survey and so recording sometimes had to be completed using the EDM Total Station. During this survey, vegetation change, depressions and other indicators that might suggest the presence of buried remains were also recorded using either the GPS or EDM. Modern features in the landscape such as structures, roads and pathways, as well those which may have had an effect upon the GPR results, were also recorded. The latter included modern services for gas or electricity, sewage lines, metal, areas of car parking, and industrial or construction materials/waste.

### 5.3.2. Surface and Buried Remains

As with the south grave site, it is important to note that the soil in the region appeared to have a high clay content. Hence, it was highly reflective. This had the effect of creating a lot of “background noise” in the data which may, in some cases, have masked other subterranean features. It also made estimating the depth of some features difficult or impossible. In the areas described below, this was also accompanied by other environmental factors that impacted upon the GPR results.

#### 5.3.2.1. Area A

Area A was located in a scrub area to the west of four greenhouse frames constructed on the site post-war. This grid measured 40 x 23m, although the entire area could not be covered with the GPR due to obstructions caused by the presence of trees, shrubs, building rubble and other surface detritus (e.g. domestic and commercial waste). Figure 29 provides an illustrated view of the results from Area A shown as timeslices (birds eye view) of the buried remains at depths of 0.25m, 0.67m and 1.57m. Also included on the figure are annotated interpretations of the data, a grid location plan and a photograph of the area.

Several buried features were observed in the data for this survey area. Many evidently related to more recent activity given their point of origin at or just below the modern ground surface. The presence of overhead electrical cables in this area also caused anomalous readings in the southern portion of the GPR data (red line; Figure 29). A large rectangular feature – measuring approximately 20m by 10m was identifiable in the data at depths of 0.67m and 1.57m. The feature was orientated north to south, although the full extent of this feature appeared to run into the area that could not be surveyed due to the commercial waste and vegetation. Although the feature appears smaller on the 0.67m time-slice, it is most likely that this is due to the contents of the feature at this level being similar to the surrounding material. It is more likely that the dimensions observed in the 1.57m time-slice is closer to the true length and width of the feature. At 1.56m depth, strong reflective signals are present within the feature (red areas; Figure 29) which may indicate buried metal. Unlike the results from the southern mass grave site, the individual 2D line profiles for this area were not as useful for data interpretation as the 3D time-slices.

When the GPR results were overlaid onto the 1944 aerial photograph, there was no apparent indication of ground disturbance within the survey area (Figure 30). It is highly likely that some visible trace of any pit in this area from 1943 would remain on the 1944 aerial image given that no quarrying activity was going on in this area (which could have subsequently masked it, as it did in other areas - see below). Hence, although it cannot be 100% confirmed in the absence of excavation, it is likely that this represents a post-war feature, perhaps associated with the industrial works in the area.

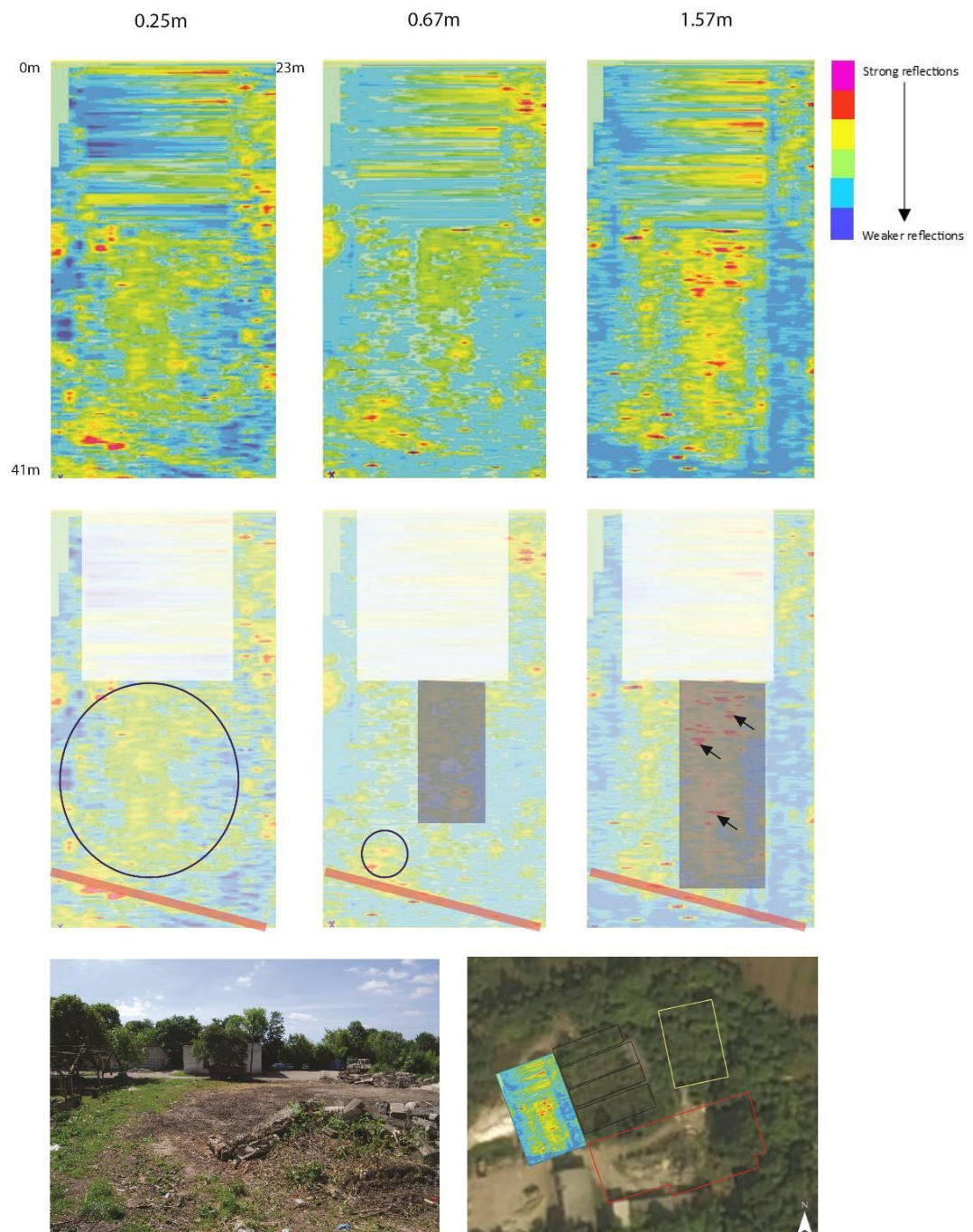


Figure 29: The time-slice (birds eye view) GPR data for Area A at depths of 0.25m, 0.67m and 1.57m (top), repeated with interpretations (middle), and photographs of the area and grid location (bottom). (Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image))



Figure 30: A close-up image showing the location of Area A overlain on the 1944 aerial photograph (Copyright: The Centre of Archaeology, Staffordshire University)

#### 5.3.2.2. Areas B-E

Areas B-E were located within each of the four greenhouses that existed adjacent to Area A. Due to obstructive debris and the presence of the greenhouse walls, a strip of land between the two survey areas could not be surveyed. Each survey area measured as follows: Area B - 30 x 8.8m, Area C – 30 x 9m, Area D – 30 x 9m, Area E – 27 x 7m. The presence of surface detritus and drainage apparatus meant that some survey lines had to be cut short or were interrupted. However, good coverage of these areas was generally achieved.

When analysing the survey data, it was evident that the greenhouse structures did impact upon the results. The metal roof struts present on each of the greenhouses caused reflections in the survey data to a greater or lesser extent depending upon the number of struts present. This effect is most apparent in Area B, where the individual strut reflections can be clearly seen (Figure 32). Likewise, the presence of upright metal pipes, some visible above the ground and some buried, caused strong reflections in the first and last survey lines in each greenhouse (Figure 33). The only other features observed in the data in these areas related to the greenhouse construction: a central channel in Areas B (Figure 32) and D (Figure 34) and two subterranean concrete-lined tanks in Area D.

As local workers claim to have seen bones when excavating in the area of the greenhouses and given the extent of the disturbances caused by the construction and existence of the greenhouses, presence of mass graves in this area cannot be totally ruled out. However, it should be noted that the information provided by the local workers was not area-specific and so could have referred to a number of areas in and around the greenhouse structures (and an adjoining building). Additionally, there is very limited ground disturbance visible on the 1944 aerial photograph in these areas (see Figure 35). The access road to the quarry face seems to run through three of the grid areas within the modern greenhouses (Areas B, C and D) and Area E appears to be partially within agricultural field systems.

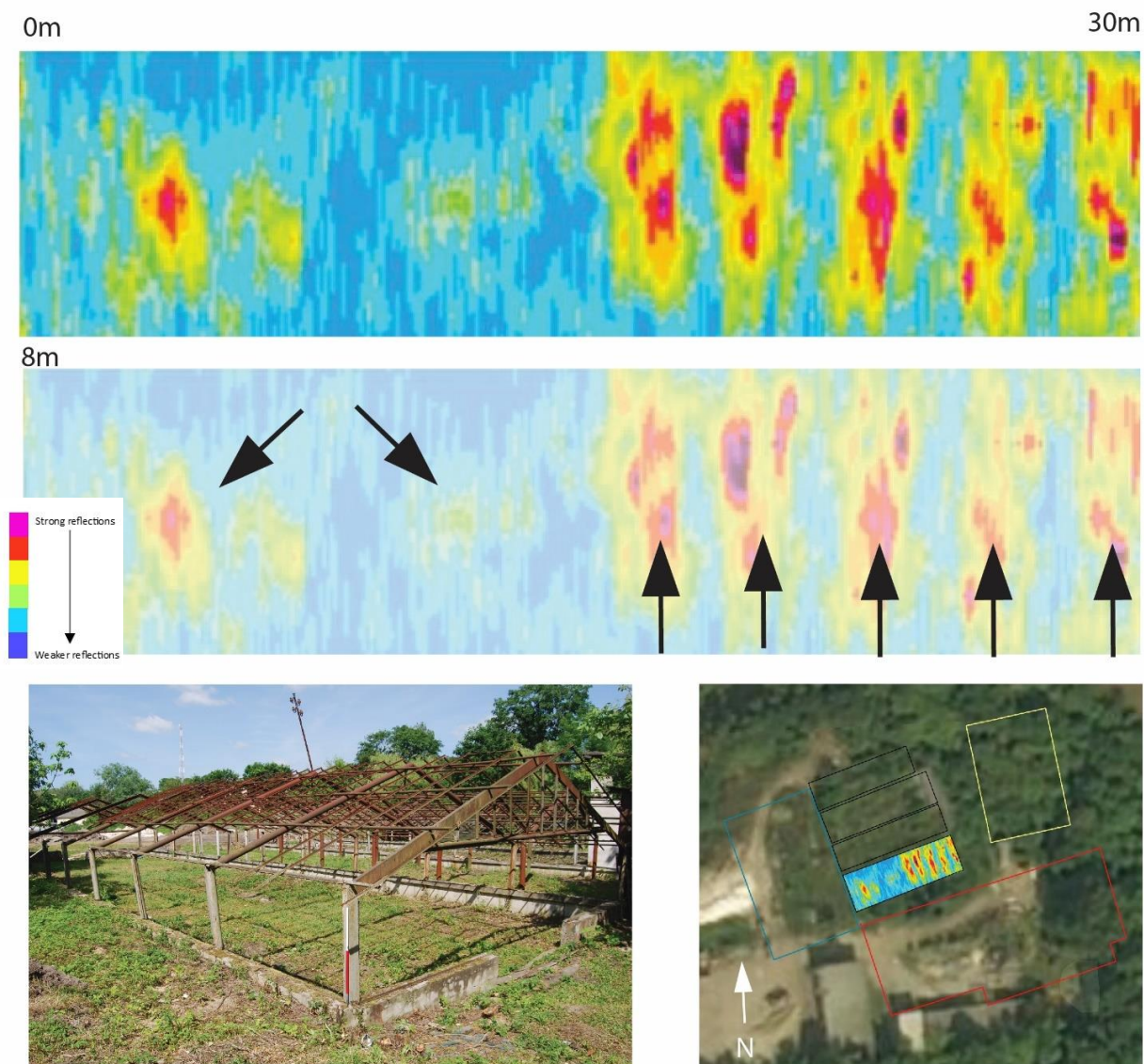


Figure 31: The time-slice (birds eye view) GPR data for Area B (Greenhouse A) at depths of 1.31m (top), repeated with interpretations (middle) showing the anomalies in the GPR data resulting from the metal roof of the greenhouse (black arrows), and photographs of the area and grid location (bottom). (Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image))

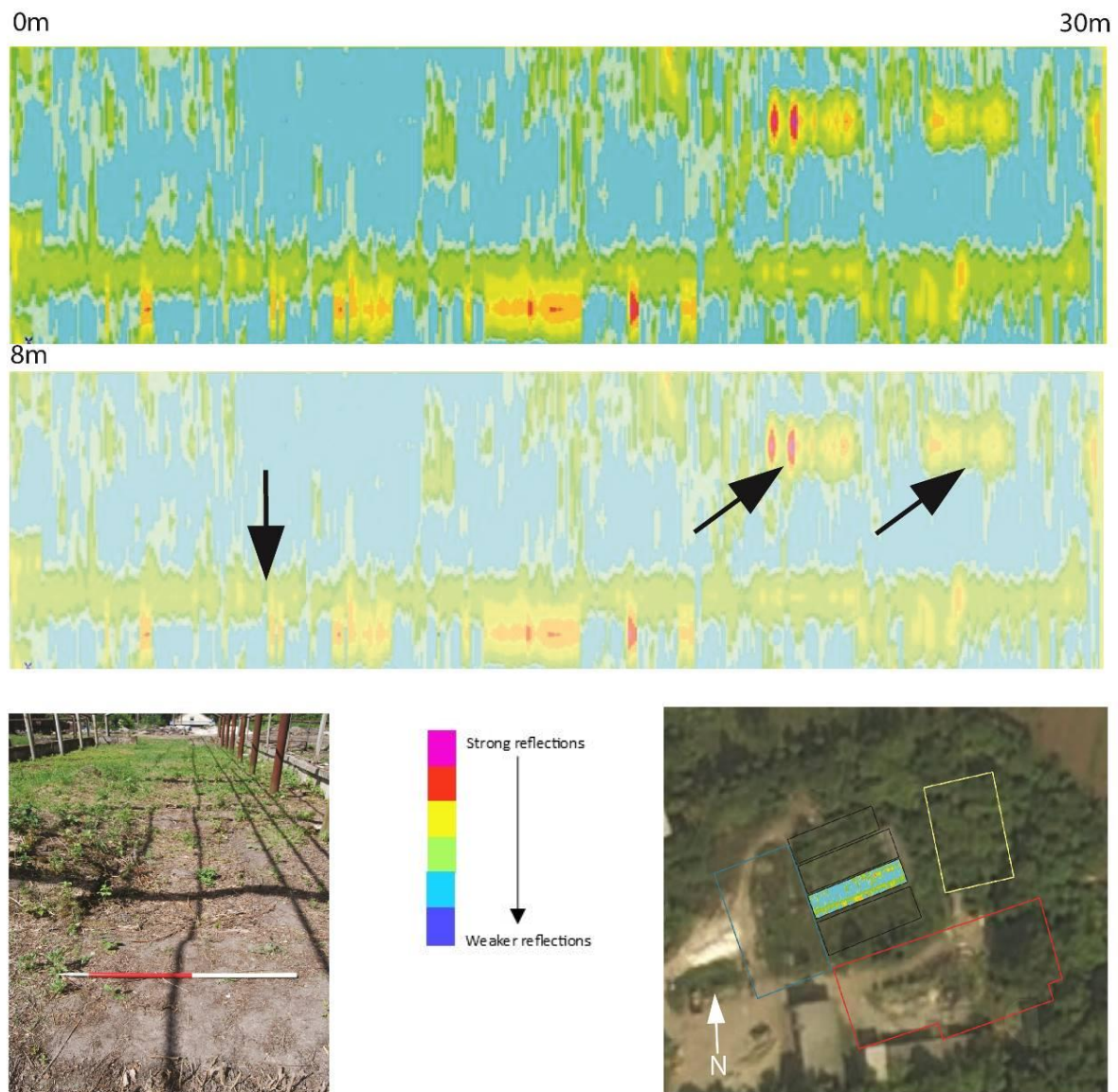


Figure 32: The time-slice (birds eye view) GPR data for Area C (Greenhouse B) at a depth of 0.48m (top), repeated with interpretations (middle) showing the anomalies in the GPR data resulting from a buried pipe or channel and two areas of modern disturbance (black arrows), and photographs of the area and grid location (bottom). (Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image))

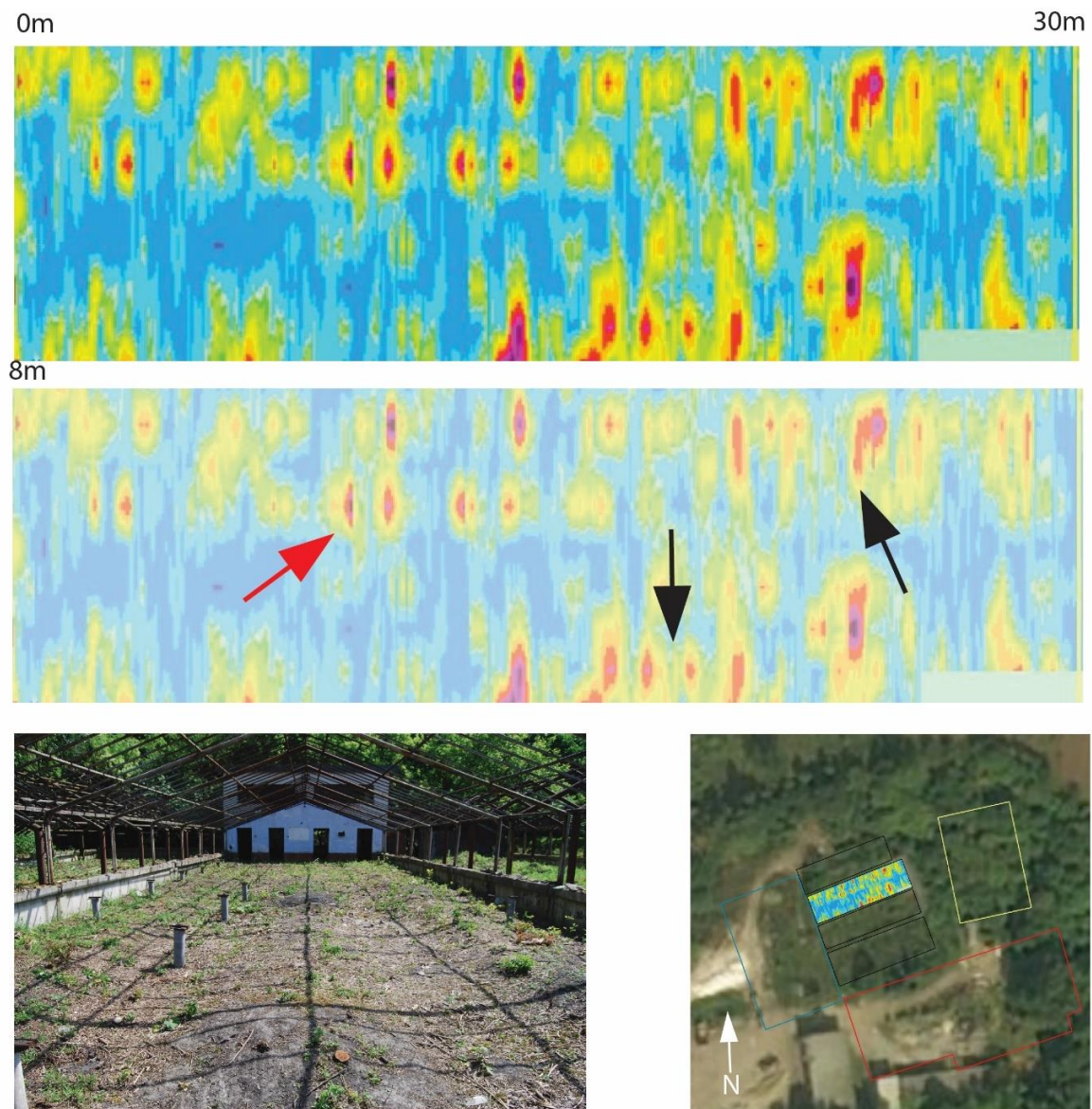
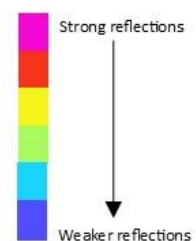


Figure 33: The time-slice (birds eye view) GPR data for Area D (Greenhouse C) at a depth of 0.94m (top), repeated with interpretations (middle) showing the anomalies in the GPR data resulting from the signal returns from the metal roof (black arrows) and from a row of buried pipes (red arrow), and photographs of the area and grid location (bottom). (Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image))



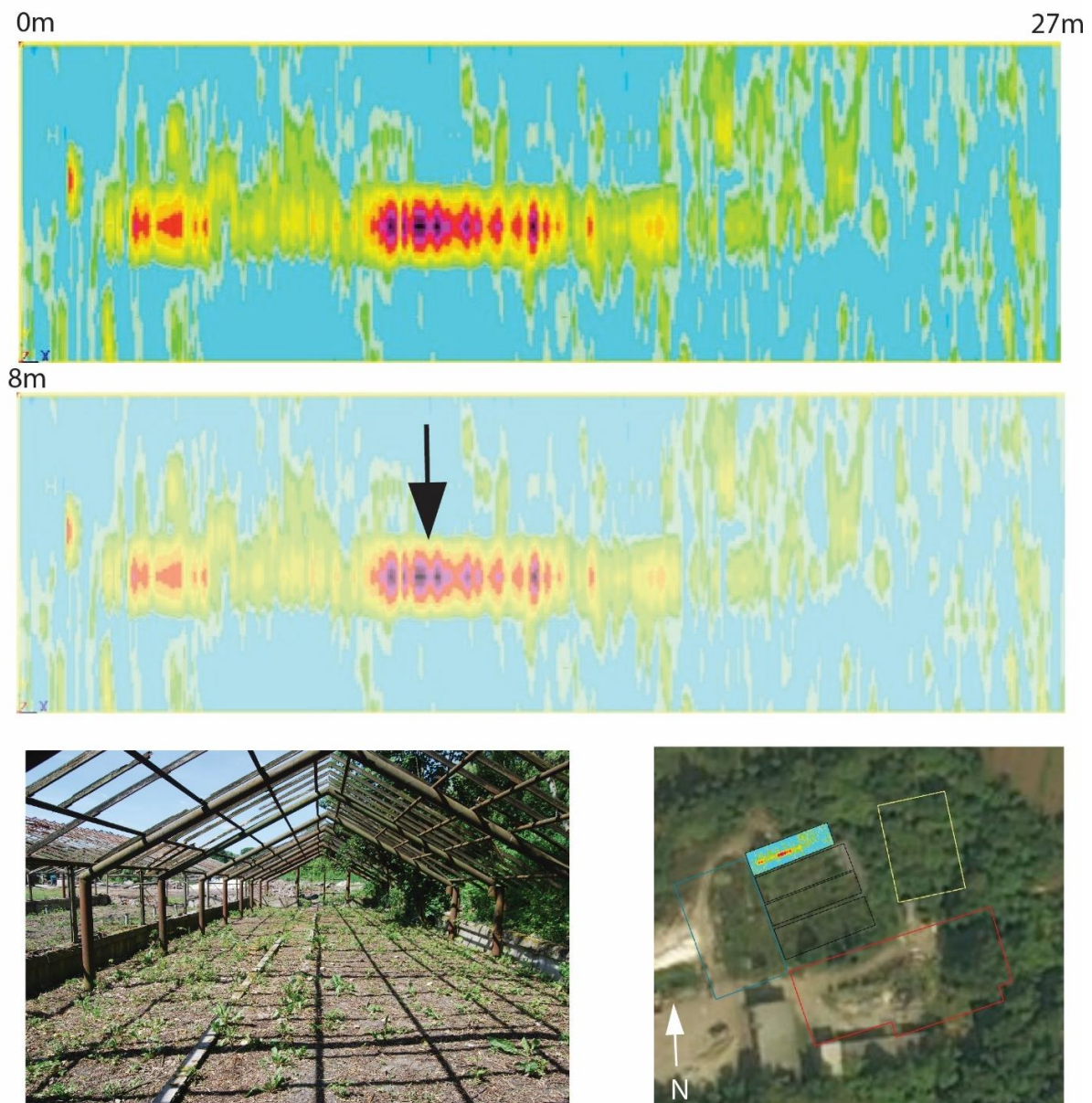
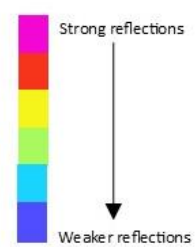


Figure 34: The time-slice (birds eye view) GPR data for Area E (Greenhouse D) at a depth of 0.48m (top), repeated with interpretations (middle) showing the anomalies in the GPR data resulting from a buried concrete channel and chamber (black arrows), and photographs of the area and grid location (bottom). Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)





*Figure 35: A close-up image showing the location of Areas B to E (Greenhouses A, B, C and D) overlaid on the 1944 aerial photograph (Copyright: The Centre of Archaeology, Staffordshire University)*

### 5.3.2.3. Area F

Area F was situated to the east of the four greenhouses and adjoining structures (Figures 25 to 28). This survey area, which measured 30 x 21m, was also bounded to the north and east by a steep embankment (possibly the old quarry face) and to the south by a structure which housed domestic animals. Topographically, the location of several above ground features within the survey area were recorded as these would have a visible effect on the GPR results. These features included the old brick and concrete foundations for an above-ground petrol tank, a metal fence and ditch which surrounded the petrol tank area, trees, surface detritus and animal waste, and several visible mounds and depressions. These can be seen in Figure 36.



*Figure 36: Area F photographs taken at the time of the survey showing the foundations of the old petrol tank structure (top left), the animal waste dump and the building to the south of the area (top right), one of the areas of mounds and depressions at the northern edge of the area (bottom left), and the bank, ditch and old metal fence posts that surround the petrol tank area (bottom right). (Copyright: The Centre of Archaeology, Staffordshire University)*

During the survey, the team was approached by a local man who worked in the area. He recalled how, several years ago, he was excavating (using a mechanical excavator) in an area in the northern corner of Area F. Here, he reported, at a depth of approximately 1m, he found human remains, including skulls that still had hair attached. At this point, he stopped excavating and recovered the area. The position that the man indicated was marked on the ground by the survey team and recorded using a Total Station for comparison with the GPR results. This area coincided closely with an area of visible mounds and depressions. The GPR results do provide evidence to corroborate the accuracy of his recollection.

Although the 2D profile lines from the GPR survey are extremely difficult to interpret due to the effects of the topographic features upon the data, buried features and layers are visible. These are best represented by the profile results from survey lines at 4m and 16m (Figures 37 and 38).

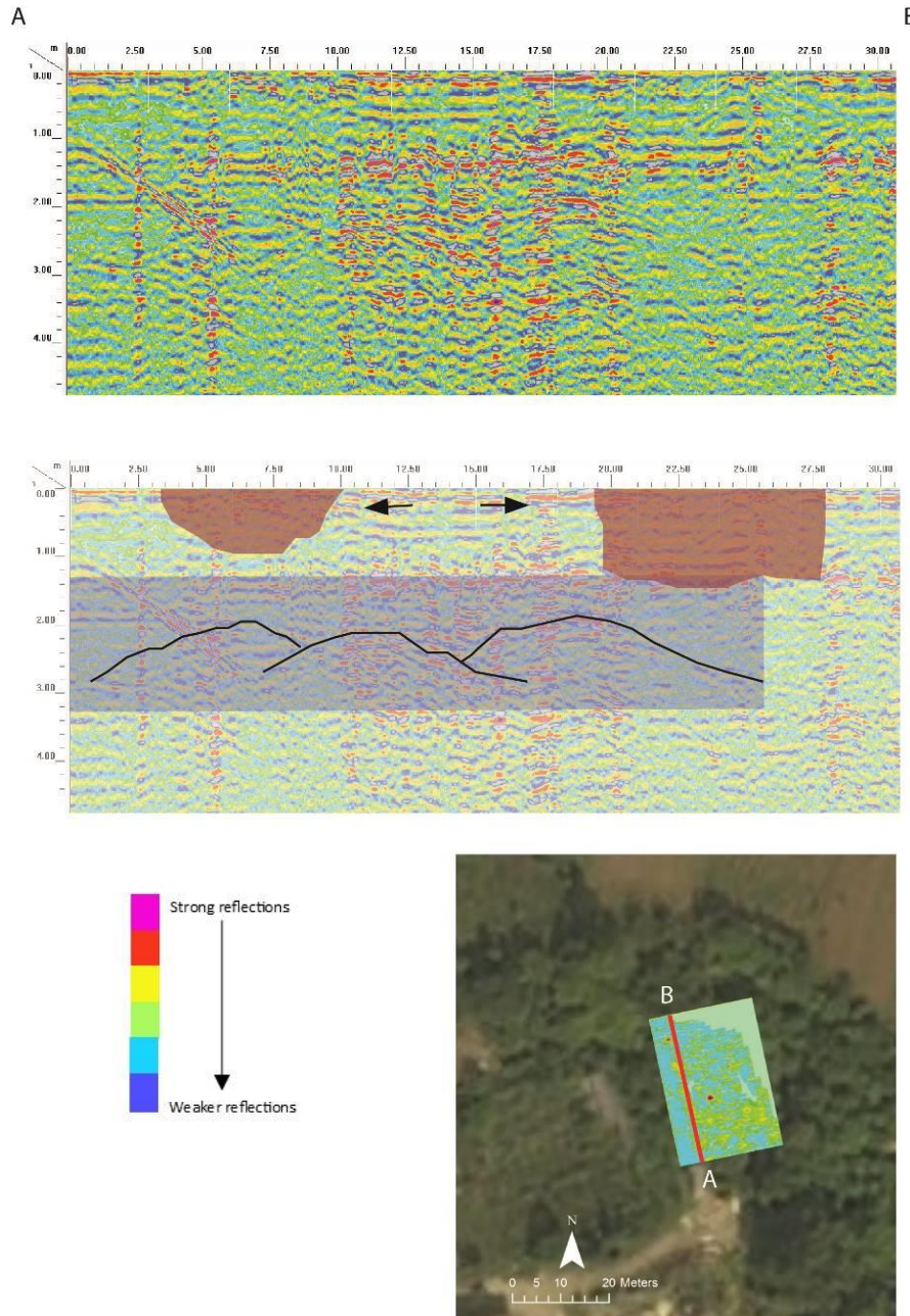


Figure 37: Section profile results from survey line 4m (top) with annotation (middle) and survey line location (bottom). Subtle signal responses from mounded remains are visible (black outlines) within an area of anomalous material (grey square), two areas of post-war modern disturbance (red pits), and ringing signal effects caused by metal objects at or close to the surface (black arrows). Copyright: The Centre of Archaeology, Staffordshire University and ESRI GIS base-mapping.

The survey section profile of the 4m transect line includes a number of significant GPR signal returns which are important when interpreting the buried remains in this area. Many of the strong signal responses (data ringing) are caused by the surface features and buried objects close to the surface (black arrows; Figure 37). However, other more subtle responses are present and can be interpreted. It is likely that the first 1m depth of material represents layers that have built up post-war and that the ground level at the time of the executions would have been c. 1m lower than the surface today. This is a pattern that is repeated in many of the other survey lines in Area F.

Two probable pit features are visible on the 2D profile which begin close to the current surface and end at a depth of approximately 1m to 1.3m (red features; Figure 37). It is likely that these represent recent ground excavation work and the second, larger pit is located in the area where the local man suggested he dug several years ago with a mechanical excavator and discovered human remains.

Beginning at a depth of approximately 1m, and running for 25m through the survey line, is an area of anomalous layers 2m in thickness which includes, at its deepest level, the signal responses consistent with mounded material (grey shading and black outlines; Figure 37). Similar GPR responses have been recorded elsewhere in Ukraine and Poland during the survey of known mass graves. It is suspected that these mounds of material represent areas of human remains and associated artefacts and textiles. The GPR can't differentiate between fully skeletal remains and the surrounding soil (as bones take on the properties of the surrounding materials) so this suggests that the possible remains here are either not fully skeletonized or that a proportion of the victims were not stripped prior to being thrown into the pit. This does corroborate some of the witness testimonies. This evidence also validates the local man's claims that he suggested that no human remains were encountered during the excavation until the pit was 1m deep. It is likely that at this depth, the excavator dug into the layers of anomalous material identified in the GPR data and human remains were discovered.

The areas of mounded remains are visible in other 2D survey lines ranging from 3m to 7m and appears to run out of the survey area to the south – so beneath the building and animal pens to the south. All of the 2D survey lines were stacked together to form a 3D data block. This allows depth timeslices (bird's eye views) of the data to be analysed and the shape in plan of features to be measured. The 3D results for Area F are illustrated in Figure 39.

A second possible pit feature is visible in the 16m 2D section profile survey line (Figure 38). This survey line was located in the south-eastern part of the area and is short in length due to the presence of the petrol tank foundations structure. As in all of the 2D data, the significant features appear to begin at a depth of 1m. In this profile, the dimensions of this feature is hard to ascertain and will be further discussed below in the 3D data analysis.

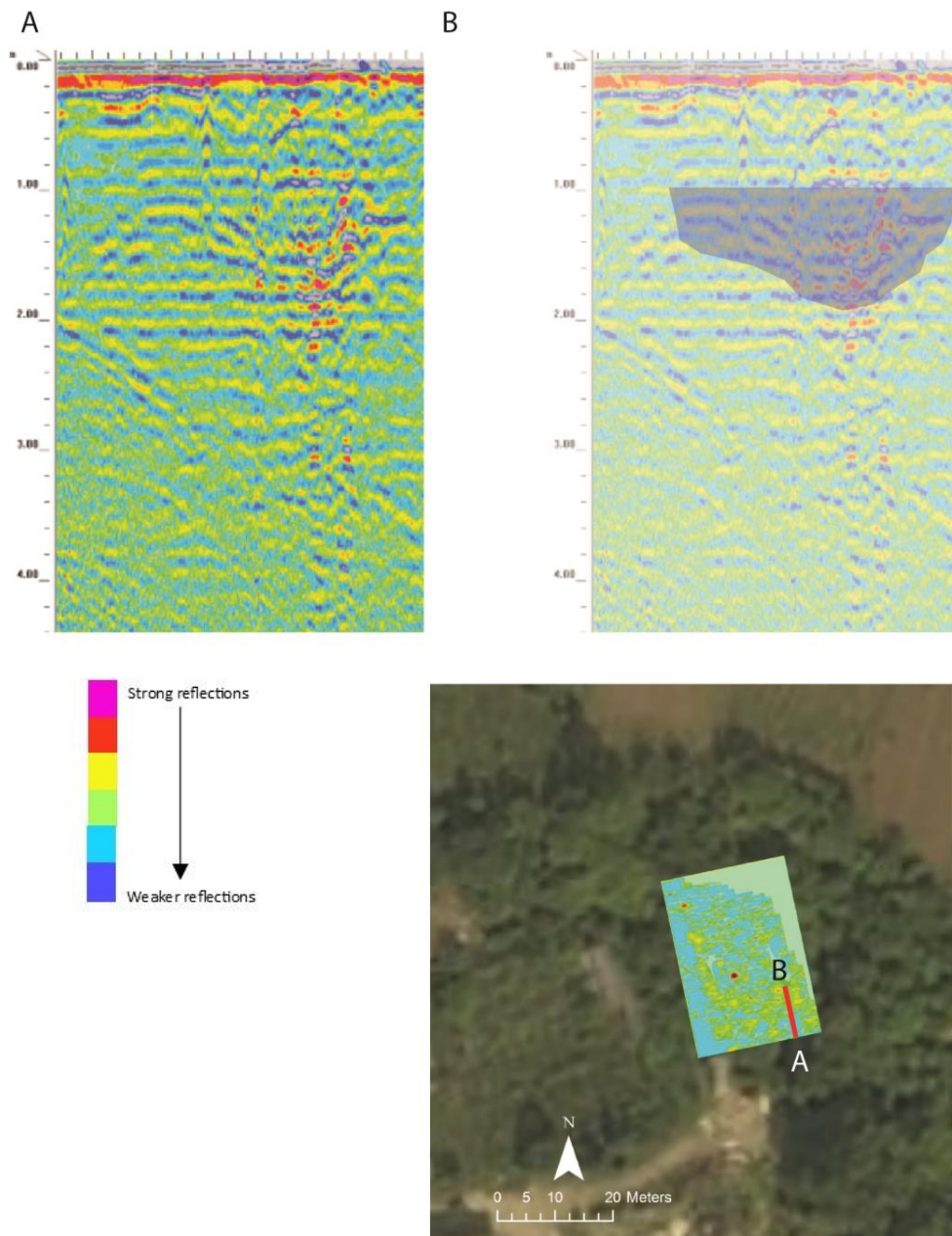


Figure 38: Section profile results from survey line 16m (top left) with annotation (top right) and survey line location (bottom). Subtle signal responses from a possible pit is visible in the profile (grey shading). Copyright: The Centre of Archaeology, Staffordshire University and ESRI GIS base-mapping.

All of the 2D profile lines were stacked to form a 3D data block. This allows the GPR results to be analysed in plan form at different depths, called timeslices. Figure 39 illustrates the most informative timeslices for Area F and includes; plan views at depths of 0.48m, 0.92m, and 1.71m, plan views of the same depths with feature annotations, and plan views of the same depths overlain by the topographic survey results showing the location of above ground features.

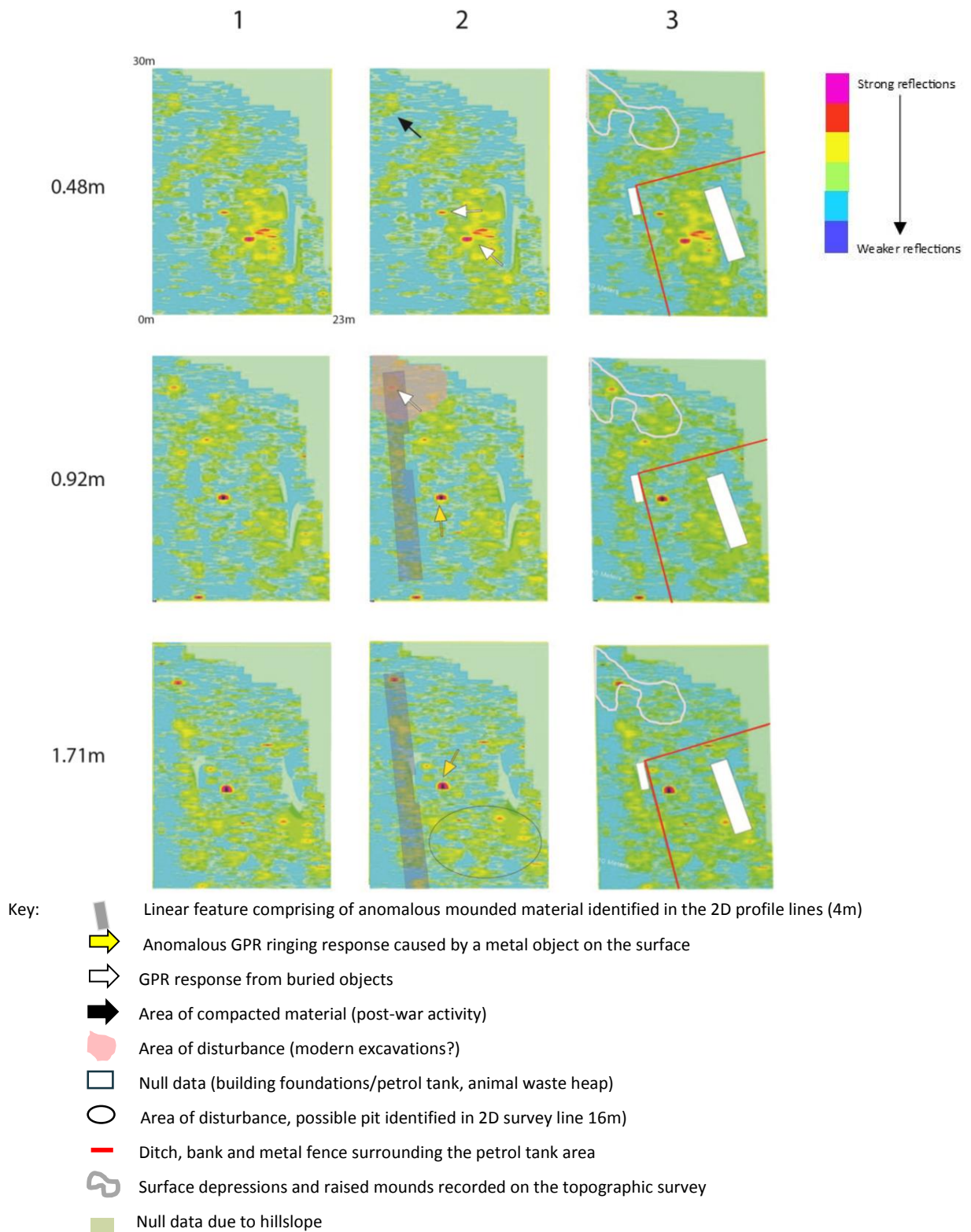


Figure 39: Time-slice (birds eye view) GPR data for Area F at depths of 0.48m, 0.92m and 1.71m (1 -left hand side column), repeated with interpretations (2 -middle column), and timeslice data overlay by above ground features recorded during the topographic survey (3 -right hand column). Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)

Several key features are visible on the timeslice data for Area F (Figure 39). The area of mounded remains recorded in the 2D profile line at 4m is first visible at a depth of 0.92m. This confirms that this feature isn't cut from the current ground surface and that the top 0.92m of material is probably post war build up and modern disturbance. In plan, this feature appears to form a long, linear trench which runs north to south through most of the survey area with dimensions of 25m by 4m. At a depth of 0.92m, the northern end of this trench-like feature appears to run into an area of disturbance which most probably represents the recent mechanical excavation referred to by the local witness (middle illustrations; Figure 39). This area also corresponds to the raised mounds and depressions which are present on the surface (right hand illustrations; Figure 39).

There are several responses that are consistent with buried metal objects, but most of these are either on the surface (with ringing effects through the data at all depths) or are part of an area of metalwork at a depth of 0.48m within the former compound of the old petrol tank structure. One possible metal object is located at a depth of 0.92m, but this is located within the area of probable modern disturbance described above.

One area of anomalous responses is visible at a depth of 1.71m (although it is also visible at the shallower depth of 1.15m (not illustrated)) and is located in the southern area of the site (black oval; Figure 40). It is not clear what this feature represents – the edges and shape in plan is not identifiable, although this area does include the feature identified in 2D survey line 16m. When the location of this area is overlain onto the 1944 aerial photograph, it corresponds to an area of visible disturbance.

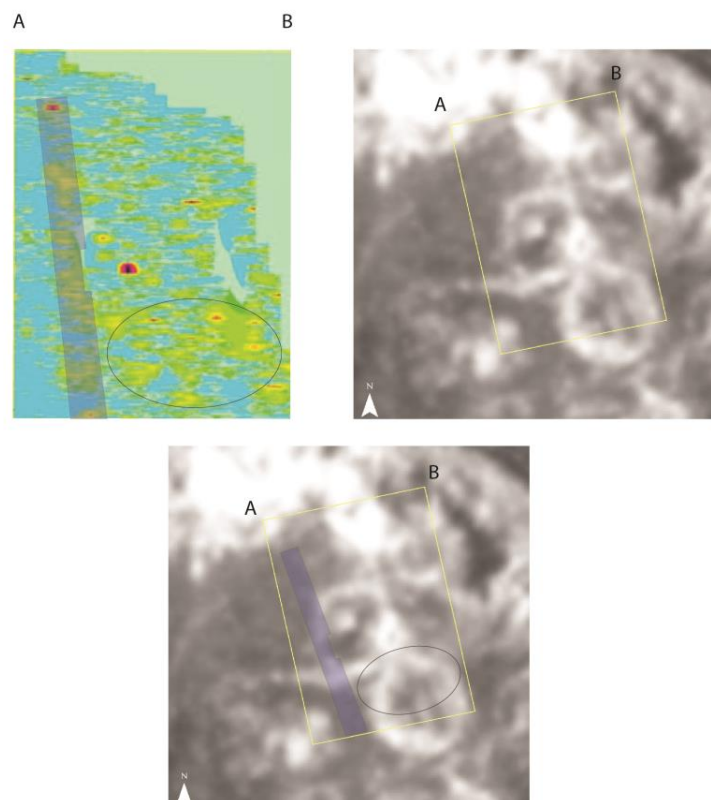


Figure 40: Timeslice data from 1.71m depth (top left) showing the linear trench feature and an area of anomalous readings. The location of the GPR grid overlain onto the 1944 aerial image (top right), and the features overlain onto the aerial image (bottom)  
Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)

What is not clear on the aerial image from 1944 is any visible trace of the linear trench feature identified in the GPR survey. This confirms the hypothesis that this area underwent significant topographical change from the time of the executions and burial (June 1943) to the time of the aerial photograph (27<sup>th</sup> June 1944). As a consequence, it is highly unlikely that the second area of disturbance illustrated on Figure 40 is a mass grave as ground disturbance is shown in the 1944 aerial image and it is this later activity that the GPR is responding to at this location.

Therefore, it is probable that one burial pit exists in Area F and comprises of a long, 4m wide linear trench running north to south for 25m before exiting the survey area to the south.

#### 5.3.2.4. Area G

The final survey area, Area G, measured 66 x 30m and was located to the south of the greenhouses (Figures 25 to 28). Two memorials, one erected by locals during the Soviet era and another erected by the Jewish community, were located in the eastern corner of this survey area. The plants and railings that form part of the memorial in this area prevented total coverage with the GPR. However, as much data as possible was collected on and around the existing memorial in order to determine whether a mass grave lies entirely or partially underneath it. Extreme caution was taken not to disturb or damage the memorial during the fieldwork. A pile of cobbles also existed in the south-east corner of the area and so this was also excluded from the survey. Along the western edge of the survey area, the presence of overhead cables and partially buried metal caused reflections in the GPR data.

Two features of interest were identified in the 2D profile section lines for Area G. Firstly, in the first few profile lines along the northern edge of the survey area, a possible pit was visible within the data. This is best illustrated from survey line 2 at 1m (Figure 41). The pit appears to be cut from a shallow depth and has a depth of 1.8m. If the orientation of the linear feature identified in Area F remains consistent, then it is possible that this Area G feature represents a continuation of this. The different depths at which the features in each area appear in the section lines can be accounted for by the difference in topography between these two areas. Regarding in their shape in plan, the two features have a very similar depth and width, with Area F survey profile line representing a longitudinal cross section (Figures 37 and 39) and the Area G profile line representing a width cross section. The 2D profile line data from Area G suggests that this feature is not visible past the 3m survey line so it appears that only the very end of the feature is present in this area. As a consequence, if this is the end of the linear mass grave identified in Area F, then this confirms that the grave runs directly beneath the temporary building and animal pens which lay between areas F and G.

The second feature of interest was identified from the 2D profile lines which ran through the area of the two memorials. This subtle feature comprises of a large pit 15m in width with a depth of approximately 1.5m (Figure 42). Unfortunately, we do not have any information on the methodology of construction used to build these memorials or why this location was chosen. Therefore, it is extremely difficult to interpret this feature. It is possible that this represents the ground work that was completed during construction, but equally it is also possible that this data confirms that a mass grave pit exists beneath the memorial complex. Given the latter possibility, it is our recommendation that this area continues to be protected and memorialised as much as possible.

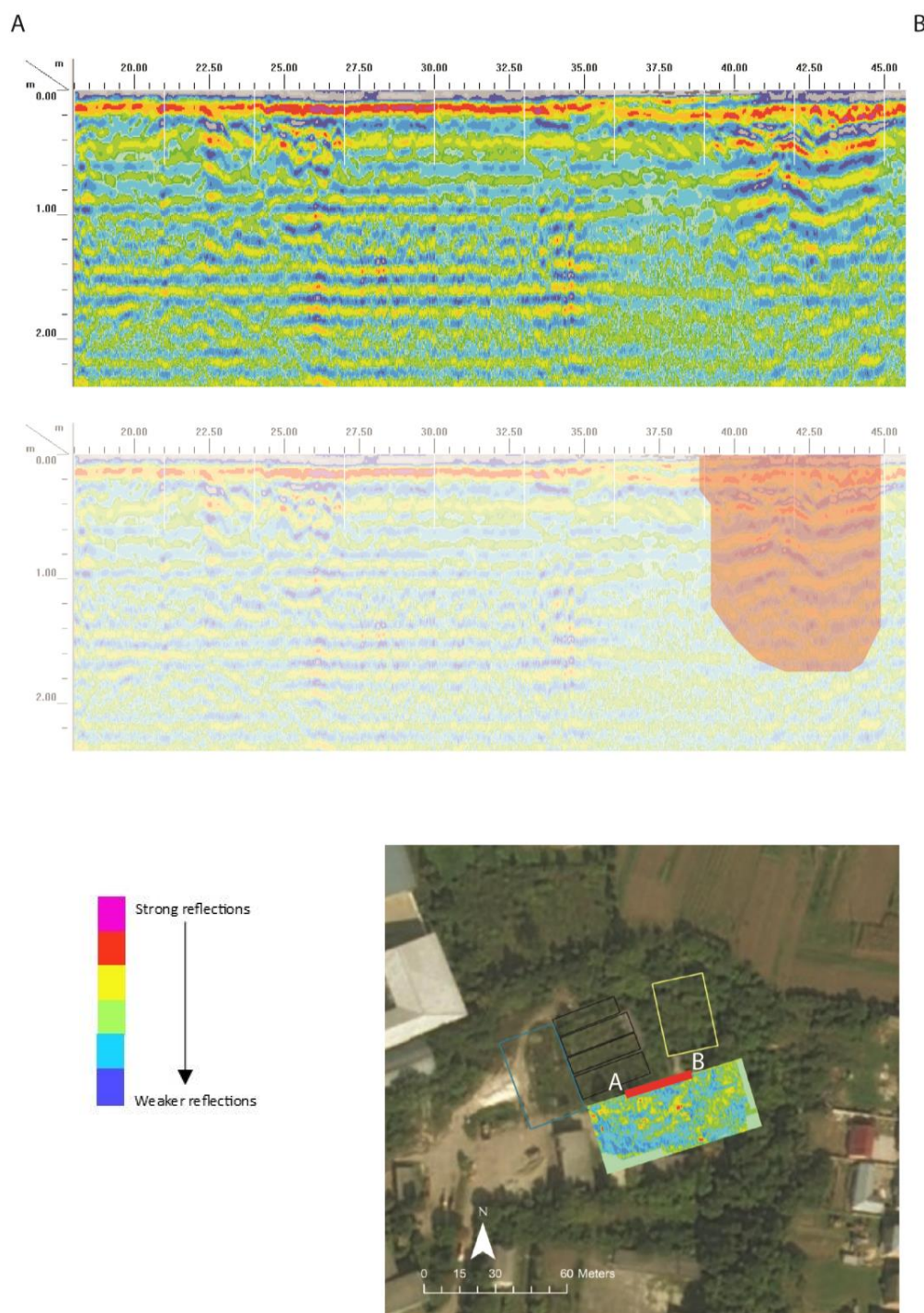


Figure 41: Section profile results from survey line 2 (1m) (top) with annotation (middle) and survey line location (bottom). A profile of a possible pit feature is visible in the section (red) Copyright: The Centre of Archaeology, Staffordshire University and ESRI GIS base-mapping.

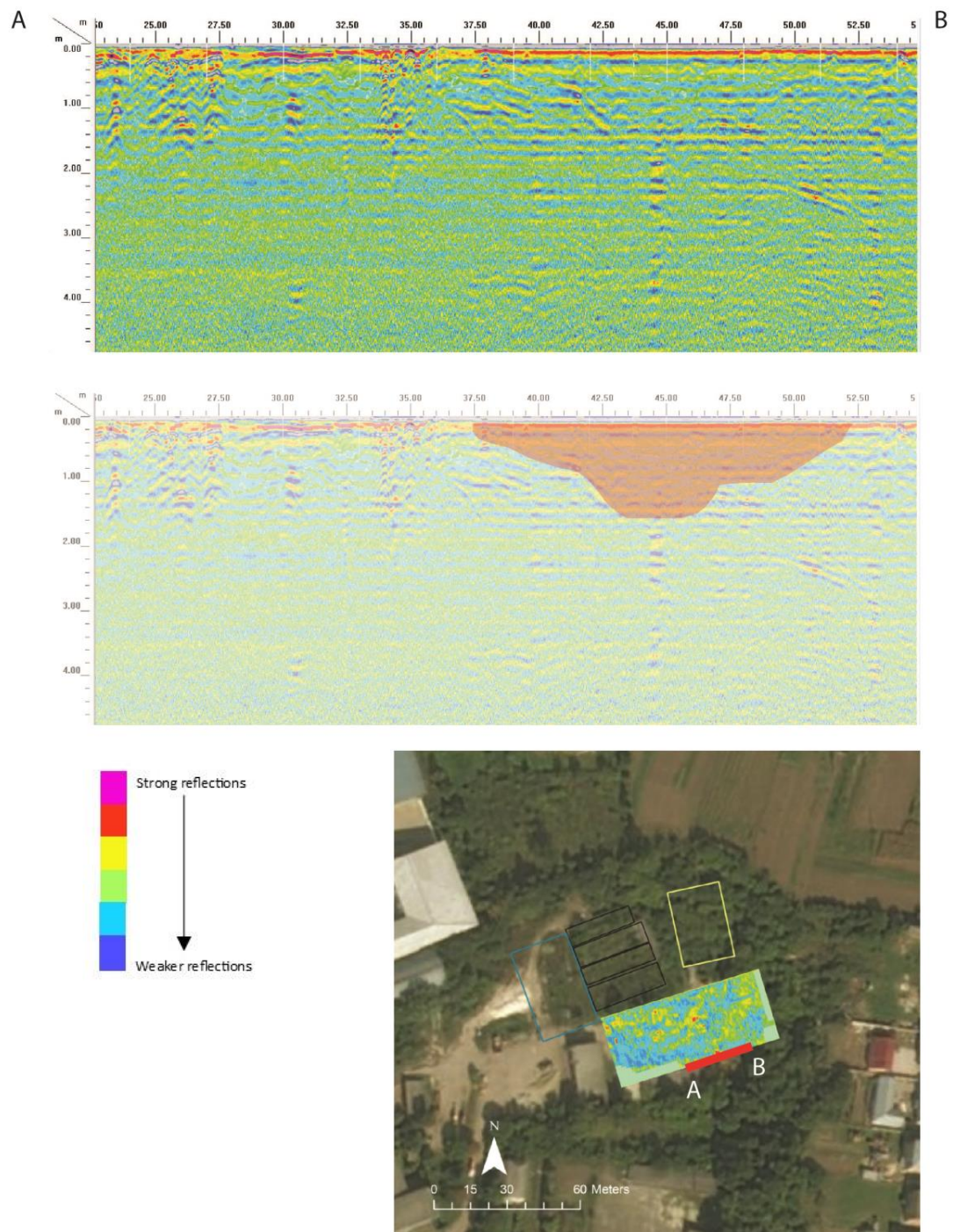


Figure 42: Section profile results from survey line 25m) (top) with annotation (middle) and survey line location (bottom). A profile of a possible pit feature is visible in the section (red) Copyright: The Centre of Archaeology, Staffordshire University and ESRI GIS base-mapping.

The 2D profile lines were combined into a 3D data block and the timeslices were analysed from varying depths. Two of these, 0.5m depth and 2m depth, are illustrated on Figure 43. Three blocks of null data (white areas) are present as the survey could not be completed at these locations. Throughout all of the depth timeslices, one feature remained consistent (black arrow; Figure 43) and this represents a probable man-hole or other modern drainage feature. The feature along the northern edge of the survey area identified in the 2D profiles is visible at a depth of 0.5m but not at 2m (black rectangle; Figure 43). At 0.5m depth, in plan, the feature does appear to be semi-circular and could certainly represent the terminus (end) of the linear feature identified in Area F.

The pit beneath the memorial complex that was identified in the 2D profiles is not identifiable in the 3D data block (red semi-circle: Figure 43), and indeed such subtle features which only appear as trace evidence in 2D profiles often do not appear in the 3D timeslices. There is also no visible trace of the large, long building that was present through the middle of this area as identified on the 1944 aerial photograph (Figure 44).

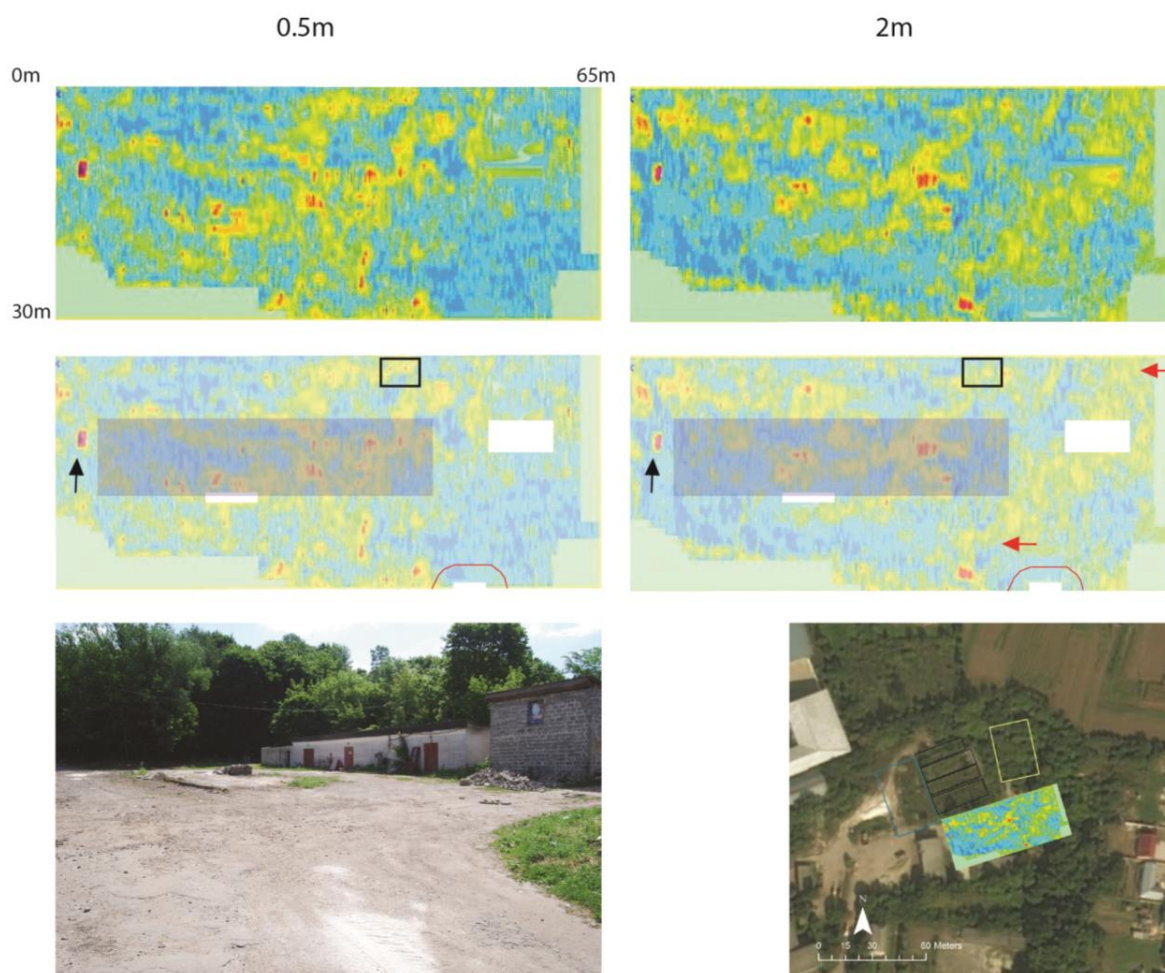


Figure 43: Time-slice (birds eye view) GPR data for Area G at depths of 0.5m and 2m (top), repeated with interpretations (middle), and an area photograph and grid location (bottom). Copyright: The Centre of Archaeology, Staffordshire University and Google Earth (aerial image)

One final area of anomalous GPR responses is visible on the timeslices from 1.2m to 2.2m depth (limits marked by the red arrows; Figure 43). It is unclear what this feature may represent. A visible feature is identifiable on the 1944 aerial image at this location which appears to have very different characteristics than the white areas of ground disturbance in surrounding areas (Figure 44). This feature cannot be ruled out as a further grave in this area, although the GPR responses from this feature are significantly different from the Area F features (for example the presence of mounded material) and the pit beneath the memorial complex (here a clear pit cut is visible in the 2D data).

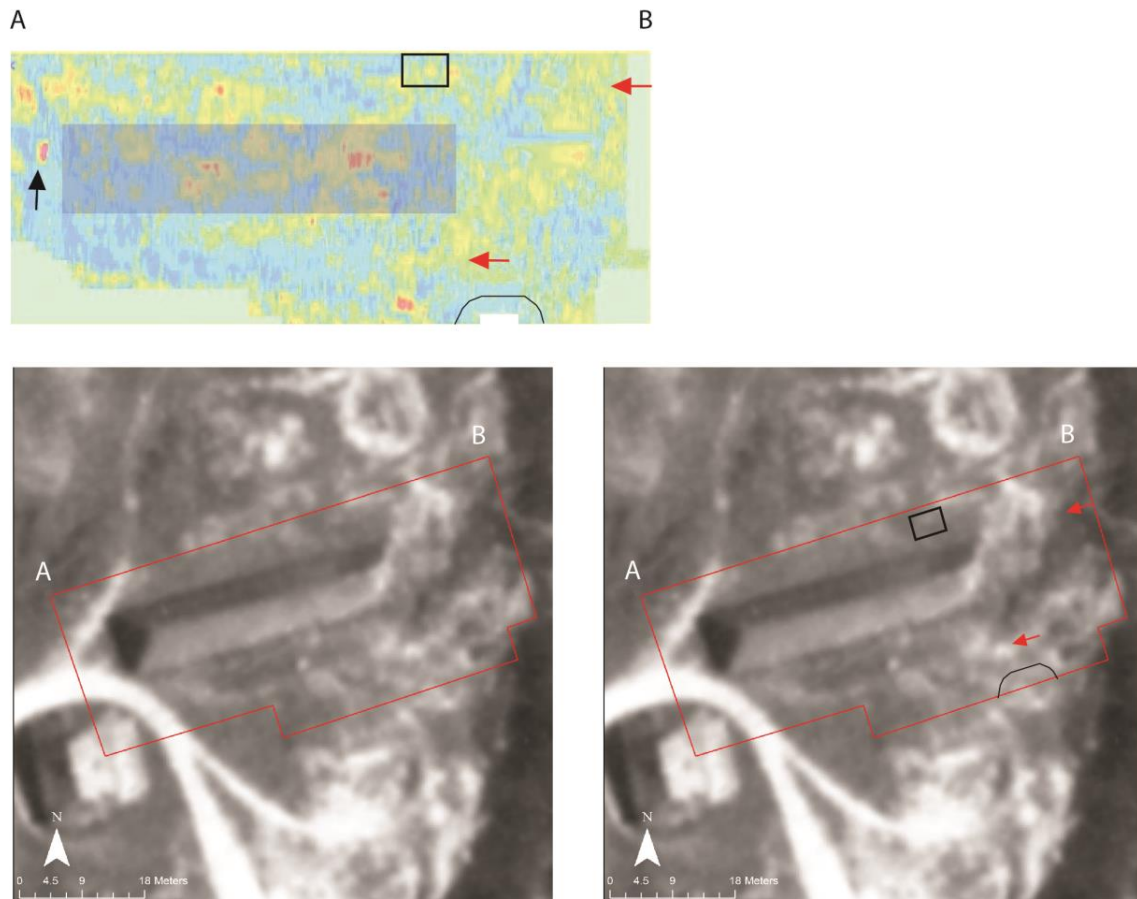


Figure 44: Features identified on the 3D timeslices overlain onto the 1944 aerial image. Copyright: The Centre of Archaeology, Staffordshire University

## 6. NEW JEWISH CEMETERY

### 6.1. Historical Review

Both the old and the new Jewish cemeteries in Rohatyn were subjected to desecration during the occupation of Rohatyn by the Germans. This resulted in the damaging and removal of the majority of the matzevot in both locations. Detailed information about this and about the current state of both sites has been provided by Rohatyn Jewish Heritage and so will not be repeated here.<sup>85</sup> However, it should be noted that, during the Holocaust, the Nazis carried out cultural genocide in Jewish cemeteries - in the form of toppling matzevot, removing them for use in building works and desecrating graves - as a means of erasing and persecuting Jewish communities.<sup>86</sup> Some cemeteries were also then subsequently used as execution sites.

Despite the damage in the Rohatyn cemeteries, it appears that burials still took place during the German occupation – though not in accordance with Jewish burial practices. Avraham Schtertzer recorded in the Rohatyn Yizkor book:

*“The cemetery soon began to fill up. Jews died without count and without statistics. Weak by nature, they weren't sick for a long time. After two or three days of illness they just died. Wagon-fulls were carried to the cemetery every day. People died without being wept over and mourned. It was hard to know what was preferable - to continue to live and suffer or the sooner the better to make an end of all the troubles”.<sup>87</sup>*

One witness testimony also alludes to the murder and burial of “22 Ukrainians, supporters of the Soviet regime” “on the Jewish cemetery” sometime in April or May 1944.<sup>88</sup> However, this testimony does not specify whether the old or new cemetery is being referred to. The RFP referred to one known testimony which suggests that there may have been a mass grave within the “new” Jewish cemetery to the north of Rohatyn. Given the current overgrown condition of the old cemetery and on the basis of the information regarding the new cemetery as the likely location for these burials, the main focus of the remainder of this investigation was the new cemetery.

### 6.2. Aerial Photograph Analysis

Aerial photographs from 1944 showing the terrain of the new cemetery shows the original rows of graves and several areas of exposed earth (Figure 45). By overlaying these images onto modern satellite imagery,

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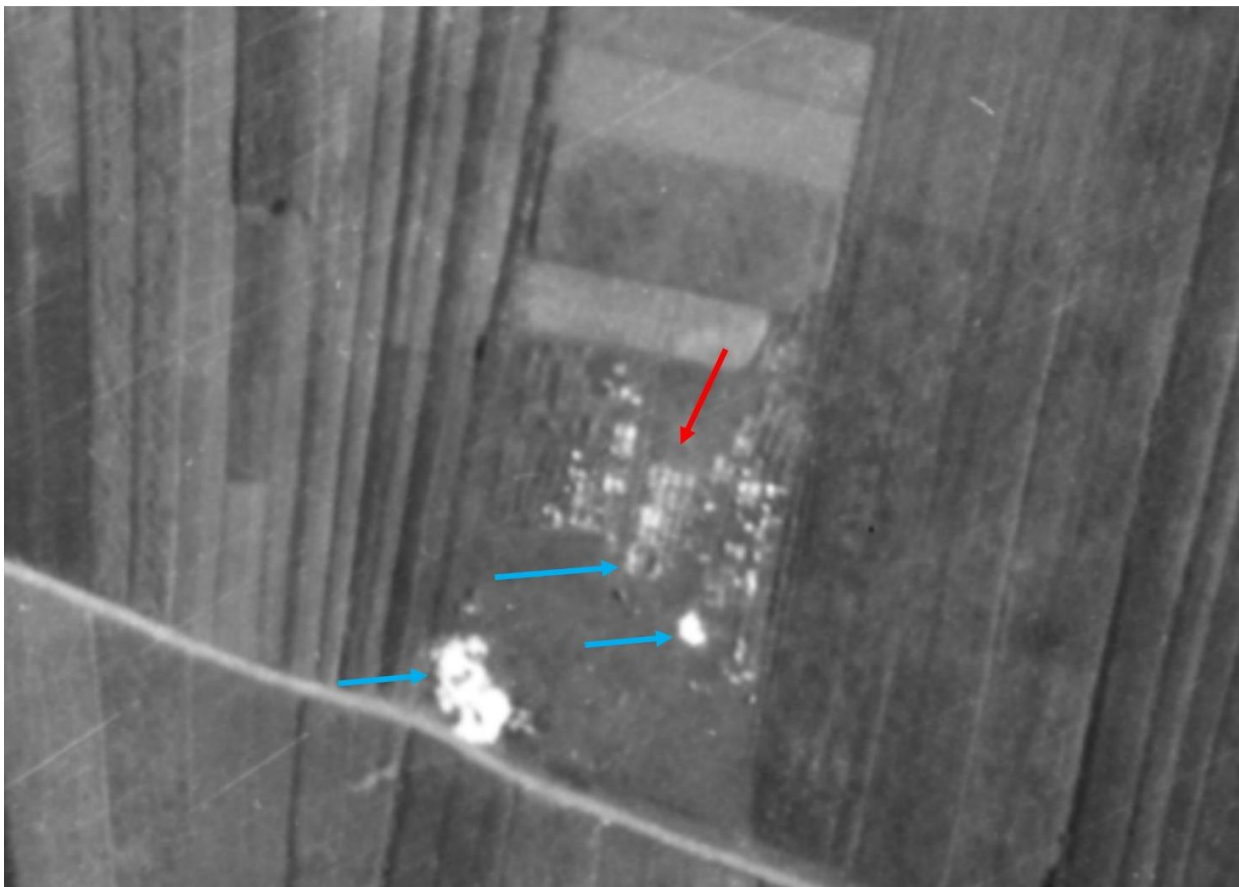
<sup>85</sup> [www.rohatynjewishheritage.org](http://www.rohatynjewishheritage.org)

<sup>86</sup> For an overview, see: Sturdy Colls, C. 2017. ‘The Archaeology of Cultural Genocide: A Forensic Turn in Holocaust Studies?’. In Dziuban (ed.), *Mapping the ‘Forensic Turn’: The Engagements with Materialities of Mass Death in Holocaust Studies and Beyond*, New Academic Press, Vienna. Also available at: <http://eprints.staffs.ac.uk/2791/1/Sturdy%20Colls%20-%20Cultural%20Genocide.pdf>

<sup>87</sup> Schtertzer, A. 1962. . "How Rohatyn Died" in Amihai, M. *The Community of Rohatyn and its Environs. Yizkor Book*. Available at: <https://www.jewishgen.org/Yizkor/rohatyn/roh032e.html#page40e>

<sup>88</sup> Witness statement of Onyfriy Brodovoy, USHMM, RG-22.002M

it is possible to determine that the current fence of the cemetery does not mark its former total area (Figure 45). As well as the clear row disturbances caused to the graves (red arrow; Figure 45), three other larger disturbances are visible (blue arrows: Figure 45). The largest area of disturbance measures approximately 21 x 11m and is located in the south-west corner of the cemetery in an area which is now situated outside the current boundary and under a pile of debris (Figure 45). The second area – measuring approximately 7 x 6.5m - is located roughly in the centre of the cemetery and is visible as a depression from on the aerial image. The third feature is located to the south east of the second feature and is roughly the same size. It is visible as an exposed area of earth. All three features are of interest for further survey work given the aforementioned testimonies provided by witnesses regarding the possibility of unmarked burials in the cemetery.



*Figure 45: 1944 aerial image of the new Jewish Cemetery site showing visible rows of graves (red arrow) and three distinct areas of larger disturbance (blue arrows). Copyright: The Centre of Archaeology, Staffordshire University*

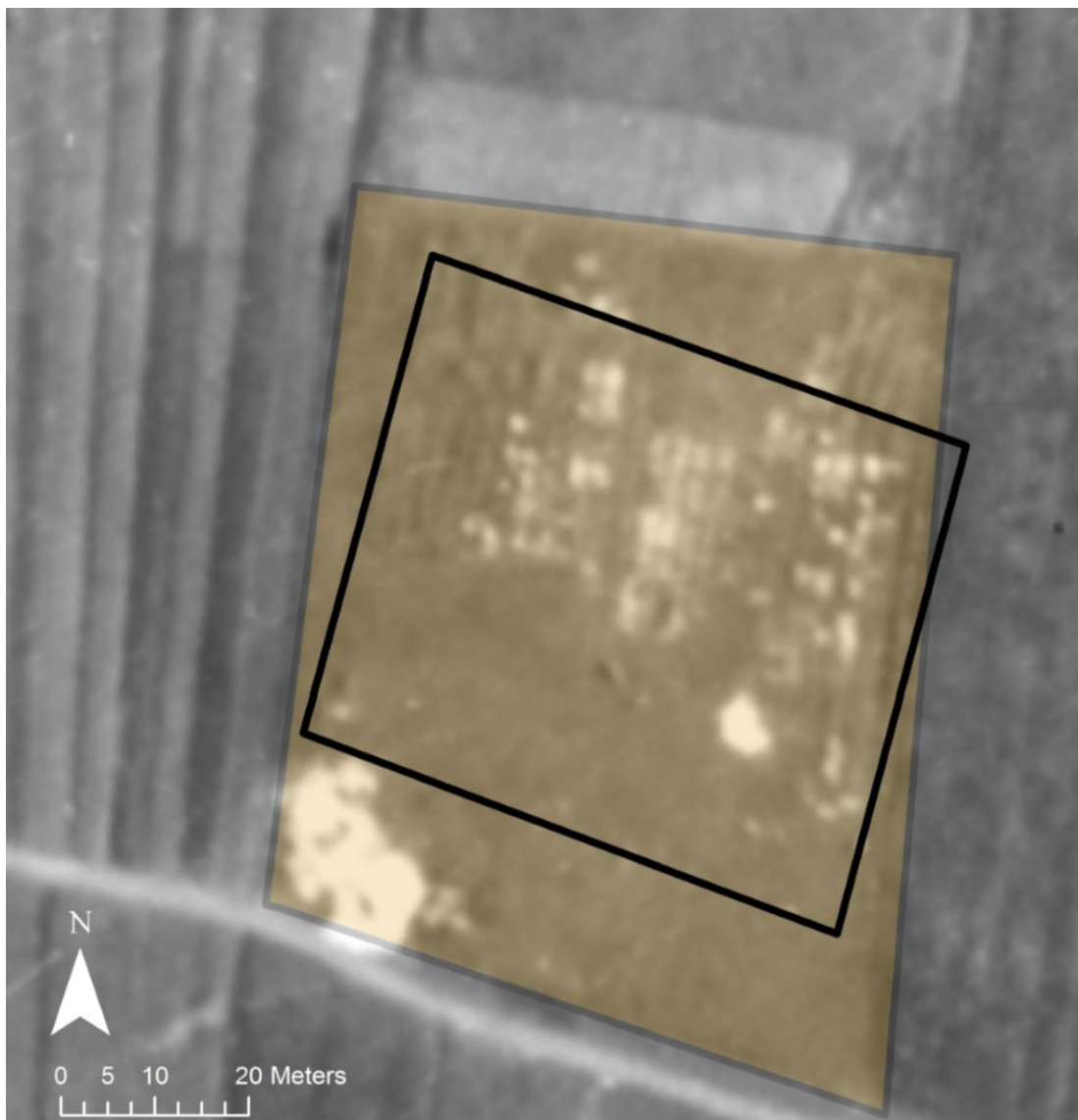


Figure 46: The present boundary of the New Jewish Cemetery (black square outline) overlain onto the 1944 aerial image showing the original limits of the cemetery boundary (yellow shading). Copyright: The Centre of Archaeology, Staffordshire University

### 6.3. New Jewish Cemetery

#### 6.3.1. Field Survey Area

Based on the project team's observations concerning cultural genocide and mass violence in other Jewish cemeteries in Europe, it was suggested that a survey of the new Jewish cemetery could likely reveal new insights into the crimes perpetrated against the Jewish community in Rohatyn and allow claims regarding mass graves to be investigated. If a mass grave(s) was identified, archaeological investigation would allow its exact perimeters to be established, thus allowing it to be marked and protected in the future. Much of the cemetery was cleared of vegetation to allow a grid to be established to allow for GPR and topographic survey (Figures 47 and 50), although the grid only covers approximately 60% of the original cemetery boundary as recorded from the 1944 aerial image (Figure 48).

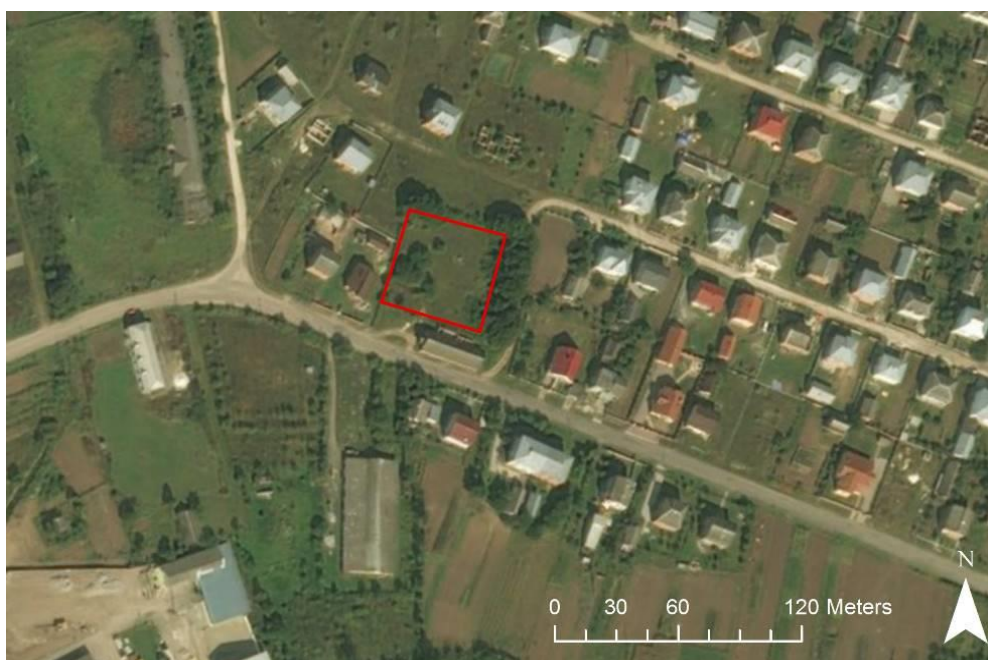


Figure 47: The GPR grid location at the New Jewish Cemetery site (red rectangle) illustrated over the current Google Earth image. Copyright: The Centre of Archaeology, Staffordshire University and Google



Figure 48: The GPR grid location at the New Jewish Cemetery site (red rectangle) illustrated over the original boundary of the cemetery (yellow shaded area). Copyright: The Centre of Archaeology, Staffordshire University and Google

When the grid location is overlain onto the 1944 image, only three of the large visible disturbances lie within this area (with the largest falling outside of the current boundary to the southwest; Figure 49).



*Figure 49: The GPR grid location at the New Jewish Cemetery site (red rectangle) illustrated over the 1944 aerial image. The Centre of Archaeology, Staffordshire University*



*Figure 50: A photograph of the New Jewish Cemetery looking south-east (Copyright: Centre of Archaeology, Staffordshire University).*

In the field, evidence of cultural genocide and mass burials within the cemetery was sought and recorded using a combination of photography, DGPS/Total Station recording and GPR (GSSI model collecting data along a 1m traverse interval). Photogrammetry methods were also employed to record surviving matzevot, some of which remain in situ, others which were discovered during the large-scale clearance work undertaken by Rohatyn Jewish Heritage and a team of volunteers from the Lviv Volunteer Center. GPR was then used to identify whether any mass graves exist within the cemetery area and to determine the locations of pre-war Jewish graves whose matzevot are predominantly no longer in situ. It is the intention that this work will result in data plots identifying the locations of any identified burials and coordinate information which would allow them to be marked in line with the Rohatyn Jewish Heritage project's aims.

The GPR survey at the new Jewish cemetery consisted of one large survey grid, measuring 50 x 42m (slightly smaller than the 50m by 46m as shown in Figures 47 and 48 due to areas of un-cleared vegetation along the southern edge of the cemetery. This grid was positioned so as to give the best possible coverage of the entire fenced cemetery area. Obstructions caused by trees and vegetation meant that small strips around the outer edges of this area on all sides could not be surveyed; hence it is not possible to comment on the presence of individual or mass graves in these areas. It was also not possible to survey the areas outside the existing cemetery boundaries (that originally formed part of the cemetery area, as shown above). Hence, the presence of graves in these areas cannot be confirmed or ruled out. The GPR survey was undertaken using a parallel survey methodology with a 0.5m traverse interval to provide highly accurate data collection and to account for obstructions that sometimes occurred at the end of survey lines.

### **6.3.2. Surface and Buried Remains**

The GPR 2D profile lines and the 3D timeslices from the cemetery have been provisionally analysed and further investigation is still underway as part of a PhD study. In general, the data is not easy to interpret given the difficult nature of the terrain during data collection and the high levels of ground disturbance across the site. However, a number of areas of interest have been identified and are summarised below.

Starting with the 3D timeslice data (birds eye view), at a depth of 0.3m, several anomalies were visible (Figure 51). A concrete area (reportedly of a former garage) located within the current cemetery boundary is clearly visible, as is an area of significant vegetation change (Figure 51). Two possible small pits are visible (brown and yellow features; Figure 51) with one close to the memorial commemorating the remains of 12 individuals who died during World War Two and who were re-buried in 2013 after being moved from the Church of the Nativity of the Theotokos. A general outline of a rectangular feature also appears to be visible within this area (encloses the two features described above), but it is unclear what this may represent and there is no visible disturbance in this area on the 1944 aerial image. There are no visible anomalies at any depth around the second memorial, although, given the quality of the data, this doesn't exclude the possibility that a feature may exist, particularly as an area of disturbance is present on the 1944 aerial photograph (Figure 45). A large area of disturbance is visible in the south-east corner of the survey area (grey area: Figure 51) which corresponds to the large white feature on the 1944 aerial image (Figure 45). One further strong signal response is visible in the north-west corner (green area), but these relate to the proximity of the cemetery boundary and trees at this location.

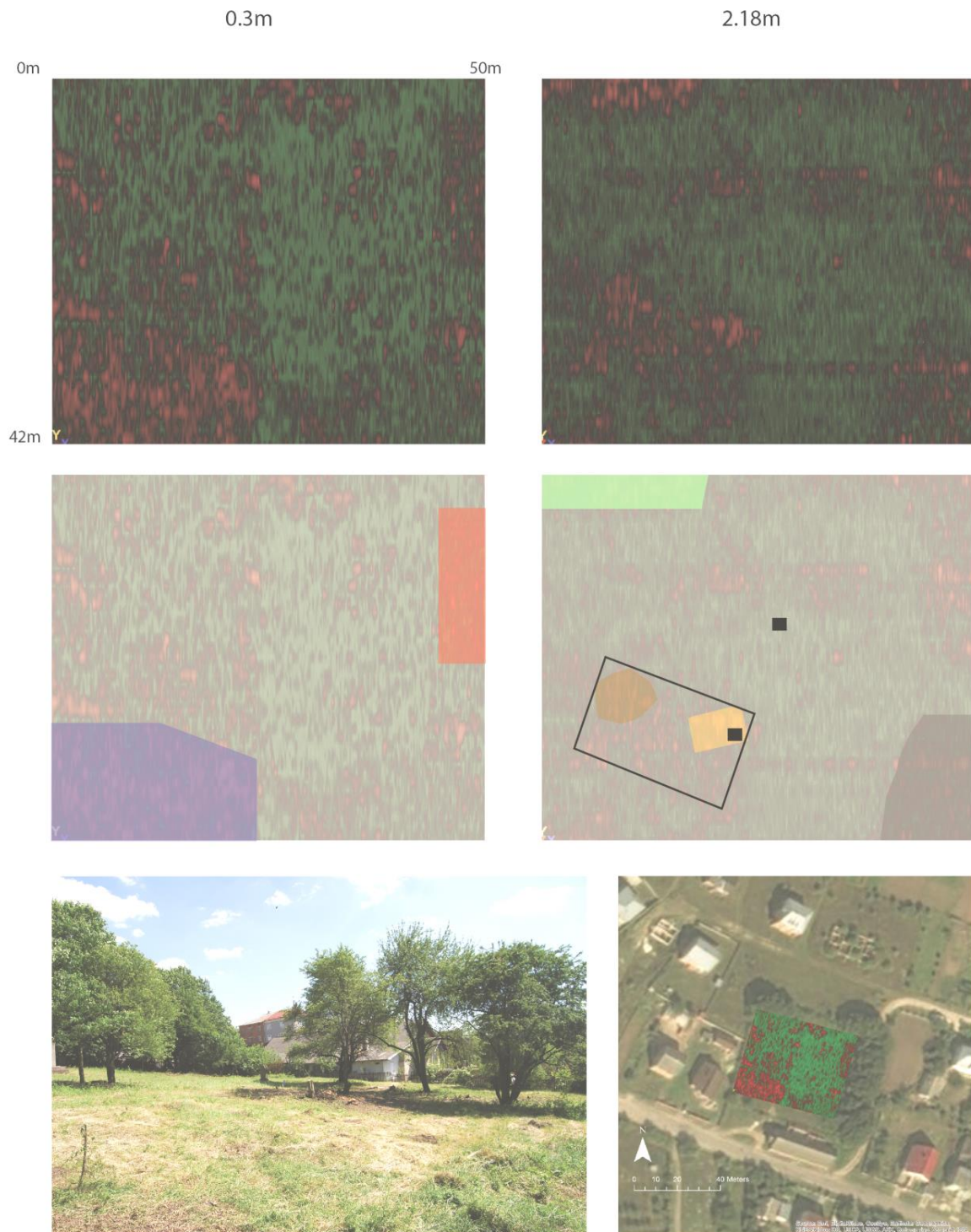


Figure 51: 0.3m and 2.18m timeslice plot of the new cemetery site (top), with feature annotation (middle), and a photograph and grid location image (bottom). The feature interpretation are: concrete (blue), vegetation change (red), area of general disturbance (grey), area of ringing from modern fence (green), memorials (black squares) two possible pits (brown and yellow) and a rectangular anomaly (black outline). (Copyright: Centre of Archaeology, Staffordshire University).

The 2D profile lines are still being analysed at the time of writing this report, but early indications are that individual graves are identifiable within the data, some located beneath visible matzevot, others with no marker stones. A full plot of these will be completed as part of the PhD study. Of particular note is the presence of two possible pits located towards the northern part of the site (Figure 52). These features don't appear to be cut from the current ground level so it is highly unlikely that these are modern features. These are not clearly visible in the 3D timeslices. It is possible that the ground level during the 1940s was significantly different across some of the site, so this may account for their appearance at a greater depth.

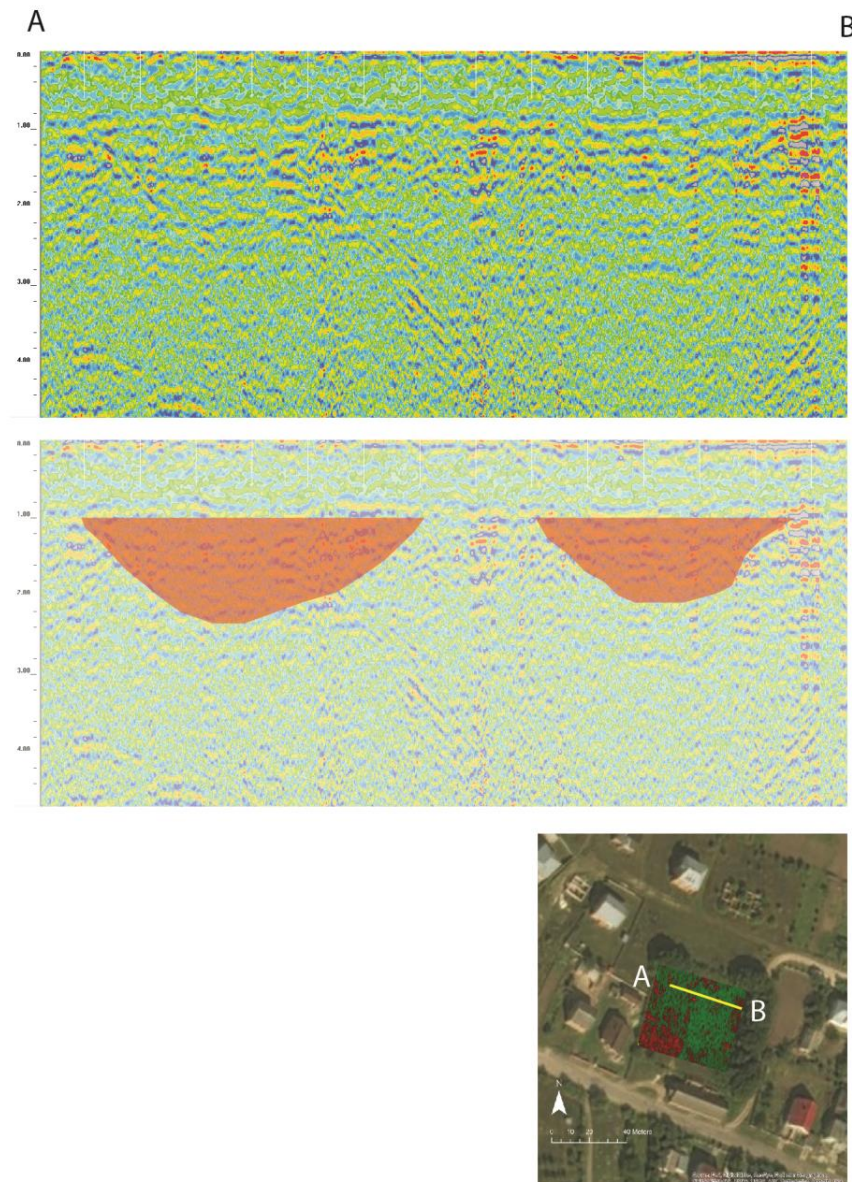


Figure 52: Section profile results from survey line 9m (top) with annotation (middle) and survey line location (bottom). The profile of 2 possible pit features are visible in the section (red) Copyright: The Centre of Archaeology, Staffordshire University and ESRI GIS base-mapping.

### 6.3.2. Old Jewish Cemetery

Although it was not in the original RFP or fieldwork proposal, photogrammetry was undertaken at the Old Jewish cemetery in order to test this method for documenting damaged matzevot. Image-based data collection was undertaken using a Canon Eos 5D Mark iv, full frame camera 30 Mpx resolution (5.36  $\mu$  pixel size) equipped with a Sigma Lens 20 mm F1.4 DG HSM and a Sigma Lens 50 mm F1.4 DG HSM. The camera network was planned in order to have a high percentage of overlap between images (70%-80%). The Expected Ground Sampling Distance (GSD) was between 2.5 and 6.5 mm. The image dataset was processed in Agisoft Photoscan software following the traditional photogrammetric pipeline. This included: image feature extraction, image feature matching (tie points) and external camera orientation retrieval, re-projection error filtering, GCPs positioning, camera optimization and dense image matching.

The images below show the models produced from this image-based data collection methodology. The inscriptions and damage on the matzevot have been enhanced using this technology and these approaches offer future possibilities for the creation of a digital database.



Figure 53: Matzevot stones modelled using photogrammetry techniques to highlight inscriptions and evidence of damage



Figure 54: Screenshots taken from digital 3D models produced from digital photogrammetry. These models are fully interactive and can be embedded on web based platforms and other websites

Interactive 3D versions of these models can be accessed at the following link:

<https://sketchfab.com/RohatynJewishHeritage>

## **7. DISCUSSION and CONCLUSION**

The investigation into the crimes perpetrated in Rohatyn and the application of archaeological methods has provided new insights into the fate of the Jewish population and the locations of probable mass burials. The historical review has allowed a wide range of source material to be gathered together for the first time and the project team hope that it will be of use to Rohatyn Jewish Heritage in their education programmes. During the archaeological fieldwork, at the south site, the location of one mass burial pit was confirmed and the project team engaged in essential recovery works to reinter human remains that had been disturbed by looters. At the north site, several complex sites were analysed, revealing the probable location of two mass burials outside of the area currently indicated by a memorial. Work at the Jewish cemeteries has begun to reveal important information about the destruction of these sites and has facilitated the production of high-definition 3D digital models of matzevot, thus preserving them by way of record. Further analysis of the GPR data from the new Jewish cemetery as part of a PhD project will undoubtedly reveal further information that can assist in virtually reconstructing the cemetery, confirming whether mass burials are present and increasing our understanding of the acts of cultural genocide carried out there. Important testimonies were collected from residents during the work who, having seen the archaeological team at work, were keen to share their stories. Again, it is hoped that this information along with that generated during all stages of the project can be used by Rohatyn Jewish Heritage to continue to raise awareness of the events that occurred in Rohatyn during the Second World War.

The survey in Rohatyn was, however, logistically extremely complex and this meant that it was not always possible to examine or generate data of adequate quality in all areas. The soil conditions, ground cover and recent uses of the sites meant that in all cases undertaking clearance works and GPR survey was very challenging (and in some cases impossible). This means that the aims of the project could not be fully achieved and some areas remain un-investigated. Hence, the presence of additional mass graves in these areas not accessed cannot be ruled out. Data analysis is ongoing in some areas and will continue until all possibilities have been exhausted. The application of alternative survey techniques may also facilitate access to additional areas in the future.

The survey in Rohatyn has demonstrated the benefits of applying a non-invasive approach to the investigation of Holocaust-era killing and burial sites and it is hoped that this work will inspire new commemorative and educational opportunities in the future. The team from the Centre of Archaeology are keen to continue to work with Rohatyn Jewish Heritage as they develop such initiatives. Once the remaining data processing and the PhD project about the Jewish cemetery is complete, a revised report will be submitted for dissemination.

## **8. ACKNOWLEDGEMENTS**

Thanks are due to Czelsie Weston and Dr Dante Abate from the Centre of Archaeology for their assistance during the fieldwork in Rohatyn and during the post-processing of the data. Thanks are also due to Marina Faka from the Cyprus Institute for her technical assistance in Rohatyn. The team is extremely grateful to Jay

Osborn and Marla Raucher Osborn from Rohatyn Jewish Heritage for inviting us to be part of this important project and for their assistance before, during and after the fieldwork. Thanks are also due to the Lviv Volunteer Center and local volunteers in Rohatyn for their assistance with clearing works ahead of the archaeological fieldwork and to the City of Rohatyn and the rabbinical authorities in Ivano-Frankivsk for granting permission and for offering advice on the works.

## 9. THE RESEARCH TEAM

### STAFFORDSHIRE UNIVERSITY

With a history of teaching, research and knowledge transfer dating back to 1901, Staffordshire University has a long and proven track record in undertaking pioneering research and providing informative, cutting-edge and stimulating training to a variety of audiences. The University has 16,000 on-campus students and a further 5000 distance and work-based learners. We have taken part in many successful international projects through funding programmes such as FP6/7, Horizon 2020, and Erasmus. The University hosts four faculties (Business and Law; Health Sciences; Computing, Engineering and Sciences; and Arts and Creative Technologies).

### CENTRE OF ARCHAEOLOGY

The Centre of Archaeology undertakes world-class research and consultancy in a wide range of archaeological and forensic subjects – all supported by cutting-edge equipment and facilities. Always striving to enhance archaeological practice, the Centre of Archaeology is currently undertaking pioneering work in the discipline of Holocaust Archaeology and forensic approaches to buried remains. It is a Registered Organisation (RO) with the Chartered Institute for Archaeologists and its staff are committed to complying with the highest standards in archaeological field practice. Staff at the Centre also work within the Forensic and Crime Science department, which was one of the first universities in the UK to be accredited by The Chartered Society of Forensic Sciences (formerly the Forensic Science Society) for high academic quality.

### PROFESSOR CAROLINE STURDY COLLS

This research is led by the Centre's Research Lead, Professor Caroline Sturdy Colls, a Professor of Conflict Archaeology and Genocide Investigation specialising in Holocaust studies. Dr Sturdy Colls' pioneering research focuses on the application of interdisciplinary approaches to the investigation of Holocaust landscapes. As part of this research, she has completed the first archaeological surveys of the former extermination camp at Treblinka (Poland), the sites pertaining to the slave labour programme in Alderney (the Channel Islands), the former Semlin Judenlager and Anhaltlager (Serbia) and killing sites in Adampol (Poland). Recently, she has also worked on a pilot project with the UK Holocaust Memorial Foundation (UKHMF) to map the terrain of Bergen-Belsen (Germany).

Professor Sturdy Colls is currently the Principal Investigator on three major research programmes focused on Holocaust and forensic archaeology. The first - *Recording Cultural Genocide and Killing Sites in Jewish Cemeteries* – is particularly relevant to the proposed research in Rohatyn since it aims to:

- (1) Conduct new research into relationships between the destruction of property by the Nazis and their collaborators, and the use of religious spaces as killing sites.
- (2) Undertake a series of “social action projects” at selected Jewish cemeteries where cultural and physical genocide occurred in the past, and where neglect and vandalism is occurring presently.
- (3) Disseminate the results of (1) and (2) via a state-of-the-art digital platform.

The second project - *Accessing Campscapes: Inclusive Strategies for Using European Conflicted Heritage* - seeks to offer new insights to interpret, evaluate and present the cultural dynamics of former Holocaust- and Communist-era camps. This project will utilise many of the non-invasive recording methods outlined in the proposed programme of work in Rohatyn, which have already been developed as part of earlier research programmes at Holocaust camps across Europe (as described above).

The third project - *Digital Forensic Archaeology* - will develop and apply novel digital recording methods from archaeology and games technology to complex criminal investigations with a view to improving the ways in which evidence at crimes scenes is presented in Court.

Professor Sturdy Colls is committed to both research and professional practice, as demonstrated by her commitment to various professional organisations and via publications. She is a member of the UKHMF Education Advisory Group, appointed by the UK Government and a member of the Forensic Archaeology Expert Panel. She undertakes forensic search and recovery work with UK Police forces, and is also a Member of the Chartered Institute For Archaeologists (MCIFA), and a Member (MCSFS) and approved assessor for the Chartered Society of Forensic Sciences (CSFS) University Accreditation Scheme. Dr Sturdy Colls currently supervises four PhD students studying a wide range of archaeological subjects including new survey and remote sensing methods, community archaeology, and dissemination and visualization methods. She also teaches on a range of Masters and Undergraduate programmes, and regularly engages in public outreach activities in the UK and abroad. She has published extensively in Holocaust and forensic archaeology. Her most recent monographs include *Holocaust Archaeologies: New Approaches and Future Directions*, and the *Missing Persons Handbook*. Her research has received international media attention via television documentaries and radio programmes aired in Europe and the US.

From August-December 2016, Professor Sturdy Colls was Visiting Fellow at the Jack, Joseph and Morton Mandel Center for Advanced Holocaust Studies at the United States Holocaust Memorial Museum. She has also held visiting fellowships at Goldsmiths College, London (Forensic Architecture Project) and Netherlands Institute of Advanced Studies (Terrorscape Project). She also acts as a Scientific Advisor for Kamp Westerbork, sits on the NWO Holocaust Archaeology Group and has been a Consultant for the Polish-German Reconciliation Foundation.

#### KEVIN COLLS

Kevin Colls is a professional archaeologist working for the Centre of Archaeology at Staffordshire University as the lead Archaeological Project Manager. Kevin has directed and published archaeological projects throughout the United Kingdom and Europe and holds over 15 years' experience in research and professional development-led archaeology. His specialist subjects include archaeological field techniques, urban archaeology and forensic archaeology.

Kevin's project portfolio includes major archaeological excavations in many of the UK's urban centres including London, Birmingham, Manchester and Bristol, archaeological survey and remote sensing on Scottish Islands, and rural archaeological surveys in central Greece. For the past eight years, Kevin has also worked closely with his wife (Professor Caroline Sturdy Colls) on a number of forensic research projects throughout Europe, including the aforementioned projects at Treblinka, Alderney and Staro Sajmiste. He is an active member of the *Recording Cultural Genocide and Killing Sites in Jewish Cemeteries* and *Accessing Campscapes: Inclusive Strategies for Using European Conflicted Heritage* projects, bringing his expertise in project management, archaeological field survey and the application of innovative non-invasive techniques to this research. He has also worked with numerous police forces as an external consultant associated with the search for buried human remains and is currently managing a diverse portfolio of major research and commercial projects. Of his current projects, the highest profile is the prestigious 'Dig for Shakespeare' Project in Stratford upon Avon. This globally important project focuses upon the excavation of the final residence of William Shakespeare (called New Place) and the house in which the Bard passed away. This project, and his work on the Scottish Islands, have led to two high profile appearances on television programmes for the BBC (Digging for Britain BBC2, and BBC Alba in Scotland) and the site was the focus of an hour-long Time Team special in 2012 (Channel 4). More recently, he has also been involved in an investigation of Shakespeare's Tomb using a wide range of advanced non-invasive survey methods and this research was the subject of a major Channel 4 documentary (Shakespeare's Tomb). Kevin brought this unique expertise to the Rohatyn Jewish Heritage Project and drew upon his experiences in applying state-of-the-art non-invasive methods to complex archaeological sites.

#### DANTE ABATE

In 2017, Dante began working at the Centre of Archaeology as a Marie Skłodowska-Curie Research Fellow on the "Digital Forensic Archaeology Project (Dig-For-Arch)". His background is in the humanities and he holds an undergraduate degree in the History of Art, a Diploma of Specialization in Protection and Valorisation of Historical & Artistic Heritage, a degree in Cultural Heritage and a Ph.D. in E-learning Development and Delivery, which he completed in 2009. Over the last decade, his research activity and professional practice has focused on applying 3D modelling techniques in the field of humanities and cultural heritage. He joined the Centre of Archaeology from the Science and Technology in Archaeology Research Center at the Cyprus Institute, where he was a Research Assistant. At Staffordshire, he is focused on the application of image-based and range-based techniques for archaeological and heritage documentation. He still continues to serve as Research Affiliate at the Cyprus Institute to work on joint projects. In 2008, he was a visiting scholar at The Institute for Advanced Technology in the Humanities (University of Virginia, USA, 2008) and a Research Fellow at the Italian National Agency for New Technologies, Energy and Sustainable Economic Development ENEA (2009-2015). In 2012, he was selected to participate in the 28<sup>th</sup> Italian Research Expedition in Antarctica to perform Terrestrial Laser Scanning surveys in the Terranova Bay area. He has published extensively on the subjects of archaeological site survey, laser scanning and 3D modelling.

#### CZELSIE WESTON

As part of an ongoing commitment to documenting Holocaust killing sites, Czelsie is currently undertaking a PhD focused on mapping and disseminating information about sites of mass violence that exist outside of Nazi camps (supervised by Professor Caroline Sturdy Colls). This doctoral project will explore several Jewish cemeteries in Poland and Ukraine along with a number of other potential mass execution sites. Czelsie's ongoing research in this field made her an invaluable member of the project team.

## APPENDIX 1 – Overview of grave testimonies and the results of the forensic investigations

### Southern Mass Grave Site. 20<sup>th</sup> March 1942

Size, Number of Pits and Date	Numbers of people	Location of the mass graves	Archaeological Evidence
Middle of February 1942.  ....two gigantic pits forty metres long, twenty metres wide and very, very deep. - <b>Tsvi Wohl</b>	<i>The road from the center of the town to the graves was littered with hundreds of corpses of people who had been shot, crushed or frozen by the cold weather. - <b>Tsvi Wohl</b></i>	<i>....beside the brickyard, in front of the area of the train station, to the left, lie our dear loved ones, the thirty – three hundred victims of the first ‘action’. - <b>I. Lewenter</b></i>	The forensic survey of the southern mass grave site has proved successful in identifying one probable mass grave which is mainly situated between the two current memorials. The grave, although difficult to ascertain the shape in plan from the GPR data, measures at least 33m by 20m and is generally ovoid in shape. The deepest point clearly identified from the data is 3.5m, although it is possible that the pit is deeper than this. The discovery of human remains in this area also confirms the presence of burials in this location. The survey also concluded that the modern road does not exactly match the contemporary road visible on the aerial images from the 1940s.  The survey also identified the presence of modern pits within the area of the probable grave.  It is likely that the northern memorial at this site is not directly situated over the grave, but the southern memorial certainly is partially over its location.
February 1942. ....two huge pits not far from Rohatyn. - <b>Regina Hader Rock</b>		<i>....on Putiatynce mountain by the brick factory. - <b>Brodivoy Onufriy</b></i>	
September and October 1941. .... Germans ....dug ditches for defence purposes.... (but these ditches were for graves, as we found later). - <b>Jack Glotzer</b>	<i>There were about 3,000 people dead. - <b>Jack Glotzer</b></i>	<i>....This place was about 4km (2-2 ½ miles) from our town. ....On the way to this place (where the ditches were) we had to gather the dead people who were shot in the ghetto. .... When we finally came to the area where the ditches were, we could not believe our eyes at what we saw. -<b>Jack Glotzer</b></i>	
<i>.... Big pit, 50 meters long and five metres in width and depth. We thought that the pit was needed for a tile factory. - <b>Abraham Sterzer</b></i>	<i>Three thousand adults and six hundred children were murdered and buried in the mass grave on that Friday. - <b>Abraham Sterzer</b></i>	<i>....All the dead were buried in a mass grave behind the railroad station. - <b>Abraham Sterzer</b></i>	
The pits were: Twenty meters long, fifteen meters wide and three meters deep. - <b>Aryeh and Cyla Blech</b>		<i>....not far from the railway station in the direction of Putiat[ntsy] -<b>Blek Tsilia</b></i>	
<i>....pits fifty meters long and five meters wide and deep. - <b>Rosette Faust</b></i>			

## Northern Mass Grave Site. 6<sup>th</sup> June 1943

Size, Number of Pits and Date	Numbers of people	Location of the mass graves	Archaeological Evidence
....People were driven naked to the pits that had prepared the day before near the new Jewish cemetery (on the way to Perenowka, beside the monastery). ....beside the pits they had to wait their turn to be shot. This lasted three days. On the second and third days, Jews were forced to dig their own graves.... - <b>Rachel and Moshe NasHofer</b>	Around 3000 people, the remaining inhabitants of the ghetto, were executed. - <b>Abraham Sterzer</b>	Graves located near the hospital. - <b>Rita Khader, Brodovoy Onyfry and Tsilia Blek</b>	The forensic investigation at this site identified two buried features that most probably represent graves. The first is located behind the greenhouses close to the former quarry slope (Survey Area F). A long, trench-like pit exists at this location which measures 26m long and 4.5m wide. The feature limits goes beyond the survey grid and appears to run beneath the temporary animal shelters, and ends within survey area G. Therefore in total, this feature is potentially c.40m in length.  The second pit was identified beneath the current memorial in survey area G. As this is only visible in the 2D profile data, the dimensions can't be ascertained at this time.
		Existence of the polish monastery and Jewish cemetery nearby. <b>L. Zahav</b>	Further buried pit features were identified in areas A, F and G, but it is more likely that these are modern features.

### Overview of Testimonies

Tsvi Wohl – A teacher who was interned in the Rohatyn ghetto from 1941 to 1943. Eye witnessed the shootings and round-up in the town in March 1942.

Regina Hader Rock – Regina lived in the ghetto and survived the liquidation. Forced to assist with the pit digging, and then went into hiding. Also involved in post-war prosecution of perpetrators.

Brodovoy Onufriy – Present in Rohatyn but didn't directly witness the killings.

Jack Glotzer – Visited the south and north mass grave sites immediately after the executions. Did not witness killings directly.

Abraham Sterzer – He was in the ghetto for the early killings. Escaped before the final ghetto liquidation. Unclear if any of the killings or burials were witnessed directly

I. Lewenter – His son was in the ghetto. He went to the USA and went back after the war to visit the south grave site.

Aryeh and Cyla Blech – Hid to survive the liquidation of the Rohatyn ghetto. There at liberation. Described the round ups but not clear if they directly witnessed the killings or the burials.

Blek Tsilia – Lived in Rohatyn and listed as survivor in USHMM record

Rosette Faust – Provides a second hand account of the pits being dug and witnesses the March round-ups in the town.

Rachel and Moshe NasHofer – Rachel was deported on the 6<sup>th</sup> Dec 1942 and jumped from the train and hid in a cellar (unclear where). Moshe survived in the forest with his son after the death of his first wife.

Rita Khader - Lived in Rohatyn and listed as survivor in USHMM record

L. Zahav – Holocaust survivor from Rohatyn who translated the Yizkor book.