



Historical UXO Research

Research Conflict Period

Rapportage

Project number: GPR10934
Version: 3.0 Definitive
Research area: UXO extension HV-cable
routing HGB

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SAMENVATTING EN LEESWIJZER

Bij Hoogebrug in Winschoten worden grondversturende werkzaamheden uitgevoerd. Omdat mogelijk aanwezige Explosieve Oorlogsresten / Niet-ontplofte Ordeningen (verder "explosieven" of "UXO") een risico vormen voor de werkzaamheden, is het van belang dat de kans op het aantreffen van explosieven binnen het onderzoeksgebied wordt onderzocht. Om die reden is het huidige Historisch UXO Onderzoek uitgevoerd.

Research layout

Dit onderzoek is uitgevoerd conform de richtlijnen van het Certificeringsschema "Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten" versie 2023-01 ("CS-VROO") dat op 1 november 2023 is uitgegeven. Daarnaast hebben wij ons gehouden aan de meest recente inzichten en inzichten die van toepassing waren tijdens dit onderzoek. Daarmee voldoet dit rapport ook aan de richtlijnen zoals gesteld in het WerkveldSpecifiek Certificeringsschema Opsporen Conventionele Explosieven (WSCS-OCE) / WorkfieldSpecific Certificate Detection Conventional Explosives¹ Daarnaast voldoet dit rapport aan de aanvullende richtlijnen zoals gesteld door Arcadis.

Een volledig vooronderzoek conform de CS-VROO bestaat uit twee delen, voorhistorisch onderzoek voor het conflicttijdperk en voorhistorisch onderzoek voor het postconflictijdperk. Voorhistorisch onderzoek kan een of beide delen bevatten. Dit rapport omvat voorhistorisch onderzoek voor het conflicttijdperk. Dit betekent niet dat naoorlogse ontwikkelingen volledig zijn uitgesloten, ze zijn echter slechts oppervlakkig bekeken. Alleen wanneer naoorlogse ontwikkelingen, op basis van dit beperkte onderzoek, aanleiding geven tot een wijziging van de conclusie, worden ze meegenomen in de analyse, conclusies en afbakening. In Bijlage 5 worden de onderzoeksopzet, de onderzoeksmethode en de uitgesloten bronnen beschreven en worden de experts die het onderzoek hebben uitgevoerd, opgesomd.

Conclusie van de onderzoekconflictperiode.

De inventarisatie en analyse van het bronmateriaal heeft geleid tot de conclusie dat er aanwijzingen zijn voor de aanwezigheid van explosieven binnen het onderzoeksgebied. Het onderzoeksgebied is daarom deels verdacht gebied. Zie het gedeelte van de Bodem UXO-risicokaart OO Conflictperiode op de volgende pagina. De hoge-resolutiekaart is te vinden in Bijlage 1.

¹ Met ingang van 1 januari 2021 is het WSCS-OCE vervangen door het Certificatieschema voor het Opsporen van Ontplobbare Oorlogsresten (verder "CS-OOO"). In deze wetgeving zijn echter geen richtlijnen opgenomen voor het uitvoeren van voorlopig historisch UXO-onderzoek. In plaats daarvan werd het certificatieschema "Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten" (CS-VROO) opgesteld. In deze wetgeving zullen richtlijnen voor het uitvoeren van voorlopig historisch UXO-onderzoek worden vastgelegd. In november 2023 is een update van de CS-VROO geïmplementeerd.



Uittreksel uit Bijlage 1 (De Bodem UXO-risicokaart OO Conflictperiode). De blauwe contour geeft de grens van het onderzoeksgebied aan. Het verdachte deel is rood gemarkeerd. Groen geeft aan dat het gebied onverdacht is. De kaart wordt in hoge resolutie weergegeven in Bijlage 1.

Afhankelijk van het bronmateriaal kunnen de volgende soorten explosieven in verdachte gebieden worden verwacht:

- Afgevuurde artilleriemunitie met een kaliber van 20 mm (geallieerd), vanaf de grond tot een diepte van 0,3 m onder de grond.

Voor een verdere toelichting op de conclusies, zie Hoofdstuk 6 en kaart Bijlage 1. Deze Bijlage toont de Bodem UXO-risicokaart. De verdachte gebieden hierin zijn gelabeld met het nummer van het subgebied. Details van elk verdacht subgebied zijn te vinden in Hoofdstuk 6.

Aanbevelingen voor verdachte gebieden

Wanneer graafwerkzaamheden gepland zijn in een verdacht deelgebied, zijn over het algemeen verdere veiligheidsmaatregelen nodig in verband met de geplande werkzaamheden en het toekomstige gebruik van het land. Het wordt aanbevolen om een UXO-onderzoek (UXO-detectie en -benadering van UXO) uit te voeren. Dit kan worden gedaan vóór of tijdens reguliere werkzaamheden in een verdacht gebied (zie rode gebied op de kaart in Bijlage 1). Dit wordt aanbevolen voor delen waar graafwerkzaamheden gepland zijn binnen een verdacht gebied.

Een UXO-onderzoek vindt plaats in verschillende fasen (zie verdere uitleg in hoofdstuk 7). Er moet rekening mee worden gehouden dat de voorbereiding doorgaans één tot twee weken in beslag neemt. De verkenning zelf zal naar verwachting in de orde van grootte van één of enkele dagen in beslag nemen, waarna het gebied explosievrij kan worden verklaard. Daarna kunnen de geplande werkzaamheden normaal worden uitgevoerd.

Aanbevelingen voor onverdacht gebied

Bode versturende werkzaamheden binnen het onderzoeksgebied kunnen normaal worden uitgevoerd.

Houd er rekening mee dat het een contra-indicatie is als er tijdens de geplande werkzaamheden onverwacht explosieven worden aangetroffen. In dat geval moeten de principes mogelijk ter plaatse worden aangepast.

Leeswijzer

Informatie in dit rapport is te vinden op de volgende plaatsen:

Achtergrond van het onderzoek

Hoofdstuk 1 beschrijft de achtergrond en het projectdoel van het onderzoek.

Onderzoeksgebied

Het onderzoeksgebied wordt beschreven in Hoofdstuk 2. Dit omvat een beschrijving en een weergave ervan in een kleine topografische kaart. Bijlage 1 toont een topografische kaart van het onderzoeksgebied in hoge resolutie.

Aanbevelingen

De samenvatting van de aanbevelingen op basis van het onderzoek zijn uiteengezet in de managementsamenvatting hierboven. Hoofdstuk 7 licht enkele aspecten van de aanbeveling toe en werkt deze uit. Deze zijn gebaseerd op de verkorte risicoanalyse in Hoofdstuk 5.

Conclusies

De conclusies van het onderzoek zijn samengevat in de managementsamenvatting hierboven en weergegeven in de Bodem-UXO-ricocokaart in Bijlage 1. In kaart Bijlage 1 worden de onverdachte gebieden in het groen weergegeven en de verdachte gebieden in het rood, voorzien van een label met het nummer van het verdachte deelgebied. Voor elk verdacht deelgebied worden in Hoofdstuk 6 details gegeven over de maximale diepte en van welk type explosieven het gebied wordt verdacht. Een nadere toelichting hierop is te vinden in Hoofdstuk

4. De conclusie voor elke gevonden gebeurtenis/oorlogsdaad is ook opgenomen in de tabellen in Bijlage 3.

Gevonden bronmateriaal en analyse

Het relevante gevonden bronmateriaal, waarop de conclusies zijn gebaseerd, is weergegeven in de tabellen in Bijlage 3. Voor elke gebeurtenis/oorlogsdaad is een analyse opgesteld met bijbehorende conclusies.

Geraadpleegde bronnen

De geraadpleegde bronnen zijn vermeld in Hoofdstuk 3. Een beschrijving van elke bron, de betrouwbaarheid ervan en de geraadpleegde documenten zijn vermeld. Indien relevante informatie is gevonden, is deze uitgewerkt in de gebeurtenissenlijst in Bijlage 3.

1 THE RESEARCH

ARCADIS Nederland B.V. ("client") has issued a written assignment to T&A Survey ("T&A") on December 7th, 2023, for carrying out the historical preliminary investigation into the presence of explosives / Explosive War Remains / Unexploded Ordinances (further "explosives" or "UXO") at the project 'UXO extension HV-cable routing HGB'.

1.1 BACKGROUND

At Hoogebrug in Winschoten, ground disturbing work will be done. Because of these activities, a preliminary examination of the presence of explosives has to be carried out. The client wishes to gain insight into the possible presence of UXO.

The possible occurrence of explosives in the Dutch soil generally relates to war operations during the Second World War ("WWII"). Examples of this include bombings, battles (May 1940, Liberation 1944-1945), defence works (mine fields) and dumpings (hiding ammunition from the enemy upon surrender or withdrawal). As any UXO present a risk to the work to be carried out, it is important that the risk of finding explosives in the research area is investigated.

1.2 PROJECT AIM

A full preliminary investigation in accordance with the CS-VROO consists of two parts, preliminary historical research for the conflict period and preliminary historical research for the post-conflict period. Preliminary historical research can contain one or both of these parts. This report entails preliminary historical research for the conflict period. This does not mean that post war developments are completely excluded, they have, however only been looked at superficially. Only when post war developments, based on this limited research, will cause an amendment of the conclusion, they are taken into account for the analysis, conclusions and demarcation.

The preliminary historical research for the conflict period aims at assessing whether there are indications that UXO are present within the research area, and if so, to delimit the suspect area. This is done based on collected and analysed (historical) factual material.

1.3 RESEARCH LAYOUT

This research has been conducted in accordance with the guidelines of the Certificatieschema "Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten" (Certificate 'Historical preliminary research and risk analysis of Explosive War Remains') version 2023-01 ("CS-VROO") that was issued on November 1st 2023. Also, we have adhered to the most recent views and insight as applicable during the course of this research. As such, this report also complies with the guidelines as stated in the WerkveldSpecifiek CertificatieSchema Opsporen Conventionele Explosieven (WSCS-OCE) / WorkfieldSpecific Certificate Detection Conventional Explosives. Next to that this report complies with the additional guidelines as stated by Arcadis.

In Appendix 5 the research layout, the research method and the excluded sources are described and the experts that conducted the research are listed.

2 THE RESEARCH AREA

2.1 RESEARCH AREA CONTOURS AND BUFFER

Geographical location and size research area

The research area consists of the fields around the B. Haitzemastraat at Hoogebrug in Winschoten, between the Pekel-Aa in the south and just past the railroad in the north, municipality Oldambt.

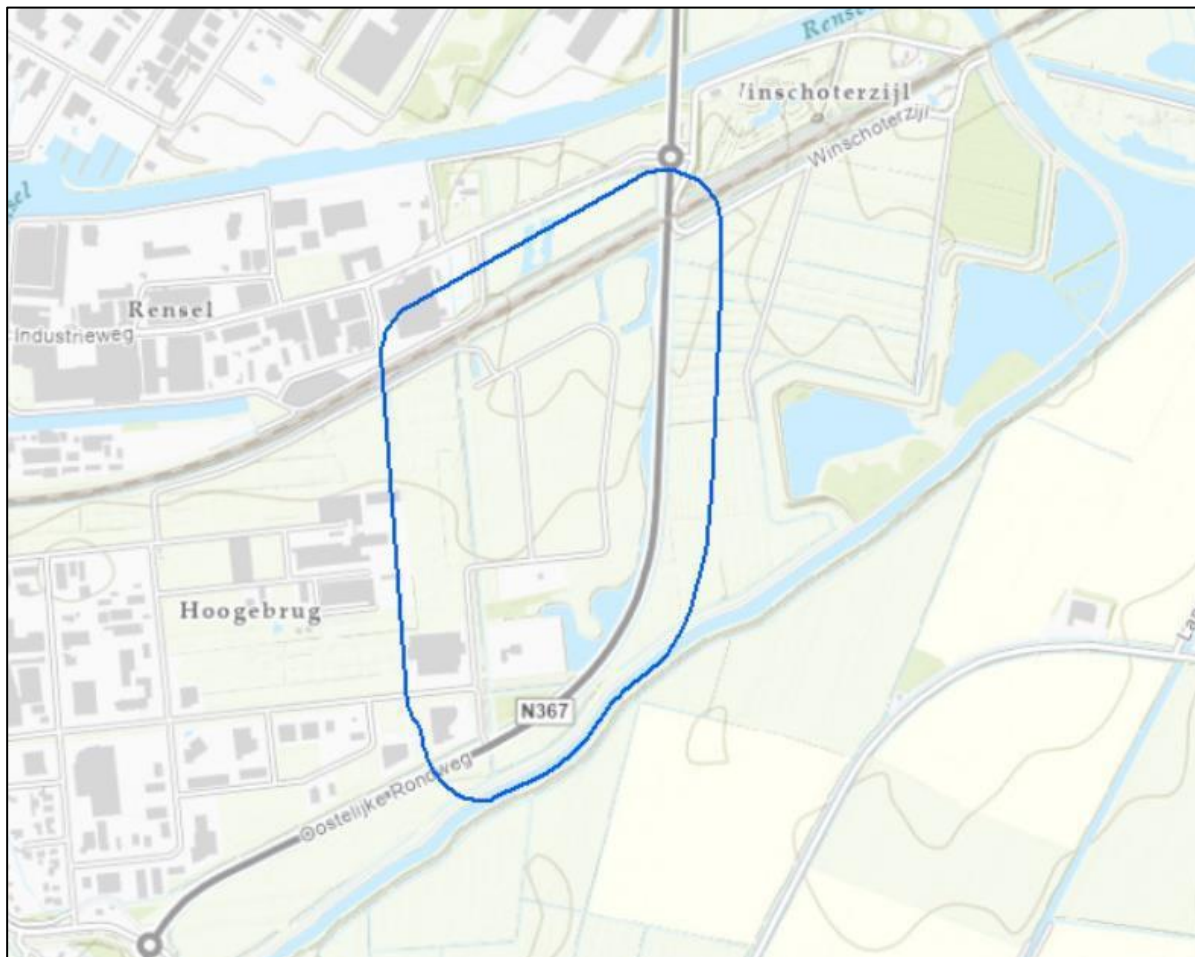


Figure 2.1-I. Overview map of the research area (blue contour).

Soil composition

The soil of the research area consists mainly of clay with sand below and occasionally some peat layers.

Buffer around the research area

For this research not only the war events with the research area were taken inventory of as well as analysed, but also similar events that occurred outside of the research area that could affect the conclusions for the research area. For this, the following (minimal) distances apply:

- 100 meter applies for defence works (trenches, manholes, bunkers, (gun)positions, minefields, etc.). These kinds of indications could be cause for the expectation of explosives within a short distance of the structure, generally up to 25 meters. Even with an error for precisely placing the structure's location, this will never exceed 50 meters. As such a buffer of a 100 meter is more than sufficient. NB. These kinds of structures could also provide clues for other war events like bombings and artillery fire. In case of these events, the appropriate radius for those events will be used and thus a larger buffer than a 100 meter will be used.
- 250 meter applies in the event of bombings, artillery fire, rocket attacks, airplane crashes, destruction and cleared explosives (MMOD and EODD) for (parts of) populated areas at the time of these war events. The reason for this, is that these kinds of events are generally recorded with a high level of details for populated areas. Generally, possible suspect areas for these types of events are no larger than 181 meter from the location of the war event (for bombings with a pin point target).
- 500 meter applies in the event of the same war events as stated above, but for low populated areas. Outside of these populated areas there is a higher chance that individual hits are not reported. For example, because only the hits near houses and roads are reported and not hits in the middle of meadows or fields. Also see the last bullet in this recount.
- 1.500 meter applies when dealing with exploded ammunition depots or trains, designated explosion points (holes) and for targets from RAF bombings where coordinates were used (due to the limited accuracy). When dealing with exploded ammunition depots or trains and designated explosion points, thrown ammunition can generally be found within a 900 meters radius, but generally not further than approximately 1.100 meters. Four-point coordinated as given by the RAF represent an area that is a thousand by a thousand meters squared. For all of these situations, a 1.500-meter buffer is sufficient to include all the relevant notifications.
- For all of the forementioned points it also has to be taken into account that when a source mentions a war event without a (detailed) location, but it is reasonably to assume that it could have occurred within the research area or within the indicated buffer zones, that it will be added to the inventory of historical facts. This will also be done when it turns out that additional sources do provide a detailed location and the war event proves to have occurred outside of the buffer zone. These types of events are for example derived from the "Verliesregister" (Airplane loss register), where locations of crashed planes are generally mentioned only in broad terms and in (close) proximity to towns or cities. Also, when damages inflicted by bombings are mentioned but without a specific location, will they be added to the inventory.

2.2 INFORMATION PROVIDED BY THE CLIENT

The client has provided T&A with the following information.

Maps

The client has provided T&A with a digital topographical map with RD-coordinates (GIS-format) indicating the research area.

Available information on soil composition

The client did not provide any information about the soil structure in the research area.

Post-war activities

The client has not provided information about post-war activities within the research area.

2.3 FORMER RESEARCH

In the table below it has been indicated with what organisations inquiries have been made about former UXO research. The column 'source indication' provides the abbreviation used in the chronological list in Appendix 3 to indicate the mentioned report. Research previously done by T&A is not stated in this table but will be used during the research. Field research done by T&A will be stated in this table when applicable.

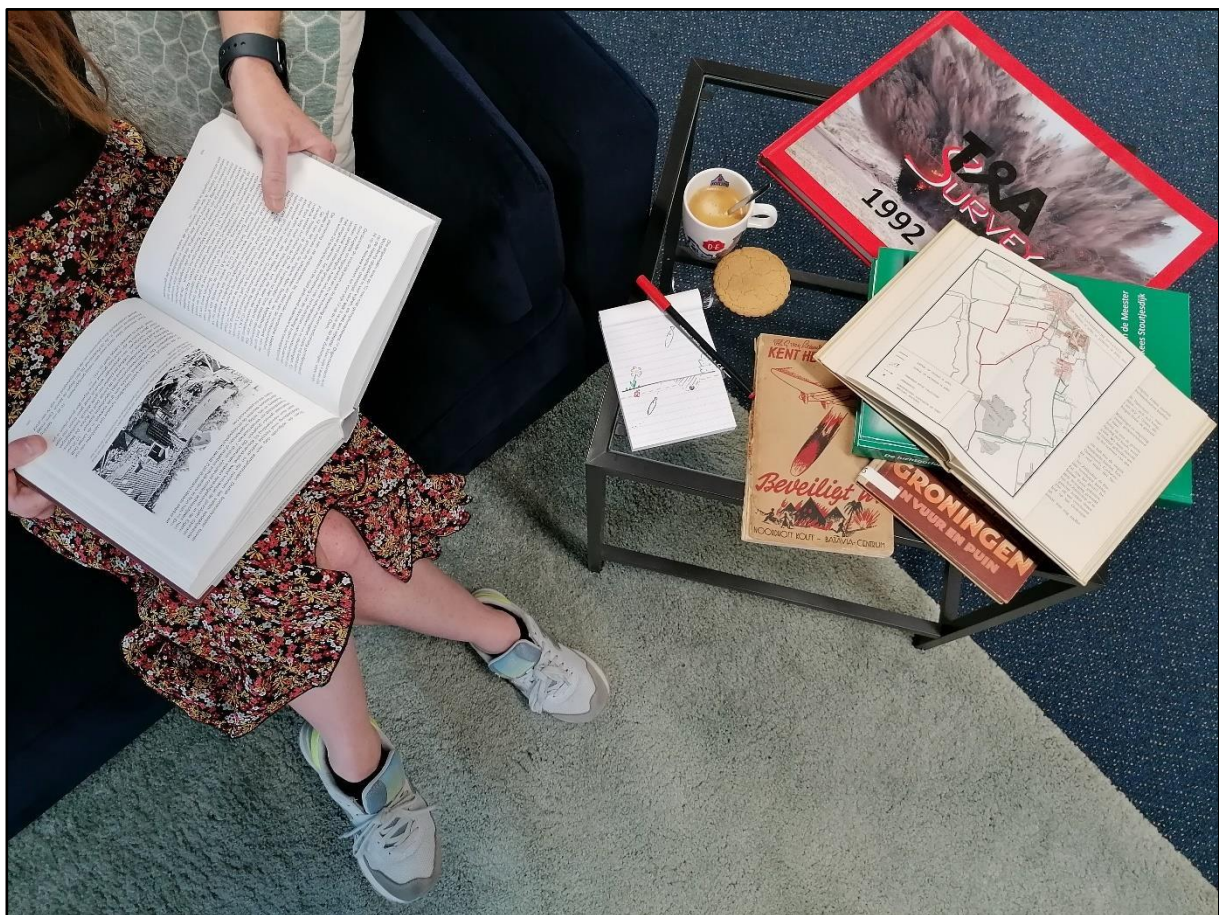
Client – dhr. N. Peters per e-mail d.d. 11-01-2024	Source indication
No reports from third parties supplied.	N.a.
Municipality Oldambt	
No reports from third parties supplied.	N.a.
ProRail	
For relevant report see under 'client' above	N.a.
Rijkswaterstaat	
No infrastructure from RWS present.	N.a.
Province	
No infrastructure from province present.	N.a.
Waterschap	
Not consulted.	N.a.
Via VEO Bommenkaart	
Vooronderzoek, R-430300 Groningen-Nieuweschans, AVG, report 1662087-VO-02, d.d. 14-04-2017	AVG

T&A has looked through the named report for relevant information coming from reliable sources. If the report has information that wasn't already retrieved during the inventory phase as carried out by T&A, the original source was consulted. Whenever it wasn't possible to consult the original source, or the report itself had to be considered the original source (for example in case of a Report of Completion of an explosives research) the information was taken from the report and is referred to in annex 3.

3 PHASE 1: INVENTORY OF SOURCE MATERIAL

The source material (literature, archives, etc.) is studied for relevant facts and clues which can be used to make a relevant selection of the available aerial photographs. All reliable sources with added value are important for further analysis, conclusions and delimitation of (non) suspect areas. The following paragraphs give an overview of the various sources that can be consulted in historical research. Each paragraph describes a source, including:

- General source information with an indication of to which extend the source is mandatory or supplementary according to the CS-VROO;
- An explanation of the reliability of the source;
- An overview of the material consulted for this research, with details of the inventories, access numbers, etc. based on which the sources are traceable;
- If a source has not been consulted, or in case there are gaps (lacuna), it is listed below the surveyed inventory table;
- The relevant events found in the source material are not elaborated in the relevant paragraph but in one chronological summary table in Appendix 3.



Reliability of the sources

According to the guidelines of the CS-VROO it must be reported how the reliability of the used sources is assessed. The standard T&A guidelines are listed per source type in the relevant paragraph in this chapter. When the report deviates from this internal directive, this will be recorded in the report and substantiated by the source material analysis in Appendix 3. Additionally, events from sources that T&A considers reliable do not require confirmation from a second source. As a rule, T&A will consult a second source, if possible, as this may lead to a better demarcation of a suspected area.

Analysis of the sources

Based on the consulted sources, Appendix 3 presents a chronological summary table of relevant events in (the vicinity of) the research area during and after WWII. In this table, each event is provided with a unique tag number and source reference. The "tag number" column refers to the tag number, the column "archive" to the archive from where the information is derived, while the "source reference" column refers to the origin of the information within the given archive.

Tag numbers

Each relevant notification of war activity is marked with a tag number in the chronological table in Appendix 3 and in the inventory map in Appendix 4.

The addition "indicative" to the tag number indicates that the notification can't be accurately positioned and its location on the inventory map is indicative. An indicative tag number may also be shown in the map as a text plane. No additional marking means the notification could be positioned (relatively) accurately.

In some cases, a notification proves to be located outside the research area, but one or more sources imply that the event might or may have occurred in or near the research area. These events are included listed in Appendix 3, including an analysis, but not in Appendix 4.

3.1 LITERATURE STUDY

The first - in accordance with the CS-VROO - compulsory step in historical preliminary research is usually the consultation of literature.

Research conflict period

Through the literature study it is possible to get an idea of general warfare in an area, usually with data of these events and sometimes with highly relevant details that are not found in other sources. This study provides an overview of events that can be used for targeted research in various national and international archives.

Research post-conflict period

A literature study for a research post-conflict period in general gives very little information. In contrary to the stories about acts of war, discourses about post war developments don't capture the imagination. Still, literature can in some ways, help to get an overall idea about of what has happened at a certain location after WWII. Also, for some cases there exist very passionate researchers, who wrote books bases on thorough research of archive documents and the field research. For example, a lot of researchers investigate and map bunkers, determining and writing down if they are still existing or, in case they aren't, how they were removed. Also, there are books to be found for example about the Delta Works, railroads and stations etc. These kinds of books can be very useful for mapping all the post-war developments of a certain location. Additionally, the books can contain references, which can be used to perform a more targeted search in various national and international archives.



In literature some standard publications (sometimes mandatory for the CS-VROO) are consulted, supplemented with regional and local literature. Some of these works are part of T&A's library, supplemented by literature from the Royal Library (KB), the Dutch Institute for War Documentation (NIOD), the municipal and / or local libraries and historical associations.

Reliability of the source

Literature used for historical research varies from low to high reliability. The reason for this is that books are written by authors with a wide variety of backgrounds in training, experience and motivation for writing and the use of a wide variety of sources. The guidelines below apply for reliability assessment of literature.

The primary source for books is archive documentation

For some books, extensive archive research has been carried out. In high quality books, archive documents are either cited or a copy is included. As a rule, these archive documents are also considered during archive research, but in some cases, they can't be retrieved (such as the so-called "yellow letters" used in the book "The Railway Company in Wartime" by C. Huurman). When T&A has tracked down the primary documentation, the reliability guidelines for that archive apply. When primary documentation was not recovered, the reliability of the primary source as well as the expertise of the author and his or her ability to interpret and correctly apply the information is estimated. Examples for books that have made ample use of archives documentation are the book by Huurman and the widely used book "En nooit was het stil" by G.J. Zwanenburg, who has made use of Flight Reports from the RAF and the USAAF as well as archive documents from Dutch and foreign archives.

History books of (local) amateurs versus reputable historians

One of the major differences in reliability of literature is caused by the author's background. Books by renowned authors like V.E. Nierstrasz, L. de Jong, H. Amersfoort, E.H. Brongers and C. Klep are considered reliable. These books are based on detailed re-search in archives and reference works, interviews with witnesses and a broad knowledge of the events in WWII². However, the contents of books written by amateur historians vary widely in terms of quality and reliability. The investigations may be rather concise, source references are often lacking and upon further examination several aspects of events appear to have been mixed up. As a rule, such literature sources should be confirmed by other sources.

Diaries from WWII

Notifications in WWII journals are generally considered reliable for an event itself, but not for the details pertaining that event. With this, it should be taken into account whether the author of the diary witnessed the event himself or got the information from others, as well

² However, it has to be taken into account when the books were written and sources where used, especially concerning May 1940. For books describing the events in May 1940, various authors used the reports from Dutch officers and troops (the documents from collection 409 from the NIMH). Although most of these were written just after the battle, there are several reports that weren't written until several years after the end of WWII and there for will be less accurate. The reports from the Dutch troops are also likely – conscious or not – somewhat exaggerated. This was derived from reports that state the presence of German armoured vehicles near the Grebbeberg (which where never there in may 1940) and from conflicting reports from the officer in charge and those from soldiers. Many books that were written just after the war, tend to (strongly) exaggerate the actions of the Dutch military and the size and strength of the German forces. Despite this, these works from renowned authors do typically provide the best information for the occupation events in May 1940 and the liberation in 1944/1945.

as the age and profession of the author. Written experiences from individuals are considered reliable as they are recorded shortly after an event. Often, they also contain details that would not be mentioned in other sources. On the other hand, events described in diaries are often exaggerated and the authors usually are not familiar with explosives. Numbers and types of explosives will have to be confirmed by other sources. Information in diaries from sources other than the author, is often less reliable and must also be confirmed by a second source.

The works by Eversteijn

In the industry reports regularly refer to the work "Bombardementen en verongelukke vliegtuigen in de periode 10 mei 1940 – 5 mei 1945" (Bombings and crashed planes between May 10th 1940 and May 5th, 1945) by T. Eversteijn. This is a non-published script from 1990, updated in 2011, without sources for the reported war events. For several of these events the original source is easily determined. These sources include standard works that T&A consults so that the Eversteijn script has no additional value for those instances. As such, the original sources sometimes supply updated publications which lack in the Eversteijn script. For other events the original source cannot be determined but they are generally described in other literature or archive documents. It is also notable that the 1990 and 2011 versions of the Eversteijn script show vast differences which indicates that (substantial) mistakes and carelessness for the 1990 version. There is no reason to assume that the 2011 version will be a substantial improvement. There is no indication that the Eversteijn script has any additional value as accounts are sometimes dated, the original source was already consulted and in other instances no primary source could be identified which greatly affects the reliability. As such, T&A does not consult these works.

Overview of the used literature

For the literature study, the following books have been consulted. The column "Source" is the abbreviation used in the chronological list of events in Appendix 3 to refer to the relevant book.

Autor	Titel	Published	Source indication
Amersfoort, H. e.a.,	<i>Mei 1940, de strijd op Nederlands grondgebied</i>	Den Haag 2005	Amersfoort (2005)
Beishuizen, T., (samenst.)	<i>Vrij! Eindelijk Vrij!. De laatste oorlogsdagen in Oost Groningen</i>	Noordboek 2005	Beishuizen (2005)
Bodewes, J.A.,	<i>Buigen en barsten: de oorlog 1940-1945 in Noord-Nederland</i>	Haren 1991	Bodewes (1991)
Boer, J.B. de,	<i>Militair gezag in Groningen: stad en provincie na de bevrijding april-oktober 1945</i>	Assen 1990	Boer (1990)
Bollen, H. en Vroemen, P.,	<i>Canadezen in actie. Nederland najaar '44 – voorjaar '46.</i>	Warnsveld 1994	Bollen (1994)
Brongers, E.H.,	<i>Inventarisatie uit diverse bronnen van in de meidagen van 1940 Tijdens of door de strijd in Nederland neergeschoten, vernielde Of door vuur beschadigde Duitse vliegtuigen, weergegeven per Provincie of gebied</i>	Wijnandsrade 2008	Brongers (2008)
Huizinga, M.H.,	<i>Maple Leaf Up, De Canadese opmars in Noord-Nederland</i>	Groningen 1980	Huizinga (1980)
Huizinga, M.H. en Doornbos, H.,	<i>Van Canada tot Dollard tou...: de bevrijdingsgevechten aan Eems en Dollard: 15 april - 2 mei 1945</i>	Scheemda 1985	Huizinga (1985)
Huizinga, M.H.,	<i>Met de blik naar boven: Groningen en omstreken tijdens oorlogsgevaar</i>	Groningen 1995	Huizinga (1995)

Autor	Titel	Published	Source indication
Huurman, C.	<i>Het spoorwegbedrijf in oorlogstijd, 1939 – 1945</i>	Eindhoven 2001	Huurman (2001)
Klep, C. (red.),	<i>De bevrijding van Nederland 1944-1945, oorlog op de flank</i>	Den Haag 1995	Klep (1995)
Korthals Altes, A.,	<i>Luchtgevaar, luchtaanvallen op Nederland 1940-1945</i>	Amsterdam 1984	Korthals Altes (1984)
Lenselink, F.,	<i>Sporen van strijd in de provincie Groningen</i>	Groningen 2000	Lenselink (2000)
Molenaar, F.J.	<i>De luchtverdediging in de meidagen 1940 (2 delen)</i>	's-Gravenhage 1970	Molenaar (1970)
NFLA	<i>NFLA-Recovery list</i>	2003	NFLA (2003)
Nierstrasz, V.E., e.a.	<i>De strijd op Nederlands grondgebied tijdens Wereldoorlog II, diverse delen</i>	's-Gravenhage	Nierstrasz
Pater, de B.C., Schoenmaker, B., e.a.	<i>De Grote Atlas van Nederland 1930-1950</i>	Utrecht 2011	Pater (2011)
Potjewijd, T.,	<i>Winschoten 1940 - 1945 : vijf dagen oorlog, vijf jaren bezetting Eerder versch. in: De Winschoter courant, 1977-1978</i>	Winschoten 1979	Potjewijd (1979)
Rijnhout, B.,	<i>De verloren strijd: een fotografisch overzicht van de massale Duitse luchtinvasie in de meidagen van 1940</i>	Breda 1982	Rijnhout (1982)
Stichting Oorlogs- en Verzetsmateriaal Groningen	<i>Bevrijd! : kleine grote herinneringen aan de bevrijding</i>	Groningen 2006	SOVG (2006)
Strating, H.,	<i>Kroniek van een bevrijding: de regio Winschoten, april 1945</i>	Scheemda 1995	Strating (1995)
Strating, H.,	<i>Winschoten 1940-1945. Een provinciestadje aan de Duitse grens</i>	Winschoten 2001	Strating (2001)
Strating, H.,	<i>Winschoten en omstreken in de branding der bevrijding</i>	Winschoten 2003	Strating (2003)
Studiegroep lucht oorlog 1939-1945	<i>Verliesregister</i>		Verliesregister NIMH
Veenstra, S.L.,	<i>In de schaduw van de glorie: overzicht van vliegtuigbergingen in Nederland: 1960-1977</i>	Zutphen 1992	Veenstra (1992)
Wees, E. van,	<i>Toen verduistering verplicht was : Groningers in de oorlog</i>	Assen 1990	Wees (1990)
Zwanenburg, G.J.,	<i>En nooit was het stil... Kroniek van een lucht oorlog – delen I en II</i>	z.p., z.j.	Zwanenburg (z.j.)

Overview of the used literature – Post-Conflict period

Not applicable: This report concerns a Research Conflict Period.

Lacuna in knowledge:

- None.

Explanation of the literature

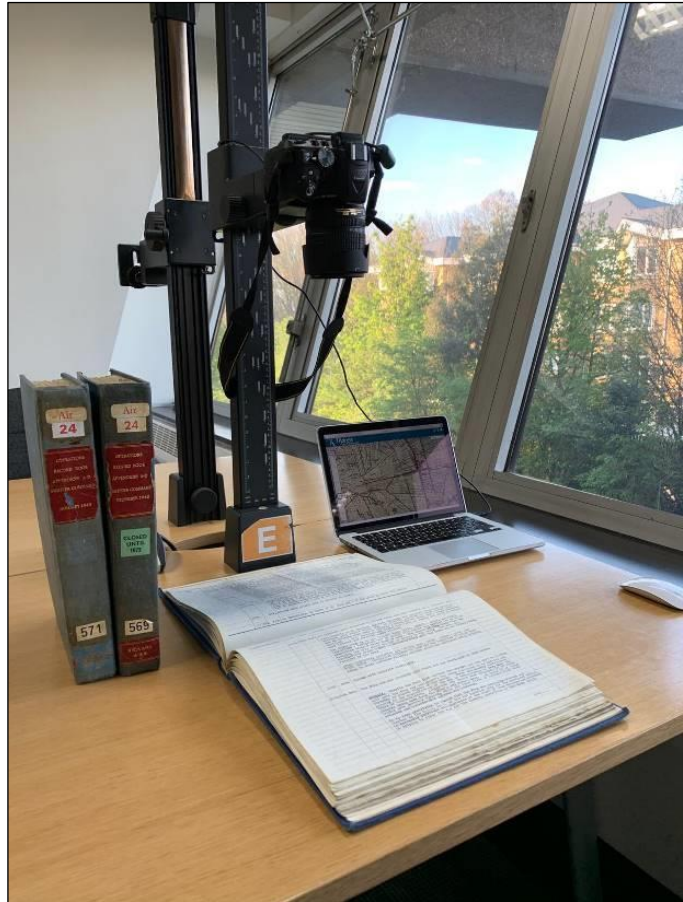
Relevant events can be found in the chronological table in Appendix 3.

3.2 ARCHIVE RESEARCH

Archive documents are the most important source of information for historical research. They usually provide the most accurate and reliable data needed for an investigation, as they are often primary sources whose information was recorded shortly after an event occurred. The documents consist of reports, but sometimes also images of warfare and military reports on planning and execution, results and used explosives.

Archives for historical research can be found in various archives in the Netherlands and abroad. Which archives should be consulted for the investigation and whether the information found is relevant or not is determined by the CS-VROO and the researcher. For each archive, an inventory of the files which are expected to contain relevant information is made. These files are consulted and the content is assessed for its relevance. In Appendix 5 the consultation method is described in greater detail.

A file that contains no indications or contraindications for the possible presence of explosives in the research area or its immediate proximity, it is not considered to be relevant. For each archive, the consulted inventories, access numbers and documents are shown in the overview tables in the following sections. For all archives, the last column of the inventory table indicates whether an inventory is considered relevant or not. If the documents were not considered relevant, a number indicates the reason why.



The numbers in the 'relevant' column of each archive represent the following:

1. The events mentioned in the documents are too far from the research area to be relevant;
2. The documents do not report explosives (related events);
3. The documents do not report relevant post-war activities;
4. The documents are missing in the archive.

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.1 Municipal archives

Municipal archive documents usually contain the most detailed and reliable information on war events in the municipality, affected locations, UXO investigations and post-war ground-moving activities. Usually, these documents are found in a local municipal archive, but some cases the documents are found in provincial or regional archives. Following CS-VROO guidelines, municipal archive documents from the air defence service, documents on found/cleared UXO and war damage reports are consulted. Additionally, the municipality is asked whether investigations into the presence of explosives have already taken place in the past. Present report concerns a conflict period historical research. This means that documents containing information about post-war developments have not been consulted.

Reliability of the source

Municipal or provincial archive documents are generally reliable, although this may vary depending on the type of document.

Reports of Air Defence Service (LBD), Police and Fire Department

LBD, police and fire brigade reports provide a reliable representation of the situation as observed during and/or after an event. They were usually drawn up shortly after an event and based on observations of a reporting officer or employees stating their objective findings, without exaggeration of facts in their own interest. These documents are considered reliable when it comes to the actual taking place of the event, the location of the location(s) concerned, the handling by the authorities and other matters that could be reliably determined by the reporting officer. This includes, for example, the number of bombs that exploded, but usually not the number of bombs thrown, as this could rarely be observed reliably.

Documents regarding found/cleared explosives

These documents are considered reliable, as they are usually drawn up shortly after the explosives are found/cleaned. They are usually based on observations of the reporting officer or direct employee, and can therefore be considered objective findings, without exaggeration of facts in their own interest.

War damage reports

The reliability of war damage reports is variable, but generally fairly reliable. Experience shows that in case of damage reports two important factors contribute to the reliability of the notification. First of all, the person reporting the damage. If the damage has been identified by the LBD, police or fire department, it is considered to be reliable. However, in the event of a claim by the owner of a damaged property, there is a chance of fraud. In addition, such claims are often made a long time after the event (often post-war), which makes the exact date and cause of the damage somewhat unreliable. A second factor that plays a role is the distance between the date of the report and the date of the event. Reports made months or years after the event often state a wrong date and/or cause of the damage. If the damage has been reported by the owner and/or long after the event, the notification should be confirmed by a second source, or it should be substantiated why the message is considered to be reliable.

Documents about post-war groundwork

The reliability for documents about post-war groundwork can vary widely. This is definitely also true for documents of specifications. In these kinds of documents, usually is put down on paper everything about what has to happen where, what the end result should look like, what materials should be used etc. Also they often contain precise drawings of the desired end result, sometimes also depicting the situation before the work activities. Unfortunately, there are some limitations. For example, a lot of specifications weren't preserved or can still be found. Also, older specifications often don't contain a lot of details about the planned works, or these were left to choose for the contractor. Therefore, in a lot of cases it is not clear what profile was used for digging, or how they did their site preparation.

Overview of consulted municipal archives en inventories

Archive municipality of Oldambt

The municipality has been consulted concerning previously performed UXO surveys within or in the close vicinity of the survey area. See §2.3 for the results of this inquiry.

Archive former municipality of Scheemda

The archives of this municipality can be found at the municipality archives of Oldambt at Winschoten. The following documents have been consulted:

Archief gemeente Scheemda 1920-1989		
Inv. Nr.	Description	Relevant
242	Politie gemeente Scheemda- correspondentie	No, 2
558, 560, 561, 562	Handhaving openbare orde- tijdens oorlog/bezettingjaren	No, 2
559	Handhaving openbare orde- tijdens oorlog/bezettingjaren	No, 1
563	Openbare orde- diverse aangelegenheden	No, 2
735	Bescherming bevolking/ luchtbescherming- diverse aangelegenheden	
1307	Schade aan gemeente-eigendommen en aan eigendommen van derden door oorlogshandelingen en de schade afwikkeling 1940-1945	No, 1
1314	Landsverdediging- overige correspondentie 1939-1941	No, 2
1318	Justitie correspondentie 1937-1945	No, 2
1321- 1322	Dagboeken van Zuster Helder.	Yes

Documents Post-Conflict Period

Not applicable: This report concerns a Research Period of Conflict.

Lacuna in knowledge municipal archives

- No records on war damages were found;
- No documents concerning found or cleared explosives were found.

Analysis of the relevant documents

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

Archive former municipality of Winschoten

The archives of this municipality can be found at the municipality archives of Oldambt at Winschoten. The following documents have been consulted:

33 - Gemeentebestuur Winschoten 1930-1945		
Inv. Nr.	Description	Relevant
149	Stukken betreffende de schade aan gemeente-eigendommen door oorlogshandelingen, 1940-1945	No, 1
150	Notulen van de vergaderingen van de luchtbeschermingskring Winschoten, 1940-1941	No, 2
355	Stukken betreffende het functioneren van de gemeentepolitie in bezettingstijd, 1942-1945	No, 2
410	Rapporten inzake de brandbestrijding opgemaakt door de opperbrandmeester, 1930-1945	No, 1
738	Stukken betreffende de wederopbouw van de in de oorlog beschadigde of verwoeste onroerende goederen 1940-1945	Yes
2264	Stukken betreffende de bescherming tegen luchtaanvallen 1930-1944	No, 1
2319	Stukken betreffende het herstel van de bruggen in verband met oorlogshandelingen 1940-1941, 1945	No, 1
2501	Stukken betreffende de schade aan schoolgebouwen door oorlogs- en bezettingshandelingen, 1945	No, 1

32 - Gemeente Winschoten 1946-1969		
Inv. Nr.	Description	Relevant
131-132	Stukken betreffende de straatnaamgeving 1948-1969	*
136	Stukken betreffende overzichten van geleden oorlogsschade aan gemeentelijke eigendommen door geallieerde gevechtshandelingen, 1946-1948	No, 1
979	Stukken betreffende kostenoverzichten, alsmede verlening van vergoedingen voor geleden oorlogs- en bezettingsschade, zowel aan gemeente eigendommen als aan particuliere eigendommen 1945-1952	No, 1

* Used when possible and necessary.

34 - Gemeentebestuur Winschoten 1970-1979		
Inv. Nr.	Description	Relevant
	No relevante documents	

Documents Post-Conflict Period

Not applicable: This report concerns a Research Period of Conflict.

Lacuna in knowledge municipal archives

- There are no reports from the Aerial protective services;
- No documents concerning found or cleared explosives were found.

Analysis of the relevant documents

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.2 Provincial archives

Documents from the provincial archives usually contain reliable information about events that happened to provincial properties, for example provincial roads, waterways and bridges. Also they often contain various documents on post-war happening on provincial level, like the clearance of explosives and the rebuilding. More exceptional are reports about bomb strikes and such and often these are reports on happenings that were already known from documents in the municipal archives, or copies thereof, or summaries of reports where critical details are missing.

When consulting the provincial archives, following CS-VROO guidelines, documents from the air defence service, documents on found/cleared UXO and war damage reports are consulted. For the provincial archives documentation concerning the Military Authority are also consulted.

Reliability of the source

Provincial archives documents are generally reliable, although this may vary depending on the type of document. The reliability corresponds to the reliability of the municipal archives (see §3.2.1)

Overview of consulted provincial archives and inventories

Provincial archives of Groningen

The archives of the province of Groningen can be found in the Groninger Archieven at Groningen. The following archives have been consulted:

63 - Militair Gezag; Provinciale Militaire Commissaris, 1945 - 1947		
Inv. Nr.	Description	Relevant
107	Uitgevaardigde Verordeningen Chef Staf Militair Gezag (proclamaties): dichten van tankgrachten, 9 mei 1945;	No, 2
113	Politionele rapporten, juni-september 1945	No, 2
131	Rapporten opgaven van plunderingen door geallieerde militairen	No, 2
140	Correspondentie inzake aangifte en opruimen van mijnevelden	No, 1
152	Opgaven van oorlogsschade aan industrieën in districten Appingedam, Groningen en Westerkwartier; stad Groningen en Westerkwartier	No, 2
153	Opgaven van oorlogsschade aan industrieën in districten Veendam en Winschoten	No, 2

64 - Militair Gezag; DMC Appingedam, 1945		
Inv. Nr.	Description	Relevant
43	Opgaven van graven van geallieerde en Duitse militairen	No, 2
44	Correspondentie inzake huiszoekingen door N.B.S. en opgaven van door Duitsers achtergelaten materialen	No, 2
49	Correspondentie betreffende de brandweer te Appingedam en het opruimen van mijnen, munitie enz	No, 1
50	Aangiften van mijnevelden, munitie en ander oorlogstuig	No, 1
76	Correspondentie inzake herstel van wegen; voorziening van elektriciteit, gas en water	No, 2

66 - Militair Gezag; DMC Veendam, 1945		
Inv. Nr.	Description	Relevant
55	Circulaires betreffende mijnevelden en luchtbescherming; aangiften van mijnevelden en oorlogstuig	No, 1
80	Opgaven van werkobjecten en correspondentie inzake het herstel van wegen	No, 2

67 - Militair Gezag; DMC Winschoten, 1945		
Inv. Nr.	Description	Relevant
68	Aangiften van mijnen, projectielen en vliegtuigwrakken, 1945	No, 1
69	Kopieën van uitgegane brieven betreffende mijnen, 1945	No, 1
90	Correspondentie met betrekking tot infrastructuur (bruggen, waterwegen, spoor, tram, droogmakerijen, vliegvelden, spoorwegen) en ontvangen opgaven inzake de toestand van bruggen en waterwegen, 1945	No, 1
91	Ontvangen brieven inzake droogmakerijen, vliegvelden en algemene stukken	No, 1
62	Ontvangen brieven inzake aangiften en klachten; politionele rapporten; processen-verbaal en aanvragen benoeming van een onbezoldigde rijksveldwachter	No, 2
63	Kopieën van uitgegane brieven inzake aangiften en klachten: politionele rapporten; processen-verbaal en bevelen tot de aanstelling van een onbezoldigde rijksveldwachter	No, 2
127	kopieën van uitgegane brieven betreffende de graven van geallieerde en Duitse militairen	No, 1
128	kopieën van uitgegane brieven met betrekking tot plunderingen en diefstal door geallieerde militairen	No, 2

68 - Militair Gezag: Militaire Haven Commissaris te Delfzijl, 1945		
Inv. Nr.	Description	Relevant
	Geen relevante inventarissen NB: De militaire havencommissaris maakte deel uit van het Militair Gezag in de provincie Groningen (zie archieftoegang 63)	

800 - Gouverneur, na 1850 Commissaris des Konings in de provincie Groningen, 1814-1941 (1950)		
Inv. Nr.	Description	Relevant
5624.1	Ingekomen stukken van de Rijksinspecteur voor de bescherming van de bevolking tegen luchtaanvallen, van burgemeesters en politiefunctionarissen, houdende opgave van bom-inslagen en andere oorlogshandelingen, waarvan sommige met processen-verbaal van getuige-verklaring, 1940 - 1945: 1940 - 1941	Yes
5624.2	Ingekomen stukken van de Rijksinspecteur voor de bescherming van de bevolking tegen luchtaanvallen, van burgemeesters en politiefunctionarissen, houdende opgave van bom-inslagen en andere oorlogshandelingen, waarvan sommige met processen-verbaal van getuige-verklaring, 1940 - 1945: 1940 - 1941	No, 1
5625	Ingekomen stukken van de Rijksinspecteur voor de bescherming van de bevolking tegen luchtaanvallen, van burgemeesters en politiefunctionarissen, houdende opgave van bom-inslagen en andere oorlogshandelingen, waarvan sommige met processen-verbaal van getuige-verklaring, 1940 - 1945: 1942 - 1945	No, 2
6112	Stukken betreffende opgaven van in de gemeenten in deze provincie op 10 mei 1940 geleden materiële oorlogsschade, 1940	No, 1

1165 - Kabinet van de Commissaris der provincie, 1942 - 19, 1942 - 1945		
Inv. Nr.	Description	Relevant
33	Stukken betreffende de luchtbescherming, 1943-1944. Met lezing over luchtaanval op Nijmegen	No, 1
35	Stukken betreffende bomschade aan gemeentegebouwen te Bellingwolde, 1943	No, 1
62	Stukken betreffende maatschappelijke steun voor nabestaanden die zijn getroffen door een bombardement te Finsterwolde, 1942-1944	No, 2

1099 - Gedeputeerde Staten van Groningen, 1814 - 1942		
Inv. Nr.	Description	Relevant
	Geen relevante inventarissen	

1776 - Provinciaal Bestuur van Groningen, (1824-) 1942-1976 (1987)		
Inv. Nr.	Description	Relevant
2748	Verslagen van oorlogshandelingen, 1945	No, 1
2852	Vordering eigendommen door de Duitse Weermacht, 1941 - 1945	No, 2
2864	2864-2866 Oorlogsgeweldschade (3 mappen), 1940 - 1946: map 1	No, 1
2865	2864-2866 Oorlogsgeweldschade (3 mappen), 1940 - 1946: map 2	No, 1
2866	2864-2866 Oorlogsgeweldschade (3 mappen), 1940 - 1946: map 3	No, 1

1776 - Provinciaal Bestuur van Groningen, (1824-) 1942-1976 (1987)		
Inv. Nr.	Description	Relevant
2867	Bezettingsschade; Uitvoering, 1941 - 1945	No, 1
2869	Oorlogsgeweldschade; Havenbedrijf Delfzijl, 1943 - 1947	No, 1
2870	Oorlogsgeweldschade, 1940-1951. Uitvoering en voorschriften en aangifte Oorlogsge- weldschade. Tevens oorlogsgeweldschade bij het Havenbedrijf Delfzijl (1943-1947)	No, 1
2872	Oorlogsgeweldschade door geallieerde strijdkrachten, 1945-1949 NB: Betreft voorschrif- ten, uitvoering, oorlogsschade PEB, aanmelding claim wegens schade	No, 1
2874	Oorlogsschade provinciale waterstaat; Algemeen, 1951	Yes
2875	Oorlogsschade provinciale waterstaat, 1951 - 1961: Rapporten directeur-hoofd-ingenieur afgedaan bij de afzonderlijke objecten, 1946-1952	No, 1
2876	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 3 en 4. 5.7.1951 nr. 10258 en 10259, 1951	No, 1
2877	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 1. 11.5.1951 nr. 7254; Al- gemeen, 1951 - 1954	No, 1
2878	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 2. 25.6.1951 nr. 9731, 1951 - 1954	No, 1
2879	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 8. 10.10.1951 nr. 15068, 1951 - 1954	No, 1
2880	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 13. 7.12.1951 nr. 15053, 1951 - 1954	No, 1
2881	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 5. 5.9.1951 nr. 13246, 1951 - 1956	No, 1
2882	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 6. 24.9.1951 nr. 14193, 1951 - 1956	No, 1
2883	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 7. 5.10.1951 nr. 14744, 1951 - 1956	No, 1
2884	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 9. 22.10.1951 nr. 15626, 1951 - 1956	No, 1
2885	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 15. 11.12.1951 nr. 18361, 1951 - 1956	No, 1
2886	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 16. 12.12.1951 nr. 18401, 1951 - 1956	No, 1
2887	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 21-22. 29.12.1951 nrs. 19244 en 19507, 1951 - 1956	No, 1
2888	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 12. 28.11.1951 nr. 17621, 1951 - 1957	No, 1
2889	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 10. 9.11.1951 nr. 16507, 1951 - 1958	No, 1
2890	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 14. 7.12.1951 nr. 18055, 1951 - 1958	Yes
2891	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 17. 12.12.1951 nr. 18402, 1951 - 1958	No, 1
2892	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 23-25. 5.7.1951 nr. 10257; 12.12.1952 nr. 19962; 23.1.1953 nr. 1335, 1951 - 1959	No, 2
2893	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 18-20. 12.12.1951 nr. 18403; 22.12.1951 nrs. 18989 en 19021, 1951 - 1960	No, 1
2894	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 11. 26.11.1951 nr. 17400, 1951 - 1961	No, 1
2895	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 11. 26.11.1951 nr. 17400, 1951 - 1961	No, 2
2896	Oorlogsschade provinciale waterstaat, 1951 - 1961: Opgaaf 1. Vergoedingen, 1952 - 1956	No, 1
3522	Oorlogsschade, 1946 - 1961: map 1	No, 1
3523	Oorlogsschade, 1946 - 1961: map 2	No, 1
4105	Bescherming van de eigendom, 1941-1949 NB. Maatregelen tegen diefstal goederen uit schepen -Bewaking spoorwegstations, kolenopslagplaatsen -Klacht over bewoners tehuis daklozen te Tange -Bestrijding overlast uit politieke motieven -Klacht jagersvereniging Slochteren over toeneming stroperij -Bewaking neergestorte of noodgelande vliegtuigen	No, 2

1776 - Provinciaal Bestuur van Groningen, (1824-) 1942-1976 (1987)		
Inv. Nr.	Description	Relevant
	-Klacht mw. Hommes, Winschoten; onrechtmatige inbezitting zomershuisje in gem. Onstwedde -Oplaten van vliegers	
4487	Meldingen van luchtaanvallen, afgeworpen bommen enz. Voorschriften, 1942-1944	No, 2
4642	Oorlogs- en bezettingsschade aan dijken, 1940-1947 NB. Werken bij het Eemskanaal door de Duitse bezetting -Herstel oorlogsschade Eemskanaaldijken -Beschadiging dijken t.g.v. bominslag -Graven in dijken door de Duitse weermacht -Maken van doorgangen in omheiningen op dijken en weilanden t.b.v. patrouille-gang door Duitse weermacht - Schade aan dijk bij Kloosterburen t.g.v. aangespoelde mijn -Opgaaf 1946/1947 oorlogs- en bezettingsschade aan dijken	No, 1
4841	Schade door oorlogshandelingen aan wegen, kanalen of daarbij behorende werken, 1945 - 1949	Yes
5623	Door oorlogsgeweld vernielde bruggen, 1945 - 1949	No, 1
5625	Provinciale bruggen; Eemskanaal; Algemeen, 1945 - 1956	No, 2
5645	Provinciale bruggen Eemskanaal; Oorlogsschade bruggen, 1950 - 1962	No, 1
5814	Spoor- en tramwegen; algemeen, 1944 - 1945	No, 2
5840	Herstel van waterwegen, 1945	No, 2
6345	Sluis Gaarkeuken. Aangifte oorlogsschade VI, 1950-1959	No, 1
7929	Vordering van gebouwen, terreinen e.d. door de Duitse weermacht, 1942 - 1945	No, 2
7936	Dekkingsgaten tegen luchtaanvallen langs wegen, 1944 - 1945	No, 2
7938	Militaire aangelegenheden Duitse bezetting; Militaire inundatie, 1944 - 1945	No, 2
7945	Vordering van gebouwen, terreinen e.d. door de geallieerde strijdkrachten, 1945	No, 2
7947	Opruimen militaire verdedigingswerken, 1945-1947 NB. Dichten van tankvallen -Verwijderen draadversperringen -Opruimen landmijnen -Opslag munitie langs openbare wegen -Opruimen permanente defensieve werken	No, 1

Documents Post-Conflict Period

Not applicable: This report concerns a Research Period of Conflict.

Lacuna in knowledge provincial archives

- None.

Analysis of the relevant documents

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.3 Dutch Institute for War Documentation

The Dutch Institute for War Documentation ("NIOD") is a war knowledge and information center and contains various books, diaries and archives about WWII. According to the guidelines of the CS-VROO, the following collections should be consulted:

- Collection 216K - Department of Justice
- Collection 077 - Generalkommissariat für das Sicherheitswesen - Höhere SS- und Polizeiführer Nord-West

Reliability of the source

Archives from collection 216K generally involve similar documents as those from the municipal archives. If this is the case and the reporting officer of the document was (a direct employee of someone) present on the location, the information is considered to be equally reliable as municipal archive information.

However, for collection 077 this is not the case; This collection contains summary reports, which are based on the original reports, telegrams, or telephone messages. There is a chance of mistakes being made while copying and summarizing information. Therefore, these archives are not first-hand reports and the details (numbers of explosives, exact locations, etc.) are considered less reliable. The event itself however is considered reliable. It is preferable to have the details confirmed by a second source.

List of consulted collections and inventories of the NIOD

Access number 077 - Collectie Generalkommissariat für das Sicherheitswesen - Höhere SS- und Polizeiführer Nord-West		
Inv. Nr.	Description	Relevant
518	Verslagen van de Befehlshaber der Ordnungspolizei betreffende de luchtaanvallen op Nederlands grondgebied van 21 tot en met 27 augustus 1940	No, 1
993	Verslagen betreffende geallieerde luchtaanvallen op bewapeningsbedrijven in Hengelo en de gasfabriek in Rotterdam, 1942-1943	No, 1
1328	Dagberichten van de Befehlshaber der Ordnungspolizei Den Haag betreffende vijandelijke luchtaanvallen, 1940-1941	Yes
1332	Stukken betreffende vijandelijke luchtaanvallen, landingen van vijandelijke vliegniers, het vinden van versperringsballons, het werpen van springstoffen en het gebruik van sabotagematerialen, 1940-1943	No, 1
1759	Berichtgevingen betreffende neergekomen vliegtuigen, 1943	No, 1
1855	Telegrammen van de marechaussee regio Rotterdam aan het 3. Polizeibataillon over bominslagen en delicten, 27-30 november 1944	No, 1

Access number 216K - Collectie Departement van Justitie		
Inv. Nr.	Description	Relevant
179	Ingekomen en minuten van uitgegane stukken, 16-12-1942 – 21-11-1944	No, 1
180	Rapporten van de plaatselijke luchtbeschermingsdiensten, politiekorpsen en de Marechaussee inzake het geven van het sein luchtalarm, het neerstorten van vliegtuigen en vliegtuigonderdelen en de vondst van niet-ontplofte explosieven, 23 juni 1943 - 28 april 1944	No, 1
181	Processen-verbaal van de plaatselijke luchtbeschermingsdiensten, politie en Marechaussee met betrekking tot vijandelijke vliegtuigen, bomaanvallen en ontploffingen in verschillende gemeenten: Aalsmeer-Apeldoorn	No, 1
182	Processen-verbaal van de plaatselijke luchtbeschermingsdiensten, politie en Marechaussee met betrekking tot vijandelijke vliegtuigen, bomaanvallen en ontploffingen in verschillende gemeenten: Arcen-Arnhem	No, 1

Access number 216K - Collectie Departement van Justitie		
Inv. Nr.	Description	Relevant
183	Processen-verbaal van de plaatselijke luchtbeschermingsdiensten, politie en Marechaussee met betrekking tot vijandelijke vliegtuigen, bomaanvallen en ontploffingen in verschillende gemeenten: Baarn-Burgh	No, 1
184	Processen-verbaal van de plaatselijke luchtbeschermingsdiensten, politie en Marechaussee met betrekking tot vijandelijke vliegtuigen, bomaanvallen en ontploffingen in verschillende gemeenten: Capelle a/d IJssel - Dwingeloo	No, 1
185	Processen-verbaal van de plaatselijke luchtbeschermingsdiensten, politie en Marechaussee met betrekking tot vijandelijke vliegtuigen, bomaanvallen en ontploffingen in verschillende gemeenten: Echt-Zwolle	No, 1
186	Meldingen van verschillende gemeenten betreffende ongevallen, beschietingen, bombardementen en het afwerpen van (lege) benzinetanks door vliegtuigen	No, 1
188	Meldingen van luchtalarm in de provincies Gelderland en Overijssel, 18 september 1944 - 16 januari 1945	No, 1
844	Rapport van de Marechaussee Clinge aan de hoofdinspecteur van de Luchtbescherming inzake het neerstorten van een vliegtuig, 3-5 januari 1944	No, 1

Analysis of the relevant documents

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.4 Dutch Institute for Military History

The Dutch Institute for Military History ("NIMH") is a specialized knowledge and research center in the field of Dutch military history and includes the following collections:

- Collection 409 "Gevechtsverslagen en rapporten mei 1940"/"Battle reports and reports May 1940"
- Collection 575 "Duitse verdedigingswerken in Nederland en rapporten van het bureau Inlichtingen te Londen (1940-1945)"/"German defense works in the Netherlands and reports of the Intelligence Office in London (1940-1945)"
- Collection 708 "Airwar 1940-1945"/"Luchtoorlog 1940-1945"
- Collection 709 "Collection De Bruin"
- Collection 801 "Aircraft salvages"/"Bergingen"

Collection 409

This collection contains combat reports and reports of the Dutch armed forces of May 1940. Most of these reports were made shortly after the battles in May 1940 by those involved in the battle. For warfare in May 1940, these reports are the most reliable source. These sources were also extensively used in the literature about the battles in May 1940, including the work of V.E. Nierstrasz, L. de Jong, H. Amersfoort and E.H. Brongers. According to the guidelines of the CS-VROO, collection 409 should be consulted if other sources indicate that ground combat has taken place in the period of May 1940.

Collection 575

This collection contains reports and maps of German defence works made up by the Dutch resistance as well as reports from the Bureau of Intelligence in London. According to the guidelines of the CS-VROO, this collection should always be consulted.

Collection 708

The collection Airwar 1940-1945 originates from documents from the former Section Air Force History (SLH) which now are part of the NIMH. The collection contains accounts, reports, publications, war diaries and loss-lists from the military aviation from the Germans as well as the Allies during WWII.

Collection 709

This collection mainly consists of copies from various subject, mainly originated from The National Archives in London. Books, drawings, correspondence, newspaper clippings, maps and photos are also part of this collection.

Collection 801

This collection contains information about aircraft recovery from various airplanes, mainly executed in the 1970's. Some of these notifications contain details accounts of the recovered airplane parts and can thus provide a valuable source for contra-indications for plane wreckages.

Reliability of the source

Collection 409

Most of these combat reports and documents have been drawn up shortly after the battles in May 1940 by those involved in the battle. For warfare in the 1940's, these reports are the most reliable source, but it should be taken into account that the amount of time passed will have affected the reliability of the accounts. These could therefore show a distorted image. Additionally, not everyone will have had a proper overview of the battle while it was in progress due to which inaccurate accounts of the events in place may have been given.

Collection 575

This collection contains reports and maps of German defence works in the Netherlands provided by the Dutch resistance and reports from the Intelligence Office in London. This collection contains maps of defence works and reports of troop movements as well as results of allied bombings. These reports are usually reliable, but details (event dates and number of bombs, etc.) can be inaccurate. A second source (generally an aerial photograph) is usually consulted to delimit the suspect area.

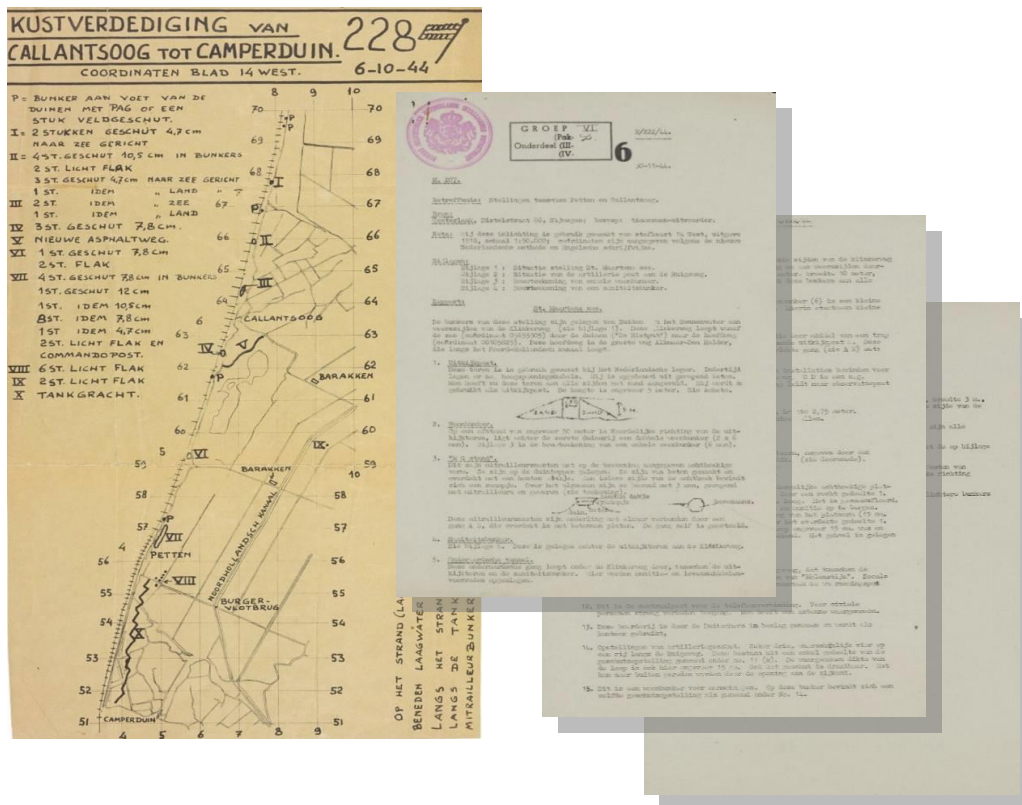


Figure 3.2.3-I. Characteristic documents from collection 575: indicative maps with defence works and reports from the Dutch resistance containing details of said defence works, gun positions etc. Source: Dutch Institute for Military History.

Collection 708

The content of this collection is a mishmash of newspaper articles, book fragments and archive documents which were collected for specific bombings. The reliability of these documents will vary substantially. Per situation/source the reliability will have to be assessed.

Collection 709

The content of this collection mainly consists of copies from documents derived from other archives, generally The National Archives in London. For the reliability of these documents see paragraph 3.2.9.1. The reliability of the other documents will vary substantially. Per situation/source the reliability will have to be assessed.

Collection 801

This collection mainly contains documents composed by an Air Force officer involved with the recovery. These reports are carefully drafted and are thus considered reliable

Consulted collections and inventories of the NIMH

Collection 409

In collection 409 the following documents were consulted.

Collectie 409 "Gevechtsverslagen en rapporten mei 1940"		
Inv. Nr.	Description	Relevant
540091	Bureau Luchtwachtdienst	No, 1

Collection 575

In collection 575 no relevant documents were found.

Collection 708

In collection 708 "Luchtoorlog 1940-1945" the following documents were consulted.

Collection 708 "Luchtoorlog 1940 – 1945"		
Inv. Nr.	Description	Relevant
23	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 N.B. Alfabetisch geordend op geografische naam - 23 Algemeen	No, 1
24	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 24 Aalten - Doetinchem	No, 1
25	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 25 Eindhoven - Kruijningen	No, 1
26	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 26 Leersum - Nijmegen	No, 1
27	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 27 Ophemert - Roosendaal	No, 1
28	Stukken betreffende de gevolgen van oorlogshandelingen waaronder bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 28 Rotterdam	No, 1
29	Stukken betreffende de gevolgen van oorlogshandelingen waaronder	No, 1

Collection 708 "Luchtoorlog 1940 – 1945"		
Inv. Nr.	Description	Relevant
	bombardementen, in en boven verschillende Nederlandse gemeenten en streken, 1940 – 2005 - 29 Schagen - Zoetermeer	
43	Meldingen van de Luchtbeschermingsdienst betreffende neergestorte vliegtuigen, 1943 - 1945	No, 1

Collection 709

In collection 709 "De Bruin" the following documents were consulted.

Collection 709 "Collectie De Bruin"		
Inv. Nr.	Description	Relevant
11	Luchtaanvallen op het eiland Rozenburg (Rotterdam), zomer 1940	No, 1
12	Luchtaanval op Kamp Amersfoort	No, 1
13	Verslagen van het bombarderen van Enschede	No, 1
14	Bombardement op Nijmegen, Arnhem, Deventer en Enschede	No, 1
15	Luchtaanvallen en bombardementen op Twello en omgeving	No, 1
16	Bombardement op het vliegveld Deelen	No, 1
17	Bombardement op de Wijhese veer (IJssel)	No, 1
18	Processen-verbaal opgesteld door de politie van Deventer betreffende de schade door geallieerde luchtaanvallen	No, 1
19	Computeruitdraai Luchtoorlog Deventer en omgeving, 1944-1945	No, 1
20	Computeruitdraai over luchtaanvallen op Oost-Nederland door de 2nd Tactical Air Force	No, 2
21	Bombardement op Goor	No, 1
22	Luchtaanvallen van middelzware bommenwerpers in Gelderland en Overijssel	No, 1
23	Kopie van het gevechtsverslag van Flak-Abteilung 331 van 6 t/m 13 april 1945 in de omgeving van Deventer	No, 1
24	Brochure van de gemeente Apeldoorn Informatie over de bevrijding van Apeldoorn	No, 1
25	Uittreksel uit het oorlogsdagboek van de 48 Highlanders of Canada betreffende de bevrijding van de gemeenten Apeldoorn en Voorst	No, 1
26	Correspondentie betreffende de Duitse verdediging in de omgeving van Deventer tijdens operatie Cannonshot	No, 1
29	Computeruitdraai Luchtoorlog Deventer en omgeving vliegtuigcrashes 1940-1945	No, 2
32	Documentatie over de bergingswerkzaamheden van de Koninklijke Luchtmacht	No, 1
33	Reconstructie van het neerschieten van een Engelse Halifax bommenwerper boven Amstelveen op 16 juni 1944	No, 1
83	Register of Missing Aircraft opgesteld door het Office of Research Service (ORS) van de RAF	No, 2
85	Aanval van 109 Squadron op de elektriciteitscentrale van Lutterade (Geleen). Het betrof de eerste "Oboe" calibratietest uitgevoerd door zes Mosquitoes	No, 1
91	Overzicht van RAF Bomber Command acties op ondermeer Waalhaven, Ypenburg, Den Haag, Maastricht, Breda en Eindhoven	No, 1
92	Overzicht van RAF aanvallen op Nederlandse vliegvelden	No, 1
94	Samenvatting van acties door 2 Tactical Air Force op Walcheren	No, 1
96	Samenvatting van de 2 Tactical Air Force over de Duitse aanval op Nederlandse en Belgische vliegvelden op 1 januari 1945 ('Operatie Bodenplatte')	No, 1
97	Aanvallen van 2 Bomber Group op Duitse troepen ter ondersteuning van de geallieerde luchtlandingen in Nederland	No, 1
99	Escorte acties van 12 Fighter Group naar Schiphol	No, 1
101	Acties van 83 Group gericht tegen doelen in Zuid-Nederland	No, 1
102	Situatie bij 83 Group na de Luftwaffe aanval op 1 januari 1945 ('Operatie Bodenplatte') betreft de vliegvelden Volkel, Eindhoven en Heesch	No, 1
104	Acties van 121 Wing vanaf vliegveld Volkel met speciale aandacht voor de Sinterklaasviering	No, 1
105	Acties van 125 Wing boven Duitsland en bezet Nederland	No, 1
107	Aanvallen door 7 Squadron op de vliegvelden Volkel en Soesterberg	No, 1
108	Bombardement op Gilze-Rijen door 9 Squadron	No, 1

Collection 709 "Collectie De Bruin"		
Inv. Nr.	Description	Relevant
109	Aanvallen door 9 (SAAF) Squadron in de omgeving van Arnhem, Nijmegen en Eindhoven	No, 1
110	Bombardement op vliegveld Soesterberg door 10 Squadron	No, 1
111	Acties van 322 (Dutch) Squadron in de omgeving van Oost-Nederland	No, 2
112	Bombardement op vliegveld Deelen door 44 (Rhodesia) Squadron	No, 1
113	Bombardement op vliegveld Gilze-Rijen door 83 (Pathfinder Force) Squadron	No, 1
114	Bombardement op de IJsselbruggen van Deventer	No, 1
115	Bombardement door 106 Squadron op Gilze-Rijen en Deelen	No, 1
117	Bombardement op vliegbasis Eindhoven door 158 Squadron	No, 1
119	Aanvallen van 180 Squadron op de veerboot van Breskens naar Vlissingen, Zuid-Beveland en de haven van Breskens, respectievelijk 11, 12 en 15 september 1944	No, 1
120	Aanvallen door 193 Squadron op Amersfoort en Amsterdam (Gestapo hoofdkwartier)	No, 1
121	Acties van 198 Squadron vanaf Gilze-Rijen op bezet Nederland	No, 1
122	122 Aanvallen door 266 (Rhodesian) Squadron op Rotterdam (Gestapo hoofdkwartier) en spoorwegknooppunt Bussum	No, 1
123	Stationering en vliegoperaties van 198 Squadron vanaf Gilze-Rijen en Kluis	No, 1
124	Acties van 247 (China-British) Squadron vanaf vliegveld Eindhoven boven bezet gebied	No, 1
126	Acties van 320 (Dutch) Squadron	No, 1
127	Acties van 322 (Dutch) Squadron	No, 1
128	Aanvallen van 331 (Norge) Squadron vanaf vliegveld Woensdrecht	No, 1
129	Bombardement op vliegveld Gilze-Rijen door 463 (RAAF) Squadron	No, 1
130	Bombardement op vliegveld Gilze-Rijen door 467 (RAAF) Squadron	No, 1
131	Bombardement op Volkel door 582 Squadron	No, 1
132	Bombardement op Westkapelle door 582 Squadron	No, 1
133	Aanvallen van 602 (City of Glasgow) Squadron op spoorwegverbindingen in het westen van Nederland	No, 1
134	Acties van 605 Squadron boven Nederland	No, 1
135	Acties van 609 Squadron vanaf Gilze-Rijen	No, 1
136	Aanval op de elektriciteitscentrale van Amsterdam door RAF Ventura bommenwerpers van 613 Squadron	No, 1
138	Aanvallen door 627 Squadron op Gilze-Rijen, Deelen, IJmuiden en Eindhoven	No, 1
139	Vliegoperaties in Oost-Nederland van 652 Squadron (Air Observation Post) de eenheid vloog met Austers	No, 1
140	Operations Record Book van RAF Station Kenley met Wing Commander J.E. "Johnny" Johnson	No, 1
141	Rapport van de Engelse luchtmachtattaché over de Duitse invasie in Nederland	No, 1
142	'Order of Battle' van de 2 Tactical Air Force op stand datum	No, 1
143	Overzicht van aanvallen uitgevoerd door 2 Tactical Air Force in Nederland	No, 2
145	Verslag van Sir Arthur Conningham betreffende de operaties van 2 Tactical Air Force tussen 6 juni 1944 - 9 mei 1945	No, 1
147	Bombardement op de Rotterdamse haven "Het vergeten bombardement"	No, 1
148	Inlichtingenrapport van RAF Fighter Command van aanvallen op de vliegvelden Soesterberg, Eindhoven, Deelen, Venlo en Twente (Enschede)	No, 1
149	Inlichtingenrapport van het USAAF bombardement op Schiphol	No, 1
150	Airbone Operation "Market" in Holland	No, 1
151	Inlichtingenrapport over Schiphol * Ook over andere vliegvelden in Nederland, wo. Gilze-Rijnen, Deelen, Leeuwarden, Volkel, Twente, Eindhoven, etc..	No, 1
152	Inlichtingenrapport over Nederlandse vliegvelden	No, 1
153	Inlichtingenrapport over de Luftwaffe aanval gericht tegen geallieerde vliegvelden in Zuid-Nederland en België, operatie 'Bodenplatte'	No, 1
160	Evaluatie van de luchtverdediging van Groot-Brittannië door RAF Fighter Command na de 'Slag om Engeland'	No, 2
161	Verdediging van Groot-Brittannië tegen aanvallen van Duitse V-wapens (Rocket and Flying Bomb)	No, 2
162	Laatste aanvallen met V-wapens op Londen	No, 2
163	Kwantitatieve gegevens van de Special Operations Executive (SOE) over zogenaamde special Duty Operations vanuit Groot-Brittannië naar Frankrijk, België en Nederland	No, 2

Collection 709 "Collectie De Bruin"		
Inv. Nr.	Description	Relevant
	(Englandspiel)	
164	Zeven combat reports van J.E. "Johnny" Johnson	No, 1
165	Dagboek van Brigadier John W. Hackett commandant van de Engelse. 4 Parachute Brigade tijdens operatie Market-Garden (slag om Arnhem)	No, 2
166	Dagboek van het Engelse 3 Regiment Royal Artillery in Zeeland (Vlissingen, Walcheren, West Kapelle)	No, 1
167	Dagboek en inlichtingenrapporten van 1 Canadian Corps in Nederland. Overgave van Generaal Blaskowitz op 5 mei 1945 en de onderhandelingen in Achterveld over voedseldroppings op 6 mei 1945	No, 2
168	Slagorder (order of Battle) van 1 Canadian Corps	No, 2
169	Dagboek van 1 Canadian Infantry Division (Reichswald, Heesch, Tilburg, Nijmegen, Cleve, Beek, IJssel, Apeldoorn, Emmerich, Elten, Laag-Keppel, Zutphen, Doesburg, Deventer, Arnhem, Beekbergen, Otterloo, Nijkerk, Garderen, Amersfoort)	No, 1
170	Dagboek van 1 Canadian Infantry Brigade (Reichswald, Zutphen, Cleve, Emmerich, IJssel, Apeldoorn, IJsselmeer)	No, 1
171	Dagboek van 2 Canadian Infantry Brigade (Reichswald, Emmerich, Toldijk, Zutphen, Deventer, Cleve, Gorsel, Apeldoorn, Arnhem, IJssel, Wilp, Dieren, Otterloo)	No, 1
172	Dagboek van 3 Canadian Infantry Brigade (Reichswald, IJssel, Apeldoorn)	No, 1
173	Dagboek van het Canadese onderdeel Carlton and York Regiment (Reichswald, Emmerich, IJssel, Bocholt, Zutphen, Deventer, Batmen, Achterhoek)	No, 1
174	Dagboek van het 1 Canadian Scottish Regiment (Zutphen, Batmen, Deventer, Schalkhaar, Wijhe, IJssel, Zwolle, Raalte, Hattem, Groningen, Siddeburen, Wagenborgen)	No, 1
175	Dagboek van het Canadese onderdeel The Loyal Edmonton Regiment (Zutphen, Voorst, IJssel, Deventer, Dieren, Ellecom)	No, 1
176	Dagboek van het Canadese onderdeel The Hastings and Prince Edward Regiment (Reichswald, Apeldoorn, Nieuw Millingen, Elspeet, Barneveld, Amersfoort, IJmuiden, Amsterdam, Santpoort, Haarlem)	No, 1
177	Dagboek van het 48 Highlanders of Canada (Reichswald, Tilburg, Den Bosch, Uden, Mook, Deventer, Zutphen, Nijmegen, Twello, Wilp, Steenkamer, Voorthuizen, Stroe, Harderwijk, Elspeet, Apeldoorn)	No, 1
178	Dagboek van het Princess Patricia's Canadian Light Infantry (Reichswald, Nijmegen, Baak, Elten, Zutphen, Emmerich, Baak)	No, 1
179	Dagboek van de Canadese eenheid 1 Bataljon of The Regina Rifle Regiment (Emmerich, Doetinchem, Zutphen, Steenderen, Deventer, Zevenaar, Bathmen, Zwolle, IJtsum, Meppel, Rouveen, Steenwijk, Groningen)	No, 1
180	Dagboek van het Royal Canadian Regiment (Reichswald, Zutphen, Deventer, Emmerich, Apeldoorn, Garderen)	No, 1
181	Dagboek van de Canadese eenheid Royal 22 Regiment (Zutphen, rivier IJssel, Apeldoorn)	No, 1
182	Dagboek van de Seaforth Highlanders of Canada (Reichswald, Beek, IJssel, Zutphen, Baak, Deventer, Voorst, Apeldoorn)	No, 1
183	Dagboek van de Canadese eenheid Nova Scotia Regiment (Reichswald, Nijmegen, Hummelo, Zutphen, rivier IJssel, Apeldoorn, Barneveld)	No, 1
184	Dagboek van de Canadese eenheid The Royal Winnipeg Rifles (Bocholt, Didam, Zevenaar, Wijhe, Almelo, Deventer, Raalte, Leeuwarden, Groningen, Meppel, Emden, Oldenburg, Nieuwenschans)	No, 1
185	Verhoor van de gevangengenomen Duitse generaal Kurt Student (commandant Legergroep H)	No, 1
186	Verhoor van de gevangengenomen Duitse generaal Hermann Plocher (commandant 6de Parachutisten Divisie)	No, 2
187	Korte historisch overzicht over de bezetting van Noordwest-Nederland door het 1 Canadese Legerkorps	No, 1
188	Eindrapport van de gevechtshandelingen in Noordwest Europa van de commandant van 1 Canadese Leger generaal H.D.G. Grear aan de Canadese Minister van Defensie generaal A.G.L. Mc Naughton	No, 2
189	Ontsnappingsverslag van de Nederlandse piloot bij de RAF Bram 'Bob' van der Stok uit het Duitse krijgsgevangenenkamp Stalag Luft III (Sagan), zie ook inventarisnummer 51	No, 2
190	Verhoor van de gevangengenomen Duitse generaal Von Massow (commandant van de Luftwaffe pilotenopleiding)	No, 2

Collection 709 "Collectie De Bruin"		
Inv. Nr.	Description	Relevant
191	Verhoor van de gevangengenomen Duitse veldmaarschalk Erhard Milch (verantwoordelijk voor de vliegtuigproductie)	No, 2
192	Verhoor van de gevangengenomen Duitse generaal Karl Bodenschatz (commandant Luftwaffe)	No, 2
193	Verhoor van de gevangengenomen Duitse generaal Adolf Galland (commandant Jagdflieger)	No, 2
194	Operatie Regan (later Fabian), betreft de informatievergaring rondom Utrecht door een vierkoppige SAS eenheid	No, 2
195	Verslag van de uitvoering van operatie Keystone (bedoeld om verwarring te stichten in het gebied tussen Amersfoort en de IJssel)	No, 2
196	De planning van operatie Keystone (bedoeld om verwarring te stichten in het gebied tussen Amersfoort en de IJssel)	No, 2
197	Bijdrage van RAF 38 Group aan operatie Keystone (bedoeld om verwarring te stichten in het gebied tussen Amersfoort en de IJssel) en operatie Amherst (inzet van twee regimenten Franse parachutisten in Drenthe)	No, 2
198	Overzicht SOE operaties in Europa	No, 2
199	Overzicht van de SOE operaties in Nederland voor het opzetten van een inlichtingen- en sabotagenetwerk (Englandspiel)	No, 2
200	Overzicht van SOE operaties in Europa	No, 2
201	Rapport van operatie Market Garden	No, 2
202	Rapport over operatie Market met commentaar en aanbevelingen en een verslag over de inzet van het Britse Glider Pilot Regiment bij operatie Market Garden	No, 2
203	Rapport van Amerikaanse generaal James M. Gavin over de inzet van zijn 82 Airborne Division 'All American' bij operatie Market Garden	No, 2
204	Rapport over de luchtondersteuning bij operatie Market	No, 2
205	Verhoorverslagen van gevangengenomen Duitse militairen in Noord-Afrika waaronder de commandant van het Afrika Korps generaal Ludwig Crüwell en kolonel Rudolf Buhse. Alle verslagen betreffen hun aandeel in de strijd van de luchtlandingstroepen in en om Den Haag in mei 1940	No, 2

Collection 801

In collection 801 the following documents were consulted.

Collection 801 Bergingen		
Inv. Nr.	Description	Relevant
2	Brief van het hoofd van de Dienst der Zuiderzeewerken aan de commandant materieel luchtmacht betreffende het opruimen van vliegtuigwrakken in Oostelijk Flevoland	No, 2
3	Brief van de minister van Financiën aan de gemeentebesturen en de Landrost van het Openbaar Lichaam Zuidelijke IJsselmeerpolder betreffende de vergoeding van de kosten voor het verwijderen van ontplofbare stoffen uit de Tweede Wereldoorlog	No, 2
5	Brief van B.J.M. baron van Voorst tot Voorst aan W.A. Mateman betreffende een opgegraven Typhoon motor in 1981	No, 2
6	Brief van A. Jansen aan J.M. van de Berg betreffende het verstrekken van inlichtingen over Luftwaffe-crashes waarbij de bemanning niet is geborgen, ten behoeve van het opstellen van een meerjarenplan voor de te verrichten opgravingen door de Koninklijke Luchtmacht	No, 1
7	Brief van L. Elferich van de gemeente Rotterdam aan S.F.M. Plantinga van het Algemeen Rijksarchief betreffende de vindbaarheid van alle rapportages van de Rotterdamse Luchtbescherming aan de centrale leiding	No, 2
11	Gevonden lijken en voorwerpen opgemaakt door de Marechaussee Gewest Arnhem – Groep Vollenhove – Post Urk	No, 4
12	Bergingsrapporten van diverse vliegtuigen	No, 1
13	Onderzoeksrapporten naar vliegtuigwrakken	No, 1
14	Gevonden vliegtuigdelen vermoedelijk afkomstig van een vliegtuig uit de Tweede Wereldoorlog	No, 1
18	Stukken betreffende het behandelen van aangelegenheden op het gebied van neergestorte vliegtuigen op diverse plaatsen in Nederland: Amstelveen	No, 2
20	Stukken betreffende het behandelen van aangelegenheden op het gebied van	No, 2

Collection 801 Bergingen		
Inv. Nr.	Description	Relevant
	neergestorte vliegtuigen op diverse plaatsen in Nederland: Houtrakpolder te Amsterdam	
21	Stukken betreffende het behandelen van aangelegenheden op het gebied van neergestorte vliegtuigen op diverse plaatsen in Nederland: IJsselmeer	No, 1
28	Stukken betreffende het behandelen van aangelegenheden op het gebied van neergestorte vliegtuigen op diverse plaatsen in Nederland: Vijfhuizen	No, 1
30	Stukken betreffende het behandelen van aangelegenheden op het gebied van neergestorte vliegtuigen op diverse plaatsen in Nederland: Zuiderzee	No, 1
31	Stukken betreffende het behandelen van aangelegenheden op het gebied van neergestorte vliegtuigen op diverse plaatsen in Nederland: Zuid-Flevoland	No, 2
35	"Vliegtuigverliezen tijdens Market Garden", geschreven door Leo Zwaaf	No, 2
45	Overzichten van de in de periode 1960-1993 geborgen vliegtuigwrakken	No, 2
48	Stukken betreffende de Stichting Dutch Aircraft Examination Group (DAEG)	No, 2

Lacuna in knowledge archive NIMH

- None.

Analysis of the relevant documents

In this archive no relevant documents have been found.

3.2.5 National Archives The Hague

In the National Archives of The Hague, under entry number 2.04.53.15 - "Home Affairs a collection of messages from municipalities addressed to Rijksinspectie Luchtbescherming in The Hague is available. These are reports of the municipalities and provinces regarding events involving airborne objects in the municipality, aircraft bombings and bombings. The documents mainly cover the period 1940-1943. These documents add little to nothing to the reports of the Civil Protection Authority's air protection service, but in case these reports are missing, the National Archives documents are a valuable source of information. Therefore, the documents of this entry have to be consulted according to the CS-VROO.

Entries 2.04.110 and 2.13.210 contain lists, overviews and newspaper articles of explosives found and cleared during the war. Both usually provide few details, but can sometimes serve as confirmation of other sources. Consulting the newspaper articles of entry 2.04.110 is mandatory according to CS-VROO.

Entries 2.05.44 and 2.13.71 concern reports of bombing raids on Dutch territory as reported to and by Dutch authorities in Great Britain. There are documents that provide overviews of attacks carried out over the period of a month, or ones that provide detailed reports of one specific attack. Mainly information from the Allied Air Force was used, sometimes partly supplemented with information from the Netherlands (probably obtained through the resistance).

Entry 2.13.167 concerns the "bunker archive" containing documents about bunker complexes – maps of the locations and floorplans and cross-sections of the bunker complexes.

The documents from entry 2.13.196 concern descriptions of flight movements and air strikes dating in the period 10 to 15 May 1940. These reports were recorded by the Dutch air defence posts that were located all over the country. Because of the German advance, various posts had to quit their duties when their location became part of an occupied area.

In The National Archive The Hague there also can be found specifications for planned work that was carried out by contractors which had for example Rijkswaterstaat or the province as their client. In most cases this concerns work on roads and waterways.

Reliability of the source

Documents from the National Archives are generally summaries, based on the original reports. This may include a document of a mayor reporting to the province or authorities in The Hague in which he summarizes the events taking place over the period of a month. There is a chance of mistakes being made by copying and summarizing information. The event itself is therefore reliable, but the details are less so. If an archive does not report first-hand, the details (numbers of explosives, exact locations, etc.) are considered less reliable unless the description is so detailed that it was literally taken from the original report. If such details are not given, it is preferable to obtain confirmation of the details by a second source.

Most of the information in entry 2.04.110 consists of newspaper articles written by laymen in the field of explosives. Experience shows that newspaper articles are often incorrect. The information from this source is only used as a second, confirmatory source.

Access 2.13.210 provides reasonably reliable information, but given the relatively sparse details, usefulness will be limited in many cases.

To accesses 2.05.44 and 2.13.71 something similar as to access 2.04.53.15 applies. The information is based on what the Allied Air Force and Resistance delivered. Although reasonably reliable, information may be lost, incomplete or less detailed than the original documents. It is therefore preferable to use the original source.

The documents in entry 2.13.167 consist of maps, sketches, drawings etc. of bunker complexes, which are made by experts, and therefore are seen as reliable. Moreover they often can be verified using aerial photographs.

The documents in entry 2.13.196 often contain reports that are short and about observations that were done from a distance. Therefore it is preferable to confirm these reports and get additional, more detailed, information using a second source.

The reliability of the specifications is considered to correspond to the reliability of these documents in the municipal archives (see §3.2.1)

Access numbers and inventories consulted at the National Archives The Hague

Toegang 2.04.53.15 – Binnenlandse Zaken; Inspectie Bescherming Bevolking tegen Luchtaanvallen, 1937-1946		
Inv. Nr.	Description	Relevant
45	Ingekomen en minuten van uitgegane brieven van en aan diverse overheidsinstellingen 1940 – 1941: Commissaris der Koningin in de provincie Groningen, nrs. 18.9.1 - 18.9.27	No, 1
64	Luchtbescherming in de provincie Groningen en de gemeente Geleen 1940	No, 1

Toegang 2.04.110 - BiZa / Korps Hulpverleningsdienst 1945-1974		
Inv. Nr.	Description	Relevant
5	Correspondentie van de Hulpverleningsdienst. 1959-1974	No, 1
20	Registers met krantenknipsels inzake explosieven. Z.d.	No, 1
21	Registers met krantenknipsels inzake explosieven. 1945-1947	No, 1
22	Registers met krantenknipsels inzake explosieven. 1957-1959	No, 1
28	Verzameling krantenknipsels inzake de Hulpverleningsdienst. [1947-1970]	No, 1
47	Stukken betreffende de bewaking van munitiedumps. 1947	No, 1
48	Stukken betreffende een regeling voor toekenning van een vergoeding aan burgers in de gemeente Muiden voor geleden schade door een ontploffing van munitie op 17 januari 1947. 1947-1948	No, 1
49	Stukken betreffende onderzoeken naar explosieven die in handen van burgers zijn gekomen. 1947-1960	No, 1
50	Stukken betreffende een zaak aangespannen tegen de Nederlandse Staat door het bergingsbedrijf Gebroeders Bijker N.V. en B.C.A. van den Oever met betrekking tot koop en berging van het wrak van de Engelse torpedojager Valentine in de Schelde. 1954	No, 1
51	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Tilburg en Kring Venlo, 1954 dec. - 1955 dec.	No, 2
52	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Tilburg en Kring Venlo, 1955 dec. - 1956 dec.	No, 2
53	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Tilburg en Kring Venlo, 1956 dec. - 1957 dec.	No, 2

Toegang 2.04.110 - BiZa / Korps Hulpverleningsdienst 1945-1974		
Inv. Nr.	Description	Relevant
54	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Barneveld, Kring Zeeland en Kring Amsterdam, 1954 dec. - 1955 dec.	No, 2
55	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Barneveld, Kring Zeeland en Kring Amsterdam, 1955 dec. - 1956 dec.	No, 2
56	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Barneveld, Kring Zeeland en Kring Amsterdam, 1956 dec. - 1957 dec.	No, 2
57	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Barneveld, Kring Amsterdam, Kring Tilburg en Kring Venlo, 1957 dec. - 1958 dec.	No, 2
58	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem/Nijmegen, Kring Amsterdam, Kring Tilburg en Kring Venlo, 1958 dec. - 1959 dec.	No, 1
59	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem/Nijmegen, Kring Barneveld, Kring Amsterdam, Kring Tilburg en Kring Venlo, 1959 dec. - 1960 dec.	No, 2
60	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Amsterdam, Kring Tilburg, 1960 dec. - 1961 dec.	No, 2
61	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1961 dec. - 1962 dec.	No, 1
62	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1962 dec. - 1963 dec.	No, 2
63	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1963 dec. - 1964 dec.	No, 1
64	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1964 dec. - 1965 dec.	No, 1
65	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1965 dec. - 1966 dec.	No, 2
66	Registers inzake meldingen van geruimde explosieven. 1954-1967 Kring Arnhem, Kring Nijmegen, Kring Tilburg en Kring Venlo, 1966 dec. - 1967 dec.	No, 2
68	Stukken betreffende het dumpen van munitie in zee. 1960-1971	No, 1
69	Stukken betreffende de inhuur van de Hulpverleningsdienst door Rijkswaterstaat Directie Wegen voor het ruimen van explosieven. 1967-1971	No, 1
72	Stukken betreffende het ruimen van een bom door Engelse militairen op Nederlands grondgebied. 1969	No, 1
74	Stukken betreffende het ruimen van explosieven in de kuststrook. 1970	No, 1
77	Stukken betreffende het beantwoorden van vragen van het Tweede-Kamerlid Roethof inzake het te laat ruimen van explosieven bij een flatgebouw te Leiden. 1972	No, 1

Toegang 2.05.44 – Inventaris van het archief van het Nederlandse Gezantschap / Ambassade in Groot-Brittannië (en Ierland tot 1949), 1813-1954		
Inv. Nr.	Description	Relevant
1414	Stukken betreffende luchtbombardementen van de R.A.F. op Nederland. 1940-1945.	No, 1

Toegang 2.13.71 – Inventaris van de archieven van het Ministerie van Defensie te Londen [1940-1941]; Ministerie van Oorlog te Londen [1941-1945]; Departement van Oorlog: Bureau Londen [1945-1947], (1933) 1940-1947 (1974)		
Inv. Nr.	Description	Relevant
368	Stukken betreffende luchtbombardementen in Nederland. 1941, 1944-1945	No, 1
576-577	Stukken betreffende luchtaanvallen op en inundaties van Nederland. 1940-1945	No, 1

Toegang 2.13.167 – Inventaris van het archief van het 2 ^e Geniecommandement, Bureau Registratie Verdedigingswerken van het Ministerie van Defensie ("Bunkerarchief"), (1923) 1946-1987 (1992)		
Inv. Nr.	Description	Relevant
	Geen relevante inventarissen	

Toegang 2.13.196 – Generale staf / Staf van de Bevelhebber der Landstrijdkrachten 1945-1972		
Inv. Nr.	Description	Relevant
3247	Vrijwillig Landstormkorps Luchtwachtdienst 1940	No, 1

Toegang 2.13.210 – Ministerie van Defensie: Commissie van Proefneming, 1867-1942		
Inv. Nr.	Description	Relevant
23	Staten houdende opgaven van plaatsen waar mogelijk onontplofte projectielen zijn gevonden, die wel of niet geruimd zijn, 1940	No, 1
24	Stukken betreffende het ruimen van landmijnen en het beschikbaar stellen van personeel, ingedeeld naar gebied, 1940	No, 1
25	Ingekomen en minuten van uitgaande stukken inzake aanvragen tot het ruimen van onontplofte (water)mijnen en personeelsaangelegenheden, 1940	No, 1
26	Ingekomen en minuten van uitgaande stukken inzake aanvragen tot het ruimen van onontplofte (water)mijnen en personeelsaangelegenheden, 1941	No, 1
27	Lijsten met opgave van voorhanden springstoffen toebehorende aan de afdeling tot het onschadelijk maken van niet gesprongen munitie, vliegtuigbommen, aanwezig in het Kruithuis te Delft, 1941-1942	No, 2
28	Lijsten met opgave van personeel en afwikkeling van de afdeling belast met het onschadelijk maken van niet gesprongen munitie en vliegtuigbommen, 1941-1942	No, 1

Documents Post-Conflict Period

Not applicable: This report concerns a Research Period of Conflict.

Lacuna in knowledge:

- None.

Analysis of the relevant documents

In this archive no relevant documents have been found.

3.2.6 Semi static archives of the Ministry of Defence at Rijswijk

During the period 1945-1972, ammunition clearings were carried out by various agencies, which kept the clearance data to themselves. The data, if available, has never been centrally archived and unlocked. A small part is located in the archives of the Mine and Ammunition Clearing Service ("MMOD") of the Ministry of Defense's Semistatic Archives in Rijswijk, where the clearances in the period 1945-1947 were made accessible. Sometimes clearance information is also found in other archives, but in the majority of cases the data is no longer available. That's why there is a gap in information on ammunition clearance for the period 1947-1972. According to the CS-VROO, the MMOD archive should always be consulted.

Reliability of the source

The clearance reports of the MMOD (period 1945-1947) are considered very reliable regarding the event and the type of reported explosive. The location of found explosives is, however, is often inaccurate (just the address of the site the explosive was found, sometimes a central point of reference without an indication where the explosive was located), which in certain cases should be taken into account in the demarcation of a suspected area. However, the clearance of explosives by this authority are very reliable (contra) indications for the conclusions regarding the research area.

Consulted documents in the Semistatic archive of the Defense Ministry

In this archive, the archives of the Mine and Ammunition Clearing Service (MMOD) 1945-1947 were consulted.

Analysis of the relevant documents

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.7 EODD archives

From the seventies, the Explosives Clearance Service of the Defence Ministry ("EODD") has performed, reported and archived UXO. These UXO clearance reports ("MORA's") of the EODD are the main source of information for tracing UXO clearances from 1972. The EODD also has mine maps in which the well-known, registered minefields are included with corresponding reports on the clearance of these fields. According to the CS-VROO, the EODD's archive must always be consulted.

Reliability of the sources

Clearance reports/MORA's

The EODD clearance reports (from 1970) are seen as very reliable regarding the event and the type of reported explosive. The location indicators of found explosives are, however, inaccurate (often the address belongs to the plot where the explosive has been found, sometimes a central reporting point without indication of the location of the explosive), which in certain cases should be taken into account when demarcating a suspect area. However, the clearance of explosives by this authority is a very reliable (counter) indication for the conclusions about the research area.

Mine maps

The mine maps are generally reliable, although often not accurately drawn. The latter can be adapted if necessary for the correct analysis and/or demarcation of a suspect area. However, the underlying documents usually concern the mine laying reports of the relevant German units, with exact and specific information about the field. The reports of the clearances of the fields are also generally quite specific, stating the executors, date of clearance, numbers and types of mines, any missing mines and explanations as to why it was suspected that mines were missing.

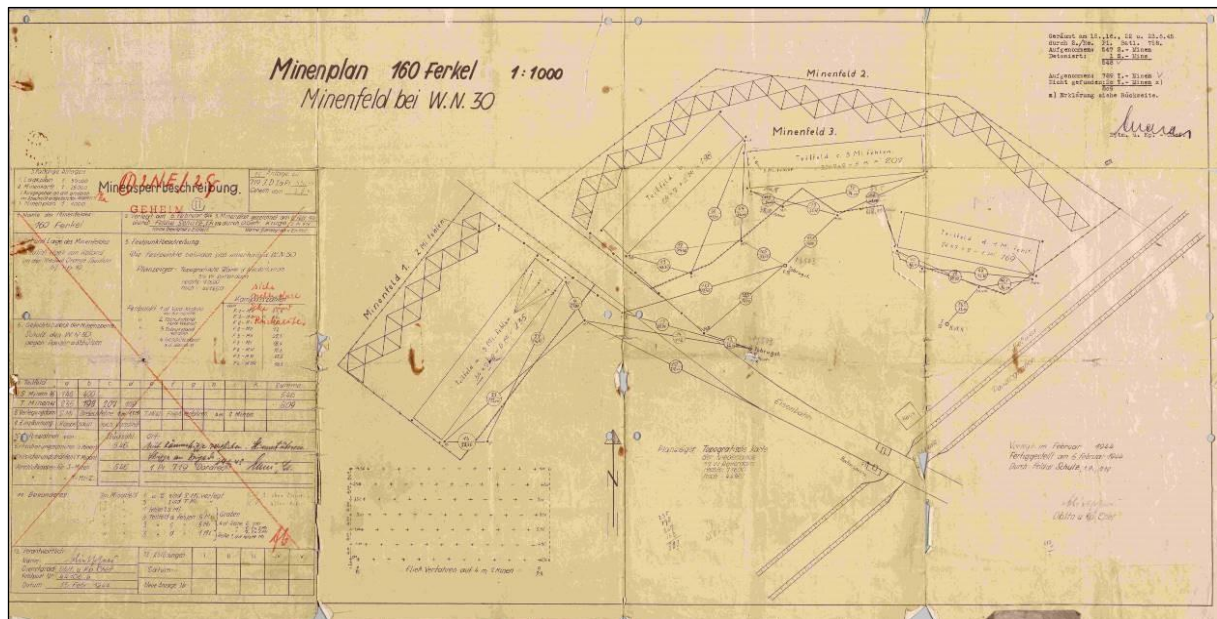


Figure 3.2.6-I. Laying report of mine fields. Source: EODD.

Consulted sources at the EODD

MORA's (Mine and Ammunition Clearance Reports) as well as mine maps have been consulted.

Lacuna in knowledge EODD-archive

- The location indicators on the MORA's are unreliable and even if data is accurate, they are sometimes archived the wrong way. Therefore, MORA's can be missed because they are registered on a wrong address.
- MORA's registered on the location of the police station have not been consulted. These include explosives handed to the police, weapons and other post-war explosives seized by the police. These can't be linked to a WWII location or war activity and are therefore not useful for the investigation.

Analysis of the relevant documents

In this archive no relevant documents have been found.

3.2.8 Historic clubs and associations

Historical societies or local history circles often have periodicals in which a variety of subjects are discussed, including WWII. It differs per association and location how extensive the information is. For example, some associations have members who have a special interest in WWII and other associations are more focused on other subjects.

Reliability of the source

These archives contain very diverse information from many different sources and levels of reliability. If there is no second source confirming a report from a similar source, the reliability of the information is explained and substantiated in the analysis in Appendix 3.

Historical societies and/or local history circles consulted

No historical association or local history circle was consulted for the present research.

3.2.9 Land Registry Zwolle

The Land Registry was founded in 1832 and started surveying under the influence of Napoleon. It soon became apparent that the quality of the cadastral maps was insufficient, causing the maps of the different municipalities to not match each other. From 1885 onwards, a national National Triangle Network was created, which was necessary to improve and guarantee the quality of the map material.³ Nowadays, historical maps, aerial photographs and cadastral information are available via the Land Registry.

Topographic maps

Topographical maps are available from the period starting in the late 19th century to present. These maps can be used to identify historical locations and provide insight into developments since WWII. They are therefore very useful for both Research Period of Conflict and Research Post-Conflict Period.

Defence Overprints

During WWII, the Allies made maps of strategic areas based on aerial photo interpretations, supplemented with information obtained through the resistance. Such maps were topographical maps marked with the locations of German defenses, often with details of the numbers, types and sizes of gun emplacements.

Cadastral information

Locations where war actions took place are often described in sources based on topographical features, which means that those locations can be found using topographical maps. Official documents often use addresses that still exist or can be found through municipal documents about street name changes or renumbering lists. However, sometimes locations are indicated by their cadastral numbers, especially in rural areas.

Minute plans and the Original Indicative Tables (OATs) are the basis of this cadastral information. Minute plans are maps showing the (old) plots and the OATs are sheets with relevant information per plot such as owner and size. The Dutch territory was divided into cadastral municipalities, which in turn were subdivided into sections, each with its own letter and numbers. A cadastral parcel was therefore designated as 'Amsterdam F 4126'. These original cadastral indications were retained as long as nothing happened to the plot. As soon as boundary changes took place or, for example, construction took place on the plot, a new number was assigned.⁴ These changes were kept in Supplementary Sheets or Support Cards. Cadastral indications from WWII very often do not correspond to the current indication. In order to convert old cadastral numbers to current locations, their history must be reconstructed.

³ Source: kadaster.nl

⁴ Source: BHIC Brabants Historisch Informatie Centrum

Reliability of the source

Topographic maps

Topographic maps are considered reliable. They were created by experienced specialists, whose aim was to create the most accurate representation of reality as possible. When using (historical) topographical maps, however, it must be taken into account that they are drawn up over a certain period of time and that details will be out of date upon publication.

Defence Overprints

Defense Overprints are considered reliable. These are interpretations of aerial photographs, in which defense works are drawn in a relatively indicative manner. Although highly experienced specialists carried out these interpretations, observations of the resistance at the locations were used. Members of the resistance were volunteers, often without specialist experience. In addition, the German troops tried to camouflage or conceal such works, sometimes with misleading structures in the area. And finally, this is also a moment in time of the situation.

Cadastral information

The exact boundaries of the plots on the minute plans were initially, from 1832, of limited reliability because the quality of the cadastral maps was still insufficient. It therefore happened that the maps of adjacent municipalities did not match each other. The introduction of the national National Triangle Network in 1885 greatly improved the quality. The minute plans and follow-up maps can be considered reliable for the location of the (old) cadastral parcels. Although all changes in the cadastral data are accurately monitored by the Land Registry, the reliability of translating old plot numbers into current ones depends on the availability of the maps and the amount of land consolidation that has taken place.

During the Second World War, the occupying Germans commissioned the Land Registry to map all (known) duds. The Land Registry has (partly) responded to this. The locations were recorded on the fieldworks (sketches made on site by surveyors of the changes in plot boundaries), in the cadastral maps and in the registers (containing plot descriptions). In the event of changes, this information, to the extent that it was actually recorded by the Land Registry, should also be transferred to the new versions. However, not all dud locations were known and not all known locations will have been recorded.

Consulted information

Topographic maps

The Kadaster's topographic maps are consulted online via www.topotijdreis.nl. For the purpose of Research Conflict Period, maps from the 1930s, 1940s and 1950s are always consulted to get an idea of the location during WWII and to look up specific locations.

Defence Overprints

The Defense Overprint maps as shown below have been consulted.

Defence Overprint maps		
Map. Nr.	Description maps	Relevant
2808	Winschoten, Eastern Holland 25.000	No, 1

Cadastral information.

There was no need to retrieve Cadastral information.

3.2.10 Other Dutch archives

In addition to the already mentioned archive institutions, there are also various archives in the Netherlands that contain relevant information for historical research. It often concerns smaller archives of, for example, local museums, hymnical and historical circles and sometimes even private archives. Such archives do not exist for every location and there is no obligation to consult them in accordance with the CS-VROO.

3.2.10.1 National Firefighter Documentation Centre (Firefighter archives)

The firefighters have drawn up a chronological overview of large-scale accidents in the Netherlands, which include events with a sum of fatalities and injuries greater than or equal to ten. The reason for this criterion is that such numbers of victims require a somewhat extensive and coordinated medical assistance. This list also includes the period of WWII and WWII related accidents in the period following the War.

Reliability of the source

The source is considered to be of varying reliability, as the sources used to compile these lists are very diverse and range from digitized newspapers to records found in archives or diaries/reports of the Air Defense Service. Several references from secondary literature are also included.

Documents consulted

Firefighter archives	
Description	Relevant
Branden met grote aantallen slachtoffers Nederland v8 1	No, 1
Grootschalig verkort NBDC site aug 2015	No, 1
Grootschalig 3 oorlogsjaren 40-45	No, 1
Omgekomen leden LBV HVD BB	No, 1

Analysis of the relevant documents

In this archive no relevant documents have been found.

3.2.10.2 Dutch Railways archives at Utrecht

The Dutch Railways archives are located in the Utrecht Archives. In these archives information on various subjects can be found, from war caused damages and repairs to documented unexploded ordinances near railways.

Reliability of the source

As the Dutch Railways were responsible for the railways and thus often had personnel on site to assess the situation, the information from this archive is considered to be reliable.

Consulted inventories of the NS-archives

The following documents were consulted:

Number 948 – Nederlandse spoorwegen, bestuursorganen		
Inv. Nr.	Description	Relevant
475	Stukken betreffende de totstandkoming en de uitvoering van Wet 1751 inzake de voorziening in de kapitaalbehoefte van de NS en de toekenning van bijdragen in de door de NS ten gevolge van de oorlogsomstandigheden en de bezetting van Nederland geleden schaden, 1945-1955	No, 2

Number 949 – Nederlandse spoorwegen, juridische zaken		
Inv. Nr.	Description	Relevant
696	Verslagen van onregelmatigheden ten gevolge van oorlogshandelingen, 1940-1941	No, 1
934	Inzake gevallen van oorlogsschade (R194), 1950-1954	No, 2

Number 957 – Nederlandse spoorwegen, hoofdboekhouding, administratieve afdeling, financieel-economische zaken		
Inv. Nr.	Description	Relevant
842	Correspondentie betreffende de vergoeding van oorlogsschade, 1941-1947	No, 1
843	Correspondentie met de Algemeen Gemachtigde voor Oorlogs- en Defensieschaden over de Afwikkeling van de schade van de NS, 1940-1945	No, 1
845	Stukken betreffende de regeling van de schade bij de dochterondernemingen, 1945-1950	No, 2
860	Stukken betreffende het verrekenen van de stakingsschade en oorlogsschade, 1945-1952	No, 1

Number 960 – Nederlandse spoorwegen, groep bedrijven infra		
Inv. Nr.	Description	Relevant
1325	Overzicht met statistische gegevens in verband met de wederopbouw van spoorbruggen na de oorlog	No, 2

Number 969 – Groningsch-Drentsche spoorwegmaatschappij		
Inv. Nr.	Description	Relevant
68	Stukken betreffende de oorlogsschade, 1945	No, 1

Analysis of the relevant documents

In this archive no relevant documents have been found.

3.2.11 Witness statements

Interviews with eyewitnesses, who have information about the possible presence of crashed aircrafts, bombs and other combat operations within the area, can provide a lot of useful information. However, more than seventy years later, the number of eyewitnesses is very limited. According to the CS-VROO there is no obligation to consult witnesses.

Reliability of the source

Eventual eyewitnesses were usually very young at the time of WWII, and the events took place more than seventy years ago. Statements of eyewitnesses are therefore not always reliable, so an eyewitness statement must always be confirmed by a second source, or it must be substantiated why a specific statement is considered reliable in the absence of another source.

Consulted witnesses

No witnesses were consulted for this investigation.

3.2.12 Foreign archives

Outside of The Netherlands there are various institutions with extensive information about WWII. These include archives, books and pictures of war activities made or taken by the national troops of the country concerned. As units of various nationalities have fought on Dutch territory, these archives often contain information about the occurrence of explosives in the Netherlands. The foreign archives concerned are described below and the foreign aerial photographs are specified in §3.3.

3.2.12.1 The National Archives in London

The National Archives in London is the official archive of the United Kingdom, containing information about British history up to more than 1,000 years ago. Here, amongst others, Flight Reports can be found with information about air attacks by the RAF during WWII. The following collections in this archive must be consulted in accordance with the CS-VROO:

- Bomber Command AIR14 day and night bomb raid sheets (1940-1945) and form E summaries (1940-1942)
- Bomber Command AIR24 appendices
- Coastal Command AIR15 strike sheets
- Fighter Command AIR24 appendices
- Allied Expeditionary Air Force (AEAF) / Second Tactical Air Force AIR37 daily logs
- AIR27 Squadron diaries of relevant units, if consultation of the previous entries gives reason to do so.

If there are indications in other sources that the research area was hit by Allied artillery shelling in this period, the War Diaries of the relevant Allied units be consulted to gather detailed information about these shellings.



DETAIL OF WORK CARRIED OUT									
By 197 SQUADRON									
FOR THE MONTH OF JANUARY 1945									
DATE	AIRCRAFT TYPE & NUMBER	CREW	DUTY	TIME		DETAILS OF SORTIE OR FLIGHT	REFERENCES		
				Up	Down				
20.1.45 (continued)	TYPHOON I B	S/Lt. R.C. CURRY	PILOT	1255	1335	DD41 INTERDICTION E.885850. The operation was abortive owing to bad weather, 10/10th. snow cloud at 4-14,000 feet and the bombs were brought back.			
	X	P/O. D.E. MATTHEWS		"	"				
	J	P/O. J.K. HARDING, D.F.C.		"	"				
	B	P/O. G.G. GIBBINGS		"	"				
	D	P/O. G.G. MAHAFFY		"	"				
	L	P/O. D.M. SMITH		"	"				
	R	P/Lt. J.G.B. HARTLEY		"	"				
	A	P/O. J.K. BYRNE		"	"				
21.1.45 22.1.45	N	P/O. J.K. BYRNE		1155	1255	NO FLYING.			
	R	P/Lt. J.G.B. HARTLEY		"	"	DD45/SHR1 STRONG POINT BRINSBURG IN BUILDING. These aircraft were airborne with 193,257 and 253 Squadrons and were over the target between 1245 and 1245 hours. This Squadron led by W/Odr. flying dropped all their bombs in a low level attack. All burst in the target area and the building was considered destroyed.			
	L	P/O. G.G. GIBBINGS		"	"				
	I	P/Lt. J.K. HARDING, D.F.C.		1155	1205				
	H	P/O. G.G. GIBBINGS		1155	1205				
	B	P/O. J.M. JAMES		"	"				
	A	P/O. A.R. DE SIE (BRIGIAN) (183838)		"	"				
	S	P/Lt. R.C. CURRY		"	"				
	M	P/O. J.W. HOWELL (AUS425852)		"	"				
	T	P/O. T.E. PARKINSON		"	"				
	X	S/Lt. R.C. CURRY		1430	1530	DD41 LEIDEN BRIDGE Y.785039. These aircraft were led by S/Lt. CURRY and were over the target at 1500 hours. Two direct hits were seen and the bridge appeared to be burning. There was a good concentration of bombs.			
	H	P/O. A.R. JAMES (AUS413870)		"	"				
	S	P/Lt. J.G.B. HARTLEY		"	"				
	B	P/O. G.G. GIBBINGS		"	"				
	P	P/O. G.G. MAHAFFY		"	"				
	N	P/O. J.K. BYRNE		"	"				
	J	P/Lt. J.K. HARDING, D.F.C.		"	"				
	L	P/O. M.R. JONES		"	"				
	A	P/O. D.E. MATTHEWS		"	"				
	T	P/O. D.M. SMITH		"	"				
	G	P/O. J.W. HOWELL (AUS425852)		1425	1515	ARROS BROOK, URSCHT ARAS. This aircraft was led by the Group Captain, Commanding the Wing. The bombs were dropped on the railway junction at E.0994 with two very near misses. Two more on the road to the south of the junction were strafed and both damaged. Over 12 troops were seen to bale out and these were shot up with many hits. Suspected ammo. dumps were seen at the side of the road E.050640. About six bunkers 15 x 20 x 6 feet were seen and much tank activity. DD41 INTERDICTION LEIDEN D.759999. These aircraft were led by P/Lt. HARTLEY and were over the target at 1700 hours. 13 bombs were dropped (one hang up) and no hits were claimed. A V2 was seen taking off from D.931842 heading west at an angle of 70-75 degs. Medium light flak was encountered from the target area.			
	J	P/Lt. J.G.B. HARTLEY		1630	1725				
	H	P/O. G.G. GIBBINGS		"	"				
	T	P/O. J.O. ROSE		"	"				
	G	P/O. T.E. PARKINSON		"	"				
	A	P/O. D.E. MATTHEWS		"	"				
	L	P/O. K.F.C. BOWMAN		"	"				
	W	P/O. J.M. JAMES		"	"				

Figure 3.2.9.1-I. Example of reporting the results of an air raid carried out by the RAF (in this case 197 Squadron of the 2nd Tactical Air Force). It is stated per day which pilots with which type of aircraft were involved in an attack, with planned target and observed results reported. Source: The National Archives in London.

Reliability of the source

Of the performed air raids, flight reports have been made. A flight report states which aircraft, on which day and what time, with which weapons and for what purpose they were supposed to attack. In addition, the crew reported what they actually did during their flight. With regard to the first part - type and number of aircraft, date and time, types of weapons and the intention- these reports are very reliable. Regarding part two - the actually performed attacks - the reports are very limited and must be confirmed by a second source. Experience from T&A and RAF investigations shows that the intended target (certainly at the beginning of WWII) was often not found, and a wrong target was attacked. In addition, also from the experience of T&A and RAF investigations, the reported results were often hugely exaggerated.

Reports of their actions and experiences have also been drawn up by the ground forces, such as the British War Diaries and the After Action Reports of the American troops. This includes the movements of the troops, whether they were under fire, where they observed enemies, etc. The reliability of these reports varies. Reports of people that were under attack will be reliable, but locations and reports from third parties are less reliable. Reports of locations may reveal errors in the map reading, or the description might be too scant to determine the location. If locations were reported by third parties, the chance of errors is even greater. This also applies to third-party reports of other matters, as well as estimates of enemy strength.

Access numbers consulted from the National Archives in London

Relevant search in RAF data

Wardocs has been consulted in order to comply with the guidelines with regard to making a relevant research effort in the data of the RAF, as stated in the CS-VROO. See §3.2.11.5 for further explanation. The documents of the access numbers listed below have been consulted by a researcher from T&A.

AIR 37 – 2nd Tactical Air Force: Registered files and reports		
Inv. Nr.	Description	Relevant
715-718	Daily Log Second Tactical Air Force, Sept. 1944 – May 1945	No, 1

AIR 24 – Royal Air Force Operations Record Book. Appendices		
Inv. Nr.	Description	Relevant
579	HQ FIGHTER COMMAND, Appendices A-I, 1943 May	Yes

AIR 27 – Air Ministry and successors: Operations Record Books, Squadrons		
Inv. Nr.	Description	Relevant
306	No 25 Squadron RAF (Royal Air Force): Operations Record Book, May 1943	Yes

Lacuna in knowledge National Archives London

- The documented locations of attacks are notoriously unreliable.
- The documented results of attacks are often greatly exaggerated.

Analysis of the relevant reports

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.12.2 *Library and Archives Canada*

The Library and Archives Canada ("Ottawa") in Ottawa is the official archive of Canada. War Diaries of the Canadian units and (aerial) photos of WWII can be found here.

Reliability of the source

The same applies here as for The National Archives in London with regard to the prepared reports of ground troops (see §3.2.11.1) and the same as for aerial photographs in general as described in §3.3.

Consulted Access Numbers from Library and Archives Canada

The archive was not consulted for this research.

3.2.12.3 *The National Archives and Records Administration te College Park*

The National Archives and Records Administration ("NARA") at College Park is the official archive of the United States. Here flight data of air raids and (aerial) photos of WWII can be found.

Reliability of the source

This is the same as for the National Archives in London regarding flight data (see §3.2.11.1 and the same as for aerial photos in general as described in §3.3.

Consulted access numbers of NARA, College Park

This archive has not been consulted for this research, as there was no reason to expect additional relevant information to be found in this archive based on the sources consulted.

3.2.12.4 Bundesarchiv-Militärarchiv te Freiburg

The Bundesarchiv-Militärarchiv in Freiburg contains information on German military history from 1867. In accordance with the guidelines of the CS-VROO, at least the Lageberichte collection of the Luftwaffenführungsstab Ic must be consulted, which contains reports of bomb drops on Dutch territory in the period 10 May 1940 - 10 November 1941.

Reliability of the sources

There are several types of reports⁵ in German language. These range from reports prepared by a German authority at a location in the Netherlands reporting on-site events (such as a local commander) to short summary reports sent to Germany to report the events (often air activity) in the Netherlands. For these reports, the same applies as for municipal archives, regional archives and the National Archives: the event itself is reliable, but the reliability of the details depends on (the position of) the person reporting.

The archive also contains some aerial photographs of WWII. The same applies as for aerial photos in general as described in §3.3.

Consulted inventories of the Bundesarchiv-Militärarchiv in Freiburg

RH24-88: LXXXVIII. Armeekorps		
Inv. Nr.	Description	Relevant
RH24-88/13	Tätigkeitsberichte Juni-Dezember 1942	No, 1
RH24-88/70	Tätigkeitsberichte Januar-Juni 1943	Yes
RH24-88/78	Tätigkeitsberichte Juli-Dezember 1943	No, 1
RH24-88/90	Tätigkeitsberichte Januar-Juni 1944	No, 1
RH24-88/99	Tätigkeitsberichte Juli-August 1944	No, 1

RL 2-II – Generalstab der Luftwaffe / Luftwaffenführungsstab, 1931-1945		
Inv. Nr.	Description	Relevant
4 5. Abteilung (Ic; Feindaufklärung, Abwehr, geistige Betreuung)		
4.3 Lagemeldungen, Lageberichte		
4.3.1 Reichsgebiet und alle Fronten		
Bandfolgetitel: Lageberichte alle Fronten.- Eigener und Feindeinsatz, Aufklärung		
RL 2-II/205	9. - 21. Mai 1940	No, 1
RL 2-II/206	22. - 27. Mai 1940	No, 1
RL 2-II/207	28. Mai - 2. Juni 1940	No, 1
RL 2-II/208	3. - 8. Juni 1940	No, 1
RL 2-II/209	9. - 14. Juni 1940	No, 1
RL 2-II/210	15. - 22. Juni 1940	No, 1
RL 2-II/211	23. - 30. Juni 1940	No, 1
RL 2-II/211a	1. - 6. Juli 1940	No, 1
RL 2-II/212	7. - 20. Juli 1940	No, 1
RL 2-II/213	21. Juli - 1. Aug. 1940	No, 1
RL 2-II/1025	2. - 11. Aug. 1940	No, 1
RL 2-II/1026	12. - 16. Aug. 1940	No, 1
RL 2-II/214	15. - 22. Sept. 1940	No, 1
RL 2-II/215	23. Sept. - 1. Okt. 1940	No, 1
RL 2-II/216	3. - 13. Okt. 1940	No, 1
RL 2-II/217	14. - 24. Okt. 1940	No, 1
RL 2-II/218	25. Okt. - 4. Nov. 1940	No, 1
RL 2-II/219	5. - 13. Nov. 1940	No, 1

⁵ Sometimes also in other archives, for which the same reliability applies as described here.

RL 2-II – Generalstab der Luftwaffe / Luftwaffeführungsstab, 1931-1945		
Inv. Nr.	Description	Relevant
4 5. Abteilung (Ic; Feindaufklärung, Abwehr, geistige Betreuung)		
4.3 Lagemeldungen, Lageberichte		
4.3.1 Reichsgebiet und alle Fronten		
Bandfolgetitel: Lageberichte alle Fronten.- Eigener und Feindeinsatz, Aufklärung		
RL 2-II/220	14. - 19. Nov. 1940	No, 1
RL 2-II/221	20. - 26. Nov. 1940	No, 1
RL 2-II/222	27. Nov. - 3. Dez. 1940	No, 1
RL 2-II/223	4. - 12. Dez. 1940	No, 1
RL 2-II/224	13. - 21. Dez. 1940	No, 1
RL 2-II/225	22. - 31. Dez. 1940	No, 1
RL 2-II/226	1. - 9. Jan. 1941	No, 1
RL 2-II/227	10. - 18. Jan. 1941	No, 1
RL 2-II/228	19. - 31. Jan. 1941	No, 1
RL 2-II/229	1. - 9. Febr. 1941	No, 1
RL 2-II/230	10. - 18. Febr. 1941	No, 1
RL 2-II/231	19. - 28. Febr. 1941	No, 1
RL 2-II/232	1. - 8. März 1941	No, 1
RL 2-II/233	9. - 16. März 1941	No, 1
RL 2-II/234	17. - 21. März 1941	No, 1
RL 2-II/235	22. - 24. März 1941	No, 1
RL 2-II/236	25. - 31. März 1941	No, 1
RL 2-II/237	1. - 7. Apr. 1941	No, 1
RL 2-II/238	8. - 14. Apr. 1941	No, 1
RL 2-II/239	15. - 22. Apr. 1941	No, 1
RL 2-II/240	23. - 30. Apr. 1941	No, 1
RL 2-II/241	1. - 6. Mai 1941	No, 1
RL 2-II/242	7. - 14. Mai 1941	No, 1
RL 2-II/243	15. - 26. Mai 1941	No, 1
RL 2-II/244	27. Mai - 7. Juni 1941	No, 1
RL 2-II/245	8. - 15. Juni 1941	No, 1
RL 2-II/246	16. - 25. Juni 1941	No, 1
RL 2-II/247	26. - 30. Juni 1941	No, 1
RL 2-II/248	1. - 6. Juli 1941	No, 1
RL 2-II/249	7. - 12. Juli 1941	No, 1
RL 2-II/250	13. - 18. Juli 1941	No, 1
RL 2-II/251	19. - 24. Juli 1941	No, 1
RL 2-II/252	25. - 31. Juli 1941	No, 1
RL 2-II/253	1. - 9. Aug. 1941	No, 1
RL 2-II/254	10. - 16. Aug. 1941	No, 1
RL 2-II/255	17. - 22. Aug. 1941	No, 1
RL 2-II/256	23. - 28. Aug. 1941	No, 1
RL 2-II/257	29. Aug. - 3. Sept. 1941	No, 1
RL 2-II/258	4. - 8. Sept. 1941	No, 1
RL 2-II/259	9. - 14. Sept. 1941	No, 1
RL 2-II/260	15. - 20. Sept. 1941	No, 1
RL 2-II/261	21. - 26. Sept. 1941	No, 1
RL 2-II/262	27. Sept. - 2. Okt. 1941	No, 1
RL 2-II/263	3. - 9. Okt. 1941	No, 1
RL 2-II/264	10. - 14. Okt. 1941	No, 1
RL 2-II/265	15. - 18. Okt. 1941	No, 1
RL 2-II/266	19. - 23. Okt. 1941	No, 1
RL 2-II/267	24. - 28. Okt. 1941	No, 1
RL 2-II/268	28. Okt. - 3. Nov. 1941	No, 1
RL 2-II/269	4. - 9. Nov. 1941	No, 1

RM 7- OKM / Seekriegsleitung der Kriegsmarine		
Inv. Nr.	Description	Relevant
Seekriegsleitung		
RM 7/345	Bd. 18 Entfernen 15. - 23. Aug. 1940	No, 1
RM 7/346	Bd. 19 Entfernen 24. - 31. Aug. 1940	No, 1
RM 7/347	Bd. 20 Entfernen 1. - 8. Sept. 1940	No, 1
RM 7/348	Bd. 21 Entfernen 9. - 21. Sept. 1940	No, 1

RW 37 - Wehrmachtsbefehlshaber in den Niederlanden (1940-1945)		
The documents mainly contain information about seized properties and goods like airplanes, properties and 'Kriegswichtige Objekten'. Also documents about in the Netherland killed German soldiers.		
Inv. Nr.	Description	Relevant
RW37/23	Wochenlageberichte Bd.1: 29. Dez. 1941-30. Aug. 1942	No, 1
RW37/24	Wochenlageberichte Bd.2: 31 Aug. 1942 – 16. Mai 1943	No, 1
RW37/25	Wochenlageberichte Bd.3: Juni-Nov. 1943	No, 1

The inventories below have been consulted to a limited extent, namely specifically with regard to reports of war actions in relation to the railway.

RL 2-II – Generalstab der Luftwaffe / Luftwaffeführungsstab, 1931-1945		
Uitgebreide inventaris betreffende alle gevechtsgebieden van Duitsland. NL komt bijna niet voor. Er zijn dossiers over 'Angriffe gegen Eisenbahnen.' maar dan betreft het de Duitse spoorwegen.		
Inv. Nr.	Description	Relevant
RL 2-II/329	Bd 2: 1944	No, 1
RL 2-II/330	Bd 3: 1945 Luftlage West nr 1/45 und 2/45, Jan. 1945 Inhoud: gegevens over sterkte van de geallieerde luchtmachten.	No, 1
RL 2-II/350	Kriegstagebuch Nr. 8 (1.9.-31.12.1943) u.ä. Auflösung Luftgau Holland zum 1.1.1944	No, 1
RL 2-II/365	Berichte meldungen Lw.FüSt. Ic.-Luftlage West Bd 1: okt-dez 1943	No, 1
RL 2-II/390	Nachträge, Nachträge zu Schadensmeldungen (Lw.FüSt. Ic Meldewesen Bd 6: West Febr. 1945	No, 1
RL 2-II/391	Bd 8: West, 1.- 11. April 1945	No, 1
RL 2-II/395	Lage West Bd 2: Juli-Dez. 1944 LL-Operation in Holland	No, 1
RL 2-II/396	Bd 3: Jan.-Apr. 1945	No, 1
RL 2-II/422	Feindlage West. Invasion: Holland, Belgien, Frankreich	No, 1
RL 2-II/423	Luftbilder Flugplätze u.a. Eindhoven, Gent	No, 1
RL 2-II/513	Deutschland.- Unterlagen (Statistik) anglo-amerikanischer Luftangriffe auf Deutschland und die besetzten Gebiete (Reichsluftverteidigung). Angriffe gegen Eisenbahnen, Verkehrswege, Industrie, verschiedene Zielgruppe usw. (1943-1945)	No, 1
RL 2-II/525	Luftangriffe auf Bahnanlagen und Züge in der Zeit vom 20.-31. Okt. 1944. – Zusammenstellung (nach Unterlagen des RVN E-Abt.)	No, 1
RL 2-II/553	Britische Navigations-Verfahren. Britische Nachtangriffe	No, 1
RL 2-II/705	Studie zur Schwerpunktkarte der Eisenbahnstreckenziele Frankreich, Belgien, Holland, Eisenbahnnetz, Gesamtbetlänge, Netzdichte	No, 1
RL 2-II/842	Bd 7: West, März 1945	No, 1
RL 2-II/1001	Einsatz der Luftwaffe bei den Operation in den Niederlanden, Belgien, und Nordfrankreich (LwFüSt Ic, Nr 10641/10 geh. (I))	No, 1
RL 2-II/1018	Auswertestelle West, Bildstelle.-Aufnahmen von Feindangriffe mit Zielkamera 15.6.1944 Bildbeilage Kriegsschiffe Nr. 9, Jan.1944	No, 1
RL 2 II/1250	Luftbilder Westeuropa, Frankreich, Westküste	No, 1
RL 2 II/1251	Luftbilder Westeuropa, Frankreich, Westküste	No, 1
RL 2 II/1252	Luftbilder Westeuropa, Frankreich, Westküste	No, 1
RL 2 II/1254	Luftbilder Westeuropa, Frankreich, Westküste	No, 1

RL 8 - Truppenführungsstäbe Fliegertruppe		
Inv. Nr.	Description	Relevant
RL 8/91	Luftverteidigung Raum Niederlande, 15. Sept. - 24. Okt. 1943	No, 1
RL 8/92	Luftverteidigung Raum Niederlande, 25. Okt. - 20. Dez. 1943	No, 1
RL 8/93	Luftverteidigung Raum Niederlande, 21. Dez. 1943 - 28. Jan. 1944	No, 1
RL 8/94	Luftverteidigung Raum Niederlande, 17. Feb. - 30. März 1944	No, 1
RL 8/171	Kriegstagebuch mit Anlagen (Fragment) Englisches Luftlandeunternehmen bei Arnheim	No, 1
RL 8/178	Übersichtskarte Niederlande.- Dislozierung der Tag- und Nachtjagd (M: 1:1.000.000, Kopie)	No, 1

RL 10 - Fliegende Verbände		
Inv. Nr.	Description	Relevant
RL 10/479 JG 1	Seeaufklärung und Luftsperrre Holland 1942-1944	No, 1
RL 10/487 I./KG 4	u.a. Einsatz Holland 1939-1944	No, 1
RL 10/540 (NJG 1)	Einsatz besetzte Westgebiete 1942-1945	No, 1
RL 10/ 541(NJG 1)		
RL 10/549	Luftbilder Vlissingen	No, 1
RL 10/560 JG 1	u.a. Einsatz Niederlande 1941-1943	No, 1
RL 10/572 (NJG 1)	Luftverteidigung Niederlande 1940-1945	No, 1
RL 10/576 (NJG 11)	u.a. 1944 Einsatz Niederlande	No, 1
RL 10/598 (NJG 1)	Einsatz besetzte Westgebiete, Reichsgebiet 1940-1945	No, 1
RL 10/620 (NJG 1)	Einsatz besetzte Westgebiete (NL) 1940-1945 'Abschussliste der III. NJG I'	No, 1

RL 11 - Truppenführungsstäbe der Flakartillerie		
Inv. Nr.	Description	Relevant
RL 11/186	Kriegstagebuch Nr. 2 (Einsatz Niederlande) 14. Feb – 17. Apr 1945 Luftverteidigungs-Kommando 5 / 5. Flak-Division	No, 1
RL 11/187	Anlageband A.- Tagesmeldungen 14. – 17. Feb 1945	No, 1

RL 14 - Verbände und Einheiten der Luftnachrichtentruppe		
Inv. Nr.	Description	Relevant
RL14/19	4. Kompanie – Berichte über den Einsatz in den Niederlanden (Jan. 1941-08.05.1945)	No, 1

RL 20 - Luftbilder		
Foto's zijn van april en mei 1943 Deze Duitse luchtfoto's zijn voorzien van een beschrijving over hoe goed of slecht de velden erbij lagen vanuit de lucht (ten behoeve van de camouflage). Bijv. 'Das Rollfeld ist zu einfarbig...' (Venlo) of 'Die Feldereinteilung ist vollkommen verblasst.' (Eindhoven). De foto's zijn niet allemaal van een bijzonder goede kwaliteit en allemaal vrij hoog genomen.		
Inv. Nr.	Description	Relevant
RL20/247	Luftbilder von Gilze-Rijen, Eindhoven, Woensdrecht, Vlissingen, Waalhaven, Haamstede, Volkel und Venlo	No, 2

RL 34 - Luftwaffenfeldverbände		
Inv. Nr.	Description	Relevant
RL34/163)	Abteilung Ia.- Kriegstagebuch Nr. 1 (Niederlande/Amsterdam) Pionier-Bataillon 16 (L) (16. Lw.Felddivision)	No, 1
RL 34/202	Luftraumbeobachtungsdienst.- Verdichtung des Flugmeldedienstes Jäger-Regiment 31 (L) (16. Lw.Felddivision)	No, 1

RH 4 - Oberkommando des Heeres/Chef des Transportwesens		
Inv. Nr.	Description	Relevant
RH 4/2	Allgemeine Abstimmungen zwischen dem General der Eisenbahntruppen und dem Baustab Speer über verschiedene Bauprojekte	No, 1
RH 4/316	Eisenbahn Holland	No, 1
RH 4/317	Eisenbahn Holland	No, 1

RH 66 - General der Eisenbahntruppen		
Inventaris met verwijzingen naar vele landen in Europa. Met name Oostfrontlanden, maar ook België en Turkije. Sommige inventarisnummers verwijzen naar Luftbilder/ Lufbildaufnahmen, maar Nederland komt dan niet voor in het rijtje landen/plaatsnamen.		
Inv. Nr.	Description	Relevant
RH66/257	Dgl. Niederlande (1944-1945)	No, 1
RH66/705	Schriftwechsel verschiedene Dienststellen über Streckenhefte besetzer Gebiete, Polen, Niederlande, Frankreich, Sowjetunion	No, 1
RH66/719	Sammlung und Verwertung von Kriegserfahrungen. Band II. U.a. Schriftverkehr über Luftbildaufnahmen v.a. Fr, B, Lux, Pol	No, 1
RH66/176	Berichte, Meldungen, Nachrichten. U.a. Sperr- und Zerstörungsmassnahmen in Frankreich und den Niederlanden, sowie der Rheinübergänge.	No, 1

RW 18 - Transport und Verkehrskommandanturen (1936-1945)		
Betreft België en Frankrijk.		
Inv. Nr.	Description	Relevant
RW18/27	Einsatz von Eisenbahnflakzüge	No, 1
RW18/35	Kriegstagebuch 17.5-31.8.1940	No, 1

RW 37 - Wehrmachtsbefehlshaber in den Niederlanden (1940-1945)		
De stukken betreffen vooral in beslag genomen zaken als vliegtuigen, grond en 'Kriegswichtige Objekten'. Verder een deel over in Nederland gesneuvelde Duitse soldaten		
Inv. Nr.	Description	Relevant
RW37/22	Wöchentliche Lageberichte des Wehrmachtsbefehlshabers in den Niederlanden 11.1.1941-28.12.41	No, 1
RW37/30	Kriegstagebuch mit Anlagen 21. Feb.-30 Juni 1944	No, 1
RW37/44	Kriegstagebuch 4. Jan.-30 Juni 1944	No, 1
RW37/47	Bd. 3: Feb.-Juli 1944 Monatsberichte der Abteilungen II, IVb, IVc, IV/Wi für Jan.-Juni 1944	No, 1
RW37/52	Kriegstagebuch mit Anlagen Bd 1: 1940-41 Aanleg van <i>Nachrichtennetz</i> en <i>Funknetz</i> , kortom kabels en leidingen door NL	No, 1
RW37/53	Kriegstagebuch mit Anlagen 1941 De aanleg en zorg voor <i>Nachrichtenverbindungen</i>	No, 1
RW37/55	Kriegstagebuch mit Anlagen Bd 2: 1942	No, 1
RW37/56	Kriegstagebuch mit Anlagen Bd 1: 1942	No, 1
RW37/58	Befehle für Massnahmen der Auflockerung, Räumung, Lämung und Zerstörung (1945)	No, 1

ZA 3 - Einrichtungen im Dienste der Alliierte Streitkräfte - Studiengruppe Luftwaffe		
Inv. Nr.	Description	Relevant
ZA 3/187	Luftgau Holland und B/N-Fr. Beantwortung von Fragen	No, 1
ZA 3/161	Luftkrieg in Westen 1942 Luftschutz in Holland, B, Fr	No, 1
ZA 3/ 859	Der Nachtschlachteinsatz insbesondere der Nachtschlachtgruppe 1- 3 (West einsatz)	No, 1
ZA 3/720	Titel: Kriegsgeschichtliche Studie Der Einsatz der Operativen Luftwaffe im Westfeldzug 1939/1940	No, 1
ZA 3/722	Titel: Der Westfeldzug 1939-1940 (Studiengruppe Geschichte des Luftkrieges)	No, 1
ZA 3/723	Titel: Der Einsatz der operativen Luftwaffe im Westfeldzug 1939/40 Studie West (Studiengruppe Geschichte des Luftkrieges)	No, 1

Militärgeschichtliche Sammlung		
Inv. Nr.	Description	Relevant
MSG 2/1470-72 MSG 2/1474-75 MSG 2/1477-78	Eisenbahntruppen und Westbefestigungen im Ersten und 2. Weltkrieg	No, 1

Lacuna in knowledge Bundesarchiv-Militärarchiv in Freiburg

- Much information from German authorities was lost in battle, deliberately destroyed or lost during WWII. It can therefore be stated in advance that information may be missing in the inventories consulted.

- Several of the pieces, such as the Kriegstagebücher, are handwritten. These manuscripts are not always easy to decipher.

Analysis of the relevant documents found

The relevant documents have been further noted and analysed in the chronological overview in Appendix 3.

3.2.12.5 Wardocs (Hans Nauta)

T&A regularly collaborates with Wardocs, the company of renowned researcher Hans Nauta. Wardocs provides data on bombings and/or plane crashes from foreign archives such as The National Archives in London, The National Archives and Records Administration ("NARA") in College Park and the Bundesarchiv-Militärarchiv in Freiburg.

Reliability of the source

Hans Nauta owns an extensive database of documents from the archives described above. He has a great deal of experience in archive research and assisting with preliminary investigations into possible explosives. He also supplies scans of the original archive documents with reference to the source. In doing so, he provides information based on sound research and with verifiable sources. The delivered documents have the same reliability as the ones from the relevant archives. Because Hans Nauta has a very large database, which he consults extensively, some gaps in knowledge of certain sources can in fact be covered. The substantiated reports of Wardocs are analyzed and processed by T&A as part of the investigation.

Relevant search in RAF data

Wardocs has been consulted in order to comply with the guidelines of making a relevant research effort in the data of the RAF, as stated in the CS-VROO. Based on the very extensive and systematically accessible database of Wardocs, a relevant search was made in the following sources:

Commands

- AIR14: Bomber Command. Day and night bomb raid sheets (1940-1945) en form E summaries (1940-1942)
- AIR15: Coastal Command. Strike sheets
- AIR16: Fighter Command
- AIR24: Fighter Command and Bomber Command. Appendices.
- AIR37: Allied Expeditionary Air Force en Second Tactical Air Force, daily logs

Groups

- AIR25: Groups

Squadrons

- AIR27: Squadrons

T&A considers Zwanenburg's books to be a relevant source in the search of documents of Bomber Command RAF. Although for these works Mr. Zwanenburg has only used the Daily and Weekly Summaries from The National Archives in London, which are not exhaustive for certain periods of WWII, T&A is of the opinion that it is sufficient for three reasons:

Firstly, the reliability of the location markers in Bomber Command RAF's records – they are notoriously unreliable. Especially since early in the war the RAF switched to almost exclusively night attacks, which did not benefit navigation. A report in these documents of an attack in or near the investigation area, without confirmation from a source that is reliable with regard to the location, would therefore in no way lead to a different conclusion of the investigation.

Secondly, Zwanenburg has already made a fairly extensive search for his investigations and has incorporated the reports regarding The Netherlands in his books. A more detailed search, without additional information being available for targeted searches, would therefore have to go deeper and be very labour-intensive.

Thirdly, the gap in Zwanenburg's books is mainly at the end of WWII, when the war took place in full force in and near The Netherlands. To overcome this, T&A always consults aerial photos from the end of WWII, so that incidental and/or unrecorded traces of acts of war are also found. If these show that there has been an air raid on or near the research area, T&A will if necessary, search the archives of Bomber Command RAF.

T&A also consults aerial photographs from the end of WWII, so that incidental and/or traces of war actions not recorded in other sources are found. If this shows that there has been an air raid on or near the research area, T&A will carry out a search in the RAF archives where necessary.

In other words: researching the documents of Bomber Command RAF in advance – so without concrete indication from another source – can only lead to a different conclusion if (1) the location designation in the relevant documents is correct and accurate enough, (2) the attack was not already mentioned in the Zwanenburg books, (3) no other source mentions bombings, (4) an aerial photo is available after the attack and (5) the aerial photo shows traces of the attack to confirm. According to T&A, the extra effort is therefore disproportionate to the chance of usable results that otherwise would not have been obtained.

T&A will search the archives of Bomber Command RAF if there are indications from other sources that point to a bombardment by units of this Command.

Entries of the National Archives in London consulted by Wardocs

Through Wardocs no relevant information concerning this research was found.

3.2.12.6 *Service Historique de la Défense, Château de Vincennes (Frankrijk)*

The Service Historique de la Défense ("SHD") is the archive of the French Ministry of Defence. It mainly contains documents about French military history from the 17th century. Although the French army and air force were not very active during WWII in the Netherlands, in May 1940 they fought and carried out air raids in Zeeland and some parts of Brabant.

Reliability of the source

The same applies as for The National Archives in London (see §3.2.11.1) and collection 409 from the NIMH (see §3.2.3), namely that battle reports and achieved results can be consciously or unconsciously exaggerated. In the heat of battle observations were sometimes erroneous and the French were less familiar with The Netherlands and therefore misstated names and locations.

Consulted entries of Service Historique de la Défense

The archive was not consulted for this research.

3.2.13 Internet information

Nowadays, the internet is a good source of information, also for historical preliminary research. Although on the internet contains a lot of unreliable and imprecise information, many archives have now made photos, archives, diaries and more digitalized material available through their website. In addition, information from amateur historians, recent newspapers, contact details of potential witnesses and location experts and more can be found.

Reliability of the source

The reliability of information from the internet is very variable. Information from the internet is used in investigations only when the source is considered reasonably to very reliable, or at least confirmed in one reliable source. If the information found on the Internet is decisive for an analysis, the reliability will be mentioned in the analysis in Annex 3.

Website Vergeltungswaffen

The website <http://www.vergeltungswaffen.nl/> gives an overview of events about V-weapons (V1 and V2) in The Netherlands. The map lists impact and launching locations. The notifications may contain additional information regarding date and location. However, the reports are not provided with source reference. Based on our own research, it can be confirmed that the indicated locations and data are not always correct and some reports are double. Also, of several reports the exact location cannot be found. Vergeltungswaffen.nl has been used in this research for an indication of the events concerning V-weapons. For the delimitation of UXO suspect areas, notifications should always be confirmed by other sources.

Consulted websites

Website	Short explanation	Source description ⁶
http://www.topotijdreis.nl/	Historical maps of Land Registry	Kadaster topotijdreis
http://www.echodelta.net/mbs/eng-translator.php	Website to convert coordinates used by the Allies to current locations.	N.v.t.
http://www.vergeltungswaffen.nl	Overview of V1 and V2 impacts in the Netherlands	Vergeltungswaffen
www.ikme.nl	Military Heritage indicative map	ikme
https://www.delpher.nl/nl/kranten	Digital archive of historical newspapers	Delpher
https://www.airwar4045.nl/	World War II allied aircraft crashes in the Netherlands	Airwar40-45
http://beeldbankgroningen.nl/	Various photographs of the surroundings of Groningen	beeldbankgroningen

Analysis of the relevant reports

No relevant notifications have been found.

⁶ In Appendix 3 these descriptions are mentioned for the specific website in the column "source description".

3.3 INTERPRETATION OF AERIAL PHOTOGRAPHS

During WWII, the Allies carried out various photo reconnaissance flights over The Netherlands. Many of these aerial photographs can be found in the Special Collections of the Wageningen UR library ("Wag") and at the Land Registry in Zwolle ("Zwolle"). Also, the aerial photography collection of the Royal Commission on the Ancient and Historical Monuments of Scotland ("RCAHMS") / National Collection of Aerial Photography ("NCAP") in Edinburgh (within two separate archives, "ACIU/JARIC") and the National Archives and Records Administration in College Park ("NARA") have (a large amount of) aerial photographs of The Netherlands available. The National Archives in London ("TNA"), the Laurier Military History Archive in Canada ("LMH"), the National Air Photo Library Ottawa ("Canada"), the Bundesarchiv/Militärarchiv in Freiburg ("BAF") and the railway museum in Utrecht ("SMU") have a more limited number of aerial photographs of The Netherlands.

Criteria aerial photo selection

Aerial photos are selected based on several criteria. The date is very important. It is preferable to use a picture taken as soon as possible after a war activity, as the traces of the war operations are generally more visible. In order to properly distinguish these traces - if necessary - a picture of the war activity is consulted, preferably date shortly before the event. In addition, image quality is very important. It is preferable to have a sharp picture of the right scale and without limiting factors, such as cloudiness, or inundations, or damage to the picture itself. See also Appendix 5 for the agreements with the client regarding the selection of aerial photos.

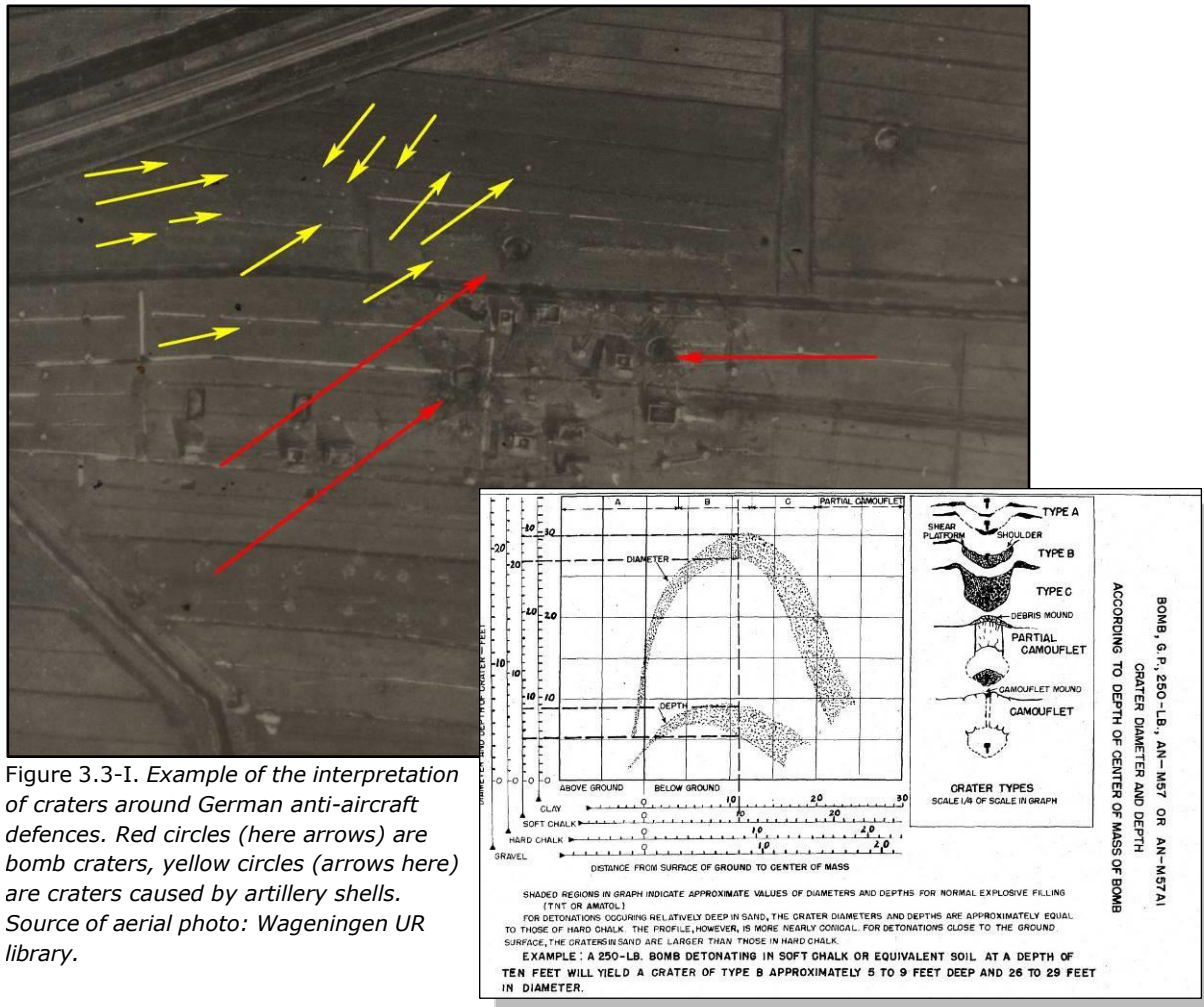
In addition, an area covering aerial photo analysis with WWII photos is performed in order to obtain a complete picture of the war operations. This is done even if there were no indications of war activities having taken place previously.

Interpretation of aerial photography

Photographs are interpreted independently by experts with experience in the interpretation of aerial photographs of the period 1940-1945. One of these experts carries out the analysis of the original footage with the knowledge from the other source material. Photo editing software is used, which enables us to adjust the brightness, contrast and sharpness of the image. The second analyst performs the analysis without the additional information from the source material and uses ArcGIS and a georeferenced aerial photograph, using an Image Analysis Toolbox and Effect Toolbox for image editing and analysis (including Dynamic Range Adjustment, Swipe functionality).

Reliability of the source

Aerial photos are generally considered a reliable source. It should be taken into account however that aerial photographs are an interpretation, in other words, some sort of "translation" of what is visible in the picture. Since not all traces of war activities are unambiguous as such, however, it is true that the reliability of these traces can differ. The reliability is increased when traces can be related to, for example, known acts of war.



In some cases, traces are not unambiguously related to the well-known acts of war. With the help of information about bomb racks (see top inset, source: Boeing B-17G Field Service Manual) based on a striking crater pattern, in some cases it can be determined which type of aircraft dropped the bombs, in other cases an analysis can be supported by information on crater dimensions (see bottom inset, source: Terminal Ballistic Data – volume 1).

When analysing the traces of acts of war, it is assessed per track/object how likely the conclusion is. In accordance with the CS-VROO, there are three classifications:

1. Confirmed: Reliability borders on certainty. The observation can be confirmed by a second source (reliability 99%);
2. Probable: the experts are mostly certain of the validity of the classification of the object on the aerial photo (reliability 50% or higher);
3. Possibly: the experts are largely uncertain about the validity of the classification of the object on the aerial photo (reliability lower than 50%).

Per object at least two experts assess how reliable the conclusion of the aerial photo analysis is. Differences in the interpretations between the experts are discussed and result in a joint final classification. If traces on an aerial photograph are not unambiguous, it will be considered whether they are confirmed by a second source. The aerial photo analysis is described in the event list in Appendix 3. Unless otherwise stated, the described traces of acts of war and objects are assessed as 'probable', or as 'confirmed' when there is a second source which verifies the observation. The assessment of the (un)certainly will be substantiated and it will be stated how this has been taken into account in the conclusions (suspect/non-suspect).

Consulted aerial photographs

The table below lists all aerial photographs of the research area consulted for this study. The abbreviations in the "Archive" column refer to the archive institutions as indicated at the beginning of this paragraph.

In Appendix 4, frames indicate which area is covered by each aerial photograph. Each frame is provided with a marking, in which the last digits indicate the photo number and the combination of numbers in front of it the sortie number.

Date	Photonr	Sortie	Map (1:x)	Relevant	Archive
06.10.1944	3087	106G/3262	ca. 10.000	Yes. Consulted in connection with bombardment on January 27 th , 1944 (marking number 6045-008)	Zwolle ACIU
29.10.1944	3338	106G/3444	ca. 10.000	Yes. Consulted in connection with bombardment on January 27 th , 1944 (marking number 6045-008)	Zwolle
19.04.1945	7092	7/111C	ca. 45.000	Yes. Consulted for area-covering aerial photo analysis of the end of WWII	JARIC NARA

Lacuna in knowledge aerial photos

- None.

Aerial photography analysis of war activities

For the aerial photo analysis, see the chronological table in Appendix 3.

Aerial photography analysis post-war in connection with ground moving activities

For the relevant post-war ground movements, refer to the chronological table in Appendix 3.

4 PHASE 2: ANALYSIS SOURCE MATERIAL

In this phase, the historical factual material as derived from the inventory phase is analysed in detail. Based on the outcome, it is determined whether the presence of explosives is suspected. This analysis is done per relevant event in the chronological overview in Appendix 3. In this chapter, a general explanation is given about the implementation of the analysis.

Suspect or non-suspect?

In the analysis the source material is analysed, and its reliability is assessed. The sections in Chapter 3 show, by source, the guidelines T&A uses to assess the reliability. In accordance with §2.3.2 of the CS-VROO, a substantiated conclusion is made based on the analysis of the indications and contraindications from the investigation of the source material as to whether there are indications for the presence of UXO in the research area (conclusion of **suspect** or **non-suspect** area), because it cannot be demonstrated that all the ammunition that has possibly been used has exploded or have now been cleared.

The document CS-VROO-02⁷ is used as a guideline for this assessment. In it various, possibly relevant, research questions are asked about common war acts/indications. The answers to these questions are substantiated with clear and traceable references to the sources and databases of resources used. If there is a deviation from this guideline, this will be justified in the analysis of the relevant war act/indication in Appendix 3. Appendix 5 also indicates how T&A deals with the research questions.

If, after the analysis of the source material, no facts indicate the possible presence of explosives, the conclusion non-suspect is drawn. If the presence of explosives is suspected, the conclusion suspect drawn. In that case, an analysis must be performed to determine the demarcation (horizontal and/or vertical), what (sub)type of explosives could be present and what calibre, nationality and appearance they have. In addition, the expected number of UXO must be given and, in the case of airplane bombs, also the type of detonators.

Based on this analysis, **part of the research area has been declared suspect**.

Complementing the analysis – demarcations, types of explosives, etc.

In Appendix 3, the last column of the table indicates for each event which suspect sub-area it belongs to. The table in Chapter 6 contains the additional analysis for each suspect sub-area.

For the suspect parts of the research area, the analysis has been supplemented with:

- Determining and demarcating the suspect area horizontally and vertically.
- Determining the main type, caliber, nationality, appearance and expected number of suspected explosives.
- Determining the sub-species and type of detonator(s) of suspected airplane bombs.

Demarcation of suspected sub-areas has been carried out per main type of explosive.

⁷ The CS-VROO-02 is a document with "Further provisions for carrying out Preliminary Investigation and Risk Analysis associated with the Certification Scheme Preliminary Investigation and Risk Analysis of Explosive Remnants of War (CS-VROO-01)".

Horizontal demarcation

The horizontal demarcation of suspect areas was made based on the results of the inventory of the source material (including the overview map in Appendix 4) and the CS-VROO-02.

This demarcation is described in the table in Chapter 6 and shown in the Soil UXO risk map in Appendix 1.

Type, caliber, nationality and appearance of the suspected explosives

Based on the source material found, an analysis was carried out of the suspected main type, caliber, nationality, appearance and expected number of the explosives within the suspect area. If the main type concerned airplane bombs, an additional analysis was carried out on the suspected sub-type and type of detonator(s).

Vertical demarcation

Explosives can be found right under the WWII ground level. The maximum depth at which explosives occur depends on various factors such as soil condition, type of explosives and in case of aerial bombs also velocity, height and angle.

Based on the type of possible explosives, soil type and post-war activities, a vertical demarcation of the suspect area is determined, as shown in the table in Chapter 6. It can be assumed that the ground level at the time of WWII corresponds to the current ground level, except where it is stated that this is not the case (see project-specific background risk at the end of this chapter). If during on-site activities this assumption proves to be incorrect, the assumption should be adjusted based on the newly acquired information.

Non-aerial ammunition

Ammunition that hasn't been thrown from an aircraft is generally expected to be up to 2.5 m below the surface, depending on the soil structure and type of explosives.

The depth below ground level given in Chapter 6 can be converted to the height with respect to the NAP (Dutch standard water level) by the Dinoloket (www.dinoloket.nl) and/or through the general height map of The Netherlands (www.ahn.nl).

The depth demarcation can then be considered a good indication based on the accessible information. If more detailed data about the soil structure become available, or about post-war soil disturbance, constructions of buildings or fill layers, it is recommended to re-establish the depth demarcation based on this additional information and to determine the necessity and method of UXO detection on that basis.

Unsuspected Top Layer

If post-war soil disturbance has taken place within suspect areas, this may mean that there is no significantly increased risk of encountering explosives for this disturbed soil layer (unless there are indications that explosives are indeed present in that disturbed layer). This concerns the following areas:

- Post-war constructed elevation layers.
- In certain circumstances underneath pre-WWII buildings.
- Stirred soil, where it is likely that explosives, if present, would have been discovered during previous work. This applies, for example, to soil above cables placed after the war, post-war renewed ballast layers and previously dredged water soils, where the planned activities are demonstrably not going deeper.

Depth of post-war works

The following can be used as general guidelines for depths of post-war works:

- Under demolished and post-war buildings: foundation depth (often 2 to 4 m below the surface unless the soil is soggy and the buildings rests on piles, then up to 10 Mpa low) at the location of the piles.
- Ballast renewal on continuous tracks: up to 0.5 m-BS.
- Roads and parking spaces: up to 0.5 below surface.
- Cables and pipes: 0.5 to 1.0 m below surface.
- Dam walls: deeper than a layer with 10 MPa pressure resistance and usually at least 4 meters long.

Please note: The above listed are just indications, which must in all cases be verified. Such verification can be done, for example, by conducting a Research Post-Conflict Period, in which post-war developments are reconstructed through desk research of available (aerial) photographs, topographical maps, drawings, archival documents and/or witnesses.

In some cases, the available information about the depth of post-war works, is so general or absent that it must be established/verified in the field through research. This can be done by drilling or probing, digging test trenches or conducting geophysical research.

See the end of Chapter 6 for project-specific post-war works.

Risk analysis

In the event that excavation work is planned within the suspected area, it is advisable to have a risk analysis carried out, which will result in advice on how to deal with the risks of the suspected explosives in the planned work and future land use. For the planned activities for which this preliminary investigation was carried out, such an analysis was carried out in abbreviated form in Chapter 5.

5 PHASE 3: SHORT RISK ANALYSES OF THE PLANNED ACTIVITIES

The potential presence of UXO in a suspect area may pose a risk during the execution of ground-moving operations. Whether the suspected explosives constitute a risk and, if so, what measures can be taken to prevent or reduce this risk depends on various factors such as the type and appearance of the suspected explosives, the demarcation of the suspected area, the planned work and environmental factors. Based on this, a risk analysis can be carried out for future ground moving activities and land use within the research area.

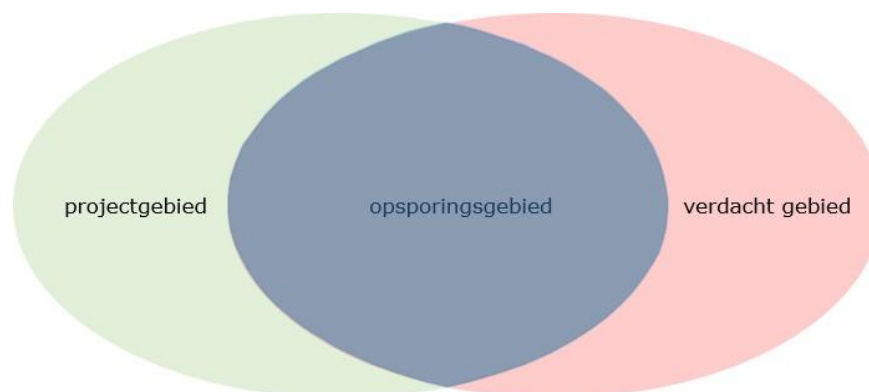
In this chapter, an abbreviated risk analysis is carried out to determine whether follow-up measures are recommended in relation to the possible presence of UXO. This generally leads to the recommendation that measures are necessary in the form of a (complete) Risk Analysis UXO and/or UXO survey (UXO detection and approach of UXO) on the one hand or that there is no reason to take further measures on the other. This is not a complete Risk Analysis OO in accordance with the CS-VROO. The results of this abbreviated analysis are stated in Chapter 7 with accompanying advice.

5.1 PLANNED ACTIVITIES

Excavation work will be carried out at the location for the construction of a data center.

5.2 ABBREVIATED RISK ANALYSIS

In general, risks related to possible UXO are limited to the area where ground disturbing works overlap with a suspect area, the so-called investigation area (see illustration below).



Investigation area (opsporingsgebied) is work area/project area (werkgebied/projectgebied) within a suspect area (verdacht gebied).

Chapter 6 lists the horizontal and vertical demarcation of each suspect sub-area. They are also made visible in the map in Appendix 1, where they are marked in red.

Where excavation work is planned in a suspect sub-area in post-war undisturbed land, further safety measures are generally necessary in connection with the planned work and the future use of the land. The nature of the work is also important. In some cases, part of a suspect area where no work is planned also belongs to the detection area. This is, for example, the case when there is a safety zone for work that causes large vibrations, such as pile driving and (high-frequency) vibration of sheet pile walls.

For the planned works of this study, the conclusions of the abbreviated risk analysis can be summarized as follows:

Excavation work is planned in suspect soil, as a result of which additional safety measures are recommended.

See Chapter 6 for further explanation.

Note: the conclusions of the abbreviated risk analysis relate to the activities described in §5.1.

6 CONCLUSIONS

6.1 CONCLUSIONS OF THE PRELIMINARY INVESTIGATION

The analysis of the facts resulted in the conclusion that several types of explosives may have been left behind in the research area during WWII. This means that a part of the research area is Suspect Area (Conflict Period).

The table below describes the suspect areas, including the (sub)species, calibers, nationality, appearance and horizontal and vertical demarcations.

In Appendix 1, these areas in the Soil UXO risk map Conflict Period are shown in red. The suspect sub-areas are also numbered in the table below and provided with a corresponding number in the Soil UXO risk map.

Conclusions and demarcations (see Chapter 4 for explanation)				
Horizontal demarcation	(Sub)species, caliber and nationality of possibly present uxo	Appearance	Number	Vertical demarcation
Suspect area 1				
Based on tag number 10934-001				
Area within 100 meter around HM 11.6 on the railroad between Winschoten and Bunde where no post-war groundwork has taken place.	<u>Allied artillery ammunition</u> : 20mm gun*	Fired	A few dozen	Given the soil structure (see §2.1), explosives are to be expected from ground level to a maximum of 0.3 meters below ground level**
* The CS-VROO doesn't have guidelines for demarcating a suspect area in aircraft shelling. There is also insufficient information known at the time of preparing this report on the dispersion of impacts of 20 mm shells during aircraft shelling in WWII. The dispersion will depend, among other things, on how steadily the aircraft and artillery were aimed at the target, how far away they were from the target, whether the target itself moved, and how long they fired (each piece of artillery could be deployed for a maximum of circa 10 seconds before the ammunition ran out, firing about 12 shells per second per piece of artillery).				
** Ground level refers to ground level at the time of WWII. It can be assumed that the ground level at the time of WWII corresponds to the current ground level, except where it is stated that this is not the case (see also project-specific post-war groundwork at the end of this chapter).				

For additional information on horizontal and vertical demarcation and the suspected species, quantities and appearance of the explosives, see Chapter 4 and the Annexes. Appendix 3 contains the explanation of the facts based on which the areas have been declared suspect and demarcated.

Project-specific background risk

The first table in Appendix 3 describes the post-war works and its locations are listed in Appendix 4. For further explanation on postwar groundworks and background risk, see Chapter 4.

Areas known to be clear of explosives within the study area

As far as we know, no areas have been stated clear of explosives based on previously conducted investigation work.

The client is advised to share the findings of this report with the municipality within which the research area is located.

6.2 COMPARISON WITH PREVIOUSLY CONDUCTED RESEARCH

A preliminary investigation into explosives has been carried out in the past. The differences are due to the following factors.

- In the previous report, post-war groundwork leading to soil disturbance of the first 0.3 m below ground level was not taken into account when demarcating the suspect area.

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the analysis of the source material and the planned works as described in §5.1, it appears that excavation work is planned in a suspect area (red area in Appendix 1), as a result of which additional safety measures are recommended.

Work in suspect area*

* This area is shown in red in the Soil UXO risk map Conflict Period in Appendix 1. For the red part, there are no clear indications that the soil was disturbed post-war.

Any work that will take place in this suspect area will be carried out in soil in which explosives may still be present.

Advice:

- Have a **UXO survey (UXO detection and approach of UXO)** carried out. It is recommended that detection is carried out before the start of or during regular work in a suspect area (see red area on the map in Appendix 1). This is advised for the parts where excavation work is planned within a suspect area.

Phases of detection survey:

1. Non-real time detection project plan to be submitted to authorities.
Work can be carried out immediately.
2. Making search areas ready for detection (passable without obstacles) by or on behalf of the client (mowing/leveling).
3. Surface and / or depth detection:
 - Area-covering measurement of work areas within suspected areas (detection areas).
 - Surface detection, depending on project-specific (disturbing) factors, may usually be around 4.0 m below ground level.
4. Delivery report, "free of UXO" declaration:
 - Surface detection Research results of detection result in a land survey map with suspect objects and partly or non-interpretable areas.
 - Advice additional detection activities (approach).
5. Projectplan real-time detection and approach to be submitted to the authorities for approval. Work can only start after active approval.
6. Real-time detection and approach.
7. Suspect objects, partly released areas, and disturbed areas are further investigated:
 - Approach team and secured crane (if necessary).
 - Digging layer by layer and identify and temporarily safeguard detected explosives.
 - Hand over the found explosive to the EOD and clearance.
8. Delivery report, "free of UXO" declaration.

Research results of the approach result in a land survey map with areas (partly) declared as free of UXO.

Detection depth

The vertical demarcation as described in Chapter 6 shows the depth of the expected types of explosives within the suspect areas. Depending on the nature of the work and the wishes of the client, the depth of investigation must be determined. The depth of detection depends on several factors:

- Depth of suspect area: the maximum depth to which the explosives may be present.
- Working depth of planned works: The maximum depth to which groundwork is done plus a safety margin of 0.5 meter.

Disruptive factors for detection

To carry out constructive and representative detection work, it is important to have a clear picture of the location-specific circumstances. These can determine the possibilities and impossibilities of the detection process. The usability and detection range of detection techniques can be negatively influenced by disruptive factors such as sheet piling, fencing, cables and pipes, high-voltage pylons, bridges, railway overhead lines and stelcon plates. The accessibility of an exploration area is also of great importance. It is generally not possible to carry out investigation work at the location of above-ground obstacles.

Ground disturbing work taking place in non-suspect areas*

* This area is shown as **green** in the Soil UXO risk map in Appendix 1.

All ground disturbing work that will take place in unsuspected areas are carried out in soil in which no explosives are expected.

Advice:

- **Ground disturbing work within the research area can be executed normally.**

8 T&A AND QUALITY

The historical preliminary research discussed in this report has been carefully performed according to commonly used insights and methods. Through an ISO-9001, VCA**, CS-VROO and CS-OOO certified quality system, T&A assures the quality and safety of its services.

T&A considers it important to monitor and reduce CO2 emissions of its activities.

T&A strives for the highest possible representativeness of the research. However, an inventory is based on a (relatively) limited archive research. Therefore, it remains possible that some relevant information was not found.

T&A is not liable for any damage that may result from the use of its research results.

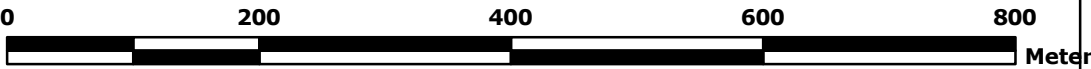
Appendix 1: Soil UXO risk map with research area

Note T&A: Although it is strived for that the map in this Appendix is shown in such a way that measurements can be taken from it, it is always recommended to use the original GIS-files when determining boundaries of (non)suspect areas. If desired, the client can receive these boundaries as GIS-files (shape-file) or as CAD-files (*.dwg of *.dxf).



Legend

- Research Area
- Status with reference to sub-areas
- Suspect Conflict Period
- Non-suspect Conflict Period



3



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Appendix:	1. Soil UXO risk map with research area		
Projectnumber:	10934		
Client:	Arcadis	Size:	A3
Draftsman:	Approved:	Scale:	1:6.000
D. Sam	M. van der Gulik	Made on:	20-02-2024

Esri Nederland, Community Map Contributors

Research Conflict Period at UXO extension HV-cable routing HGB

Appendix 2: Explanation of table use in Appendix 3 and Chapter 6.

Appendix 3 contains two types of tables. The first type concerns the chronological list of events in and near the research area, including an analysis of the source material. The second type concerns the clearances by the EOD, also including an analysis. If clearances by the EOD can be related to specific war acts in the first type of table, the relevant clearance is (also) combined with the event in the first table.

Use of Appendix 3 – chronological events list

Together with Appendices 1 and 4, they form a complete overview of what happened, when and where and for which parts of the research area - based on that source material - can be concluded that the presence of explosives is suspected or unsuspected. The explanation below is to support the use of the chronological overview and the relationships with Appendices 1 and 4.

Tag number

The event list in Appendix 3 contains a detailed explanation of what the source states for each event per source. In the first column ("tag number"), each report that occurred in or near the research area is provided with a number that is unique per event. These numbers refer to tags in the event map in Appendix 4, which are labeled with the same number.

If this number is provided with the message "indicative" or "ind" (in the map), this means that the event cannot be placed exactly. The same applies to text boxes in Appendix 4. If this inaccuracy has consequences for the conclusion and/or horizontal demarcation, this is stated in the column "motivation for the conclusion" in the first table in Appendix 3. For the interpretation of Aerial Photographs "luchtfoto" is used to refer to Appendix 4.

Events that were not relevant for further analysis, for example because they took place far outside the research area, or did not appear to be related to explosives, do not have a tag number and are therefore not mapped.

Date

This column shows the date of the event (as accurately as possible).

Event/location

This column describes the event, quoting the original source as much as possible. This includes all information that is considered relevant from the source in question.

Source and archive

Based on the "source" and "archive" columns, the sources can be found via Chapter 3. Archive institutions with a longer name are shown with the abbreviation that is generally used for the archive in question and which is also stated as such in Chapter 3.

Conclusion and motivation

The "conclusion" column states whether (part of) the investigation area is suspected or unsuspected based on an event. The column "motivation for conclusion" contains an explanation of how this conclusion was arrived at. In addition, this column - if necessary - contains the reliability of the source, substantiation (of accuracy) of demarcation(s), types of explosives, substantiation of deviations from the guidelines (if applicable), etc.

Suspect area

If the conclusion "suspected" has been drawn, the "suspect area" column refers to the sub-area as described in the table in Chapter 6.

Use of Appendix 3 – clearances by the EOD

This table is below the events list and concerns the MORA's of the EOD.

Tag number

Because the EOD works with UO-numbers, no tag numbers are used for the MORA's, but reference is made to the UO-number. This is shown in the first column and - like the other marker numbers - refers to the corresponding number in map Appendix 4.

Location

This column describes the location where the explosive is located. This is not always the location where the explosive was found and is rarely very accurate. For example, there are reports of an explosive being found on a dredger in a canal, but it is otherwise unclear where the explosive was dredged up. An address also does not necessarily provide clarity about the location where the explosive was found - it could come from the ground in front of the address, but it could also have been found far away in the plot of the farm in question. Moreover, it cannot be ruled out that it was a collector's item or was found "in grandpa's attic". However, such information is rarely included in a MORA, making the location designation unreliable as to the location of the explosive found.

Find

This quotes what the EOD found on site. This is often in abbreviations, which differ over the years and per person.

Conclusion, motivation conclusion and suspect area

See the description of this in the explanation of the chronological events list.

Use of table in chapter 6 – conclusions and demarcation

This table describes the horizontal demarcation, (sub)species, caliber/weight, nationality, appearance and vertical demarcation for each suspected sub-area. Because several events from the event list can together lead to one suspicious sub-area, it is stated for each sub-area on the basis of which marker number(s) the sub-area has been declared suspect.

Horizontal demarcation

This column describes the horizontal demarcation, taking into account any inaccuracies (if applicable) due to limited possibilities to accurately place an event. If the demarcation deviates from the guidelines, this will be stated in a footnote below.

Sub)species, caliber and nationality of possibly present uxo

This column contains details of the explosives that may be found. If necessary, an explanation of this will be provided in a footnote below.

Appearance

This indicates the appearance in which explosives that may be present may be expected.

Number

This states the number of expected explosives. If this can be determined exactly, an exact number will be given. In most cases this concerns an indication of the numbers of expected explosives.

Vertical demarcation

This lists the vertical demarcation based on the soil structure, type and maximum caliber of the explosive. In the case of drop-off ammunition for which a penetration calculation has been carried out, a footnote refers to the principles for this calculation, which are stated below.

Appendix 3: Chronological list WWII events

Appendix 3 Chronological list WWII events

Inventory source material					Analyses source material		
Tag number	Date	Event/location	Source	Archive	Conclusion	Motivation for conclusion	Suspect area
Meidagen van 1940 te Winschoten							
Geen	10-05-40	Om 06.30 uur geeft de commandant van de 2e compagnie - Iie bataljon - 36e regiment Infanterie - opdracht aan zijn luitenant in Winschoten, de spoorbrug te vernielen. Deze voert dit uit door een locomotor met twee goederenwagens in de opengedraaide brug te rijden. Als gevolg hiervan loopt de pantser trein, die bij het Buiskooldiep al enige uren vertraging heeft opgelopen, vast voor de spoorbrug over het Zijlsterdiep. De bewaking, o.l.v. sergeant Huisman, heeft op de westelijke oever van het Zijlsterdiep stelling genomen. Ter hoogte van de strokartonfabriek Reiderland wordt een sectie infanterie uit de Duitse trein geladen, die daarop de Nederlandse bewakers aanvalt. De pantser trein wordt hier geruime tijd opgehouden.	Huurman (2001), 54	Literatuur	Non-suspect	This is too far from the research area to affect it.	Non-suspect
Projectiel te Winschoten							
Geen	08-01-41	Winschoten. In de avond is een projectiel neergekomen in het open veld en heeft een gat gemaakt van ongeveer 6 á 7 cm. De grond is in de omtrek (1m2) verbrand. Scherven waren genummerd F.L. 1938 A.	800-5624.1	Provinciaal archief Groningen	Non-suspect	Given the description, this will probably have been a flare. The research area is non-suspect regarding this notification.	Non-suspect
	09-01-41	In de nacht van 9 januari, in Winschoten (Groningen), 1 bom op akkerland. Geen schade.	077-1328	NIOD			
Lichtbom te Winschoten							
Geen	01-03-41	In Winschoten (Groningen), 1 uitgebrande lichtbom gevonden.	077-1328	NIOD	Non-suspect	From the sources it can be concluded that a flare or photo flash bomb was found. However, these were dropped individually, or a few at a time to illuminate locations. The presence of a flare or photo flash bomb is not a reason to expect several such explosives in the immediate vicinity. Therefore, a suspect area cannot be demarcated based on this notification.	Non-suspect
Brandbom te Winschoten							
Geen	12-03-41	In Winschoten (Groningen), 1 niet ontbrande brandbom gevonden.	077-1328	NIOD	Non-suspect	The exact location is not known. As a result, a suspect area cannot be demarcated.	Non-suspect
	12-03-41	Winschoten. Omstreeks 16.30 uur werd er een brandbom gevonden aan de kant van een sloot welke niet is ontbrand.	800-5624.1	Provinciaal archief Groningen			
Trein bij Winschoten beschoten							
10934-001	23/24-05-43	Mosquito's beschieten op maandag 24 mei om 01.40 uur tussen Winschoten en Scheemda de Duitse militaire verlofgangerstrein SF 317 Hamburg-Altona - Amiens bij kilometer 11.600. Eén van de personenrijtuigen wordt geheel doorzeefd met kogels. Er worden zes Duitse militairen gedood, twee zwaar en vijf licht gewond. De loc is maar licht beschadigd.	Huurman (2001), 250	Literatuur	Suspect	From the sources it can be concluded that in the night of 23 to 24 May 1943 a train was shot at on the track near Winschoten at the height of hm 11,600. The train was shelled with both on-board cannons and machine guns. The mentioned hm point on the railway line is located right next to the research area. It can be stated that the research area in a radius of 100 meters around the mentioned location on the railway, is suspect on 20 mm guns with the exception of the area of which it can be said that on the basis of postwar groundworks has already been stirred up to 0.3 m – mv.	Sub-area 1 (see also Appendix 1)
	23/24-05-43	De Duitsers rapporteerden dat tussen Groningen en Nieuweschans die nacht een trein met Duitse verlofgangers met boordwapens was beschoten. Hierbij werden twee soldaten gedood en raakten er negen gewond.	Zwanenburg (z.j.), 521	Literatuur			
	23/24-05-43	Ook is er een melding van een beschieting in de nacht van 23 op 24 mei 1943 bij volle maan, van een Duitse Wehrmacht trein bij Winschoten , waarbij 6 Duitsers omkomen en 8 zwaar gewond raken.	Huizinga (1995), 30, 172	Literatuur			
	24-05-43	Um 01.50 Bordwaffenangriff auf Strecke Groningen-Winschoten auf nicht Flakgeschützten Urlauberrung. Verluste: 2 Tote, 4 Schwer- und 6 Leicheverletzte.	RH24-88/70	Bundearchiv Freiburg			
	24-05-43	Dagboek Zuster Helder te Scheemda Vannacht +- 2 uur werden we gewekt, er waren [...] Engelsche vliegtuigen in de lucht. Ook [...] geschoten. Vanmorgen hoorden we dat er [...] was op de Duitse verloftrein die hier [...] om ongeveer 2 uur langs gaat. Deze komt [...] Duitschland. Naar men zegt waren er doden [...] bij gekomen. [...] <i>Noot T&A. In de beschikbare scan van dit archiefstuk bedekt een klein krantenartikel een deel van de tekst, aangegeven met [...].</i>	Scheemda-1321/1322	Gemeentearchief Scheemda			
	23/24-05-43	For the period sunset to sunrise 23/24th May 1943 Offensive operations. 11 Groups. i) 605 Sqdn. Between 2331-0011 hrs. Six Mosquitos 11 left Castle Camps to patrol enemy airfields at Leeuwarden, Beauvais, Deil, Venlo, Deelen, Bergen and Gilze Rijen. A mosquito despatched to petrol Gilze sighted an aircraft with navigation lights on but lost it when the lights were doused. Four other mosquitos carried out uneventful patrols and one returned early owing to a technical fault. ii) 151 Sqdn. At 2341 and 0034 hrs. respectively two mosquitos 11 left Castle Camps tot patrol Vechts Airfield.	AIR24/579	National Archives			

Municipality Oldambt							
Inventory source material					Analyses source material		
Tag number	Date	Event/location	Source	Archive	Conclusion	Motivation for conclusion	Suspect area
		The leading Mosquito attacked and E/A, which had twin ..ginesand a single fin, over Vechts airfield. Strikes were seen on the fuselage of the E/A which is claimed as damaged, A second E/A was sighted but could not be attacked before it landed. iii) 25 Sqdn. At 2346 and 0059 hrs respectively two Mosquitos 11 left Castle Camps to patrol Twente and Deelen airfields. The first Mosquito attacked and damaged a locomotive at Aschendorf. The other Mosquito carried out an uneventful patrol. [...] vi) 264 Sqdn. At 0113 hrs a Mosquito 11 left Castle Camps to patrol Venlo airfield. Owing to unfavourable weather conditions over the Dutch coast the patrol was abandoned. vii) 456 Sqdn. At 0116 and 0220 hrs two Mosquits 11 left Castle Camps to patrol enemy airfields at Bergen and Leeuwarden. No E/A were seen by either A/C. One of the Mosquitos sighted a dinghy with a flashing white light off Vlieland. viii) 307 Sqdn. At 0139 and 0146 hrs two Mosquitos 11 left Castle Camps for Deelen and Gilze airfields. Both aircraft carried out uneventful patrols. ix) 410 Sqdn. At 2332 and 0043 hrs respectively two Mosquitos 11 left Castle Camps to patrol enemy airfields at Rheine and Gilze Rijen. No E/A were seen by the first Mosquito which experienced flak from Rheine airfield. The Patrol by the second Mosquito was uneventful.					
	23/24-05-43	Operation Record Book 25 Squadron R.A.F. 23.5.43 Mosquito II, F/LT Singleton, J. & SGT. Skinner, R., duty: intruder, up: 23.46 down: 03.08. 23-5-43 Flight Lieutenant J. Singleton with Sergeant R. Skinner and Flying Officer E.R.F. Cooke with Pilot Officer N.H. Guthrie were sent off on a secret mission from Castle Camps this evening and returned safely in time for an early breakfast. Six patrols had been flown when signs of enemy activity cause the first pair to be sent off again. Flying officer J. Cheney with Pilot officer J.K. Mycock and Sergeant A.N. Wilson wit Sergeant E.O. Davies were soon airborne and Flying Officer Cheney was sent out to sea in pursuit of a retracting Hun, but to no avail; after a time, the patrols were recalled. The raid had been to the north of the sector. In the course of the operation, Flight Lieutenant J. Singleton sighted a train about 5 miles south of Aschendorf and attacked it with two-three second burst of cannon and machine gun fire from 700 feet to 300 feet. Strikes were seen on the engine cabin and tender.	AIR27/306-9	National Archives			
Focke wulf bij Belingwolde neergekomen							
Geen	08-10-43	Om 15.15 uur is bij Bellingwolde Fw190 (410266) van 2./JG 11 neergekomen.	Verliesregister NIMH	Literatuur	Non-suspect	Although it is reported in Zwanenburg's book that a Focke Wulf landed near Winschoten, the Loss Register shows that this was not at Winschoten but at Bellingwolde. This is too far from the research area to affect it.	Non-suspect
	08-10-43	Fighter Command. Noot. ... verloor de Luftwaffe in gevechten ... maar 20 jagers, terwijl eveneens een aantal, door brandstofgebrek of anderszins, een noodlanding moest maken. De meeste Duitse jagers kwamen neer in Nederland. ... één Fw-190 van 2/JG11 bij Winschoten, ... Het merendeel der Duitse vliegers kwam om het leven.	Zwanenburg (z.j.)	Literatuur			
Bommen bij Winschoten							
Geen	22-10-43	Bommen bij Winschoten.	Huizinga (1995), 179	Literatuur	Non-suspect	This report shows that bombs fell near Winschoten in October 1943. There are no other sources available that confirm this report or that give more information about the exact location. Therefore, a suspect area cannot be demarcated based on this notification.	Non-suspect
Schade aangericht door brisantbommen							
6045-008 Indicatief	27-01-44	Winschoten. Ten gevolge van oorlogshandelingen omstreeks 20.00 uur (brisantbommen) nabij het kanaal Pekelder A is matige schade aangericht. Er zijn geen slachtoffers te betreuren. Er ontstond geen brand.	800-5625	Provinciaal archief Groningen	Non-suspect	There are no unambiguous traces of these bombs visible in the vicinity of the research area. Therefore, a suspect area cannot be demarcated based on these facts.	Non-suspect
Luchtfoto	06-10-44	De foto dekt het gebied ten zuidoosten van Winschoten. De foto is van prima schaal en kwaliteit. Op de foto zijn in de omgeving van het onderzoeksgebied geen eenduidige sporen van de bij de Pekelder A gemelde bommen zichtbaar.	Foto 3087 Sortie 106G/3262	Zwolle ACIU			
Luchtfoto	29-10-44	De foto dekt het gebied ten oosten van Winschoten. De foto is van prima schaal en kwaliteit. Op de foto zijn geen eenduidige sporen van de bij de Pekelder A gemelde bommen zichtbaar.	Foto 3338 Sortie 106G/3444	Zwolle			

Municipality Oldambt							
Inventory source material					Analyses source material		
Tag number	Date	Event/location	Source	Archive	Conclusion	Motivation for conclusion	Suspect area
Trein bij Winschoten beschoten							
Geen	13-03-44	13 maart 1944: 'Vanmorgen is de trein van Winschoten door Engelse vliegers aangevallen'; vermeldt de jonge Wagter in zijn dagboek.	Huizinga (1995), 33, 187	Literatuur	Non-suspect	No exact location of the shooting is known. Therefore, a suspect area cannot be demarcated based on this notification.	Non-suspect
Trein op het baanvak Winschoten-Nieuweschans beschoten							
Geen	08-04-44	8th Air Force. 644 bommenwerpers met escorte en ondersteuning van 571 jagers van de 8th en 209 van de AEF (IXth AF), 102 P-47's en 107 P-51's, alsmede 25 P-51's van de RAF, uitgestuurd voor aanvallen op doelen in Duitsland. Noot. De NS meldde dat om 14.15 trein 3212 op het baanvak Winschoten-Nieuweschans door vliegtuigen werd beschoten, waarbij één reiziger werd gedood en enkele gewond, waarvan er later nog één in een ziekenhuis overleed.	Zwanenburg (z.j.)	Literatuur	Non-suspect	On 8 April 1944, a train between Winschoten and Nieuweschans was shot at. At the time of the attack, American bombers with fighter escorts were flying overhead. The attack on the train will have been carried out by fighter planes. Those were P-47 (Thunderbolts) and P-51 (Mustangs). Mustangs and Thunderbolts only had machine guns (six .50 calibres) with which they fired, not on-board cannons. As a rule, the projectiles fired by machine guns do not contain explosive components. Theoretically, they could shoot rockets, but there are no indications of this. It can therefore be said that the research area is Non-suspect with regard to this shooting.	Non-suspect
Trein bij Winschoten beschoten							
Geen	22/23-05-44	In de nacht van 22 op 23 mei 1944 wordt een Wehrmachttrain bij Winschoten beschoten. Er vallen 6 Duitse slachtoffers.	Huizinga (1995), 30	Literatuur	Non-suspect	No exact location of the shooting is known. Therefore, a suspect area cannot be demarcated based on this notification.	Non-suspect
Trein op het baanvak Winschoten-Nieuweschans beschoten							
Geen	30-06-44	Bomber Command. 380 vliegtuigen moesten aanvallen uitvoeren op V-1 startplaatsen in Frankrijk, maar tevens gingen zes Mosquito 's op offensieve patrouillevluchten. Noot. De NS rapporteerde dat om 15.45 tussen Winschoten en Nieuweschans trein 981 werd beschoten, waarbij drie reizigers en twee man personeel werden gedood, zes reizigers, één man personeel en één Duitse soldaat gewond.	Zwanenburg (z.j.)	Literatuur	Non-suspect	This is too far from the research area to affect it.	Non-suspect
	30-06-44	Om 15.45 uur trein beschoten tussen Nieuweschans en Winschoten.	Huurman (2001), 302	Literatuur			
	30-06-44	Trein Nieuwenschans-Groningen wordt bij Ulsda beschoten, machinist J. Bruins en L. Bolder worden gedood, hoewel ze als passagiers in de trein zitten. Volgens het dagblad van het Noorden vielen er 5 tot 7 doden.	Huizinga (1995), 36, 190	Literatuur			
Luchtfoto's van 6 oktober 1944							
Luchtfoto	06-10-44	De foto dekt het gebied ten zuidoosten van Winschoten. De foto is van prima schaal en kwaliteit. Op de foto zijn in de omgeving van het onderzoeksgebied geen eenduidige sporen van oorlogshandelingen zichtbaar.	Foto 3087 Sortie 106G/3262	Zwolle ACIU	Non-suspect	There are no unambiguous traces of acts of war visible in the vicinity of the research area.	Non-suspect
Luchtfoto's van 29 oktober 1944							
Luchtfoto	29-10-44	De foto dekt het gebied ten oosten van Winschoten. De foto is van prima schaal en kwaliteit. Op de foto zijn geen eenduidige sporen van oorlogshandelingen zichtbaar.	Foto 3338 Sortie 106G/3444	Zwolle	Non-suspect	There are no unambiguous traces of acts of war visible in the vicinity of the research area.	Non-suspect
Trein op het spoor Groningen - Nieuweschans beschoten							
Geen	06-11-44	Treinbeschieting op de lijn Groningen - Nieuweschans.	Huizinga (1995), 208	Literatuur	Non-suspect	Based on the available information, the exact location of this attack on this large stretch of track is not known. Therefore, a suspect area cannot be demarcated based on this notification.	Non-suspect
Trein aangevallen nabij Winschoten							
0094-105 Indicatief	22-02-45	Op 22 februari 1945 vielen twee geallieerde jagers een personentrein aan, welke vanuit Winschoten op weg was naar Nieuweschans. De trein werd even buiten Winschoten buiten werking gesteld. Ook de silo van Robertus aan de Oosterhaven werd bij deze gelegenheid door 2 cm kogels getroffen.	Strating (2001), 234	Literatuur	Non-suspect	From the source it can be concluded that on February 22 an aircraft shooting took place near Winschoten. A train was shot at and a silo at the Oosterhaven was also hit with 2 cm bullets. The exact location of the shot at train is not known. Also, no other sources have been found that could be used to determine the exact location. The Oosterhaven, and in particular the part where one might expect a silo, is located at a sufficient distance from the research area. The research area is therefore Non-suspect with regard to this event.	Non-suspect

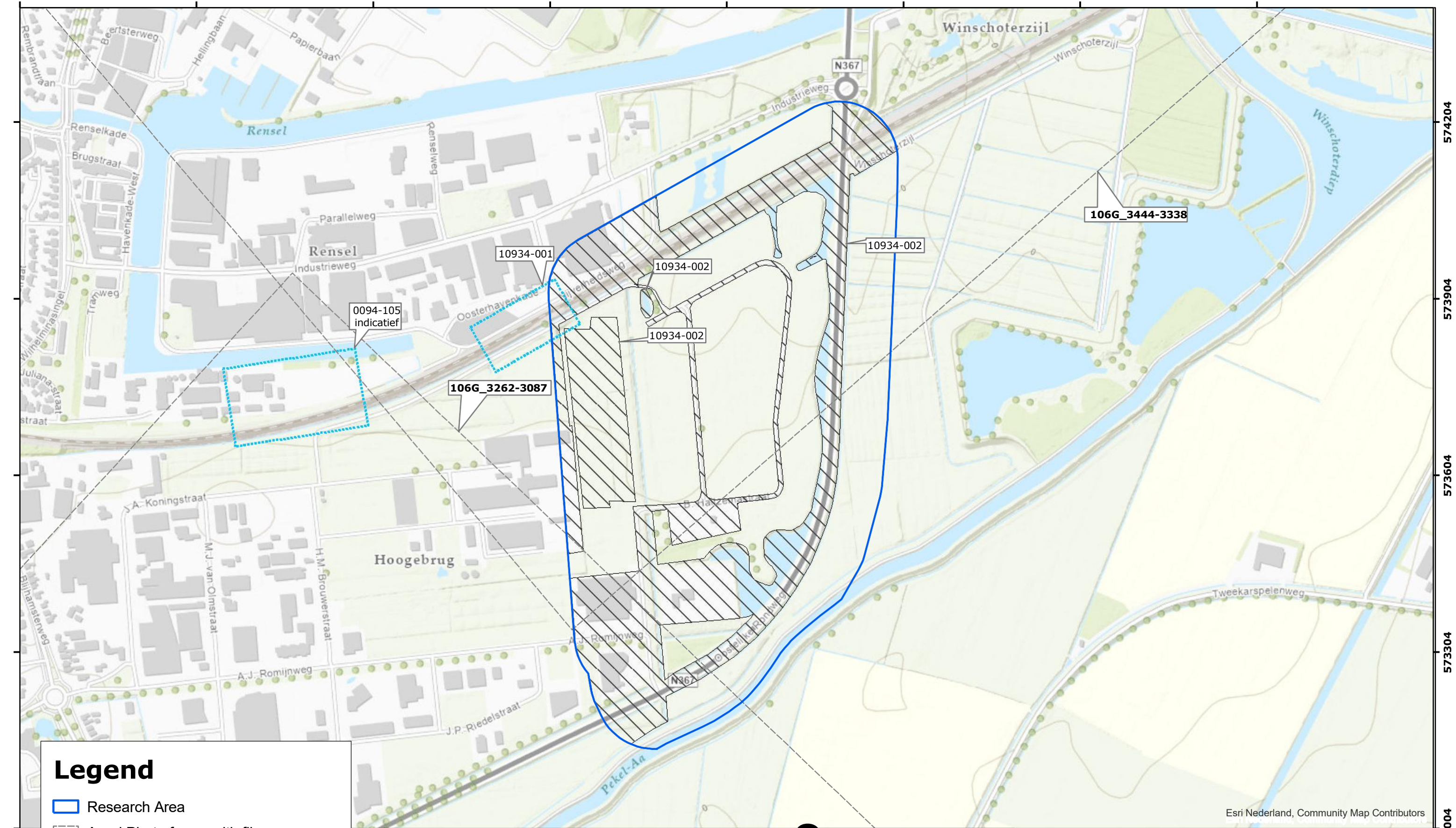
Municipality Oldambt							
Inventory source material					Analyses source material		
Tag number	Date	Event/location	Source	Archive	Conclusion	Motivation for conclusion	Suspect area
Bommen op Winschoten							
Geen	28-02-45	Bombardement op Winschoten ; Twee doden. Eén dame zal later aan haar verwondingen bezwijken.	Huizinga (1995), 233	Literatuur	Non-suspect	This is too far from the research area to affect it.	Non-suspect
	28-02-45	Het gemeentelijke ontsmettingsgebouwtje is bij de bomaanval op de gasfabriek grotendeels vernield.	33 - 738	Gemeentearchief Winschoten			
	28-02-45	Bombardement op Winschoten, 2 directe doden, later overlijdt een zwaar gewonde.	Huizinga (1995), 234	Literatuur			
	28-02-45	In de avond stelt een geallieerde jager met een 500 kg bom (die voor het doel neerkomt en het huis van de familie Wolbers) en 20 mm granaten van zijn boordkanonnen de Winschoter Gasfabriek buiten bedrijf.	Strating (1995), 17, Strating (2001), 233	Literatuur			
	28-02-45	Om half tien, bij avond, hingen er lichtkogels rond de fabriek. Kort hierna sloeg de bom in. op het huis van Rients Wolbers of in de weg vlak voor het huis, dat volledig instortte. Een vliegtuig zette zijn vlucht voor, circulerend rind het gasbedrijf met het mitrailleurvuur doorlopend gericht op de gashouder.	Potjewijd (1979), 45, 46	Literatuur			
Bruggen vernield							
Geen	10/15-04-45	Draaibrug over de Pekel A te Winschoterzijl. In het tijdvak van 10-15 april 1945 hebben Duitse militairen de brug nabij de spil laten springen. Als gevolg daarvan werden vernield: de draaipijler gedeeltelijk, de spil, de spilkoker, alle brugliggers ter lengte van enige meters nabij de spil, het draaimechanisme, de spanjukken en voor het grootste gedeelte het brugdek. In verband met toekomstige kanaalplannen is de brug nog niet hersteld (07-12-52) en vermoedelijk zal deze ook niet meer hersteld worden.	1776-2874, 2890, -4841	- Provinciaal archief Groningen	Non-suspect	This is too far from the research area to affect it.	Non-suspect
Bevrijding Winschoten							
Geen	12/13-04-45	In de nacht van 12 op 13 april vertrok de hele (Duitse) eenheid - even plotseling als zij gekomen was - richting Duitsland, maar liet een vliegtuigbom in het gymnastieklokaal achter. [Winschoten]	Strating (2001), 237	Literatuur	Non-suspect	<u>Bomb in gymnasium</u> : This is too far from the research area to affect it. <u>Liberation Winschoten</u> : Marking number 3152.1-050 shows that in mid-April 1945 there were battles in and near Winschoten. Shelling took place on the Posttilbrug and at Winschoter Hoogebrug, among other places. This is too far from the research area to affect it.	Non-suspect
Geen	13-04-45	11.00 uur. Met het nodige mitrailleurvuur, waarbij de Poolse Saxon tanks (25 ponders) ook vanuit de kruising Onstwedde/Wedde/Wedderveer in de richting van de Winschoter Hoogebrug schieten zuiveren de Belgen bij het oprukken van de tanks richting Blijham de secundaire wegen. De vijand kan geen georganiseerde tegenstand meer bieden. Het huis van Bleeker lag precies in de vuurlinie naar de Posttilbrug . 16.30 uur. Veel vuur, vooral van mitrailleurs, op de verwachte Duitse posities. De Polen kunnen de Turfwegkruising weer innemen. De boerderij van Werkman raakt hierbij wel in brand. 21.15 uur. De Duitse soldaten schieten vanuit Winschoter Oostereinde en de geallieerden hebben hun stellingen bij Bijham staan. 22.30 uur. Op de buurt bij Garst 115 te Winschoten werd geschoten, granaten explodeerden vlakbij. Ook een granaat in de voortuin van St. Vitusholt 68. Zuiderveen 4 werd eveneens door artillerievuur getroffen en de woning van Van Wal aan het St. Vitushof, 7e laan. Aan het einde van de dag zijn de geallieerden 4 km van Winschoten.	Potjewijd (1979), 66, Strating (1995), 72, 73, 76, 77, 80-82, 84, 86, 89, 90	Literatuur			
	13-04-45	12.25-12.37 De verdediging van Winschoten wordt door 16 Poolse tanks beschoten. Duitse artillerie (Batt. Dollard-Süd) schiet terug.	Huizinga (1995), 248	Literatuur			
	13-04-45	Batterie-Dollart Süd in de Carel Coenraadpolder bestond uit 4 stuks 10.5 cm kanonnen en werd door The Regina Rifle Regiment en met steun van de artillerie en vliegtuigen uitgeschakeld. Dat gebeurde in de nacht van 24 op 25 april, nadat de batterij reeds vanaf 13 april z'n stem had laten horen. De batterij verhinderde dat de Polen in dit gebied verder optimaal konden opereren. Vooral bij Winschoten, Blijham en Scheemda ondervond men veel last van de granaten van het geschut tijdens de opmars naar het noorden.	Huizinga (1985), 12	Literatuur			
	14-04-45	Door de positie van het bezettingsleger bij Winschoter Hoogebrug had Winschoten twee maal 24 uur in de frontlijn gelegen.	Potjewijd (1979), 71	Literatuur			
Geen	15-04-45	Op 15 april 1945 werden er door de geallieerden enkele artillerieschoten gelost op de Langestraat en de fabriek 'Reiderland' om te zien of Duitse troepen terug zouden vuren. Toen dit niet het geval bleek te zijn trokken de geallieerden Winschoten binnen en was het dorp bevrijd.	Strating (2001), 242	Literatuur			
Geen	15-04-45	08.30 uur. Winschoten is vrij van vijand. De door de Duitse soldaten rond de Winschoterhoogebrug gelegde mijnen moeten verwijderd worden. 09.30 uur. De Belgische Genies controleert bij de Hoogebrug op de aanwezigheid van explosieven en mijnen. Ze komen onder artillerievuur te liggen, waarschijnlijk afkomstig van de Polen. Ook granaten bij de Ludensweg te Winschoten. De Posttil klapbrug was door explosieven ontzet. Artillerie inslagen bij Geertsea's IJzerhanden en achter de "Reiderland" (omgeving Posttil). 10.30 uur. Verkenningseenheid bij geeft vanuit de Wilhelminasingel een paar mitrailleussalvo's af op de naaste omgeving van de brug bij Posttil. 12.00 uur. De 2e compagnie trekt vanuit het gebied bij Westerlee zonder gevecht Winschoten binnen. 14.00 uur. Winschoten is bevrijd.	Strating (1995), 122-129, 179	Literatuur			

Municipality Oldambt					Analyses source material		
Inventory source material							
Tag number	Date	Event/location	Source	Archive	Conclusion	Motivation for conclusion	Suspect area
Luchtfoto	15-04-45	Het bataljon Jagers van Podhale was een eenheid die deel uitmaakte van de Eerste Poolse Pantserdivisie. Op 15 april 1945 trokken de Jagers Winschoten binnen en bevrijdden de stad.	Lenselink (2000), 47, 48	Literatuur			
	15-04-45	Voor Winschoten werd 15 april bevrijdingsdag. Twaalf geallieerde vliegtuigen beschoten op 15 april Duitse stellingen, waarna de vijand richting Beerta verdween. Op zondagmorgen namen Poolse kanonnen de stad nog eens onder vuur en om 1200 uur trokken Polen en Belgen Winschoten binnen, nadat een SAS-groep mijnen onder een brug had verwijderd, waarbij de Belgen abusievelijk door de Polen werden beschoten.	Bollen (1994), 210-211	Literatuur			
	15-04-45	Winschoten werd bevrijd.	Huizinga (1995), 252, Strating (2003), 29 Winschoten bevrijding	Literatuur Internet			
	19-04-45	De luchtfoto is van goede kwaliteit, maar een grote schaal. De foto dekt het hele gebied tussen Heiligerlee en Nieuwe-Pekela. Door de grote schaal zijn oorlogshandelingen moeilijker te herkennen. Er zijn binnen en bij het onderzoeksgebied geen eenduidige sporen van oorlogshandelingen zichtbaar.	Foto 7092 sortie 7/111C	JARIC NARA			
Luchtfoto van 19 april 1945							
Luchtfoto	19-04-45	De luchtfoto is van goede kwaliteit, maar een grote schaal. De foto dekt het hele gebied tussen Heiligerlee en Nieuwe-Pekela. Door de grote schaal zijn oorlogshandelingen moeilijker te herkennen. Er zijn binnen en bij het onderzoeksgebied geen eenduidige sporen van oorlogshandelingen zichtbaar.	Foto 7092 sortie 7/111C	JARIC NARA	Non-suspect	There are no unambiguous traces of acts of war visible in the vicinity of the research area.	Non-suspect
Schade door springen bom							
Geen	-	Na de oorlog werd gemeld: Door het springen van een bom in de onmiddellijke nabijheid van de woning, werd het gehele huis ingedrukt, waarna de bouwvallige ruïne moeste worden afgebroken. <i>Noot T&A: Het is niet duidelijk welk huis wordt bedoeld.</i>	33 - 738	Gemeentearchief Winschoten	Non-suspect	This document shows that a house in Winschoten was damaged after the end of the war by the (delibarate?) explosion of a bomb. There are no other sources that provide more information regarding the location of the house or the bomb. Therefore, a suspect area cannot be demarcated based on these facts.	Non-suspect
Meldingen burgemeester Winschoten							
Geen	19-02-46	De burgemeester der gemeente Winschoten verklaart hierbij, dat, voor zoover hem bekend, momenteel geen explosieve stoffen of enigerlei munitie in deze gemeente meer aanwezig zijn.	MMOD-archief	MMOD-archief	Non-suspect	From these sources it can be concluded that, as far as the mayor is aware at the time of writing, there were no more explosives in the municipality. However, the value that should be given to such a report is small, because after the war several reports of explosives were found in the municipality. In any case, it can be assumed that the storage locations of explosives known at that time, which were built here and there immediately after the liberation, had been cleared.	Non-suspect
	26-08-46	De secretaris der gemeente Winschoten verklaart hierbij, dat voor zooveel hem bekend, in deze gemeente geen munitie, kogels, bommen e.d. meer aanwezig zijn.	MMOD-archief	MMOD-archief			
Naoorlogse grondroering							
10934-002	Naoorlogs	Op basis van de vergelijking van luchtfoto's ten tijde van WOII met de huidige situatie valt op dat de percelen naoorlogs zijn herverdeeld en dat ter plaatse de B. Haitzemastraat is aangelegd evenals de Oostelijke rondweg met naastgelegen waterpartijen. Langs de genoemde straat zijn verschillende bedrijventerreinen aangelegd. In één van de velden zijn zonnepanelen aangelegd. In de noordoosthoek van het onderzoeksgebied is ook een industrie/bedrijventerrein gekomen.	Luchtfoto's WOII en GoogleEarth	Luchtfoto's WOII en GoogleEarth	Non-suspect	On the basis of the post-war groundworks, there is a background risk for the layer of soil that was disturbed after the war.	Non-suspect

List of UXO clearances by the EOD (MORA’s)

Municipality Oldambt			Analyses source material		
UO nr	Location	Find	Conclusion	Motivation conclusion	Suspect area
	No relevant mora’s				

Appendix 4: Map of problem inventory



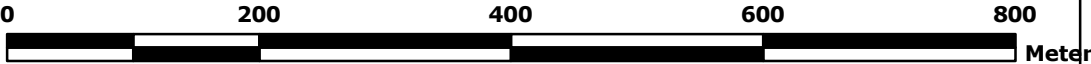
Legend

- Research Area
- Areal Photo frame with file name

Archive Information

- Struck by shootings from aircraft guns
- Post WWII soil disturbing activities

Photo 7092 covers the entire map image



3



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Research Conflict Period at UXO extension HV-cable routing HGB

Appendix:	4. Map of problem inventory		
Projectnumber:	10934		
Client:	Arcadis	Size:	A3
Draftsman:	Approved:	Scale:	1:6.000
D. Sam	M. van der Gulik	Made on:	16-01-2024

Appendix 5: Agreements of the assignment

The research – background and project goal

See §1.1 en §1.2.

Research Area

See §2.1 and Appendix 1.

Executive persons

This research is carried out by experienced researchers with a relevant college or university education. The investigation is monitored by the project leader, while a senior explosives expert is involved in the conclusions and analysis. An authorized member of the management also approves the report and the Soil UXO risk map.

The following experts were involved in the research.

Expertise	Naam deskundige
Historical research	• David Sam (research and reporting) • Maurice de Cock (Project leader)
Explosives Expertise/ Civil Engineering	• Johan Barnhoorn (Senior Explosives Expert)
Aerial Photo Interpretation	• Maurice de Cock • David Sam • Sophie Jansen
GIS	• David Sam

Methodology

This report was carried out in accordance with the most recent guidelines of the certification scheme “Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten” that came into force on 1 November 2023. Internal work instructions have also been drawn up for all parts of the preliminary investigation. These work instructions provide further details of the way in which the investigation is carried out with regard to matters in which the certification scheme does not provide sufficient detailed guidance.

The standard report of the Preliminary Investigation has been drawn up in such a way that it also serves as a checklist. As a result, the general requirements, the inventory and traceability of the source material, the assessment and evaluation of the source material and possible comments are always explicitly brought to the attention of the researcher, so that the completeness of the research can be guaranteed. The report is also checked by the project leader and the analysis and conclusions are also checked by a senior explosives expert.

Design of the study

According to the guidelines, both a Conflict Period Investigation and a Post-Conflict Period Investigation consist of two phases:

1. Inventory of the source material
2. Analysis of the source material

Phase 1. Inventory of the source material – Research Conflict Period

The inventory of the source material concerns the collection of historical source material. This involves an inventory of events/information that form an indication that the research area, or part of it, is suspected of the presence of explosives (indications), or unsuspected (contraindications). These events are listed in a chronological list of events (Appendix 3) and mapped as accurately as possible (Appendix 4).

As a rule, the so-called "funnel method" is used for the inventory, in which the big picture is initially formed of the acts of war in and around the research area, after which the details are zoomed in.

Literature study

- First, a general picture of relevant events is formed by means of general, national and then regional literature. A more in-depth study is made through local literature.

Initial archival research

- Archival research completes the chronological list of acts of war.
- Archival documents are also used to confirm the facts as established during the literature study.
- By means of information from the archive documents, details of the acts of war, as found during the literature search, can be added.

Additional archival research

- Based on the chronological overview of events obtained, additional, more specialist archive institutions are consulted (if necessary). For example, foreign archives to obtain details about bomb loads from attacking aircraft.

Archival research aerial photographs

- By consulting aerial photographs, facts as established during the literature and archive research can be confirmed and/or localized.
- An area-covering aerial photo analysis is carried out with photos from the end of WWII in order to obtain the most complete picture possible of the acts of war.
- If necessary, aerial photographs from WWII are compared with the current situation in order to obtain contraindications: information that constitutes an indication that the suspect area, or part of it, can be considered non-suspect on the basis of post-war, large-scale groundworks.

Archives consulted and methods of consultation

The following table provides an overview of the sources that are mandatory and non-mandatory in accordance with the CS-VROO. It indicates which sources were consulted by T&A for the current investigation. As a rule, consulted sources are stored in the T&A digital archive and, in the case of literature, books are regularly purchased and added to the collection.

Source	Consult			Method of consultation and archiving
	Mandatory	Non-mandatory	Done by T&A	
Literature	√		√	- Internal literature archive T&A is consulted. - This is supplemented by online searches via Google, KB and NIOD and, where necessary, physical visits or purchases of book(s).
Municipal and provincial archives	√		√	- An inventory is made online via the archive website. - By telephone and/or e-mail, it is found out whether explosives investigations have already been carried out and an appointment is made for the archive visit, during which the purpose of the investigation is also stated and the question is asked whether more information is available about this than appears from the online inventory. - Archives are physically visited, unless the above contact moments show that there are no documents in the archive. - On site, it is checked whether there is a deviating analogue inventory and the archivist is asked whether more (possibly) relevant information is available. - Provincial archives were inventoried in 2015/2016 and fully digitally recorded in the T&A archive. - Since around 2010, municipal archives have been inventoried for each project and fully digitally recorded in the T&A archive. - If an archive has already been digitally archived in the T&A archive, physical visits will in principle no longer be carried out. In this case, it is only checked whether there is any new information and/or explosives investigations carried out since the last visit of T&A. - Name of the date of consultation of the archive and the name of the performer(s) is registered internally at T&A.
Netherlands Institute for Military History	√	√	√	- Collections 409 and 575 are available online. - This archive will only be physically visited if necessary for consulting other collections. - Consultation will take place by the investigator in the period between the confirmation of order and the date of the report.
Netherlands Institute for War documentation	√		√	- In 2014, the mandatory access numbers were digitized in their entirety and are present in the T&A archive. - For others: see literature.
National Archives The Hague	√		√	- In 2011-2013, the mandatory documents were digitized in their entirety and are present in the T&A archive. - Documents from the bunker archive are consulted online and, where necessary, by means of a physical visit by the researcher. - Bij het fysiek raadplegen van dit archief, wordt op dezelfde wijze gewerkt als vermeld bij gemeentearchief.
Semistatic archive services - Ministry of Defence in Rijswijk	√		√	- In 2010-2011, the mandatory documents were digitized in their entirety and are now in the T&A archive. - If it is deemed necessary to consult these archives, the procedure will be carried out in the same way as stated in the municipal archives.
Explosive Clearance Service Defence	√		√	Consultation takes place on a project-by-project basis in accordance with the procedure provided by the EOD.

Source	Consult			Method of consultation and archiving
	Mandatory	Non-mandatory	Done by T&A	
Historical societies and local history circles		✓		If it is deemed necessary to consult them, information is searched online, magazines are ordered and, in some cases, contact is sought by telephone or e-mail.
Aerial photo collections Wageningen UR and Land Registry Zwolle	✓		✓	Will be consulted by the researcher online via www.dotkadata.nl per project during the execution of the research.
Aerial photograph collection RCAHMS/NCAP	✓	✓	✓	Will be consulted online by the researcher for each project during the execution of the research.
The National Archives (Londen)	✓	✓	✓	- Part that is present in the T&A archive is consulted. - If necessary and available online, it will be consulted online. - If necessary, a physical visit will be carried out by a T&A researcher. - If consulted via Wardocs, this is mentioned in §3.2.12.5.
Library and Archives Canada		✓		- If necessary and available online, will be consulted online. - If necessary, a physical visit will be carried out by a T&A researcher or a local researcher. - If consulted via Wardocs, this is mentioned in §3.2.12.5.
Bundesarchiv-Militärarchiv (Freiburg)	✓		✓	- In 2017, the mandatory collection was digitized in its entirety (alongside a number of other collections) and is now in the T&A archive. - If consulted via Wardocs, this is mentioned in §3.2.12.5.
Service Historique de la Défense		✓		- If necessary and available online, will be consulted online - If necessary, a physical visit will be carried out by a T&A researcher or a local researcher.
Land Registry (post-war maps)	✓		✓	- Will be consulted using www.topotijdreis.nl for each project. - To retrieve cadastral data, if necessary, the archive is consulted as described in §3.2.9.
The National Archives and Records Administration te College Park		✓		If necessary, it has been consulted via Wardocs. In that case, this is mentioned in §3.2.12.5.
Witness testimony		✓		For each statement, it is stated who, where and when it was carried out.
Newspaper reports		✓	✓	Can be consulted via the Internet, collections 708 and 709 of the NIMH and accesses 2.04.110 and 2.13.210 of the National Archives.

Excluded sources

The following sources have not been (exhaustively) consulted for the purposes of the Conflict Period Research:

- The research for contraindications after WWII is part of a Research Post-Conflict Period. For the Conflict Period Research, we only searched for UXO detection and approach of UXO carried out and large-scale groundworks based on comparison of aerial photographs and on the basis of the information provided by the client at the start of the research.
- No inquiries were made via the VEO Bomb Map and with managers of (rail) infrastructure that is visible in the research area, as referred to in §2.2 of the CS-VROO, unless explicitly agreed with the client. T&A uses the working method as described on below.

UXO detection and approach of UXO carried out

T&A assumes that the relevant administrator(s) are already involved in the process and that relevant investigations have therefore been delivered to T&A via the client. It is noted that in accordance with the WSCS-OCE and the CS-000, project plans for investigation work must be submitted to the municipality for notification upon detection and for approval during approach work. Since T&A has inquired with the municipality(s) about explosives investigations that have already been carried out, the investigations that have already been carried out by administrators should also have come to light. If this was the case and it turned out that reports from relevant explosives investigations were available to administrators, this was inquired in consultation with the client.

Preliminary investigations and risk analysis already carried out

No inquiries will be made for reports of Preliminary Investigations and Risk Analyses of Explosives that have already been carried out, unless explicitly agreed with the client and stated in this report. This means that any deviating conclusions (horizontal demarcation of suspect area) are not known and not reported or substantiated.

The reason for this is that many desk studies were carried out before the CS-VROO came into force. These studies were all carried out with outdated demarcation rules. As a result, the research effort cannot be justified in terms of time and budget and the expected added value is virtually nil. During the quotation phase, T&A will draw the client's attention to studies known to T&A that have already been carried out, if these can be of added value.

- No calculations will be carried out for the penetration depths of drop-off ammunition if insufficient probe information is made available by the client to make such calculations reliable in accordance with the Design Regulation for the Determination of the Penetration Depth of Conventional Explosives (Deltares, 1210497-000, 2015). It should be noted that there is generally too little probe information available via Dinoloket for this.
- In accordance with the CS-VROO, the most suitable aerial photographs must be selected from the inventoried aerial photographs. The selection must take into account coverage, date of recording in relation to acts of war, quality of the photo image and scale. T&A initially consults the aerial photographs from the Dutch aerial photo archives, as the quality and coverage are immediately visible online, in addition to the scale and date. If suitable photos are found, no inventory will be made of the aerial photos that RCAHMS/NCAP has available. In addition to the date of the aerial photograph, only an indication of the coverage and scale of the relevant archive institution can be found online and the quality is at most very indicative. If no suitable aerial photographs were found in the Dutch archives, RCAHMS/NCAP was certainly consulted.
- In accordance with the CS-VROO, aerial photographs from before the event, and from as soon as possible after the relevant event, must be used. T&A only consults aerial photographs from before the event if there are indications that this could be of added value.

Phase 2: Analyzing the source material

After the inventory phase, the source material found is analyzed. On this basis it can be determined whether the investigation area is non-suspected or (partly) suspect.

Dealing with research questions in accordance with the CS-VROO-02

In the CS-VROO-02, questionnaires have been drawn up with potentially relevant questions for various war actions, that serve to support the analysis and must also be answered so that the analysis can also be traced back by third parties. The questions in the lists are not exhaustive, but on the other hand they usually do not always have to be answered. As a result, answers to the questions are often not provided or are not stated in this report.

The questionnaires are handled as follows: The analyzes are mainly described in Appendix 3 in the column "motivation for conclusion". This explains how T&A came to its conclusions, without explicitly stating the questions. However, the explanation of the motivation makes it clear which questions were asked and answered to arrive at the conclusion suspect or non-suspect.

Substantiation of other matters, such as the horizontal and vertical demarcation, types and calibers of the explosives, numbers, release heights, etc. are sometimes, but not always, stated there, but where applicable in the table in Chapter 6. Finally, questions are sometimes answered in the "event/location" column of Appendix 3, especially when it comes to aerial photo interpretation.

If, after the inventory and analysis of the source material, (part of) the research area is declared suspect, (non-)suspect areas are demarcated in the horizontal and vertical directions, using RD coordinates. The main type, caliber/weight, nationality and appearance of the expected explosives are also determined. If the main type concerns drop-off ammunition, the sub-type, number and type of detonator(s) are also determined, if possible.

Abbreviated risk analysis, conclusions and recommendations

Based on the results, an abbreviated risk analysis was carried out, taking into account future work and use of the location. This resulted in conclusions and associated recommendations for the follow-up process. An UXO detection may be part of this advice. This is a field investigation in which suspicious objects, possible explosives, can be detected.

Delivery

The results of the preliminary investigation have been incorporated into a report including Soil UXO risk map (Appendix 1). More specifically, the report includes:

- 1) reason for the Preliminary Investigation, description and objective of the assignment (§1.1 and §1.2);
- 2) delimitation of the research area (§2.1 and Appendix 1);
- 3) description of the conduct of the research, including method and persons involved (this Appendix);
- 4) justification of the source material, including source references (Chapter 3 and Appendix 3);
- 5) results of the assessment of the source material (Appendix 3 and §4.2);
- 6) demarcation of (non-)suspect area(s) and Soil UXO risk map (Appendix 1 and Chapter 6);
- 7) event list and event map (Appendices 3 and 4a respectively);
- 8) description of gaps in knowledge (where applicable per source);
- 9) abbreviated risk analysis with associated conclusions and recommendations.

The report is delivered digitally in PDF format. The attachments will be provided in Autocad/GIS format upon request.

Planning

After receiving the order confirmation and digital map with RD coordinates showing the contours of the research area, the project is included in the planning. The lead time for the first phase (inventory of the source material) is several weeks, taking into account the delivery time of some, mainly foreign archives. The second phase generally lasts from a week to several weeks, depending on what is encountered in the first phase. Delivery takes place as indicated in the quotation. Requesting aerial photographs can take many weeks in specific cases. If the agreed delivery time threatens to be exceeded, the client will be contacted.

Appendix 6: General evaluation of UXO risks

Consequences of detonation (explosion)

Explosives have been in the soil under poor conditions since WWII. When explosives are found, there is a risk of uncontrolled detonation. Causes of an uncontrolled detonation can include accidents during ammunition handling, fire and groundwork. The chance of an uncontrolled detonation is small, but the consequences are significant. It is therefore necessary to examine which events could follow each other and with what effects.

An uncontrolled detonation can lead to serious injuries and damage to equipment and/or livestock within the sphere of influence of a detonation. Depending on the location of detonation, the damage can vary in severity; a detonation on land has different consequences than a detonation in (deep) water. During a detonation, a large amount of energy is released in a very short time in the form of pressure, shock wave, temperature and possibly fragmentation. This must be taken into account when determining safety and protective measures.

Pressure

Depending on the type of explosive, a pressure of 100,000 to 400,000 bar can develop in the immediate vicinity of the detonation point. No material can withstand this detonation pressure. A pressure of four bar can cause serious damage to the human body, even leading to death.

Shockwave

During a detonation a shock wave is created. The force of the shock wave depends on the detonation speed of the explosive. The resulting detonation speed varies from approximately 3000 to 9000 m/sec. Depending on the medium through which the shock wave propagates, the shock wave can cause damage to machines, structures and vessels. It is a given that a shock wave propagates further in water than in air. The damage caused by the shock wave can therefore be greater under water than in the air.

Temperature

Very high temperatures are released in the immediate vicinity of the detonation point. Depending on the location of the detonation, these temperatures can cause a fire. Underwater, the effects of the high temperatures released during a detonation are nil.

Fragmentation

The best-known danger that arises from detonation is fragmentation. Depending on the material in which the explosive is packaged (the body of the explosive) and the location of the detonation, fragmentation may occur. As a result of the resulting pressure and temperature, the shards that are formed acquire a very high speed, which initially amounts to approximately 1500 meters per second. Depending on the condition and type of explosive substance, the size of the fragments will vary.

Depending on the weight of the shards and the medium through which they travel, the distance they travel can vary greatly. In addition to direct fragmentation, secondary fragmentation must also be taken into account. Secondary fragmentation refers to materials (e.g. gravel and stones) that are thrown around from the immediate vicinity of the detonation as a result of the increasing pressure.

Other effects

Explosives have also been used with (the addition of) flammable substances and chemicals, which pose a very specific danger to their environment. For example, phosphorus was used in so-called explosive smoke grenades and hand grenades. White phosphorus is a flammable substance that can spontaneously ignite upon contact with oxygen.

When white phosphorus burns, it emits a toxic smoke and can ultimately cause a detonation if the explosive also contains a dispersal explosive charge. It happens that explosives filled with white phosphorus ignite spontaneously when they are uncovered during excavation work. In general, explosive substances can be said to be toxic.

Safety measures/risk

In areas where explosives may be present, maximum protection against their effects is provided. These measures relate to both action factors and implementation factors.

We can divide the measures into two main groups:

- Safety measures: all measures taken to prevent an explosive from detonating uncontrolled.
- Protective measures: all measures taken to limit or prevent the actual effect of an explosive on persons, livestock and goods.

The risks of uncontrolled detonation of explosives during ground-penetrating work depend on the type of explosives and the depth/place at which they can be found.

Type of explosives

To assess the risks and determine the correct safety measures, it is important to know which types of explosives can be expected.

Size

The rule of thumb is that the size of an explosive determines its effect on the environment. The larger the explosive, the greater the effect on the environment. The effect on the environment is partly determined by the net content of the explosive substance.

Sensitivity

The chance that an explosive will detonate uncontrolled depends on the sensitivity of an explosive. The sensitivity of an explosive is determined by the sensitivity of the explosive substance present in the explosive and/or the (arming) condition of the installed detonator. The more sensitive an explosive, the more likely an uncontrolled detonation will occur. The sensitivity of explosive substances in the form of explosives often increases due to aging. The sensitivity of a detonator is mainly determined by the arming condition.

The arming condition of a detonator is determined by the forces exerted on a detonator during firing, throwing, throwing or placing of the explosive. During the so-called arming of a detonator, all explosive and/or mechanical components are aligned, allowing the explosive to operate.

Arming can also occur by explosives being thrown around as a result of an explosion. The explosion could be the result of demolition work or an uncontrolled explosion. Explosives equipped with armed detonators are generally more dangerous than explosives whose detonators are not armed.

Appendix 7: Laws and grant possibilities for UXO research

Explosives research legislation and regulations

The tasks and responsibilities for groundwork for both client and contractor are anchored in the Working Conditions Act. This is a framework law that is further elaborated in the Working Conditions Decree and the Working Conditions Regulation.

In accordance with Article 2.26 of the Working Conditions Decree, a client must ensure in the design phase that the contractor is able to meet the obligations under the Working Conditions Act.

In accordance with Article 2.28 of the Working Conditions Decree, the client must identify the risks during the design phase in a Safety and Health Plan Design Phase, so that the executive party can take the necessary control measures. This also applies to the risks related to explosives from the Second World War.

Article 1.5a, part c of the Working Conditions Decree states that there is a Certificatieschema voor het Opsporen van Ontplofbare Oorlogsresten (CS-OOO, Certification Scheme for the Detection of Explosive Remnants of War). This certification scheme has been drawn up by the scheme manager, the Foundation for the Safe Handling of Explosive Substances (VOMES). The aim of this certification scheme is to ensure that the detection of explosive remnants of war takes place in a safe manner. Companies that carry out these activities must comply with this.

The scheme was established by VOMES on October 15, 2020, and published in the Government Gazette dated 11/3/2020. There are two sub-areas, namely:

- Sub-area A: Detection of explosive remnants of war.
- Sub-area B: Civil engineering support.

In accordance with Paragraph 4.1 of the CS-OOO, the client must have demonstrably approved the project plan before field work can start. In accordance with Appendix 3 of the CS-OOO, the EOD must be informed about the project prior to the investigation work. Approval of the investigation work by the competent authority OOV is required for reporting the exploration project to the EOD. This obligation does not apply to detection research.

Companies that carry out UXO detection and approach of UXO and may obtain explosives must have an exemption under the Weapons and Ammunition Act (Article 4).

Enforcement

The Working Conditions Act is inspected by the SZW Inspectorate of the Ministry of Social Affairs and Employment.

The mayor is responsible for Public Order and Safety within a municipality. The presence of explosives can endanger Public Order and Safety. Based on the Municipal Act (Articles 175, 176), the mayor is responsible for enforcement and authorized action.

Working in contaminated soil

Work in contaminated soil must take place in accordance with the Working Conditions Decree in accordance with CROW 400.

Working along the (highway) road

Work along the (highway) road must take place in accordance with the Working Conditions Decree in accordance with CROW 96.

Working along the rail track

Work along the rail track must be carried out in accordance with the Safe Working Standards Framework and the Safe Working Regulations of ProRail (managed by RailAlert). Anyone who enters railway property or in the vicinity of objects belonging to the main railway infrastructure, on behalf of or with the permission of ProRail, must have a valid Certificate of Access (BvT). This will be added to the Digital Safety Passport (DVP).

Protecting archaeological values

In accordance with the Archaeological Monuments Care Act (Monumentenwet 2007), archaeological research must be carried out if there is a risk of disruption of archaeologically valuable information. Research must be carried out in accordance with the Dutch Archeology Quality Standard 4.0 (KNA 4.0).

Information about subsidies for explosives detection and clearance – bomb scheme

Municipalities can receive a contribution from the municipal fund for the detection and clearance of explosives. Costs for preliminary investigation, detection, preventive measures, necessary emergency facilities and groundwork are eligible for a subsidy. VAT does not qualify for this.

Municipalities can receive 68% of the costs for detecting explosives through a supplementary payment. For this purpose, it is sufficient to send a municipal decision containing the costs incurred. Contributions no longer relate to future costs. No further substantiation needs to be submitted.

To be eligible for a contribution, the municipality must submit a council decision that includes the costs incurred for detecting and clearing explosives. No further substantiation needs to be submitted. Project plans or studies into risks, etc., will not be considered. VAT is not eligible for compensation. The statement of costs incurred must therefore clearly state that the amounts are exclusive of VAT.

The necessary council decisions must be submitted before April 1. The costs incurred can be made transparent in IV3 via the 'lastenfunctie' "160 opsporingen ruiming van conventionele explosieven". Council decisions can preferably be sent via regelingen@minbz.nl. Requests submitted before April 1 will be granted in the relevant year.

For questions or further information about the bomb scheme: postbus.gf@minbzk.nl

Knowledge center

The Conventional Explosives Knowledge Center (KCE), as it is officially called, will help municipalities answer questions. An assessment framework is also being drawn up that municipalities can use to make a decision about whether or not to clear explosives. The knowledge center will also conduct research to increase knowledge about detecting explosives. The KCE is established and managed by Rijkswaterstaat, on behalf of the Ministry of the Internal Affairs and Kingdom Relations. Rijkswaterstaat was asked to do this because of its specific experience in setting up and facilitating knowledge centers in the domain of the physical environment.

Appendix 8: CS-VROO guidelines horizontal demarcation suspect area

The table below lists a selection of terms and concepts, as defined in Appendix 01.01 of the CS-VROO. The selection includes the terms that are (possibly) used in and/or relevant for understanding this report.

Term/begrip	Afkorting	Definitie
Achtergelaten ontplofbare munitie		Ontplofbare munitie die tijdens een gewapend conflict niet is gebruikt, die is achtergelaten of gedumpt door een partij bij een gewapend conflict en al dan niet voor ontsteking zijn geprepareerd, van een ontsteking zijn voorzien, op scherp zijn gezet of anderszins voor gebruik zijn voorbereid.
Blindganger		Verschoten of afgeworpen ontplofbare munitie die die door onbekende redenen niet tot ontploffing is gekomen.
Bombardement		Het aanvallen van een doel met bommen om het betreffende doel te beschadigen, buiten werking te stellen of om de vijand tot overgave te dwingen.
Boordgeschut		Boordwapen van een vliegtuig met een kaliber groter of gelijk aan 20 mm.
Boordmitrailleur		Boordwapen van een vliegtuig met een kaliber kleiner dan 20 mm.
Clustermunitie		Clustermunitie betreft munitie die in een cluster (moederlichaam of small bomb container) worden afgeworpen of verschoten.
Conflictperiode		Periode waarin het gewapend conflict heeft plaatsgevonden (oorlogsperiode).
Conventionele Explosieven (munitie)	CE	Munitie (explosieven) die zijn toegestaan bij gewapende conflicten conform de Conventie van Geneve.
Dumplocatie		Locatie waar ontplofbare oorlogsresten zijn gedumpt, zowel tijdens als na de conflictperiode.
Explosieven Opruimingsdienst Defensie	EODD	Overkoepelende organisatie van het Ministerie van Defensie belast met het (op)ruimen van ontplofbare oorlogsresten in opdracht van het bevoegd gezag Openbare Orde en Veiligheid.
Explosieven Opruimingsdienst Explosieve stof	EOD	Uitvoerende dienst binnen de EODD die belast is met het (op)ruimen van ontplofbare oorlogsresten in opdracht van de EODD
Geschutmunitie		Een stof of een mengsel van stoffen waardoorheen een plaatselijk veroorzaakte chemische reactie kan voortschrijden, zonder dat daarvoor toevoer van energie of materie van buitenaf nodig is.
Geschutstelling		Munitie met een kaliber van 20 mm of groter.
Grondgevecht		Locatie waar één of meerdere vuurmonden zijn opgesteld.
Grondroering		Een gewapend conflict dat heeft plaatsgevonden tussen twee of meerdere strijdende partijen op een bepaalde locatie.
Handgranaten		Het omwoelen, omwerken, ontgraven van een bepaalde grondlaag incl. het veroorzaken van ondergrondse trillingen.
Jachtbommenwerper	Jabo	Munitie-artikel speciaal ontworpen om met de hand te worden geworpen.
Kleinkalibermunitie	KKM	Een jachtvliegtuig dat is aangepast om er bombardementen mee te kunnen uitvoeren.
Kraterpatroon		Munitie voor handvuurwapens en mitrailleurs met een kaliber tot 20 mm.
Loopgraaf		Meerdere kraters bij elkaar waarin een bepaald patroon te ontdekken is in relatie tot de wijze van afgeworpen of verschoten munitieartikelen.
Mangat		Een sleuf of gang in de grond (op of onder maaiveld) die militairen beschermt tegen vijandelijk vuur en waarvan tegenvuur kan worden uitgebracht.
Mijnenlegrapporten		Een gat in de grond aangelegd ter bescherming tegen vijandelijke aanvallen voor zowel militairen als burgers.
Mijnenveld		Rapport en legpatroon van een aangelegd mijnenveld met soorten en aantallen mijnen.
Mijn- en Munitieopruimingsdienst	MMOD	Een mijnenveld is een al dan niet afgebakend stuk grond waar landmijnen zijn geplaatst.
Melding, Opdracht, Ruimrapportage en Afdoening	MORA	Organisatie die vlak na WOII belast was met het (op)ruimen van ontplofbare oorlogsresten in opdracht van het bevoegd gezag Openbare Orde en Veiligheid.
Munitie voor granaatwerpers		Rapportage van de EOD voor het (op)ruimen van aangetroffen ontplofbare oorlogsresten.
Na-conflictperiode		Munitie bedoeld om met een granaatwerper te verschieten.
		De periode na het gewapend conflict tot heden.

Term/begrip	Afkorting	Definitie
Niet-gesprongen munitie		In een gewapend conflict gebruikte ontplofbare munitie die ontsteking gereed is, van een ontsteking is voorzien, op scherp is gezet of anderszins voor gebruik is voorbereid en die niet tot ontploffing is gekomen
Offset		Ondergrondse verplaatsing van een blindganger.
Ontstekingsinrichting		Een voorziening die op een explosief is geplaatst of geplaatst kan worden en die op het juiste moment de gewenste werking van het explosief veroorzaakt.
Ontploffbare munitie		Conventionele munitie die explosieve stoffen bevat als bedoeld in het protocol inzake ontplofbare oorlogsresten van 28 november 2003 (Trb. 2004, 227) met inbegrip van mijnen, valstrikken en andere mechanismen.
Opsporingswerkzaamheden		Alle werkzaamheden die worden uitgevoerd ten behoeve van de opsporing van ontplofbare oorlogsresten.
Oorlogshandelingen		Activiteiten die plaatsvonden in de conflictperiode waarbij munitie/explosieven zijn ingezet.
Raket		Een projectiel dat wordt voortgedreven door de reactiekracht die wordt opgewekt door de uitstroming van de gassen welke ontstaan bij verbranding van de door het projectiel meegevoerde stuwstof.
Relevante bron		Een bron die vermeldt dat binnen het onderzoeksgebied activiteiten hebben plaatsgevonden waarbij munitie/explosieven zijn ingezet.
Small Bomb Container	SBC	Container gevuld met clustermunitie die in zijn geheel in een bommenwerper wordt geplaatst, zodat alle clustermunitie gelijktijdig kan worden afgeworpen. De SBC blijft in de bommenwerper achter.
Strategisch bombardement		Bombardement met grote aantallen bommen afgeworpen van grote hoogte hoofdzakelijk uitgevoerd in het achterland van de vijand, gericht tegen industriële capaciteit, infrastructuur en/of burgerbevolking.
Sub-munitie		Munitieartikelen die zijn opgenomen in een clusterlichaam en op enig moment na verschieten of afwerpen hiervan vrijkomen en zelfstandig hun weg vervolgen.
Tactisch bombardement		Bombardement gericht op vijandelijke troepen, aanvoerlijnen en commandocentra etc. in de onmiddellijke nabijheid van het front of bezet gebied.
Toebehoren van munitie		Voorwerpen die onderdeel uitmaakten van of toebehoorden aan munitie, geen explosieve stoffen bevatten en niet zijn onder te brengen bij een van de overige hoofdsoorten.
Tweede Wereldoorlog	WO-II WO2	Conflictperiode 1940-1945.
Uitvoeringsopdracht EODD	UO	Vervanger van de MORA.
Valstrikken		Explosieven die worden geplaatst met als doel om door het uitvoeren van een onschuldige handeling tot werking te komen.
Verdedigingswerk		Een groepering van wapenopstellingen en/of geschutsoopstellingen, rondom afgezet met een versperring en/of loopgraven.
Vernielingsmiddelen		Explosieven om vernielingen of vernietigingen mee uit te voeren.
Vernietigingslocaties		Locatie waar munitie vernietigd is, in de praktijk doorgaans springputten genoemd.
Verticale afbakening		Afbakening van een OO verdacht gebied in verticale richting. Betreft zowel het bepalen van de (minimale) boven- als (maximale) ondergrens van de OO verdachte bodemlaag.
Vliegtuigcrash		Het neerkomen van (delen van) een militair vliegtuig, niet zijnde een geslaagde (nood)landing.
Vuurwerken		Explosieven, meestal voorzien van een pyrotechnisch mengsel bedoeld voor het creëren van speciale effecten, zoals brand, licht, knal, rook en/of traangas.
Wapenopstelling		Een opstelling voor handvuurwapens, machinegeweren en/of andere (semi)automatische wapens, niet zijnde onderdeel van een verdedigingswerk.

Appendix 9: CS-VROO Certificate



T & A Survey Bodemonderzoek B.V.

Dynamostraat 48, 1014 BK Amsterdam

KvK-nummer: 33299426

Dit certificaat is afgegeven op basis van het Certificatieschema Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten, vastgesteld d.d. 29 januari 2021, waarmee voldaan wordt aan de kaderbepalingen van het Arbeidsomstandighedenbesluit.

Certificaat

Vooronderzoek en Risicoanalyse ontplofbare oorlogsresten

Evaluatie van het kwaliteitssysteem heeft plaatsgevonden volgens het certificatiereglement van TÜV Nederland voor het toepassingsgebied:

Deelgebied: Vooronderzoek ontplofbare oorlogsresten.
Deelgebied: Risicoanalyse ontplofbare oorlogsresten.

Deze certificatie is onderworpen aan een jaarlijkse evaluatie door TÜV Nederland.

TÜV Nederland verklaart dat het gerechtvaardigd vertrouwen bestaat dat het door de **T & A Survey Bodemonderzoek B.V.** gehanteerde kwaliteitssysteem voldoet aan de eisen uit het bovengenoemde certificatieschema.

De eisen in dit certificatieschema hebben betrekking op het kwaliteitssysteem van het bedrijf inzake het Vooronderzoek en de Risicoanalyse van ontplofbare oorlogsresten.

Registratienummer: 13803-10.2
Ingangsdatum certificaat: 08-07-2021
Certificaat geldig tot: 21-08-2024
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Appendix 10: Distributors list

The definitive rapport will be sent to:

- Arcadis.