

Train stations as green entrances to National Park Utrechtse Heuvelrug, the Netherlands

Facilitating a modal shift in nature-based tourism



Source: <https://www.ns.nl/en/about-ns/trains-of-ns>

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Executive summary

This consultancy report delves into the intricacies of establishing green entrances, highlighting the significance of train stations for a modal shift initiative of National Park Utrechtse Heuvelrug (NPUH). Green entrances emphasize natural elements in urban settings to connect people with nature, fostering accessible mobility and the attractiveness of train stations and public transportation. As for the structure of the report, it commences with an insightful introduction sketching an overview and setting the stage for the subsequent exploration of case studies and theoretical frameworks. Subsequently, a thorough discussion, culminating in impactful recommendations to enhance the traveler experience and the facilitation of making train stations as green entrances. Finally, the report concludes with a reflection on the limitations of the research and the need for further study, emphasizing the enduring value of the insights it provides.

The national park Kinteloijen faces increasing visitor numbers, primarily by car, which strains the park its delicate ecosystem and nearby populace. In response to these challenges, the National Park Utrechtse Heuvelrug has introduced an initiative to transform train stations into "green entrances". This strategic move aims to combat environmental concerns, enhance energy efficiency, and elevate the visitor experience. The initiative aligns with promoting a modal shift, encouraging travelers to favor sustainable alternatives like taking the train. This research underscores the immense potential of train stations as "green entrances" to facilitate and stimulate a modal shift away from private vehicles. These regional or local hubs can serve as essential centers for connecting people with nature while promoting public transportation options.

The key findings of this report include train stations operating as vital hubs for outdoor recreational endeavors, and promoting the preference for public transit over private vehicles among (local) visitors. Moreover, the integration of green infrastructure has the potential to convert train stations into environmentally sustainable environments. Through the usage of the MONA model framework in this report it evaluated the efficacy of green entrances, identifying their strengths and flaws to enhance their functionality.

That is what shaped our three recommendations in the assessment of facilitating a modal shift in nature-based tourism regarding sustainable mobility like trains. First, the NPUH should improve the provided (online) information. For instance, improve the NPUH website by providing detailed public transportation information, highlighting amenities and attractions, sharing the environmental impact of car usage, recommending main highlights, and streamlining cross-platform information. Second, improve physical presence and facilities at train stations as this is vital. That can be done through adding signage and advertisements, expanding the availability of OV-bikes, and collaborating with transportation authorities to offer combined tickets. Third, renew and implement a regional plan for green (NP)-entrances regionally. For instance, rebrand train stations as "NP-stations" and give them a matching aesthetic with greenery for example. This is to make it clear that the station is an official entrance to the NPUH which can encourage visitors to use public transportation to get there. This report not only advocates for the transformation of train stations into "green entrances" but also delineates actionable recommendations to catalyze a modal shift towards sustainable mobility, underscoring the pivotal role of these stations in fostering environmental consciousness and enhancing visitor experiences within National Park Utrechtse Heuvelrug.

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Train Stations As Green Entrances To National Park Utrechtse Heuvelrug

ENP31006, December 2023

By Ryan, Sharon, Jamela, Manon, Klävs, and Alvin



RQ:

How can train stations around the Utrechtse Heuvelrug facilitate a modal shift for sustainable recreation within the Utrechtse Heuvelrug?

Theoretical Framework



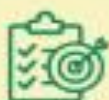
Green Gateways

Emphasizes natural elements in urban settings to connect people with nature, fostering accessible mobility and attractiveness.



MONA Project

The MONA model framework evaluates the efficacy of green entrances, identifying their strengths and flaws to enhance their functionality. This modal shift at Kwintelooijen serves as a key solution to reduce negative impacts and stimulate inclusive access.



Strategic Plan

Regional Analysis:

Highlights using more public transport and create diverse accessible train stations.

Local Analysis:

Focuses on Kwintelooijen, indicating the train stations of Veenendaal and Rhenen as a green gateway, and emphasizes the need for a modal shift.



Recommendation

I. Improve provided information (online)

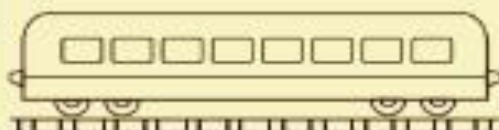
- Take people by the hand with public transport information.
- Define consistent terminology for TOPs, Green Entrances and parking lots.
- Streamline information channels and websites on mobility advice.

II. Improve physical presence and facilities at train stations

- Visibility and presence.
- Create walking and cycling routes facilities.
- Extension of OV-fiets system.

II. Renew and implement a regional plan for green (NP)-entrances regionally

- Create a vision to rebrand the Green Entrances, spread more evenly and promote clearly online.
- Target NP-Stations: accessible, close to popular natural areas, and with space for new facilities.
- Enhance immersion and greenery. Create 'NP-Entrance' posts or visitor centres.



1. Introduction

1.1 Introduction to the case

The high population density and limited public transportation connections to natural recreation areas in the Netherlands, create sustainability challenges for the administration of nature-based tourism. Therefore, many natural areas are looking into ways to integrate public transportation networks to gradually replace private transportation to these areas.

In this case study, we are looking at the Kwinteloijen recreational area as a case study to provide recommendations for a regional transition toward sustainable nature-based tourism through “green entrances”. Those entrances prioritize natural elements within urban landscapes, fostering connectivity with nature, enhancing the appeal of train stations, and promoting accessible mobility through public transportation. In the case of Kwinteloijen, it is connected to the nearby Veenendaal with a high-traffic road that connects to the narrow road leading directly to the nature area and there is a parking space area in front of the park (Google Maps, n.d.). Then from relatively nearby Rhenen, the traffic is better fit for cycling and private transportation, however, taking public transportation takes approximately 30 minutes (Google Maps, n.d.). Therefore, this raises the question of how the national park in collaboration with the municipalities can integrate Kwinteloijen and the broader nature area into the already existing public transportation network to enhance sustainable mobility.

Due to that the National Park Utrechtse Heuvelrug (NPUH) participates in the EU-funded MONA project. MONA stands for "MOdal shift, routing and nudging solutions in NATure areas for sustainable tourism" (Nationaal Park Utrechtse Heuvelrug, 2023). The project is a collaboration between multiple Western European natural areas wanting to make tourism more sustainable (MONA, n.d.). This project's relevance to the consultation report lies in fostering a modal shift within the NPUH. MONA's comprehensive approach focuses on sustainable mobility and tourism solutions to alleviate recreational pressure in natural areas. Aligning with MONA's objectives, this report specifically targets promoting a modal shift within the park, emphasizing the pivotal role of local train stations in creating green entrances to facilitate sustainable visitor flows.

By drawing insights from MONA, this report aims to propose strategies aligned with the project's emphasis on assessing regional and local potential for sustainable mobility solutions. It intends to explore initiatives like mobility hubs at train stations, make green entrances, and enable last-mile connectivity within Kwinteloijen. Additionally, the report aligns with MONA's objective of making train stations inviting and accessible, proposing strategies like greening stations and enhancing signage to encourage public transport usage locally. Thus, by aligning with the MONA project's principles, strategies, and initiatives, this report endeavors to formulate a comprehensive plan facilitating a modal shift and sustainable mobility. This alignment strengthens the report's credibility, enabling it to guide decision-making processes effectively.

1.2 Objective & Research questions

As for the primary objective, this report will assist the commissioner in making informed decisions regarding the implementation of a modal shift in the NPUH. It, also, aims to provide comprehensive insights and recommendations that contribute to paving the way for the modal shift to be effective within the specified region, particularly highlighting the pivotal role that local train stations can play in supporting and fostering the successful execution of this transition. This will be assessed on both a regional and local level. In the report, we will explore the potential of train stations as ‘green entrances’ into the national park, and thereafter we will zoom in on the recreational area Kwinteloijen, which can be regarded as a pilot project of the NP. The Kwinteloijen area has been chosen for this as it is a place already in active development, and local authorities show progressive attitudes in facilitating a modal shift. In our methodology, we integrate visits to local areas by using green mobility, draw upon findings from a thorough literature review, and actively collaborate with the local commissioner.

Therefore, the main research question is: *“How can train stations around the Utrechtse Heuvelrug facilitate a modal shift for sustainable recreation within the Utrechtse Heuvelrug?”*.

To be able to address the primary research question is divided into two subsidiary questions.

1. What are the relevant local and regional train stations, and how can these stations contribute to the successful implementation of the modal shift?
2. What opportunities and obstacles are present for the existing train stations to become green entrances?

2. Theoretical framework

Throughout the Consultancy Report, we utilize two theoretical frameworks – modal shift and green entrances. Both frameworks are key to providing recommendations for train station integration in Kwinteloijen

Modal shift

When searching for literature on the concept of modal shift, the key reoccurring topic is the modal shift that took place during the COVID-19 period. During the pandemic, a global wide shift from public- and paratransit to private modes of transport took place, resulting in increased usage of private transport after the pandemic as well. Not only the choice of mode of transport, but mobility aspects such as trip purposes, distance traveled, traveling group size, and frequency of trips have been affected (Abdullah et.al. 2020). Even in short distance travel, our post-pandemic society tends to use motorized private modes and the pandemic has affected our practices of everyday life travel behavior. At the same time, in most European countries, the public transport sector suffered from the pandemic in two main ways, namely the significantly and continuously decreasing number of customers and the high losses due to additionally implemented hygiene and safety measures. Therefore, the public transport sector still heavily relies on substantial monetary support (Eisenmann et.al. 2021).

Alongside the COVID-19 pandemic, travelers now have a variety of transportation modes to choose from, including the development of new mobility options such as e-bikes and electric public transport. With the rise of mobility services like Uber, passengers are presented with an array of choices (Liu et al., 2023). A modal shift key strategy is to nudge passengers of transport to choose public, shared or more sustainable modes of transportation, by reducing car dependency through the optimization of public transport systems and accessibility, empowering carpooling opportunities, and improving information and communication routes and tools (Müller and Reutter, 2022). Thus, the MONA project of the Utrechtse Heuvelrug aims to empower and nudge all visitors of the national park towards sustainable mobility. In this consultancy report, we shall focus on the modal shift towards train transportation specifically.

Green Entrances

The concept of a green entrance (or green gateways) refers to the presence of natural elements in mostly urban settings, to connect people with nature, such as parks, reserves, or other greenery nearby (Adinolfi et al., 2014). [SO1] They serve as an entrance or transition area between urban and natural spaces, fostering the connection to and attractiveness of nature to people passing this gateway. Specifically, in terms of the MONA project, the term ‘green entrance’ is used to describe ‘green’ mobility hubs from where people can enter natural areas in an immersive way. These entrances are thus green by themselves (as described previously) but are also connecting to a ‘green’ area, in terms of natural environments (Sterre Sparreboom, personal communication, 6 December 2023).

Key elements of green entrances are sustainability, biodiversity, aesthetics, education and engagement, and these entrances can be as big as futuristic, self-sustaining, infrastructural designs, such as the Gardens by the Bay in Singapore, or as small as potted greenery around streetlights or green roofing on bus stops. However, when strategic placement is challenging, optimizing access to existing areas becomes essential.

Enhancing public transportation systems to urban green spaces is identified as a cost-effective approach to fostering connections between residents and the natural environment (Chen, 2015).

Whilst the concept of the green entrance in the context of green mobility is relatively new, there are little to no concrete reports on what are key elements in a successful implementation of 'green entrance' visions. This is especially true when combined to specifically train stations and recreational tourism. Thus, this only shows the relevance of the pilot studies of MONA at Utrechtse Heuvelrug and similar cases. For our analysis and recommendations, we have drawn up three main pillars that are expected vital for successful green entrance transitioning for train stations. Whilst it is not to say that when these are adhered to, the new system will unconditionally work, we do firmly believe them to lay a confident foundation for successful green entrances in train stations. These 'success pillars' are high quality and consistent mobility information provisioning; abundance and accessible practical facilities at the train station; and train station immersion and connectivity with the natural environment.

These three pillars form the framework of this report, and thus the underlying basis for the assessment of the current status of NPUH and Kwintelooijen, and the subsequent recommendations largely follow the pillar structure as well. While we acknowledge that these pillars may not strictly adhere to SMART principles, they are considered effective within the scope of this limited consultancy report. We encourage further research to refine and expand on defining the success factors or pillars for green entrance systems in recreational tourism.

3. Assessments and Results: Analysing the Current Situation

The significance of assessing the current state of train stations is emphasized through an examination of the various benefits stemming from enhanced infrastructure, particularly in sustainability and mobility. From promoting sustainable practices to addressing diverse passenger needs, the transformation of train stations becomes a crucial element in the effort to establish more efficient, inclusive, and forward-thinking urban environments. Utilizing the MONA model, we explore the dimensions of accessibility, sustainability, and Inclusivity, acknowledging that the improvement of train stations plays a central role in the holistic development of urban spaces. Therefore, our decision to undertake an assessment aligns with the overarching goal of advancing these crucial dimensions. The case analysis differentiates between regional and local levels. The regional level is focused on the entirety of National Park Utrechtse Heuvelrug, while the local level is focused on the Kwintelooijen recreation area itself. [RM2][RM3] The objective of this section is to provide an overview of the current status of train stations and assess the feasibility of transforming them into green entrances. This analysis closely aligns with the three design pillars outlined in the previous section, laying the foundation for the subsequent recommendations in Chapter 4.

Regional level: National Park Utrechtse Heuvelrug

Area description

The National Park Utrechtse Heuvelrug consists of around 20 thousand hectares of connected forests and heathlands that are situated along the geographical ridge feature that stretches from Hilversum to Rhenen (Nationaal Park Utrechtse Heuvelrug, 2020a). The case study area and the MONA project entails the area within the province Utrecht, that stretches from the border with Noord-Holland in the North-West to the city of Rhenen in the South-East, which includes the working area of NPUH (Nationaal Park Utrechtse Heuvelrug, 2020a). The NPUH makes up the second largest connected forest area in the Netherlands but consists of plots owned by over seventy individual landowners and managers who work with the foundation NPUH. As a result, the NP is made up of many smaller natural areas that have their own facilities and websites, and there are no official visitor centers or main entrances for the National Park Utrechtse Heuvelrug as is oftentimes standard. The NPUH and its various parts draw hundreds of thousands of visitors annually (KANTAR PUBLIC, 2023), who come to enjoy the natural landscape, the cultural heritage, the recreational facilities, and the surrounding villages (Provincie Utrecht, n.d.; Samenwerkingverband

Nationale Parken, n.d.). Some of the most visited destinations are Lage Vuursche, Austerlitz, Kasteel Amerongen, Paleis Soestdijk and Kwinteloijen (Appendix A1) (Sterre Sparreboom, personal communication, 6 December 2023).

In typical Dutch fashion, the National Park is fragmented between roads and urban areas. The NPUH is located only about ten kilometers east of the city center of Utrecht, and thus is situated overall close to the metropolitan area 'de Randstad'. Two highways cross the NPUH in the middle (A12 and A28), and another runs parallel on the northwest side of the park (A27). About ten national roads cross through or border the NPUH. In parallel, the A28 runs the major railway connection from Utrecht to Arnhem, and there are several train stations surrounding the study area (Google Maps, n.d.). There is a vast network of cycling and hiking routes, and entrance points with parking lots are dispersed around the area (RBT HEUVELRUG & VALLEI, n.d.-a).

Visitor mobility

Due to the adjacent car infrastructure, ample parking spots have been created for those who come to the NPUH by car. In 2022, visitors of all the considered natural areas that are part of the NPUH, most often travelled to the location by car (per location varying between 65-75% of all visitors), followed by bike and/or hiking (KANTAR PUBLIC, 2023). To accommodate these visitors parking lots are abundant within



and surrounding the NPUH, provided by the site-specific terrain and nature management, or for example as part of the 'TOP Points', of which there are about twelve in the NPUH (map can be found in Appendix A1) (Natuurmonumenten, n.d.; RoutesinUtrecht, n.d.). These are recreational points of interest where ample parking space for (electric) cars and bikes is available, where one can start well-signed hiking and (mountain-)biking routes, and often enjoy recreational facilities (RBT

HEUVELRUG & VALLEI, n.d.-b). The NPUH website defers people looking for locations to park their car to the TOP points, or to one of five 'Groene Entrees' (EN: Green Entrances): Kaapse Bossen, Amerongen, Boswei Driebergen, Prattenburg, and Doornse Gat (Nationaal Park Utrechtse Heuvelrug, 2020b), which are mostly located in the South-East of the NPUH (Appendix A1).

FIGURE 1 - ONE OF THE CURRENT 'GROENE ENTREES' AT AMERONGEN, SHOWING HOW IT IS MOSTLY A PARKING LOT WITH A SMALL INFO-PILLAR. https://commons.wikimedia.org/wiki/File:NP_Utrechtse_Heuvelrug_Groene_entree_Amerongen.JPG

Whilst the percentage of visitors who arrive by public transport is low, there are about 15 well-connected train stations in, or in the close vicinity of the NPUH (Google Maps, n.d.), many

of which are easily accessible from the Netherlands' biggest station Utrecht Centraal, or any other direction as Zwolle or Arnhem (CU2030, n.d.; Nederlandse Spoorwegen, n.d.). The complete list of considered train stations consists of Amersfoort Centraal, Baarn, Bilthoven, Bunnik, Den Dolder, Driebergen-Zeist, Hilversum, Hilversum Sportpark, Hollandsche Rading, Maarn, Rhenen, Soest, Soestdijk, Soest Zuid, Utrecht Overvecht, Veenendaal Centrum, and Veenendaal West (Appendix A1) (Google Maps, n.d.). These stations are located up to 5km from the closest point of the NPUH, and thus all allow for hiking into the park, or it is generally possible to take a short bus trip to get a bit further into the park.

Another popular option to get further into the NPUH, or just as a means of recreation, is to use an 'OV-fiets' (rental bike by the Dutch Railways) for the same goal. These bikes are getting increasingly available at both larger and smaller stations, though are not yet present everywhere (currently at eleven of the previously mentioned stations, and the bus station Zeist), and their numbers vary greatly (7 bikes at Den Dolder station, compared to 248 at Driebergen-Zeist) (OVFietsBeschikbaar, n.d.-a, n.d.-b). In 2022,

Driebergen-Zeist has specifically been targeted for a pilot with electric OV-bikes, to stimulate people to further explore the NPUH, and to overall facilitate easier last-mile transportation (Bright, 2022; Sterre Sparreboom, personal communication, 6 December 2023).

Furthermore, the station Driebergen-Zeist can likely be considered one of the major stations that could function as a mobility hub in the NPUH, due to its central location, the plentiful facilities, and multiple hikes or cycle routes into the NPUH start at the station. The station is filled with greenery, and modern architectonic elements, but also architecture that resembles old-fashioned estate styles as typical for the areas surrounding the station. Overall, the renewed Driebergen-Zeist station stands out in the NPUH as a large and modern station that would like to be seen as a hub or 'green entrance' for the natural area (Sterre Sparreboom, personal communication, 6 December 2023). The majority of the other stations directly in the area are older, simple stations that consist of little more besides two platforms, without much greenery or direction into recreation. Information is lacking, on which of the stations in the area are currently being used most relatively to travel into the NPUH.

Local level: Dagrecreatiegebied Kwinteloijen

Case description

Kwinteloijen National Park serves as a sanctuary for nature lovers and outdoor enthusiasts (Jansen, 2022). This exceptional recreation area reveals a variety of landscapes, each filled with distinct natural wonders, providing several recreational options to accommodate every preference. According to National Park De Utrechtse Heuvelrug (NPUH), increasing visitor numbers in national parks around the Netherlands have pressured park resources and residents' quality of life. In a 2023 assessment turned out that of all visitors in Kwinteloijen, 0% of them arrive by either train or bus, compared to 75% by car and 19% by bike. Additionally, of all the visitors in Kwinteloijen, 97% of them are from the direct proximity of this natural area: 82% from Veenendaal and 15% from Rhenen municipalities (KANTAR PUBLIC, 2023).

NPUH is investigating measures to distribute visitor flows and stimulate modal shifts at Kwinteloijen to address this issue. In this case, train stations are preferred and treated as 'green entrances'. Three major train stations are in proximity: Rhenen, Veenendaal-West, and Veenendaal-Centrum. The consultancy group decided on Veenendaal-Centrum as the suitable train station for the modal shift initiative. Unlike the other two train stations, the visitors can walk/cycle to Kwinteloijen for the shortest duration.

Modal shift is a practical and effective approach to managing the movement of visitors at Kwinteloijen. It can alleviate traffic congestion and improve accessibility (Rahman, Jahan, & Zhou, 2020). Additionally, this also promotes physical activity that takes part in enhanced visitor experience which ultimately preserves the park's natural resources. Local assessments are essential for comprehending the distinct circumstances, obstacles, and assets of Veenendaal Centre Station. Through this, considering all stakeholders, a precise and pertinent understanding can lead to the detection of efficiencies and contribute to decision-making, becoming indispensable instruments for planning, resource distribution, and policy development. Taking this into account, local assessment paves the way to a better understanding and starting point of a broader analysis through regional or other pertinent levels. Considering the present circumstances at Kwinteloijen, a modal shift is a vital element in addressing the existing difficulties with effective solutions.

As we explore the improvement of public transportation infrastructure, a thorough examination of train stations becomes crucial in the context of urban planning and development. Despite its classification as a basic station, the group observed that Veenendaal Centrum Station is equipped with a range of amenities that cater to the needs of its passengers. A ramp ensures accessibility for individuals with disabilities, while two platforms facilitate the smooth movement of trains headed towards Utrecht Centraal, Arnhem Centraal, and Ede-Wageningen.

The station features a convenient information kiosk equipped with an emergency button for prompt assistance, a ticket vending machine, automated top-up machines, and pole check-in and check-out facilities. Passengers can also avail themselves of sheltered waiting areas, restrooms, and pre-and post-transport facilities, including unpaid car parking spaces, unguarded bicycle parking areas, bicycle lockers, and access to the OV-fiets bike-sharing service. Additionally, a bus stop adjacent to the station entrance provides seamless connectivity to local bus routes.

Green Entrances consist of multiple elements. In Malmo, Sweden, train stations were converted into green entrances (Anderson, 2014). The observed ocular inspection of the group identified the presence of these elements in the Veenendaal central station. The presence of a design that is pedestrian-friendly, safe, and convenient. A bicycle infrastructure, optimizing green spaces, and fostering partnerships with relevant stakeholders. Having undertaken these elements ensures a seamless transition of this train station into connecting people, and nature and conforms to the initiative of modal shifts as per developed by NPUH.

An upsurge in visitor interest in these recreational locations must be considered to determine whether it is feasible to include local recreational places in the regional public transportation network. In the case of Kwinteloijen, it is critical to distribute tourists and encourage them to use the Veenendaal-Centrum as a green entrance. Once this is established and becomes the norm, all other components that might be considered, such as incorporating regional public transportation networks into local recreational areas, can be considered.

4. Recommendations

Introducing an initiative to transform train stations into inviting and accessible hubs is a pivotal step towards promoting public transport usage and fostering sustainable mobility to the National Park Utrechtse Heuvelrug. Train stations could grow to be at the core of sustainable, public transportation-based tourism for the national park. Our objective is to position it as a pivotal gateway for tourists, thereby promoting a shift towards sustainable and environmentally conscious modes of transportation. This initiative aligns with a broader commitment to creating a more sustainable and environmentally conscious travel experience for residents and visitors alike. To achieve these goals, we recommend three key pieces of advice, that are formulated below and are largely based on the earlier posed 'success pillars' for Green Entrances. The advice is mostly written with the regional view in mind, with a short zoom-in on the Kwinteloijen case at the end of each section. These three recommendations can be considered separately, but somewhat overlap, and enhance each other when implemented successfully. They are sorted to increase (estimated) costliness and effect size.

4.1 Improve provided accessibility information

A well-managed website can provide clear navigation and guidance, helping visitors find essential information such as access points, activities, and services within the park. In terms of facilitating a modal shift, it is of utmost importance that potential visitors of natural areas are made aware of the ease with which they can reach their destination, also via public transport.

Current online information provisioning on visitation infrastructure for the NPUH is lacking clarity and guidance. On the websites of the NPUH (np-utrechtseheuvelrug.nl) and of the tourism-institute RBT (opdeheuvelrug.nl) no concrete information is provided for either car parking or public transport. It is mentioned the area is easy to reach, there is plenty of parking, and public transport can easily be planned. Cars are referred to one of 26 TOPs¹ of which only some are in the NPUH, and several train stations are mentioned by name, but no implementable travel advice is given on either of these major websites. It is

¹ Toeristisch Overstap Punt (EN: Touristic Transfer Point); system of points assigned in Utrecht and Gelderland provinces as touristic hotspot for arriving (by car) and entering natural and/or cultural areas with a different mode of transport

quite challenging to gain a good understanding of where the NPUH wants visitors to arrive by car. The definitions and purposes for (concepts such as) green entrances, green gates, TOPs, general parking lots, and green stations have become cluttered, and sometimes information available online is dated (e.g. 'gates' mentioned on Wikipedia). These issues have been recognized at NPUH, and a glossary and revision should follow in the coming years, in relation to the MONA project (Sterre Sparreboom, personal communication, December 6, 2023).

For efficient communication with the public, it is of major importance to streamline information among platforms. It is however the very nature of the NPUH that makes this challenging: as the area consists of tens of separate natural, cultural, and recreational areas, most of them with their own website and accessibility information. Additionally, the question 'Where is the national park?' remains relevant to be answered by the public. There are no "main entrances" or visitor centers under the name of NPUH, which makes it challenging for visitors out of the area to know where to go, in contrast to other national parks that have more concrete visitor information (e.g. NP Zuid-Kennemerland, Duinen van Texel). Local nature areas (i.e. Lage Vuursche, Kaapse Bossen), have their individual vision of local infrastructure that does not necessarily match with the regional NP vision. As a result, different websites could mention different parking lots, and visitors could experience it as confusing, as they are overwhelmed by information from the different parties' websites.

It is recommended that the main website of NPUH, but also the websites of individual sub-areas, improve their accessibility information to lower the bar for potential visitors. As stated at the start, visitors should be greeted with information on public transportation and guided through the process to show it is rather easy. The objective is to reassure the public that public transport is just as convenient as using the car. In order to do this, websites should immediately greet visitors with detailed, but straightforward public transport information that includes travel duration, main destinations in the park, and directions. Facilities, sights and present (signed) walking routes into the National Park should be highlighted. Public transport usage can be encouraged by also sharing numbers on the environmental impacts of car usage in comparison to soft mobility options. Lastly, we recommend more clear information on the NP that it consists of many connected yet separated areas, and some advice on which locations are main highlights within NPUH, for visitors that want to visit the NP without knowledge of the sub-areas. For Kwinteloijen, as part of the NPUH, the described challenges hold up, and we would recommend improving public transport instructions in line with the aforementioned (currently none of the four semi-official websites have this information²).

4.2 Improve physical presence and facilities at train stations

The train stations present in the study area vary greatly on many levels: facilities, size, passenger numbers, architectural style, aesthetics, and so on. On the one end of the spectrum, major stations like Driebergen-Zeist and Amersfoort Centraal are rather modern, with an abundance of facilities both on and surrounding the station. In stark contrast, stations like Maarn and Den Dolder are simple and aged, consisting of barely more than the two concrete platforms. Whilst it is out of reach to analyze all fifteen stations individually, some facilities can be recommended nonetheless, that would immediately make the train station a more attractive place for arrival into a natural area, forming a basis for growth into a true green entrance. Although a rough regional assessment has been undertaken (Appendix A1), mapping all facilities at all fifteen train stations is beyond this research. It is for the NPUH to, in the future, analyze which stations are most lacking key facilities to make them attractive for tourism, and to select target stations to vastly

² <https://www.opdeheuvelrug.nl/locatie/3413767958/dagrecreatiegebied-kwintelooyen-1>
<https://www.rhenen.nl/belasting-en-vergunningen/kwinteloijen>
<https://visitrhenen.com/natuur-rhenen/kwinteloijen/>
<https://www.houseofbird.nl/kwinteloijen/>

improve. Below are some generalized recommendations on physical representation and facilities at train stations that likely fit (some of) the stations relevant to NPUH.

In order to make the station itself a more attractive place to be, we recommend increasing the focus of the design to feel open and natural, with both modern and natural elements. One could strongly draw inspiration from the design of the revised Driebergen-Zeist (FIGURE 2), which has rebuilt a previously dated train station into a modern station with traditional aesthetics that link it to the natural environment and the estate culture surrounding the area. Incorporating a wider vision for the station to also include a 'station square' adjacent, makes the station feel more like an established mobility hub and landing place, as compared to only a train platform (AD, n.d.; Architectenweb.nl, n.d.).



FIGURE 2 - OLD (LEFT) AND RENEWED (RIGHT) STATION DRIEBERGEN-ZEIST, CLEARLY SHOWING THE NEW MODERN DESIGN WITH MORE INTEGRATIVE APPROACH INTO ITS SURROUNDINGS.

Additionally, practical facilities should be made to be well-functioning and available. Every train station should have basic facilities such as operating toilets, drinking water points, and lockers, in order to accommodate the needs of recreationists. Besides, the existing OV-bike system should be expanded upon, to have more bikes and electric bikes, at least at the stations that are the main entrances for the national park. The more facilities available at train stations to accommodate the direct needs of recreational visitors, the less likely the visitors are going to experience their choice of public transport as an extra hurdle. As said, it is to be expected that even a minor inconvenience could make the target audience choose for transport by car rather than public transport.

The abovementioned could also be applied to the train stations that are close to the area of Kwinteloijen: Rhenen, Veenendaal Centrum, and Veenendaal West (Appendix A1), in order to make these more attractive as green entrances. All three stations could benefit from accommodating tourists, as they are all close to natural environments. Of these, Veenendaal Centrum is likely the most relevant for specifically Kwinteloijen, as it is closest, although still a fifty-minute walk next to major roads. We would recommend that Veenendaal Centrum improves the OV-fiets availability and information, as the number of bikes is low, and online it is not mentioned as a station with bikes at all. Other than that, the station is rather outdated and could be revised to feel more like a landing area. However, considering that currently 0% of visitors come by train, and 82% of visitors are from Veenendaal (KANTAR PUBLIC, 2023), it seems that developing the train station as a green entrance for Kwinteloijen seems futile and without effect: visitations are largely local, making the train station irrelevant. This could be different if there was a desire to target trans-regional visitors, but this is currently not the case (as discussed at the seminar for this project at Rhenen town hall on December 13th, 2023).

Successful implementation of these recommendations can effectively promote a pathway from regional train stations to recreational points. It is important to note that specific advice for improvement may vary, considering the distinctive characteristics of regional train stations, local community preferences, and the commitment to creating a positive passenger experience. Despite existing facilities, there is still room for

strategic improvement in accommodating tourists to the national park. We would thus advise local stations to analyze how changes in facilities could enhance the station's functioning as a 'green entrance' for the NPUH. [SO4]

4.3 Renew and implement a regional plan for green (NP)-entrances regionally.

We find it recommendable that the NPUH at a regional scale would implement a new vision of green entrances with train stations playing a major role. Crafting a vision for the rebranding of Green Entrances, with a focus on achieving a more balanced distribution and effective online promotion, necessitates a methodical and comprehensive approach. With around fifteen train stations present in the area of the NPUH, it seems most facilities are in place to allow for soft mobility by train. As mentioned, (2.1 and 2.2), the usage of stations to enter the national park (i.e., as Green Entrance) can be encouraged with smaller measures: by improving the (online) information provisioning on mobility, and by improving facilities, immersivity, and greenery at the station. For a larger mobility transition, we believe it to be paramount that train stations are looked at regionally, whilst resolving present information provision issues.

We would suggest that the NPUH update its 'green entrance' concepts to match the vision under MONA, and with that include train stations explicitly. The new green entrances could even be rebranded as 'NP-Entrances' in order to provide more guidance for visitors as to where to go (see 2.1). In order to facilitate the modal shift, it seems advisable to focus this new vision heavily around (some of) the multiple existing train stations and put these on the map as official entrances to the NPUH. Possibly, these could be rebranded as official 'NP-Stations' and be given a matching aesthetic that makes clear one has just arrived in (or close to) a National Park, which could come with several benefits. When a station is promoted as being an entrance, visitors by train would feel that the infrastructure is thoughtfully adapted to them and that they are not a forgotten group, stimulating their mobility behavior. This is further enhanced by letting the NP experience start already at the train station rather than a kilometer ahead. If the short walk from the station to the 'actual' nature is branded right, it can be seen as part of the recreation rather than annoying last-mile transportation. Lastly, by clearly promoting the station as part of the NPUH, commuters, and other travelers not currently heading to the NP might notice and remember for the future that travels into the NPUH can easily be achieved by train.

In the pursuit of enhancing both visitor experience and sustainability in this development, it is crucial to adopt a thoughtful approach as it plays a crucial role in shaping the overall experience of visitors and contributing to the park's broader goals of conservation, education, and sustainable tourism. We believe that for successful rebranding the design elements should be simple, clear, consistent, and feasible, whilst in line with the basis design principles of the green entrance. Naturally, before actual implementation, further research would be needed on the design principles for successfully rebranding towards these 'NP stations', but a short description of our vision is provided (textbox A).

Textbox A: Draft vision for the hypothetical NP-stations in National Park Utrechtse Heuvelrug

Visitors should be met right outside the station with a sign that welcomes them in NPUH (at NP-Station 'name'). Here, recognizable NP-signposts should lead guests via an enjoyable routing to the 'start' of nature from which recreation can be commenced. These short routes should be enhanced with endemic greenery for immersion, and with educational signage on local culture, geology, flora and fauna, emphasizing the importance of conservation. These integrated measures not only improve the overall visitor experience but also contribute to sustainable practices and environmental education. The NP-entrance experience could be made complete with the inclusion of an information kiosk (larger than, but similar to the current 'info-zuilen' – figure 1) at a prominent place outside of the station to display relevant information bulletins, activities and house-rules. Paired to this could be the start of the walk into the NP, emphasized with greenery and an actual archway with climbing plants, to provide some embodiment of entering the NPUH.

For a more thorough assessment of the initiative's impact on local and regional areas, it is essential to consider both positive and negative aspects and implement specific metrics. Incorporating "Transition Management" allows for monitoring results, performance evaluation, and continuous adjustments based on evolving visitor patterns, environmental considerations, and community feedback. This approach facilitates informed decision-making and significantly contributes to the overarching goal of sustainability in the management of natural areas (Gößling et al., 2012).

A last but vital point is developing a strategy on how to select and target stations that should become NP-entrances. These stations should align with accessibility, proximity to popular natural areas, and the availability of space for new facilities. Equally important however would be to assess the willingness of local stakeholders and landowners to have the official NP-entrances at a certain location. Furthermore, it is likely easier to implement changes at smaller stations and the focal stations should be dispersed more evenly than current green entrances (S. Sparreboom, personal communication, 6 December 2023). We would specifically recommend picking four or five stations spread throughout the NPUH, that are close to hotspots, could accommodate higher visitor numbers and facilities, and already *feel* proximate and connected to the natural environment. An example of dispersed stations, close to hotspots could be Veenendaal-West, Driebergen-Zeist, Den Dolder, Hollandsche Rading, and Baarn (Appendix A1). However, developing a strategic approach to this targeting and executing it, requires an approach that is beyond the scope of this report, and we would recommend this to NPUH as a follow-up project within MONA. In this follow-up, the desires and challenges specific to the Kwintelooijen case can be considered as well. The latter has not been done in this project, as the scale of this recommendation can hardly be applied just to Kwintelooijen without considering regional vision.

5. Conclusion

Firstly, the MONA model emphasizes the importance of evaluating the components of green entrances, including sustainability, community engagement, and environmental quality, to maximize their benefits in connecting people with nature. When strategic placement of additional green spaces is not feasible, maximizing accessibility to existing green spaces becomes paramount. Improving the public transit systems, such as trains to urban green spaces, is a cost-effective strategy to encourage citizens to connect with the natural environment (Chen, 2015). While incorporating natural features is crucial, addressing obstacles is essential for green entrances to be successful and sustainable.

Secondly, establishing green entrances requires substantial financial resources and is accompanied by many impediments. These challenges include development and implementation, guaranteeing proper upkeep, actively involving the local community, and promoting partnerships among various stakeholders. Collaboration across disciplines, such as urban planning and environmental science, is paramount to address complex challenges. However, it is critical to recognize that effective interaction across stakeholders is essential for collaborative success. Unfortunately, communication hurdles might hamper development in some cases. Green entrances must be evaluated regularly to ensure their long-term success. Regardless, one of the threats in this process is the need for specific metrics, making optimizing these entrances effectively tricky. This lack of metrics also poses challenges when justifying investments, securing ongoing support, and adapting to the ever-changing conditions of the community and the environment. Appendix 2 provides a comprehensive overview of the significant challenges when considering the impact of enhancing green entrance opportunities in implementing green entrances.

Thirdly, recognizing the pivotal role of accessibility and attractiveness in train stations is crucial for catalyzing a shift in the transportation model. A seamless and inviting travel experience enhances commuter satisfaction and contributes to a more sustainable and widely adopted mode of transportation.

More importantly, the key focus lies in emphasizing the significance of our three recommendations. These recommendations primarily center on improving the provided (online) information, enhancements of the physical presence and facilities at train stations, and renewing and implementing a regional plan for green (NP)-entrances regionally. These recommendations aim to address crucial areas that require attention and improvement to enhance travelers' overall experience and promote sustainable regional practices. The planners involved, (non) governmental agencies, and other stakeholders, have the opportunity to improve the overall quality of train stations significantly. This will result in train stations that are not only functional but also visually appealing, creating a positive impact on how people perceive and ultimately select public transportation options. The forward-looking approach mentioned here aligns with the overarching objective of developing transportation systems that are efficient, visually appealing, and inclusive. These systems aim to cater to the varied requirements of communities on a larger scale, encompassing multiple regions.

Ultimately, the research undertaking was conducted within a limited timeframe, which may have challenged the group to meet their objectives and achieve optimal results. If the circumstances were to change, the group would have had the opportunity to dedicate a significant amount of additional time to thoroughly delve into the intricacies of the complex topic addressed in this consultancy report. Despite any potential reservations, the group firmly believes the assessment is robust and comprehensive. It encompasses crucial and significant aspects that can be effectively utilized by National Park Utrechtse Heuvelrug and other relevant stakeholders who stand to gain valuable insights from it.

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Appendix

Appendix 1 – Map of the National Park Utrechtse Heuvelrug

The map below shows the transportation features in the area in terms of soft mobility. The original blue boxes and red pins resp. indicate train stations and ‘touristic transfer points’. The latter should by name match with the TOPs indicated online³, which are indicated by the blue rings added. The green squares represent the current green entrances listed by NPUH, whilst the green diamond represents a green entrance listed on Google Maps, but not by the NPUH. The orange star shows the location of NPUH on Google Maps, which does not correspond to an entrance or TOP. The shaded orange fields represent main busy areas as mentioned by Sparreboom (personal communication, 6 December 2023), from west to east: Lage Vuursche, Paleis Soestdijk, Austerlitz, Kasteel Amerongen, and Kwinteloijen.

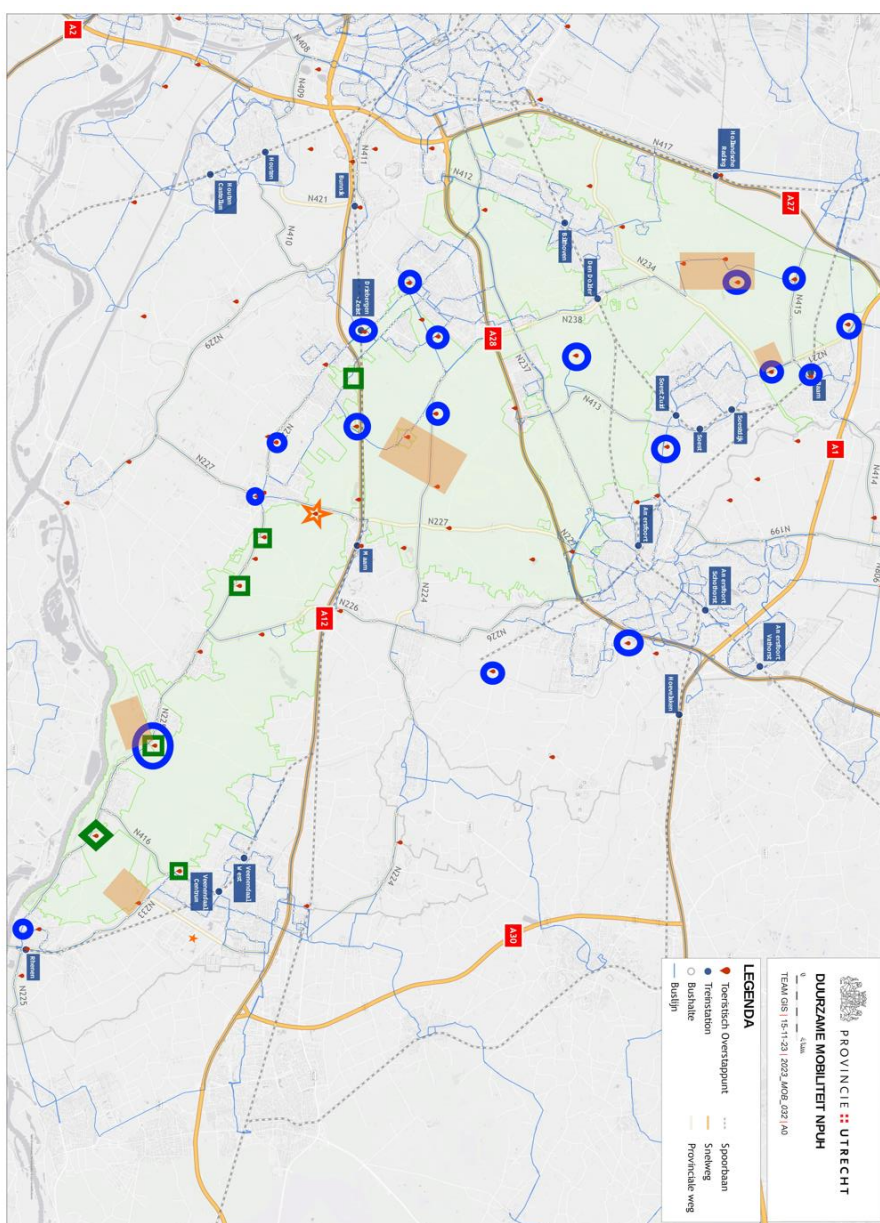


FIGURE 3 - MOBILITY MAP OF THE NATIONAL PARK UTRECHTSE HEUVELRUG
(ADJUSTED, ORIGINAL PROVIDED BY S. SPARREBOOM).

³ <https://www.routesinutrecht.nl/route-informatie/toeristisch-overstappunt-top>

Appendix 2 – Opportunities and Challenges

The table below gives a schematic overview of the opportunities and challenges that can be identified or expected at the implementation stage, as presented in the conclusion of this consultancy paper. Both the opportunities and challenges are divided into three sections, namely 'environmental', 'societal' and 'design and implementation' (managerial).

	<u>OPPORTUNITIES</u>	<u>CHALLENGES</u>
Environmental +	<ul style="list-style-type: none"> • Shift to sustainable mobility • Biodiversity conservation • Aesthetics of NPUH • Education of community and visitors • Awareness of green entrances 	<ul style="list-style-type: none"> • Integrating green entrances in the current architecture and infrastructure of the cities • Maintaining green spaces requires ongoing effort and resources • Possibly harming existing flora and fauna in implementing changes • Limited space
Societal +	<ul style="list-style-type: none"> • Mental and physical health enhancement • Involving the local community in the design process and addressing their concerns or preferences • Pedestrians and cyclists managing 	<ul style="list-style-type: none"> • Existing urban infrastructure • Resistance to change by local communities and stakeholders • Poor communication of green entrances in surrounding communities • Peak hours
Design & implementation	<ul style="list-style-type: none"> • Collaboration and investments by diverse set of stakeholders • Incorporating sustainable technologies • Foster partnerships with local businesses for the maintenance and activation of green entrance spaces 	<ul style="list-style-type: none"> • Balancing the interests, culture and expectations of various stakeholders • Securing funding for the design, construction, and maintenance of green entrances. • Unexpected weather conditions should include provisions for more amenities

FIGURE 4 – ANALYSING MONA MODEL: OPPORTUNITIES AND CHALLENGES FOR GREEN ENTRANCE BASED ON ENVIRONMENTAL, SOCIAL, AND IMPLEMENTATION FACTORS.