CONCEIVING INFRASTRUCTURE AS A MODE OF URBANISM:
Canalizing and colonizing the Campine

One of the densest rail networks in the world, a density of highways exceeding three times the European average and in the density ranking of canal networks, Belgium comes in second.\(^1\) This intensively knitted network of transport infrastructure is counterpointed by a dispersed urbanisation pattern. Besides the constellation of five metropolitan regions (such Brussels or Antwerp), this urbanised landscape shares spatial characteristics with those which have been denominated in the past as ‘citta diffusa’, ‘urban sprawl’ or ‘periferia’.\(^2\)

Composed out of scattered patches of urban, industrial or recreational program and agricultural relics, the average Belgian territory forms a low density fragmented reality.\(^3\) The correlation between the development of this dense transport infrastructure network and the urbanisation process, remains however an underexposed item in the history of planning and urbanism.

In common research and design practice, infrastructure and urbanism belong to different disciplinary domains.\(^4\) While the first one is claimed by the engineer, occupied by criteria such as optimal technical performance, safety or feasibility, the discipline of urbanism is often situated on the transition between architecture, social and policy science. Both are the subject and object of different journals, departments and designers. Also their historiography shows little common ground. While the first one concentrates on the developing and perfecting of the network and its benchmarks or analyzes the technological evolution, the history of urbanism chooses systematically the perspective of the traditional city. The concentric growth of the classic nuclear city, adding built belts along centripetal patterns of transport, is well documented, but outside this specific morphological context, the conception of infrastructure and its attendant urbanisation patterns remain treated a black box.\(^5\)

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\(^1\) EUROSTAT, Regional road and rail transport networks: Density highest not only in capital regions, in: Statistics in focus, Transport, nr. 28, 2008
\(^2\) DE GEYTER, X.; After-sprawl: research for the contemporary city, De Singel, Antwerp, 2002, p.22
\(^3\) DE MEULDER, B., e.a.; Patching up the Belgian landscape, in: Oase, 52, December, 1999, p.111
Today this strong disintegration is getting largely out of date. Traffic congestions, environmental conflicts or social segregation: all these symptoms point out that a mainly car-orientated culture is unable to provide any longer the transportation needs of this splintered spatial condition in a durable and efficient way. The remodelling of the transport network together with a reorganisation of the sprawled territory seems unavoidable and demands for an integrated approach. Moreover, as infrastructural projects are considered to become one of the last instruments by which the government is still able to intervene in this urbanised landscape on a large scale, a better understanding of the structuring potential of transport networks is urgent.

In this attempt to complement the history of urbanism and to gain insight in the structuring potentialities of the infrastructural project, this research conceives infrastructure as a mode of urban design. When does the infrastructural project transcend its mere technical status and can it be considered as an inclusive urbanization project? This inclusiveness is analyzed on several levels by a combination of literary study and cartographical interpretation. On one hand this study aims to trace to which extent the conception of the transport network is part of an implicit urbanisation goal. When does the implementation of an infrastructural project exceed the transport economic logics and becomes a crucial instrument in a regional development strategy? By mapping the social, political and economic motives, triggering the infrastructural project, this hypothesis is contextualised. Simultaneously the shaping of the network, during the reaching of a consensus between the different actors, is investigated. On the other hand, the research examines the infrastructural plan itself, considering it as a synthetic spatial figure reconciling the different motives with the technical criteria. Finally a morphological feedback outlines in which way the infrastructure project adapts to the existing landscape, interacts with the other present transport networks and to which extent the project induces new spatial conditions.

The object of research is the urbanisation of three different regions: the Belgian coastline, the Walloon coal basin and the rural Campine. The consecutive linear transport infrastructures of canals, train, tramway, and highway form their dissection lines. The studied period runs from early nineteenth century until the contemporary landscape. Each of these regions plays, at some time in history, an important role in the national economy. Although their urbanisation pattern can not simply be defined by the concentric scheme, and their infrastructural development is a hybrid alternative to the national applied model, both are interweave closely into one economic and spatial coherent region.

The case of the Belgian coastscape studies how the successively interconnecting of the existing coastal villages by series of different parallel transport systems, leads to an

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6 OFFNER, J.-M.; Réseaux, territoires et organisation sociale, Documentation Française, Paris, 1994, p.3
7 SMETS, M.; The contemporary landscape of Europe's infrastructures, 2001, in: Lotus international, vol.110, p.121
ubiquitous accessibility which transforms the shore line into a real estate eldorado. Not only does the network, together with the increasing touristic culture, catalyze the expansion of the existing settlements, at the turn of the century the trace and the tram stops are part of the negotiations between the railway companies and the big landed owners, and give rise to new residential and touristic developments.

In the second case trains, trams, local railways and feeder roads interweave mines, factories, mine compounds, villages and cities in the Walloon coal basin. One century later, a highway is induced as a new regional development spine, meandering between new industrial estates.

This paper presents the first layer of the third case study: the canal network and its attendant urbanisation process in the Campine, halfway the nineteenth century.

A wide- and fine-branched network

Already long before the emergence of the Belgium state, successive plans traced canals through the Campine region. Each of those projects considered the canal network as a mere transportation instrument. In this way the canalisation of the two Nete rivers was on the agenda in the fifteenth century and in later stages Antwerp was planned to be connected with secondary cities in the north-eastern part of Belgium such as Herentals. Napoleon Bonaparte’s attempts to make a Canal du Nord, which would connect the two main valleys of this region, that of the Scheldt and the Meuse, stranded after 1808. Also later pleas, in favour of connecting the harbour of Antwerp with the Rhine region, ran out by the implementation of a faster and less expensive rail way connection in 1834.8

It lasts for the canalisation project to gain credibility and feasibility until the transport quality of the network is combined with an agricultural motive, or a regional development notion in general. At that time, the Flanders region was confronted with a persistent exponential growth of the population and an agricultural conjuncture in the rest of Flanders.9 Therefore the undeveloped moorlands of the Campine became an interesting alternative. Cultivating the scarcely inhabited region would not only provide labour to the unemployed farmers in the Flanders during their agricultural crisis.10 It was an opportunity to boost the local population rate, by which it would exceed largely the natural demographical growth, and therefore stimulate a significant raise of tax income for the State. Attempts of reclamation were already initiated by the government in the late eighteenth century, for example by issuing a decree which pressured the villages to sell and cultivate their communal grounds. Although the soil

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8 VAN DER HERTEN, Bart ; Belgïe onder stoom: transport en communicatie tijdens de 19de eeuw, Universitaire pers Leuven, Leuven, 2004, p.254-257
9 DIGAND, Frédéric ; Du défrichement des bruyères et des moyens de coloniser à l’intérieur 100 000 habitants des Flandres, De Backer, Antwerpen, 1849, p. 4
10 BONJEAN, M.-B. ; Essai sur la question de défrichement des landes et bruyères et sur diverses améliorations, Oudart, Liège, 1845
constellation was not infertile -the ground substances resemble that of the other agricultural
developed Flemish territory- the reclamation of the land progressed not appreciably.11

Those previous attempts had failed because of their deficiency of “voies de communications”
or transport infrastructure.12 That was the main conclusion of engineer Ulrich Nicolas
Kümmer’s report in 1845, appointed by the Ministry of Public Works as responsible for the
reclamation project.13 It is in the combination with the motives to develop the complete
Campine, that a canalisation project in this region gains again credibility and its route is
moulded. In this concept the transport function meets the development agenda: the canal
was no longer perceived as a mere transportation line for people or goods between the both
ends of the line, but as a large scale, extensive water basin, enabling fertile calcareous water
from the Meuse to flow all over the adjacent parcels. Earlier local, small scale farming
experiments had taught that bringing in water, would lead to the cultivation of grass. Grass
would able the cultivator to raise cattle, that would in its turn produce fertilizer. This mould
was necessary to turn the ground into farmable land.

Based on his former experience in canal infrastructure, and after examining all the former
plans of engineers Teichmann and Masui, Kümmer developed an appropriate canalisation
scheme.14 The governmental ambition to develop the whole Campine into ‘a real province’,
is reflected in the elaboration of the infrastructural plans. The single line trajectories of the
former plans which cut straight across the region, shift into a more equally dispersed scheme
of multiple canals which reach into the farthest corners of the desolate region.15 The fact that
this agricultural function prevailed over its transportation mode is reflected in original sections
of the designed canals: the profile was deep enough to run water through them, but was
inadequate for ships, even for those with a shallow draught.16 Later insight would
acknowledge that the canals could also be used to import additional fertilizer from the city of
Antwerp during the initial phase, but also to export the production that would exceed the local
needs of its future inhabitants. Sold at the market, the profits would certainly attract new
volunteers to the isolated region, Kümmer would argue later.

11 DE BEUKELAER, F.X. ; Défrichement des bruyères Campinoises, Antwerpen, 1899, p. 16
12 KUMMER, U. ; Les défrichements des bruyères de la Campine, Mémoire sur l’intervention projetée du
gouvernement, Bruxelles,1845, p.2
13 Kümmer was head of “the Service des défrichements de la Campine”, or translated: “Service of reclamation of
the Campine region”.
For a more elaborate biography on ir. Kümmer: INDEKEU, B. ; Aan de vergetelheid ontrukt: Ulrich Nicolas
14 KUMMER, U. ; Polders du bas-Escaut en Belgique, in : Annales des travaux publics, Bruxelles, 1844 and
KUMMER, U. ; Essai sur les travaux de fascinages et la construction des digues, ou Description du
réendiguement des polders du Bas Escaut belge, précédé d’une notice historique sur ces polders, Bruxelles,
1849
15 Ministère des travaux publics. Administrations des ponts et chaussées et des chemins de fer ; Album du
développement progressif du réseau des routes, des voies navigables et des chemins de fer de 1830 à 1880,
Lith. De Verver-De Weuwe, Bruxelles, 1881
16 VAN DER HERTEN, Bart ; België onder stoem: transport en communicatie tijdens de 19de eeuw, Universitaire
Secondly, tapping into the main canals, a fine mesh of irrigation channels was drawn into the adjacent fields. The canals functioned thus as a basin and the secondary network was designed to conduct the water, enriched with ooze and lime, deep into the moorlands. In this way, more than 25000 hectares of watering fields were lined up along the main canals in Kümmer’s original drawings.

Immediately after the voting of the project in 1843, the realisation of canal network was started in three fazes. The central branch of approximately sixty kilometres was already realized 3 years later.

**A mediating process between the different institutional levels and the private industry**

During the endorsement process, the reclamation project could count on several local supporters in the Parliament and the government. But not only in the unblocking of the decision making process of the Campine canals, national motives met regional interests, also on the level of the financing, the infrastructural project can be conceived as the result of a mediating process between actors on different scale levels. In 1842 the State was convinced that the owners of the land adjacent to the canal should contribute to the financing of the canal, since they would benefit directly from the realisation. Heavy protest arose and the contributions were never paid. Regarding this issue, the Belgian Prime Minister, Jean-Baptiste Nothomb, interpellates one year later the lower institutional levels regarding one central question: “What are, in your opinion, the best means to exploit your land?” 17 The provincial responsibilities passed the question on to their advisory boards and delegates in the local communities. Synthesizing the received comments, Kümmer’s conclusions tend towards a large scale State intervention with room for private initiative.18 In his notes on the governmental intervention, he argues that it is the State’s responsibility to provide the canals and the main irrigation channels, the construction of dams and the indispensable land levelling. The private industry would develop the less expensive, secondary irrigation channels and would be charged with the profitable agricultural development.

**The colony as a proven urbanisation model**

The fine-meshed canal structure of the reclamation project is completed with a well-tried housing development model. Kümmer’s report sketches the discussion on the application of the colony as the appropriate accommodation model. Amidst the agricultural plots, delimited by the irrigation channels, the imported Flemish farmers would be accommodated in clusters of farms and some communal facilities. This type had already proven its efficiency in early eighteenth century Europe, but in a rather different context. Colonies were founded to provide accommodation for those who did not fit in the industrialised world. Precursors in this typology can be recognised in Count Rumford’s Militärgarten or the Armen Erziehungsrepublik of Baron Von Fellenberg, where orphans, vagabonds or professional


18 Annexe A in Kümmer’s report of 1845
bums were condemned to military duty or agricultural labour. 19 Already in 1810, the castle of Hoogstraten, near Antwerp, was used in this sense as a beggar resort.

In these surroundings, the military engineer Johannes van den Bosch was assigned by the king in 1817 to deal with a persistent poverty problem in the Netherlands. Therefore he establishes an association, which erects, among other colonies, those of Wortel and Merksplas. 20 In the ‘free’ colony of Wortel, the needing families are provided with a dwelling, furniture, clothes, farm land and some animals. From then on, they are ought to be self-supporting and to donate a small part of their income to the association, in order to redeem their loan. On the other hand, in Merksplas, men and women were forced to work separately in workshops and recreate on the central situated inner court.

After the revolution and declaration of independence, the ‘Dutch’ projects, situated now on Belgian territory, fell in disgrace. The application of the colony model in the reclamation project was therefore not left undiscussed. In 1846, the responsible minister de Theux expresses himself rather negatively on their implementation. In his opinion, it was indeed the responsibility of the State to develop community facilities such as churches or schools. But thanks to the reclamation project, dispersed residential nuclei would emerge spontaneously, without any government support necessary. One year later, his successor, minister Rogier considered the colonies as an inexpensive and efficient link in the process of transferring the abundant population from East- and West-Flanders to the uninhabited region. He pleads the foundation of three outposts, distributed along the canal structure, each consisting out of thirty farms, a chapel and a school.

In 1849 Kümmer concludes that the colony model needed to complement the infrastructure works was no almshouse, but would be conceived as one exemplary undertaking, used to seduce the private initiative. 21 In this State project, the imported farmers would learn the techniques necessary to cultivate the savage land. Publicity about the success of this single farm would attract private initiative, and inspired candidate colonists would continue the reclamation on a larger scale by their own means.

**The Van Schendel project**

The inquiry of minister Nothomb, held in 1843, triggered also a flood of private suggestions, explaining in which way the colonisation of the moorlands could be established. 22 In one of his later reports, engineer Kümmer affirms the enthusiasm of the private industry for the

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19 VAN DEUN, Piet; *Kolonies van Weldadigheid: in beeld/buiten beeld*, tentoonstelling in het Stedelijk museum van Lommel, Lommel, 2007

20 WESTENDORP BOERMA, J.; *Johannes Van den Bosch als sociaal hervormer: de maatschappij van weldadigheid*, Ipenbuur en Van Seldam, Amsterdam, 1927

21 KÜMMER, U.; *Création de prairies irrigables et établissement d’une colonie agricole dans la Campine*, Rapport adressé à M. le Ministre de l’Intérieur sur les résultats obtenus pendant l’année 1850 inclusivement à la suite de l’intervention de l’état, Devroye, Brussels, 1850, p.110

22 FINCOEUR, Michel-Benoit, e.a.; *Inventaire raisonné des collections cartographiques Vandermaelen*, Bibliothèque Royale De Belgique, Brussels, 2000
colonisation project.\textsuperscript{23} Although the Van Schendel project was never to be realised, it is emblematic for the concurrence at that time between state objectives and private interests within the framework of the reclamation idea. The proposal indeed unveils the rather megalomanian ambitions of the entrepreneur, but it also depicts well the general supported conception of the infrastructural project as a large-scale urbanisation plan.\textsuperscript{24}

The scale on which Van Schendel unfolds his plans, is that of the global Campine region: 340 000 hectares. However, his ambitions do not stop there: the Belgian instigator is convinced that his method would also be applicable in some comparable parts of the Belgian Ardennes, France and the Netherlands. This expansive site is to be colonised by a fazed grid scheme, based on ‘blocks’ of each 10 000 hectares. According to his elaborated calculations, it would take two years to develop the first block. At the end of the first year, the realisation of the second block already would be started. In this way, the total Campine region could be reclaimed in approximately 15 years.

The plan of one block unit is formed by a combination of road and canal structures. An orthogonal grid of four canals divides the block in smaller plots. Roads and pathways interconnect every junction of these canals, together with the centre of each plot. On every midpoint, the plan aligns a village. In this way, the towns are equally distanced from each other, each of them responsible for the cultivation of the surrounding 2500 hectares. The layout of these villages would be guaranteed by an exquisite selection of architects. For every block unit they would draw up a plan, including 128 large and 160 small farms, a church, a presbytery, a community centre and a school.

These public facilities play a crucial role in Van Schendel’s reclamation strategy. In an appendix he details a social model supporting its spatial counterpart. Together with the mayors, the priest was ought to practice a salutary influence on the moral conduct of the future inhabitants. Doubtless participation and persistent motivation to this development model was supported by a system of remuneration and promotion. Honest, hard working farmers would receive some kind of prize-medals. The cultivators, who collected a significant number of those markings, were eligible to be promoted to superior chef of the next block.

\textbf{Framed between canal and road: the agricultural colony of Lommel}

In the elaboration of the masterplan of the exemplary colony, the schism between infrastructural conception and urban design completely fades. Once the development of the outpost was ratified in 1849, a site on state property was selected near the junction of the main Campine canal and the traveller’s road, connecting the Belgian city Hasselt with the Dutch ‘s Hertogenbosch. The settlement was therefore also situated close to a dockyard.

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\textsuperscript{23} KÜMMER, U.; \textit{Création de prairies irrigables et établissement d’une colonie agricole dans la Campine, Rapport adressé à M. le Ministre de l’Intérieur sur les résultats obtenus pendant l’année 1850 inclusivement à la suite de l’intervention de l’état}, Devroye, Brussels, 1851, p.26
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\textsuperscript{24} VAN SCHENDEL, P.; \textit{Projet pour le défrichement des bruyères de la Campine ou autres}, Impr. Vancampenhout, Brussels, 1848, 24 p.
\end{flushleft}
along the main canal and in the proximity of an 18\textsuperscript{th} century toll house on the paved road. The pamphlet used to attract voluntary workers to the colony of Lommel is representative for the hybrid conceptualisation of the masterplan of the site, moulded by canal and road. With arrows indicating the direction of the drainage, the advertisement looks more like an engineering schematic than a reflection of a promising domestic future.\textsuperscript{25}

Two times ten single family farms are positioned on a patch that is limited on one side by the irrigation channels linked to the canal and on the other side by a central feeder road, connecting the houses to the road, mentioned above. This double comb structure of infrastructure defines the masterplan in a way that the order of dimensions of the farm allotment does not differ from that of the other cultivatable parcels spread along the canal infrastructure. Clustered at the end of the central path, -today still named as ‘Colony Street’ - and near the crossing with the main road, the communal facilities are located. As Kümmer’s report subscribes, the topographical maps of that time indicate the existence of a church, a presbytery and a school.\textsuperscript{26}

Every smallholding has five hectares to its disposition: one hectare of grassland, one hectare of grain and three hectares of moorland that had to be cultivated. The interweaving of dwelling and farming continues on the level of the architectural composition of the farmhouse: half of the built space is claimed by sheds and stables, leaving over one sleeping room, one common room and basic sanitary.\textsuperscript{27}

A limited successful project but with a permanent footprint
Cartographical research clarifies how drastically the infrastructural project dictates a new topography on its surroundings. The development of the canals and the colony wipes out completely, for example, the network of small-scale, mainly north-south orientated, trails. They were formed by chariots, which tried to avoid to get stuck in former swampy pathways, and therefore traced repeatedly new routes through the moorlands. Also the sudden application of large scale foresting is remarkably present in the comparison with anterior maps. The reclamation law of 1847, that obliged the local authorities to sell their communal grounds to candidate-buyers, prescribed that the sold communal grounds either had to be cultivated –with crops or plants- or could be planted with conifers. As the demand for wood in the mines was big, and their maintenance was far less intensive, pine forests were a popular enforcement of the law by the new private owners. Also the axis of the main canal was visually reinforced with an alignment of trees. To this day, together with the canals, they still characterize the Campine landscape.

On several maps, dating from just before the implementation of the watering fields in Lommel, only a couple of small housing collectives, adjaсing the main road, are noticeable.

\textsuperscript{25} cfr. KNAEPEN R. ; Kaarten keuren vanuit een Kempisch perspectief, in: Limburg, jg. 69, 1990
\textsuperscript{26} Carte Topographique de la Belgique, 1866-1880
\textsuperscript{27} ROGIER, C. ; Défrichement des terrains incultes. Exécution de la loi du 25 mars 1847, Bruxelles, Impr. Devroye, 1850, plan D’
They functioned as toll houses. In order to be self-supporting their inhabitants started reclamation of some parcels already in 1800. Further alongside the canal infrastructure, regional maps, registered halfway the nineteenth century, not only reveal the other watering fields of Kümmer’s reclamation project. This period gave also rise to other new agricultural settlements, such as that of Rauw, characterised by an orthogonal street lay out.  

The project aroused lively professional interest, also from abroad. Several French engineers dedicated a substantial study on their Campine discovery and reflect in which way the irrigation system could be applied in comparable regions back home. The plans featured also at the international agricultural exposition of Paris in 1878. Nevertheless, the large scale infrastructural project can hardly be called a success. From the promised 25 000 hectares in 1846, engineer Kümmer sees his ambitions reduced to 2257 effectively developed hectares. The allotments in the first developed watering field were immediately sold out. But the next sales could only tempt a couple of wealthy investors, such as bankers or the mayor of Antwerp at that time. The failure knows many causes. First of all, the colony of Lommel did not succeed to be exemplary. Haunted by cattle diseases and bad harvests, the colonists were forced to work elsewhere and soon lost their motivation. Secondly, some source books mention the insufficient flow of water, provided by the canals and irrigation channels. As the development of the watering fields increased, more water was attracted from the canals, in such a way that even the shipping traffic was hypothecated. Comparison of successive sections of the canal shows how their profiles were systematically widened. Even after a large scale investment by the government in broadening the canals and the building of water locks, the situation remained critical. Farmers were compelled to recuperate and recycle the water, what therefore lost after a while its fertile qualities. Lastly, even the largest net profits, made by Kümmer’s most faithful disciples such as the agricultural engineer Keelhoff, were still relatively low and the private investors found better opportunities elsewhere in the flourishing industry.

Nevertheless, the enthusiasm of the state impulse is continued by the small-scale cultivator. By the end of the century, the anonymous local farmer will be responsible for more than two thirds of the total reclamation of the moorlands.

28 ANTROP, Marc, e.a.; België in kaart: de evolutie van het landschap in drie eeuwen cartografie, Lannoo, Tielt, 2006, p.28
29 MANGON, H.; Études sur les irrigations de la Campine et les travaux analogues de la Sologne et d’autres parties de la France, L. Mathias, Paris, 1850
31 To make sure that the first sale did not fail, Kümmer and his engineering colleagues, such as Keelhoff, had bought themselves large plots in the first auction, hoping for positive publicity to stimulate private interest at the following auctions.
But the excavation of the canals also unlocked the sandy grounds of the Campine. From the 1870’s on, the well-accessible landscape is again radically transformed, this time by sand extracting factories. The next layer of the research, analyses how, the urbanisation of this region before the first World War is landscaped by the activities of new heavy industry, supported by a considerable expansion of the canal and road network, and the gathering of labourer’s residential areas around them. After the Second World War, the numerous recreational facilities and domestic allotments, together with the introduction of the highway is the object of analysis of the third layer of this region.

Conclusions
The analysis of the Campine canalisation and colonisation supports the hypothesis that at the basis of large scale infrastructural projects an implicit development motive can be revealed, and therefore the urbanisation of the region finds its origin in a planned form of spatial policy. The reclamation project only exists merely by the grace of the canal infrastructure, and on the other hand, in competition with the train network, the conception of the canal structure only stood a chance by relating it to the regional development agenda.

The mapping clarifies how the canal project, conceived as a mode of urbanism, hybridizes in regard to its original singular linear form in a twofold way. On the regional scale level, the trajectory of the canal turns into a wide-spread canal system, developing several branches which reach into the far ends of the desolate region. Secondly, the local embedding is guaranteed by the development of a secondary, fine-meshed structure of irrigation channels, clustered into patches of watering fields.

Only by linking the project with the other transport infrastructures, the masterplan is moulded and integrated in its surroundings. A double comb structure of the irrigation channels alternating with a new secondary road network, defines the dimensions and the inner functioning of the colony. Other later private projects will suggest complementarity with the vicinal rail network.

The infrastructure project does not introduce the principle of reclamation into the region but catalyzes its development and translates into a specific form, adjusted to the regional characteristics. Although the large scale state initiative can hardly be called a success, small scale farming picks up the enthusiasm and continues vigorously the cultivation of considerable amounts of moorland.

The reclamation project shapes its surrounding landscape with a definitive footprint, consisting out of a new housing typology, large-scale foresting and a rational parcelling.

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33 DE BEUKELAER, F.X.; Défrichement des bruyères Campinoises, Impr. De Backer, Antwerpen, 1899, p. 2