

TOD against the context in cross-border metropolis? Visions and paradoxes in the case of the Great Geneva Agglomeration.

Flore Guichot

EPFL - ITN-MSCA – TOD-IS-RUR

Paola Viganò, Vincent Kaufmann, Greet De Block

Expected thesis defence: November, 2025

flore.guichot@epfl.ch

Urbanization and heavy transport infrastructure coordination has become one of the leading principles of sustainable urban growth and mobility transition. This paper proposes a critical reflection on the implementation of the Transit-Oriented Development model in asymmetrical and interdependent cross-border metropolitan regions. Using the Great Geneva as the main research case, this contribution highlights the ecological but also social risks which this intrinsically selective and hierarchic model bears. By looking at the evolution of planning vision as well as policies and mechanisms that shaped the urban structure of the metropolis, this analysis showcases the need to take a step back to understand the current territorial paradoxes systemically and to search for hybrid strategies through a more contextual socio-spatial reading.

Introduction

The articulation between urban patterns and sustainable travel behaviors within metropolitan territories, characterized by ever-increasing land consumption and mobility flows (Offner 2018), is one of the major challenges of the contemporary territorial project. The coordination of heavy public transport systems and urban development on nodes, also called Transit-Oriented Development (TOD), is the dominant model in practice and theory. It is internationally recognized to support sustainable metropolitan development (Newman, Kenworthy 2015). The question of the transferability of such a model in different contexts has been a major theme in academic research (Thomas et al. 2018; Thomas, Bertolini 2017; Tan et al. 2014). This body of research has produced knowledge on successful TOD policy implementation and how to overcome barriers in different contexts. However, when looking at the implementation of the model through a transport planning lens, results tend to be slightly tautological marked by a strongly normative and progressist ideology (Qviström 2015; Papa, Bertolini 2015).

In the Swiss context, changes in governance and practices of coordination of transport and urbanization have been the subject of much interest in the academic sphere (Kaufmann, Sager 2016; Walter, Roy-Baillargeon 2015; Gallez et al. 2013). This research mainly used historic and comparative approaches between Swiss or international agglomeration cases to assess cooperation and coordination mechanism. However, the spatial condition in which this coordination takes place and the impact of such a hegemonic model in specific contexts is still little documented. And this, even though some scholars have called upon the necessity of a critical gaze on the current Transit-Oriented Development and its role in metropolization processes (Qvinstrom et al. 2019; Viganò et al. 2017). The case of the Great Geneva is used as an “extreme case” (Flyvberg 2006) to reflect on the implementation of the largely Swiss-driven model in the cross-border territory. This contribution aims to identify the impact of the turn to Transit-Oriented Development model in cross-border metropolises, focusing on the socio-spatial condition in which the model is being developed.

This research intends to address the tension between current metropolitan TOD-supported growth ambition and the specificities of cross-border territory. By doing so, it intends to go beyond normative assumptions and fill the spatial and disciplinary gaps between the TOD model, based on transport planning, and the empirical observation of territorial development.

Firstly, it traces the emergence of the Swiss type of TOD, as the main growth model for metropolitan spaces, under national support. Secondly, it draws on planning history to understand the different visions that lead the cross-border metropolis development mirroring it with the actual evolution of urbanization. And finally, at present, this contribution highlights the paradoxes which emerge from the application of the model in the Great Geneva, identifying social and ecological risks associated with the model and the counter vision that could support future hybridization for the metropolis.

From city-territory to Transit-Oriented agglomeration development

A national turn toward the metropolis.

At the end of the 20th century, major works and studies identified the delayed but drastic change of scales of the urban phenomenon in Switzerland under the impetus of economic development, in the strongly attractive but also constrained Swiss territory (Bassand 2004; 1995). Despite the persistence of ruralist ideology (Walter 1994), the Swiss metropolization process was well underway, defining new spatial, social, cultural, and political relations, and needs (Leresche, Bassand 1991). Hyper concentration, conurbation, the massification of flows, and increasing social exclusion and inequalities, going far beyond the traditional municipal scale of action, became a major political and planning concern (Hildebrand 2006). While in parallel, the protection of rural, natural, and more widely, of the environment which had gained strength in the second part of the century, became operationalized with for example the first *plan sectoriel des surfaces d'assolement* (geographic census of cultivable land and amount to be protected). Hence, in planning logics, an opposition between the built and the natural and rural environments started to arise. Therefore, metropolization process and preservation process were increasingly understood as two separate problems, each advocating for specific and sectorial solutions.

Under the pressure of the Swiss cities union, the revision of the constitution in 1999 and the following report on Confederation agglomerations policies, despite advocating not to be a re-orientation of territorial priorities, clearly conceptualize the dominant new role that cities and their agglomeration were taking in the Swiss territory both spatially, financially, and politically (Rapport du Conseil Fédéral 2001). The myth of communal autonomy fades away and enacts a regionalist approach to Swiss planning (Joye, Leresche 1993; Walter, Roy-Baillargeon 2015). Rather than a “city coextensive of the territory” (Corboz 1999) on a national scale, the “rational occupation” (Constitution fédérale de la Confédération suisse 1999) of the territory is now associated with the vision of a “polycentric network of urban system” (Hildebrand, 2006) superimposed on ‘natural’ and ‘rural’ territories. This vision cuts drastically with the previous spatial and political stand for *Concentration Décentralisée* at the national scale. It takes a radical turn to support and emphasize a selective and hierarchical development processes structured upon metropolitan regions development (Viganò et al. 2017). Hence, since the beginning of the 20th century, rather than a means to “ensure the harmonious development of the entire country” (Loi fédérale sur l'aménagement du territoire 1979) the ability to accommodate growth while preserving natural landscapes became a metropolitan matter.

Toward a TOD model at the Agglomeration scale against sprawl and for sustainable development.

This polarization of political and planning concerns went along with a new operational tool: *les projets d'agglomération*. This tool inaugurates a new kind of metropolitan governance aimed at developing a “vertical, horizontal and multisectoral” (Union des villes Suisse 2016) cooperation between the different territorial scales both nationally and internationally. Showcasing that the main issue is now that of the sustainable accommodation of urban growth in the agglomeration perimeter¹, this cooperation tool is directly aimed at the “efficient coordination of transport and urbanization” (Union des villes Suisse 2016) to promote territorial coherence.

To support the agglomeration project, the creation in 2006 of the *programme en faveur du trafic d'agglomération* (program in favor of agglomeration traffic) supported by federal funds, marks a turning point for Swiss metropolitan development (Walter, Roy-Baillargeon 2015). This fund enacts the specific support and intervention of the federal government in metropolitan development processes. This fund, based on oil taxes revenues, enables the confederation to co-finance agglomeration measures, up to 45%, if, and only if, they are associated with mobility infrastructures, within the framework of agglomeration plans. In addition, the allocation of this fund is subject to the organization of urban development around public transport infrastructure following the objectives set by the *Loi fédérale pour l'Aménagement du Territoire* (LAT). The revision of this law in 2014, directly aims at stemming sprawl, requiring the coordinating of urbanization and transport with the explicit ambition to develop “compact built environments” while developing “the city on the city”. To support these aims, the LAT also introduced the distinction between ‘*zone-à-bâtir*’ (buildable areas) and ‘*hors zone-à-bâtir*’ (out-of-buildable area), increasingly pushing for the reduction of urban

¹ VACo Perimeter defined by the ARE (*Office fédéral du développement territorial*) on a statistical basis (Population, number of commuter workers, etc.).

perimeters. Therefore, today, following the idea that “mass-transit needs mass” (Suzuki et al, 2013), development is to be set in the remaining empty spaces of these urban perimeters to justify infrastructural investments, strongly cutting with the fine grain and highly subsidized multimodal transport system which characterizes the Swiss context. Hence, altogether, the Swiss federal support for Agglomeration development strongly sets incentive and normative measures to promote a Transit-Oriented Development model for Swiss metropolises.

Finally, the allocation of federal funding for agglomeration projects follows a specific process. The fund is parted between agglomerations according to a federal rating assessing the compliance of the general agglomeration project with federal policies. More specifically, the different measures proposed within the agglomeration plan are rated according to ‘efficiency’ criteria defining the ‘cost-utility’ ratio of the measure, assessing its relevance and maturity based on transport efficiency, densification, security, and environmental impact sub-criterias (ARE 2023). Thereby, this process puts in competition the different agglomerations with each other but also the different measures within the agglomeration according to a specific growth-supporting lens. We can also note that the very rapid pace of the process, 4 years between generations, strongly pushes toward a specific type of rapid mass new development. Thus, the agglomeration plans and their financial incentives account for a more and more clean-cut reading of the metropolitan space, between development corridors and the rest of the agglomeration space. This top-down planning logic supports hegemonic development strategies, regardless of the context. More ‘mature’ and easily compactable urban fabrics well-served by public transport are seen as sustainable places to accommodate growth in opposition to the rest of the urban fabric. Therefore, despite having participated in the reduction of the pace of land consumption, this cartesian and binary reading based on public transport infrastructure as the main driver of urban growth supports a selective and self-enforcing polarization mechanism on corridors, promoting spatial hierarchization at the agglomeration scale.

The Great Geneva, a case of trans-border TOD in an interdependent and asymmetric territory

The financial and planning process described earlier has the particularity, to be applied in the same manner in both Swiss and cross-border metropolises. It allowed the co-financing of transport development across but also outside national borders. Even more so, the cross-border agglomerations of Basel and Geneva are even considered to be the best-rated in the last evaluation process². However, mobility and urbanization coordination takes on a particular dimension in cross-border territories. Firstly, as many scholars have pointed out, cross-border metropolises are specific cases where differences in remuneration, taxation, land and living cost, or access to services have a direct impact on mobilities across the border, creating an interplay between unbalanced socio-economic conditions and spatial interdependency, beyond the traditional center-periphery relation (Sohn 2014; Decoville et al. 2013; Gallez et al. 2013). Secondly, because of the difference in terms of embodied built and infrastructural capital on each side of the border. And thirdly, in terms of power relations in the planning process depending on both financial, but also human, social, and institutional capital available on each side of the border (Bertrand et al., 2015). The ‘Swiss style’ model of Transit-Oriented Development hence takes a specific dimension in cross-border agglomerations. Because of the country’s geographical, economic, and instructional position in the European territory, as well as its decentralized political system, the Swiss cities have a strong vertical power relation with their cross-border edge regions. In addition, the specific decentralized democratic Swiss system strongly tempers the top-down application of the model. Indeed, no planning tools can strictly tight together infrastructural implementation and urban development, **unlike the ‘*contrat d’axe*’** for example in France, since citizens, through referendums have the ability at the municipal level to challenge any development project, which has no equivalent in more politically centralized systems.

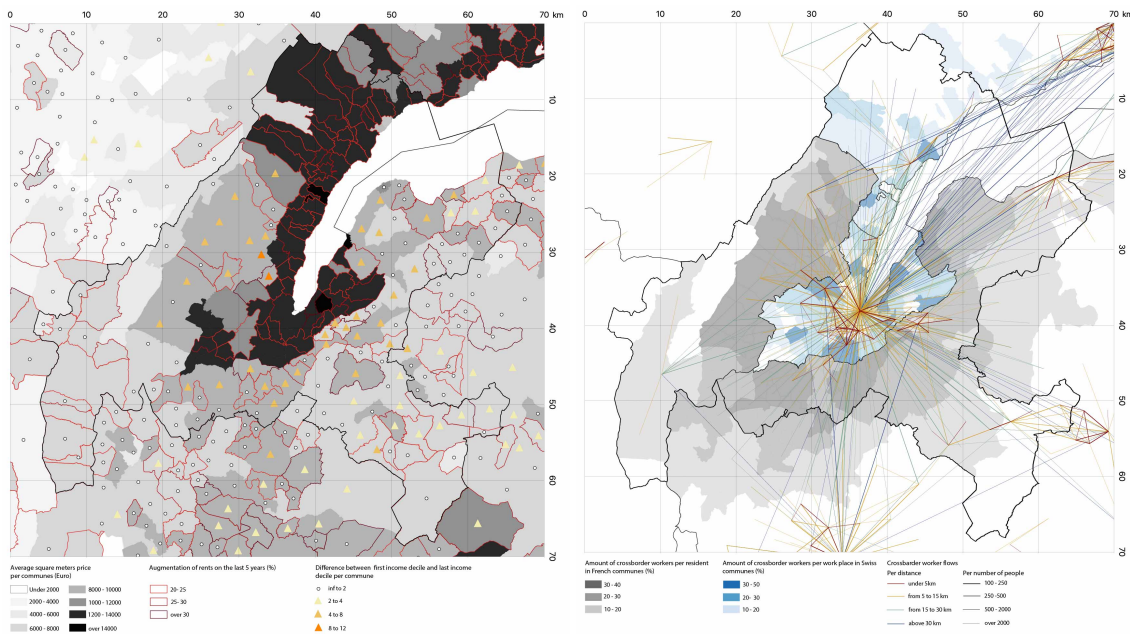
The Greater Geneva agglomeration is a large and constrained territory in the watershed of the Rhone River caught between Lemman Lake shores, the Arve Valley, and the Jura and pre-Alpine mountains. The cross-border agglomeration joins together the Geneva Canton with part of the Vaud Canton, Haute-Savoie and Ain French regions. Since 2007, following the new orientation of Swiss planning, the cross-border coordination of Greater Geneva has been federated around a radio-centric Transit-Oriented Development model, aiming to support the vision of a “green, multipolar, compact, and

² Rapport d’examen des projets d’agglomération de 4e génération, 2023, ARE.

proximity-based, cross-border metropolis” (PA4, 2021, 24) with new public transport axes as its backbone. Here the TOD model is set as a means to bring coherence to the cross-border agglomeration as one entity. This development model is also at the heart of the agglomeration's recent commitment toward the socio-ecological transition which includes carbon neutrality and zero net artificialization by 2050 (Charte Grand Genève en transition, 2022).

As the recent change of name of the agglomeration asserts, the canton de Geneve has the leading role in the Grand Geneva Agglomeration development project. Power relations in the coordination project are strongly vertical with instructional, political, and financial means strongly polarized in the Canton in comparison to small parts of edge regions in the French hyper-centralized system. The Great Geneva is usually qualified as a cross-border metropolis with a strong ‘functional integration’ (Sohn 2014). This functional integration relates mainly to the labor flows, with nearly 70%³ of the total amount of jobs in the agglomeration located in the Geneva canton. This form of asymmetry also goes with a high level of interdependence, with nearly half of Geneva's workforce living on the other side of the border [fig.1]. This interdependency was made even clearer during the Covid crisis with the inability to close the national border without paralyzing Geneva. However, the integration in terms of non-work-related activities is way milder and socially conditioned (Gumy 2022).

The differential in life costs between France and Switzerland creates a clear demarcation at the border. While, beyond the border, the French part of the agglomeration has the particularity of being at the same time a very wealthy region by French standards, due to cross-border workers’ income, and one of the most socially unequal territories of the country since French base salaries are disconnected from the ever-increasing housing and live cost in the bordering space [fig.2]. Hence, despite the political engagement to “re-balance” the territory to ensure “solidarity, cohesion, and social equity” since the first *Charte d'Aménagement Franco-Valdo-Genevoise* in 1997, the Great Geneva remains a strongly interdependent and asymmetrical territory. Little to no financial, land policies, or fiscal levers have been implemented since then to remedy the situation despite planning cooperation through the agglomeration plan.



[fig.1] Left: Incomes and inequalities. Source: elaborated by the author, data from INSEE and OFS. [fig.2] Right: Metropolitan integration. Source: elaborated by the author, from INSEE and OFS data.

Erasing, Remanence, and Inertia – Planning and the territory

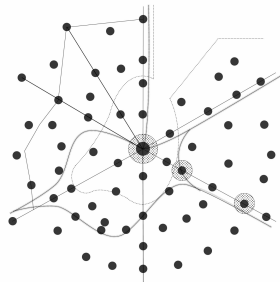
Erasing of the transport network and rurbanization process

The urban development of the canton de Geneve is the story of a city-canton cut from both its national and morphological territory through historical interplays (Barbier, Schwarz 2016). Because

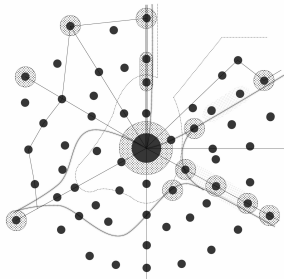
³ In 2022 according to the Office cantonal de la statistique (Ocstat).

of this particularity, and its peculiar geographical position of being a dead-end city, main transport corridor development had avoided the city. To remedy this enclaved positioning, and connect the city to its natural territory, by the 1920's the city of Geneva had developed one of the densest tramway systems in Europe going in rays across the national border (Barbier, Schwarz 2019). However, this structure was nearly completely erased and replaced by a more efficient bus system when the first drastic demographic growth in the region erupted, enacting the era of the “all-car-oriented-development” dominating Geneva’s planning (Gallez et al. 2008). At the same time, from the beginning of the 1950s, Geneva, aware of the restricted nature of its territory, sets in motion mechanisms to protect its agricultural and natural capital. This rapid awareness triggered a relatively early spillover mechanism of the urban growth towards neighboring French territories where the price of land was lower and the availability of land greater (Hussy 2019).

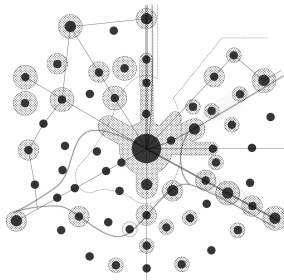
Avant 1920



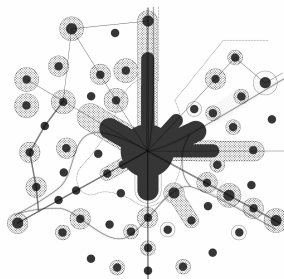
1960



1980



2020

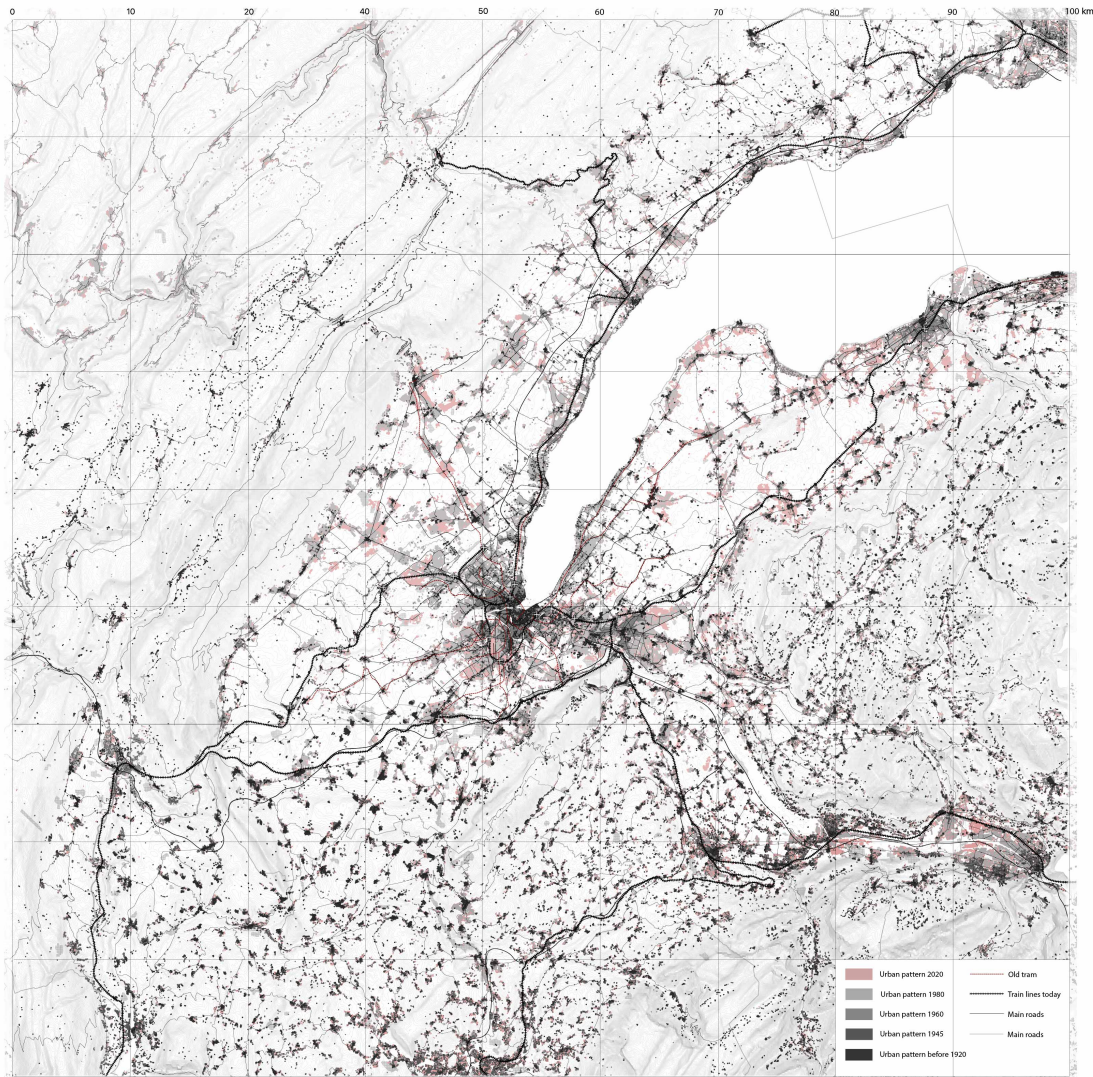


[fig.3] Great Geneva development scheme. Source: elaborated by the author from Roux and Brauer’s diagram

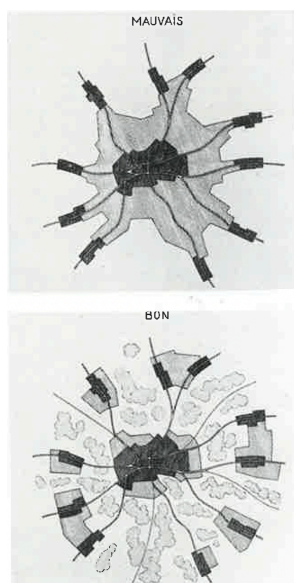
The development of the agglomeration followed a traditional “rurbanization” process (Bauer, Roux 1976) with the combination of continuous development of the core city and aggregation around pre-existing village nodes [fig.3]. However, the early preservation of Geneva’s rural periphery to the north of the Canton, marks a clear-cut differentiation of the development across the frontier and a more important and faster transformation on the French side of what has for a long time been called the ‘other Geneva’ beyond the preserved green belt (Diener et al. 2005). In the first phase, until the end of the 40’s, there is clear development based on the rail infrastructure and a smaller one related to the tramways. By the 1960’s we see an important development of Geneva, both transversally and on the lake shore, and the development of polarities on the main road system. However, between the 60’s and the 80’s a much less hierarchical urbanization started to take shape supported by the strong car-oriented infrastructural development. This development on the French side is achieved by aggregation around the pre-existing village structure on first but also secondary roads and according to the topo-morphological logics, while the radial continuous urbanization of Geneva came to join the borders of the canton [fig.4]. Thereby, between the 1960’s and today, 60% of population growth has been accommodated on the French side, mainly around village areas and small local centers [tab.1] defining a spread but concentrated development based on village structure in the main plain, developing a multipolar urban structure with little hierarchization.

	Part of growth absorbed:		
	On the french side of the Agglomeration	In French Village, local and peripheral communes	In Great Geneva Village, local and peripheral communes
Growth 2018-1968	61	63,7	62,3
Growth 2018-1982	43,9	68,9	45,1
Growth 2018-1999	59,7	66,7	42,6
Growth 1999-1982	62,9	72,8	79,1
Growth 1982-1975	62,6	71,2	77,2
Growth 1975-1968	61	44	50,4
Growth 1968-1954	43,4	33,8	15,6

Table 1: Population growth from 1954 until today in the Great Geneva region, according to commune types. Source: elaborated by the author, from INSEE, OFS and structure urbaine per commune SITG.



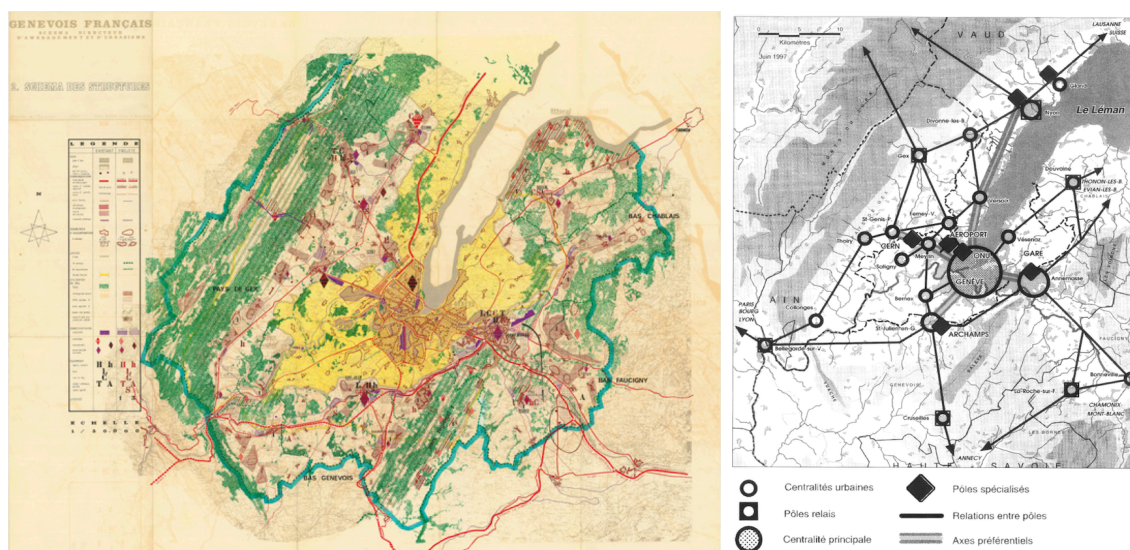
[fig.4] Up: Great Geneva development. Source: elaborated by the author from carte de l'état major, carte Siegfried, built fabric from data.gouv, SITG. [fig.5] Down: 'good' and 'bad' development Scheme. Source: A.Bodemer, *Livre d'or du bilingue*, 1942.



Visions et planning

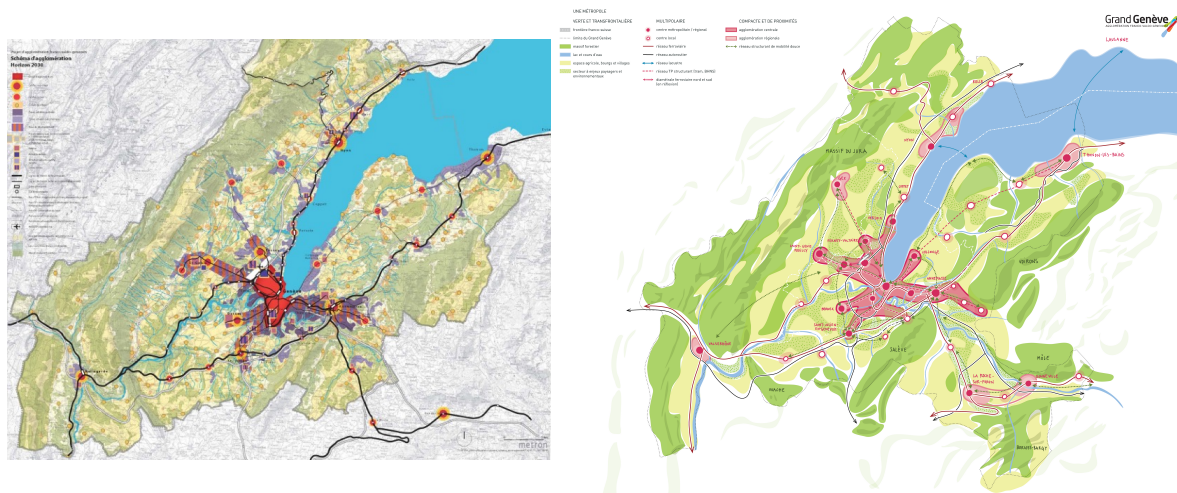
The canton of Geneva supported a particular model of a “compact city on automobile networks” (Gallez et al. 2013), of which the *Plan Directeur* of 1966 is the apogee. This period advocates for a concentrated but discontinuous development of the city still focusing on the idea that a ‘good’ urban development should maintain natural connections in-between urban poles rather than enforcing axial development [fig.5]. The so-called ‘*Plan Alvéolaire*’ of 1966 draws a hyper-compact Geneva structured on motorway belts. This vision considered too radical will be rejected by the population through a referendum (Joye, Kaufman, 1998). However, the edition of this plan corresponds to the French law for land orientation and with it, the implementation of the first *Schéma Directeur d’Aménagement Urbain* (SDAU). Thus, the first master plan of the French Genevois, and the first representation of a planning vision at the metropolitan scale, is structured around the vision of an alveolar agglomeration [fig.6]. This plan shows the significant multipolarity of the agglomeration and proposed to shape future development poles in

connection to main car infrastructure. However, in the 1980s Geneva took a drastic turn towards public transport and the question of how-to management labor induced cross-border flows, growing in intensity, became a priority. The *Plan Directeur de Geneve* of 1989 still clearly expresses the will to stem the oil-stain development of Geneva towards its cantonal borders while developing a transport system beyond its borders. Hence, the first *Plan Directeur Transfrontalier* in 1996, carried out on the scale of the agglomeration in 1996, largely relies on this alveolar and multipolar vision while shifting from car-oriented development to transport-oriented development [fig.7]. Thus, by the end of the 20th century, we can still read a continuity between automobile planning and transport planning with a very articulated vision of what the public transport network should be at the agglomeration scale. Nevertheless, with public transport planning, we can already see a much more hierarchical reading of the urban structure.



[fig.6] Left: Schéma Directeur d'Aménagement et d'Urbanisme du Genevois français, 1967. Source: Archive fond CRR. [fig.7] Right: Plan Directeur Transfrontalier, 1996. Source: Charte d'Aménagement Franco-Valdo-Genevois, 1997.

The first Franco-Valdo-Genevois' agglomeration plan, fitting the transborder coordination into the tool provided by Swiss planning, bears witness to an important shift of vision for the Great Geneva agglomeration. The main vision becomes that of radiocentric corridors around Geneva reaching out to the French side of the agglomeration to accommodate 'sustainable development'. This vision is confirmed by the definition of radiocentric study areas for the second-generation plan, also called PACA (*Perimètre d'Aménagement Coordonné d'Agglomération*). The ambition of this reading is to get out of the typical center-periphery and French-Swiss divide (Quincerot 2009). Nevertheless, this vision establishes another form of duality where the spaces "outside the networks" are gradually being disregarded. Nearly all the urban structures outside the radio centric model are defined as 'villages' in the first agglomeration, whether qualifying actual Swiss villages or secondary or small French centers [fig.8]. Finally, in the fourth agglomeration plan, taking a strong stand to adapt to the necessity of the socio-ecological transition, they are completely erased in both the transport plans and the overall vision of Greater Geneva 2040 [fig.9]. Thus, the TOD vision proposed by the agglomeration plans increasingly tends to ignore the question of spaces 'in-between' (Sievverts 2004) the main axes and poles, going against the alveolar vision of the territory. Embodying the strongly selective and normative bias of the TOD logic, it puts in opposition good compact urban form well-served by public transport and bad urbanization condemned to car-dependent or relegated to aesthetic and ruralist values. Therefore, by giving priority to the search for radical solutions in the face of environmental challenges, the dominant vision for the Great Geneva neglects the pre-existing tissue in favor of a hyper-selectivity and vertical growth-oriented model putting in opposition the more endogenous urban development and the planning vision.



[fig.8] Left: Schéma d'Agglomération. Horizon 2030. Source: Agglomération Franco-Valdo-Genevoise, Projet d'Agglomération de 1er Génération, 2007. [fig.9] Right: Vision d'ensemble Grand Genève 2040. Source: Grand Genève - Agglomération Franco-Valdo-Genevoise, Projet d'Agglomération de 4er Génération, 2021.

The contemporary paradoxes of the TOD, risks, and counter-visions.

Geneva a *specific case of Swiss style Trans-Boarder TOD*

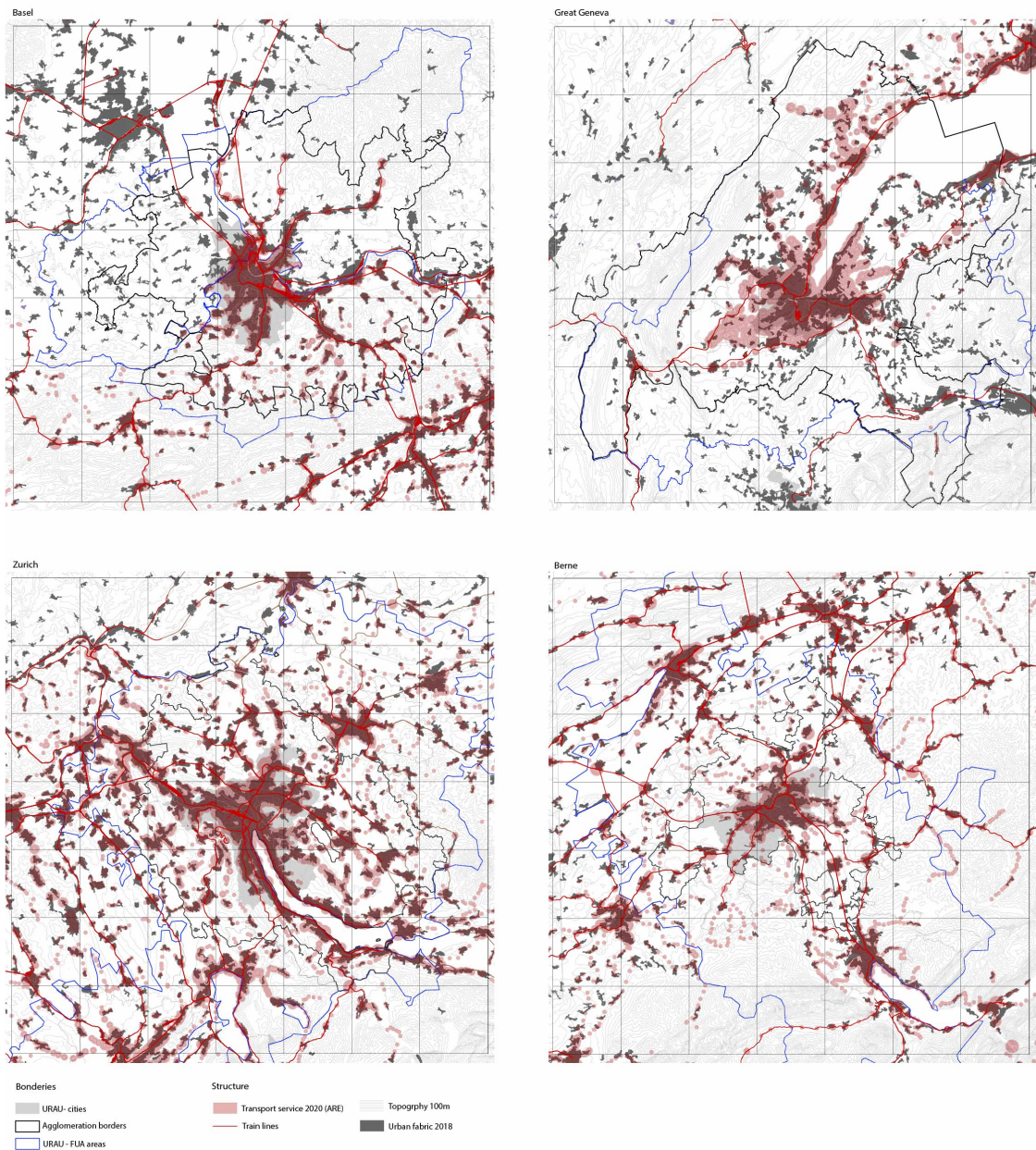
From this increasingly selective and hierarchical planning vision, tending to neglect the urbanization of the last half century, emerges the spatial paradox that the metropolis is facing today. The TOD bases project, intended to tackle the transition of the Agglomeration toward carbon neutrality, supports at great expense and with great difficulty, the establishment of a radio-centric system which only served 50% of the metropolitan urban fabric⁴. Therefore, around forty percent of the current population of Greater Geneva lives "outside" of the main public transport infrastructure's reach⁵. Meanwhile, according to scenarios developed by the Great Geneva still, only 52,6 % of the population should have access to a very good or good public transport service by 2040⁶, meaning that massive investment in transport will only allow to buffer radio-centric growth effect rather than support a modal transition for people living in the metropolis today.

The proportion of people with poor to no public transport access is very high in the Great Geneva (39,1%) if we compare it to Zurich (23,3%), Berne (25%), or Basel (32,8 %) Agglomerations [Tab.2]. This result is even more striking if we consider that the Great Geneva has a densely populated central core compared to other Swiss agglomerations. Quite obviously, Zurich's densely meshed metropolitan transport system is much more successful in responding to its dispersed urban structure with 76,7% of its population benefiting from a very good to average public transport service. Nevertheless, both Bern and Basel metropolitan areas have a radio-centric transport structure. In the case of Berne, the rather concentrated urban structure of the metropolitan space can partly explain its high service quality. Basel agglomeration showcases that the transborder nature of agglomerations strongly impacted the relationship between transport and urbanization. However, the Basel communal-based planning did not have early protective mechanisms, enforcing spillover mechanism across the border, and represents a more traditional case of metropolitan corridor development on its persistent transport system [fig.10]. This comparison highlights that the current state of the Great Geneva Agglomeration is due to a multiplicity of factors from its topo-morphological and institutional conditions to historical political and planning decisions, which created a strong path dependency. The Great Geneva is therefore a specific situation, which is not only one of "delay", as it is usually asserted, but one of another form of urban structure based in its particular conditions of development. These are particularly ill-suited to the TOD model in which strong infrastructure reticular re-development is utterly disconnected from the current context.

⁴ GIS calculation made on the base of public transport services in 2020 (ARE) and the urban fabric 2019 (SITG).

⁵ GIS calculation made on the base of public transport services in 2020 (ARE) and georeferenced population density pers 100m2 in 2020 (OFS).

⁶ Scenario MOCA developed for the Plan d'Agglomération de 4eme generation. PA4, June 2021.



[fig.10] Comparison map of urban and transport structure between four Swiss metropolises in 2020: Basel, Zurich, Great Geneva and Berne. Source: elaborated by the author from Copernicus, ARE 2020, Opentreetmap, OFS and Europa.Eu data.

	Zurich	Basel	Berne	Geneva
Urban structure	Strongly dispersed	Radial and dispersed	Concentrated	Radial and dispersed
Transport system structure	Network	Radiocentric	Radiocentric	Radiocentric
Topographic constrain	Low	Low	High	High
Continuity of the public transport system	Yes	Yes	No	No
Surface Bati pas desseri par le TP	12	9,5	6	49
Transborder	No	Yes	No	Yes

Protection of open space before federal policy	No	No	No	No
Part of the population in central agglomeration	45	36	22	44
Part of the population in periphery	55	64	78	56
Early car restriction policy	Yes	Yes	Yes	No
Population of the Agglomeration with very good to medium public transport service	76,7	67,2	75	60,9
Population of the Agglomeration with bad to no public transport service	23,3	32,8	25	39,1

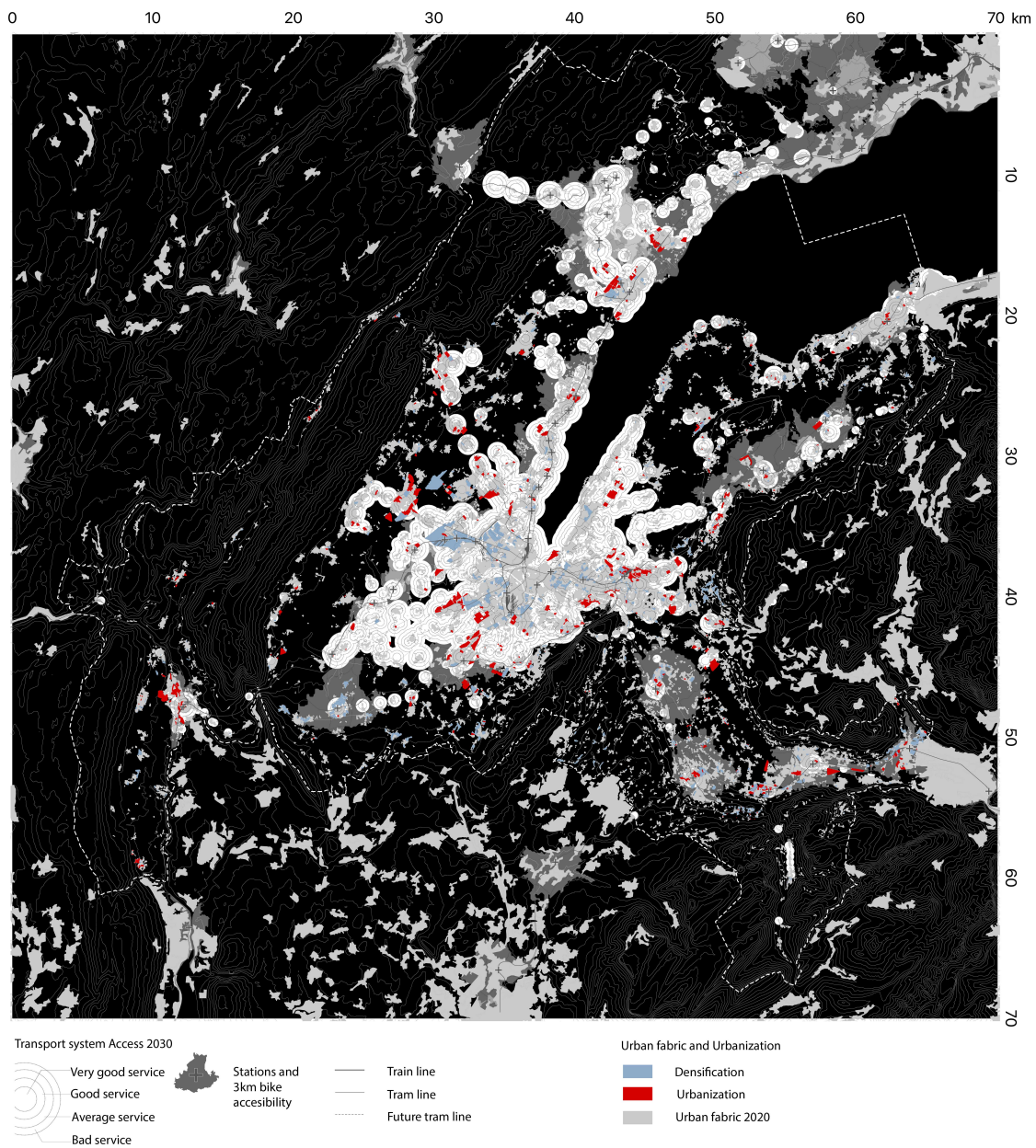
Table 2: Comparison table of urban and transport structure between four Swiss metropolises in 2020: Basel, Zurich, Great Geneva and Berne. Source: elaborated by the author based in GIS analysis from Copernicus, ARE 2020, OFS and Europa.Eu data.

Ecological risks and socio-spatial marginalization

The miss match between the planning model and the current urban structure of the agglomeration also generates another spatial paradox at the scale of the agglomeration between the different objectives of ecological transition. On the one hand, 52%⁷ of the future developments are located outside the transport axes in areas with little or no transport service, which showcases the inertia of the cross-border structure and the complexity of its reorientation. However, most of them are redevelopment or projects on already artificialized land. On the other hand, while the Greater Geneva is committing to soil preservation in order to achieve net zero-artificialization by 2050, 47% of future development is planned on agricultural land among which 65% is on the French territory. The vast majority of these are located on future public transport infrastructures [fig.11]. Thus, the proposed model creates an internal contradiction between modal shift and land protection. Hence, despite the questionability of the ability to truly re-oriented growth the current model clearly puts in opposition new development and the adaptation of existing urban structure. Therefore, current planning takes the risk to support a head-along metropolization process in which new flows induced by mono-functional mass development on arable land are barely supported by new infrastructure rather than sustaining ecological transition processes. Specialized development of which the latest ZAC project in Ferney-Voltaire is a striking example, highlighted by *Terre de Lutttes* as one of the most ecologically detrimental projects on the French territory⁸.

⁷ GIS calculation based on public transport services in 2020 (ARE) and spatialized future development project (SITG)

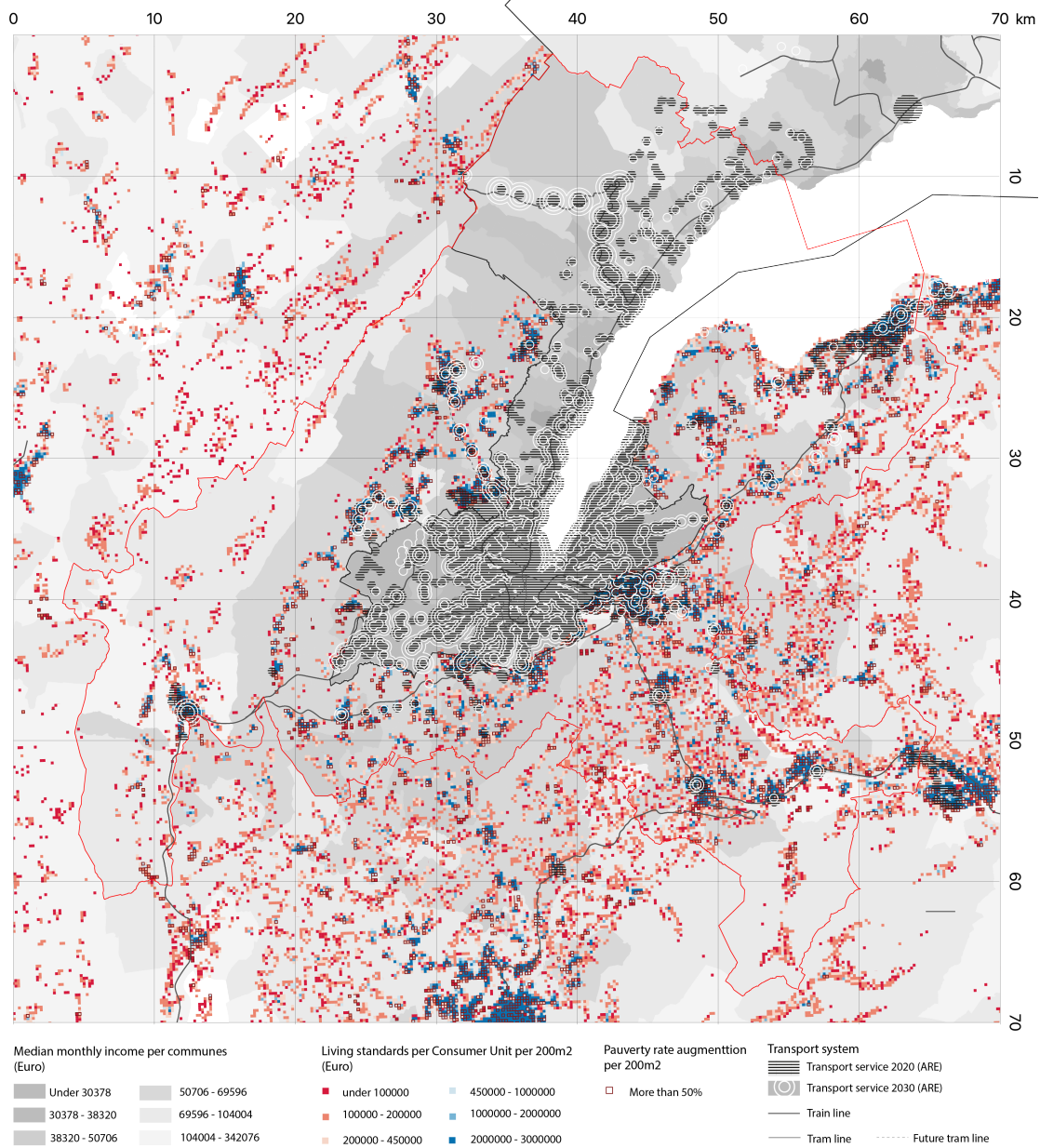
⁸ Rapport projet local, impact global. (in)compatibilité entre les objectifs de transition écologique et la réalité de terrain?, Terre de lutte, Mai 2022.



[fig.11] Great Geneva development and public transport access in 2030. Source: elaborated by the author from SITG and ARE data.

In addition to ecological risk, in the cross-border asymmetrical context of the Great Geneva, this selectivity of the strong transport and urbanization mechanism needs to be understood not only in the typical duality between transition objectives and economically driven metropolization, but also as an actor socio-spatial dynamic. As described earlier, the Greater Geneva is a socially unbalanced metropolis. As we can see, the social schism in the agglomeration is not only materialized across the border but also organized around main transport corridors leading to Geneva. While the median income strictly marks the borders, in terms of living standards the wealthiest populations on the French side are located not only in the bordering spaces but mainly in the denser well-served by public transport areas. This phenomenon is of course directly related to the very important and ever-growing number of transborder workers in the well-connected French communes. However, in parallel, we also witness that the major poverty rate augmentation in the last ten years has taken place in-between the network's axes, further marking the gap [fig.12]. This can partly be explained by the conjunction of housing and living prices, French-based salaries, and the fact that small French communes do not have the obligation to provide social housing. Nevertheless, precarity is mostly

located at the margin of the model in highly car-dependent areas. In this context the hyper-polarized and selective development model, located in communes where housing prices are high and strongly increasing [fig.2], can only enforce the socio-spatial marginalization process especially when public transport pricing is based on Swiss standards while the Canton de Geneve is slowly restricting car permeability through its frontier and enforcing prerogatives to access social housing⁹.



[fig.12] Great Geneva living standards and transport system. Source: elaborated by the author from data.gouv, SITG data.

Hence, this very vertical transport-based planning of growth tends to transfer metropolitan externalities to the French side of the agglomeration, with increasingly detrimental ecological impact, but also, reinforces the spatial dominance of the reticular agglomeration model directed toward Geneva, and by doing so participates to the socio-spatial marginalization of the metropolitan population ‘outside of the networks’. In this sense, the current radiocentric TOD development in the transborder context of the Great Geneva metropolis is risking supporting a socially selective re-

⁹ In February 2022 a referendum accepted by the population demands four years of residency in the canton (instead of two) to be able to apply social housing.

bordering (Herzog, Sohn 2014) while chasing « transition » objectives which would have an important socio-ecological impact. The conflicting Geneva bypass highway project, seen as an emancipatory tool for the French Chablais communes while having a major negative environmental impact is one of the representations of such risks.

(re)Emergence and possible counter visions

In 2020, the Foundation Braillard organized an international competition intended to propose scenarios supporting the ecological transition of the agglomeration. The visions that emerge from this consultation are drastically shifting from the image prefigured by the agglomeration plan. In the seven contributions, the radiocentric image around the central city disappears and the focus is no longer on the ability to accommodate dense growth on public transport but the ability to take advantage of the embodied built and unbuilt capital through mobility networks [fig.12]. This contribution strongly supports the analysis made earlier and tries to find more hydride urban models neither alveolar nor reticular in the usual sense. They offer an image based on the diversity of ways of inhabiting the territory and the plurality of networks. In-between spaces, whether rural, rural-urban, or peri-urban are identified as more flexible spaces which represent opportunities for the socio-ecological transition.



[fig.12] Proposition formulated by designer teams for the Consultation Braillard

Aware of the limit of the current agglomeration model in terms of transition and to the little response that the last agglomeration plans call for “proximity-living” brings to the metropolitan space “outside of the networks”, the Great Geneva is currently engaged in a new form of research-by-design through the latest and ongoing PACA process. This consultation based on the work of design teams and participative ateliers, intends to draw possible transition strategies from the edge of the metropolis toward Geneva rather than the other way around. The fine grain territorial and policy analysis provided by the teams strongly enforced the idea of a transition from the ground up based on the existing territorial context. How this contribution will tackle mobility urbanization relation, and further on, how they will be translated in the 5th agglomeration plan remains to be seen.

Conclusion

The Great Geneva is today at a crossroads in its planning process, which justifies the importance of better understanding its evolution, both in terms of planning and political visions and morphological evolution, to support future development scenarios able to sustain the drastic shift that the socio-ecological transition requires. The national Swiss planning’s turn against ‘sprawl’ lead to a growing selectivity and hierarchization of the urban fabric defining a ‘one-size fits all’ Transit-Oriented Development strategy for metropolitan growth, supported by financial and institutional logics. In the case of the Great Geneva, the agglomeration plan marks a drastic shift in territorial vision. The alveolar reading fades to give way to a radio-centric reticular reading echoing pre-car structures. Historical, morphological, and political reading allowed us to take a wider gaze upon the current paradoxes that are arising in the metropolis. Highlighting a situation that is not only one of “delayed” infrastructural development but of misfitted strategies with regard to the stratified cross-border context.

But despite the lack of transferability of the vertical and top-down model, the complex socio-spatial cross-border metropolis showcases the idea that the generic application of the model poses socio-ecological risks. First of all, vertical power relations tend to push metropolitan externalities beyond the border, rather than support coherent transition strategies. Second of all, the opposition between well-served compact new urban nodes and the urban fabric "outside of the networks", defined an exclusive and 'city-centered' transition process. Regardless of how one gazes upon periurban and rural-urban space, they still constitute a non-negligible part of the urban fabric which needs means to adapt to current ecological objectives. The model's lack of attention to in-between space does not just ignore the peripheries but takes the risk to sustain and even to relatively increase its car dependency. Finally, in strongly asymmetric and interdependent contexts such as cross-border contexts, the TOD model risks to support a form of selective re-bordering through transport and urbanization development, enforcing socio-spatial marginalization of the already most vulnerable parts of the metropolitan population.

At a time when the ecological transition is the main challenge of metropolises, this contribution highlights the need to take a step back from generic selective and hierarchical models of development to understand the conditions and the context in which they are implemented. It points out the necessity of a more contextual reading beyond generic growth-supported metropolitanization processes, to the risk of sustaining, specifically in asymmetrical and unbalanced territorial context, socio-spatial marginalization, and ecological risks. Therefore, the need for hybridization of the TOD model towards a less top-down and more articulated relation between the urban fabric, both new and pre-existing, and transport networks. More so, these hybrid strategies need to be in line with the existing path-dependent spatial logics, adapted to the specificity of places as well as plural and horizontal territorial relationships.

Bibliography

- ARE, Office fédéral du développement territorial. (2023) Rapport d'examen des projets d'agglomération de 4e génération.
- Barbier, C. and Schwarz, P.-F. (2016) *Des Celtes au Grand Genève*. Deuxième éd. Saint-Julien-en-Genevois: La Salévienne.
- Barbier, C. and Schwarz, P.-F. (2019) *Aller et venir, transports et mobilité dans le Pays de Genève*. Saint-Julien-en-Genevois: La Salévienne.
- Bassand, M. (2004) *La métropolisation de la Suisse*. Lausanne: Presses polytechniques et universitaires romandes (Collection Le savoir suisse ; Société, 21).
- Bauer, G. and Roux, J.M. (1976) *La rurbanisation ; ou, La ville éparpillée*. Paris: Éditions du Seuil (Collection Espacements).
- Bertrand, N., Cremer-Schulte, D. and Perrin, M. (2015) 'Planification stratégique et asymétries territoriales. Grenoble et le Grand Genève, deux régions urbaines alpines à l'épreuve de la cohérence.', *Revue de géographie alpine*, 103(3). Available at: <https://doi.org/10.4000/rga.3104>.
- Constitution fédérale de la Confédération suisse. (1999) (État le 13 février 2022) Aménagement du territoire, Art.75.
- Corboz, A. (1999) *La Suisse comme ville: colloque du Groupe d'Histoire Urbaine, Genève, 12 - 13 mars 1998*. Edited by F. Walter and Groupe d'Étude d'Histoire Urbaine. Basel: Schwabe (Itinera, 22).
- CRFG (1997) *Charte d'Aménagement Franco-Valdo-Genevoise*.
- Decoville, A. et al. (2013) 'Comparing Cross-border Metropolitan Integration in Europe: Towards a Functional Typology', *Journal of Borderlands Studies*, 28(2), pp. 221–237. Available at: <https://doi.org/10.1080/08865655.2013.854654>.
- ECOPLAN AG (2016) *Projets d'agglomération Bilan et perspectives. Une coordination efficace des transports et de l'urbanisation*. Union des villes suisses.
- Flyvbjerg, B. (2006) 'Five Misunderstandings About Case-Study Research', *Qualitative Inquiry*, 12(2), pp. 219–245. Available at: <https://doi.org/10.1177/1077800405284363>.
- Gallez, C. et al. (2008) *Mythes et réalités de la cohérence urbanisme-transport: Trajectoires urbaines comparées en Suisse et en France*. CNRS - Programme Interdisciplinaire de Recherche Développement Urbain Durable.
- Gallez, C. et al. (2013) 'Coordonner transport et urbanisme. Visions et pratiques locales en Suisse et en France', *Revue d'Économie Régionale & Urbaine*, avril(2), pp. 317–337. Available at: <https://doi.org/10.3917/reru.132.0317>.
- Grand Genève. Agglomération Franco-Valdo-Genevoise (2022) *Chartre Grand Genève en Transition*.
- Grand Genève. Agglomération Franco-Valdo-Genevoise, G. (2021) *Projet D'Agglomération De 4^e Génération Grand Genève. (PA4) Rapport principal*.

- Hildebrand, S. (2006). *Urbane Schweiz. Urbanistische Konzepte für die Schweiz von 1930 bis heute*. In K. Borgmann, M. Bruhn, S. Kuhrau, M. Schalenberg (Eds.), *Das Ende der Urbanisierung? Wandelnde Perspektiven auf die Stadt, ihre Geschichte und Erforschung* (pp. 69–84). Berlin: Humboldt- Universität zu Berlin. Retrieved from http://edoc.huberlin.de/e_histfor/8
- Hüssy, C. (2019) *Le Grand Genève Territoire hybride*. 1. Auflage. Saarbrücken: Éditions universitaires européennes.
- Joye, D. and Kaufmann, V. (1998) '50 ans d'aménagement du territoire à Genève', *Les Annales de la recherche Urbaine*, (Gouvernance), pp. 93–100.
- Joye, D. and Leresche, J.-P. (1993) 'Métropolisation : de l'urbain au politique', *Espaces*, Les cahiers (Les apories du territoire).
- Kaufmann, V. and Sager, F. (2006) 'The Coordination of Local Policies for Urban Development and Public Transportation in Four Swiss Cities', *Journal of Urban Affairs*, 28(4), pp. 353–374. Available at: <https://doi.org/10.1111/j.1467-9906.2006.00300.x>.
- Leresche, J. and Bassand, M. (1991) 'Métropole lémanique: Une nouvelle dynamique urbaine (Rapport de recherche)', *Lausanne: IREC, Institut de Recherche sur l'Environnement Construit, Département d'Architecture—EPFL* [Preprint].
- Leresche, J.-P., Joye, D. and Bassand, M. (1994) *Métropolisations: interdépendances mondiales et implications lémaniques*. Genève: Georg ed (Collection Lug).
- Loi fédérale sur l'aménagement du territoire. (1979) (État le 1^{er} janvier 2019) art.1 al.1.
- Newman, P. and Kenworthy, J. (2015) *The End of Automobile Dependence: How Cities Are Moving Beyond Car-Based Planning*. Washington, DC: Island Press/Center for Resource Economics. Available at: <https://doi.org/10.5822/978-1-61091-613-4>.
- Office fédéral du développement territorial, ARE and Secrétariat d'État à l'économie, seco (2001) *Politique des agglomérations de la Confédération (Rapport du Conseil fédéral)*.
- Offner, J.-M. (2018) *Métropoles invisibles: les métropoles au défi de la métropolisation*. La Défense: PUCA, Plan urbanisme construction architecture (Les conférences POPSU).
- Papa, E. and Bertolini, L. (2015) 'Accessibility and Transit-Oriented Development in European metropolitan areas', *Journal of Transport Geography*, 47, pp. 70–83. Available at: <https://doi.org/10.1016/j.jtrangeo.2015.07.003>.
- Quincero, R. (2009) 'Ni « autre Genève », ni « France Voisine » : Des fragments de l'Agglomération', in *Genève à l'épreuve de la durabilité*. Fondation Braillard.
- Qviström, M. (2015) 'Putting accessibility in place: A relational reading of accessibility in policies for transit-oriented development', *Geoforum*, 58, pp. 166–173. Available at: <https://doi.org/10.1016/j.geoforum.2014.11.007>.
- Qviström, M., Luka, N. and De Block, G. (2019) 'Beyond Circular Thinking: Geographies of Transit-Oriented Development', *International Journal of Urban and Regional Research*, 43(4), pp. 786–793. Available at: <https://doi.org/10.1111/1468-2427.12798>.
- Sieverts, T., Deluze, J.-M. and Vincent, J. (2004) *Entre-ville: une lecture de la Zwischenstadt*. Marseille: Éd. Parenthèses (Collection Eupalinos).
- Sohn, C. (2014) 'The Border as a Resource in the Global Urban Space: A Contribution to the Cross-Border Metropolis Hypothesis: The border as a resource in the global urban space', *International Journal of Urban and Regional Research*, 38(5), pp. 1697–1711. Available at: <https://doi.org/10.1111/1468-2427.12071>.
- Suzuki, H., Cervero, R. and Iuchi, K. (2013) *Transforming Cities with Transit: Transit and Land-Use Integration for Sustainable Urban Development*. The World Bank. Available at: <https://doi.org/10.1596/978-0-8213-9745-9>.
- Tan, W., Bertolini, L. and Janssen-Jansen, L. (2014) 'Identifying and conceptualising context-specific barriers to transit-oriented development strategies: the case of the Netherlands', *Town Planning Review*, 85(5), pp. 639–663. Available at: <https://doi.org/10.3828/tpr.2014.38>.
- Thomas, G. (2011) 'A Typology for the Case Study in Social Science Following a Review of Definition, Discourse, and Structure', *Qualitative Inquiry*, 17(6), pp. 511–521. Available at: <https://doi.org/10.1177/1077800411409884>.
- Thomas, R. et al. (2018) 'Is transit-oriented development (TOD) an internationally transferable policy concept?', *Regional Studies*, 52(9), pp. 1201–1213. Available at: <https://doi.org/10.1080/00343404.2018.1428740>.
- Thomas, R. and Bertolini, L. (2015) 'Defining critical success factors in TOD implementation using rough set analysis', *Journal of Transport and Land Use* [Preprint]. Available at: <https://doi.org/10.5198/jtlu.2015.513>.
- Viganò, P. et al. (2017) 'Rethinking Urban Form: Switzerland as a "Horizontal Metropolis"', *Urban Planning*, 2(1), pp. 88–99. Available at: <https://doi.org/10.17645/up.v2i1.871>.
- Walter, F. (1994) *La Suisse urbaine: 1750-1950*. Carouge-Genève: Editions Zoé (Collection Histoire, 3).

Walter, S. and Roy-Baillargeon, O. (2015) 'La coordination du transport et de l'aménagement à l'heure des projets d'agglomération suisses : la régionalisation de la planification à Berne, Genève, Lausanne et Zurich', *Flux*, N° 101-102(3), pp. 16–28. Available at: <https://doi.org/10.3917/flux.101.0016>.