

Does New Urbanism achieve a sustainable transportation system?
- featuring the town of Celebration



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2003

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Abstract:

Creating a sustainable society is a fundamental goal for Sweden and Europe. In Sweden, the urban environment has progressively evolved into a car-oriented environment. The problem is even greater in USA, which has led to sprawling cities and inefficient urban planning. A new American method of urban planning; New Urbanism, has been developed to oppose this trend of growth. The aim of this study has been to analyze if New Urbanism is a way to achieve a sustainable transportation system. To do this, not only theoretically, but also practically, a field study has been performed in a town built on the ideas of New Urbanism, namely; Celebration in Florida. Its transportation system has been analyzed through different methods, such as observations, minor measurements and through interviews with American and Swedish city planners. Further, the tool of quality analysis; TRAST - Traffic in the Attractive Town, and the tool of competitiveness between modes of transportation; Streetwise Traveler, has been used in the evaluation. The results of our analysis indicated that Celebration did not fulfill the advisories of New Urbanism, since it did not have a satisfying transit system. However, Celebration did realize all other advisories of the New Urbanism traffic network, and together with a theoretically analysis this lead to the conclusion that New Urbanism achieves a sustainable transportation system, but only when all of its planning measures are used, without exceptions, on new developments.

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Foreword

To study New Urbanism and Celebration has been exciting and rewarding, and it has given us a general knowledge about traffic planning and its history. The trip we made to Celebration, Florida, did not only contribute to our study of New Urbanism, it also functioned as a study trip for our personal interests. The master thesis is performed at the Department of Technology and Society, Lund Institute of Technology. Professor Bengt Holmberg has been our supervisor and external reviewer is Christer Ljungberg, Trivector AB, Lund.

We would like to take the opportunity to thank all the people who have helped us with our study. We would especially like to thank a few individuals, which have helped us with inspiration and ideas.

Thanks to Mr. Geoffrey Mouen, Geoffrey Mouen Architects, Celebration, for your generosity and for sharing your knowledge with us. Mr. Don Leptic, Department of Roads and Engineering, Osceola County, Kissimmee; thank you for giving us an impartial view of Celebration and its transportation system. Thank you Mr. Michael Prevost, landscape architect in Celebration, for your hospitality and attention.

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Lund, Close to Christmas, 2003.

Jenny & Jakob

Sammanfattning

New Urbanism är en samlad term för ett nytt och annorlunda sätt att tolka stadsplanering. Den generella idén med New Urbanism är att återställa det amerikanska samhället från sprawl; okontrollerad utbredning av städer, så kallade ”edge cities”, och motorvägslandskap. För att klara av detta så klargör New Urbanism att våra samhällen och städer bör byggas på ett annorlunda sätt än var det ofta är idag. De borde ha ett tydligt centrum omgivet av bebyggelse. Trafiknätet borde planeras före bebyggelsen planeras, för att undvika problemet med att tvingas dra långa vägar till hus som är anlagda på lågkostnads- och lågdensitetstomter, vilket medföljer återvändsgränder, så kallade ”cul-de-sacs”. New Urbanism är ett alternativ till att lösa problemen med sprawl, och en vision av att skapa ett hållbart samhälle med ett hållbart transportsystem.

Uppnår New Urbanism verkligen målet att skapa ett hållbart transportsystem? Detta har tidigare inte helt utretts. Att enbart använda argument på hur och varför New Urbanisms verktyg fungerar är inte tillräckligt, New Urbanism behöver även tydliga underlag för sina argument. Vi har undersökt om New Urbanism verkligen uppnår ett hållbart transportsystem, för att utreda om New Urbanism är en användbar metod mot miljöförstörande samhällsutveckling.

Staden Celebration har valts ut som studieobjekt, för att vi ska kunna utvärdera hur väl New Urbanism förverkligar ett hållbart transportsystem. Celebration är ett så kallat TND – Traditional Neighborhood Development, vilket betyder ungefär ”traditionell grannskapsbebyggelse”. TND är ett fundamentalt verktyg för New Urbanism och planerar och bygger en stad på ett sätt som skapar en säker, hälsosam och en hållbar miljö samt där människor kan gå eller cykla och spendera tid med varandra på offentliga platser. Analysen av Celebration bygger på observationer, mindre mätningar, intervjuer och en grundlig teoretisk studie av New Urbanism och Celebration. En tidig version av det nya svenska verktyget: TRAST – Trafik för en attraktiv stad, har använts för att fastställa trafiknätets kvalitet. Vidare har verktyget: Smart trafikant, använts för att utreda konkurrenskraften mellan att köra bil och gå och cykla.

Resultaten från undersökningarna, visade att Celebration är generellt ett bra exempel av ett TND, men att staden behöver god kollektivtrafik. Avsaknaden av ett bra kollektivtrafiksystem hindrar Celebration från att helt och hållet uppfylla TND-kraven. Sammanfattningsvis har det visat sig att Celebration inte är det bästa valet av studieobjekt. Emellertid uppfyller Celebration andra stora delar av TND-standard, nämligen trafiknätets och stadens struktur. Därför blir slutsatsen att Celebration kommer att kunna uppnå ett hållbart transportsystem när staden kompletteras med kollektivtrafik av hög kvalitet.

Utifrån de teoretiska studierna av New Urbanism och fältstudien av Celebration, kan vi slutligen summera att New Urbanism inte helt uppnår hållbarhet om inte alla dess idéer förverkligas. New Urbanism kan uppnå ett hållbart transportsystem om dess tre vanligaste planeringsverktyg: regionalplanering, TND och TOD (kollektivtrafikorienterad bebyggelse), används utan undantag samt att New Urbanism börjar använda mjuka åtgärder. Genom att New Urbanisms kompletteras med Mobility Management, d.v.s. att sprid information och kunskap samt påverkar människors val av färdmedel, så kan New Urbanism vara ett mycket bra sätt att planera en amerikansk stad på.

I jämförelse med Sverige och Europa, så är New Urbanism inte så speciellt, men i jämförelse med det generella planeringssättet i USA, så är det en utveckling i rätt riktning.

Summary

New Urbanism is an assembled term for a new and different way to interpret urban planning. The general idea of New Urbanism is to restore the American society from sprawl; uncontrolled geographically spreading of cities, edge cities and highway environments. To do this, New Urbanism proclaims that the village and the city should be built in a different way, than it most often is today. They should have a distinguished town center surrounded by housing areas. The traffic network should be planned before the localization planning of the houses, to avoid the problems with streets being drawn a long distance to reach houses built on low-cost, low-density properties, creating so called cul-de-sacs. New Urbanism is an alternative solution to the problems with sprawl, and a vision to create a sustainable society, with a sustainable transportation system.

Does New Urbanism actually achieve their goal of creating sustainable transportation systems? This is something that has not yet been fully examined. To simply use arguments on how and why the tools of New Urbanism work is not enough. New urbanism needs clear verifications to their arguments. We have investigated whether New Urbanism achieves a sustainable transportation system, to evaluate if New Urbanism is a usable method against ecologically destructive social development.

To evaluate how well New Urbanism implements a sustainable transportation system, the town of Celebration has been chosen as a study object. Celebration is a Traditional Neighborhood Development, a TND. The TND is a fundamental tool of New Urbanism to plan and build a town in a way that will create a safe, healthy, sustainable environment, where people walk and bicycle and spend time with each other in public areas. To analyze Celebration, we have performed observations, minor measurements, interviews and a thorough theoretical study of New Urbanism and Celebration. An early version of the new Swedish traffic tool; TRAST - Traffic in the Attractive Town, has been used to establish the quality of the traffic network. Furthermore, the tool; Streetwise Traveller, have been used to investigate the compatibility between driving car and walking and biking

The results from the investigation showed that Celebration is over all a good example of a TND, but requires a satisfying transit system. The lack of good transit keeps Celebration from fulfilling the fundamental requirements of a TND. Consequently, Celebration appeared not to be the best choice of study object. However, the other parts of Celebration; the traffic network and the town structure, fulfill the standards of a TND, and therefore the conclusions are that Celebration will achieve a sustainable transportation system as soon as it is complemented with high-quality transit.

From theoretical studies and the field study of Celebration and New Urbanism, it can be summarized that New Urbanism does not really reach sustainability if not all its ideas are realized. New Urbanism could achieve a sustainable transportation system if the three primary planning tools; Regional planning, TND and TOD – Transit Oriented Development, are without exceptions used in all developments, and further; if New Urbanism starts using the measures of Mobility Management, to actually spread information and affect peoples choices, it could be a very good way to plan a town in the US.

Compared to Sweden and Europe, New Urbanism does not seem very eccentric, but compared to the general planning in the US, it is a progress in the right direction.

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1 Introduction

1.1 Background

The urban environment in the USA has to the point of today evolved into being totally car-oriented. The car is the main mean of transportation and alternatives to the car are usually used more for people's leisure time hobbies or recreation. In most neighborhoods people do not even have the opportunity to walk, bicycle or use public transport. The city planning force people to drive their cars even for very short journeys.

American architects, city planners and transportation engineers have reacted against the development of the cities today; also known as sprawl. They believe that low-density cities prevent people from socialize spontaneously, using environmental friendly transportation means and living in a varied community. Together they have formed an organisation which works in the direction of preventing sprawling in the community and the direction of creating a less car-oriented society. Together they formed a congress and composed a manifest of the new model of urban planning; "The New Urbanism".

Inspired by New Urbanism, the town of Celebration was built. The city was created as a prototype of neotraditional neighborhoods, i.e. societies that are inspired by pre-war urban planning, but with a modern use.

Why did we choose to write about New Urbanism and Celebration?

After living a year in the very suburb of the low-density city of Dallas, USA, Jenny has experienced the backside of sprawl and car-oriented cities. This was in 1997 to 1998 and several years after that she came in contact with an American, telling her about the New Urbanism and American architects working in preventing purpose of outspreading societies. After getting a more fundamental background on New Urbanism she decided to do her master thesis on the subject, in order to highlight a different kind of American planning method and to actual investigate if the people of the congress and the New Urbanism method lived up to their promises. During a conversation with her fellow student of transportation engineering, Jakob, a shared interest in New Urbanism and city planning was discovered.

Consequently, we decided to cooperate on our master thesis to investigate the level of actual use of sustainable transportation planning in neotraditional and New Urbanism-inspired neighborhoods.

The town of Celebration was chosen for several reasons:

- Its distinct city limits and how well it is marked of from its surroundings. The city is surrounded with wetlands and has no adjacent community.
- The whole city is planned on the basis of New Urbanism, and not just parts of it.
- The city has a low number of inhabitants and exploits a small area of land.

When Celebration was selected, we did not understand the difference between a TND – Traditional Neighborhood Development, and a TOD – Transit Oriented Development. A TOD would probably have been even more interesting in a transportation point of view.

1.2 Purpose and aim

The purpose of our degree project is to investigate whether New Urbanism is a way to create a sustainable society with a sustainable transportation system.

By studying a neighborhood, built and planned after the city planning methods of New Urbanism, we want to evaluate whether New Urbanism is a good mean of control in changing the main mean of transport from the car to more environmental friendly alternatives.

The aim of this study is to, through the field study of Celebration, be able to investigate the formulation of the thesis, not only theoretically, but also from the reality: **Does New Urbanism achieve a sustainable transportation system?** The data will be analysed and compared with as well Swedish research as American experiences.

1.3 Limitations

To minimize the proportions of the project, this evaluation will be based on a field study of only one development. There are many projects of New Urbanism character in America, but There are many New Urbanism developments being planned or are already under construction in USA, but there are not many developments that are yet finished. Many of these developments are so called infills, where small locations of already built cities as Miami, San Francisco, Washington DC etc. are being improved with New Urbanism methods. The oldest and most known New Urbanism development is the town of Seaside, in Florida. It was built in the 80th, but has lately naturally developed into a summerhouse area, and is therefore not a good piece for a field study.

There have been a problem to find reliable statistics. The Celebration town board is supposed to provide the county with statistics and this has not yet been done. Because of this, our study has been based on interviews, measurements and our own observations.

This report will only treat the ecological point of view of Sustainable Development. The report is written in American English.

The conveyance of goods are left out from this evaluation.

Since the areas of Aquila Reserve, Roseville Corner and Artisan Park has not yet been built in Aug 2003, these areas are left out from all analysis and observations. In addition, they are left out on the maps, presented in the report. The high school is located at the far west side, and has been left out on the presented maps, to reach a better resolution in the illustrations. A complete map, with all planned areas except from the high school, is presented in Appendix 1.

1.4 Methodology

The report is based on the following major methods:

- **Study of Literature, both American and Swedish, concerning New Urbanism, Celebration and city planning.** The study is not only done to create a thorough knowledge about New Urbanism and the town of Celebration, but also used in the theoretical evaluation of New Urbanism.
- **Observations of Celebration and its residents during two weeks time.** Due to the lack of reliable statistics the observations are a vital part in the investigation.
- **Car follows Car** – practical investigation on the actual vehicle speeds. By following other cars during the afternoon and the mornings in two days time, an approximation of the actual speed is measured on different roads in Celebration. This is done in this rather primitive way, since there are no statistics on actual vehicle speeds in Celebration.
- **TRAST – Traffic for the attractive city*** – a quality check and inspection of the urban traffic network. An early version of the Swedish traffic planning tool; TRAST, is used in the analysis to evaluate the quality of the traffic network in Celebration. TRAST is chosen, partly because it is the latest traffic planning tool in Sweden, and also since it could be interesting for the developers of TRAST to see how it can be used in reality, before it is finally completed.
- **Streetwise Traveler** – evaluation on how competitive the transportation modes are concerning health, travel time, economy and environmental issues. Streetwise Traveler enables an overview of the differences between the most common transportation modes concerning the issues mentioned above. This method is used, since it is a good way to see how well other transportation modes, than the car, works in an American society.
- **Interviews.** Two Swedish and three American traffic planners and architects associated to city planning are interviewed. These interviews provide the evaluation a deep experience on the traffic planning of Celebration.

The methods TRAST and Streetwise Traveler are described more thoroughly in the report. To limit the proportions of the thesis, we have chosen not to use any more methods. One of the methods: Car follows Car, has been chosen when no statistics were found in Celebration and the Osceola County. All other methods were chosen before the study.

* TRAST – *Traffic for the attractive city*, is developed to be a manual that leads the user through a city planning process where both the planning of the building as well as the planning of the traffic is considered. The structure of TRAST, as well as its methods, is described more thoroughly in chapter 4.4.

1.5 Structure of the report

The report is divided into five parts:

- The history and fundamental purpose of New Urbanism and the creation of Celebration.
- A presentation of Celebration.
- Presentations of different traffic planning tools, both American and Swedish.
- Analyses and investigations of Celebration.
- Evaluation of Celebration, if it is a good example of a city with a sustainable transportation system and a suggestion on improvements.

This is to guide the reader through the background of New Urbanism, an up-to-date view of our field object, our results from our study and the evaluation of our result.

Special interests

If you are not interested to read the whole report, we recommend you to read the following chapters.

Looking for knowledge about Sprawl?	– Read chapter 3.1, 3.2 and 3.3.
Interested in TRAST?	– Read chapter 5.1 and chapter 6.1, 6.3.
Curious about Celebration?	– Read chapter 3.5 and chapter 4.
Interested in New Urbanism?	– Read chapter 3.4, 5.2.
Interested in the answer to the title?	– Read chapter 7.

2 Sustainable transportation system

The question of this thesis is whether New Urbanism achieves a so-called sustainable transportation system. What is a sustainable transportation system?

2.1 A brief explanation of sustainability

Simplified, the following definition might give an answer to the question above.

**A society where the transportation system and the traffic functions in symbiosis with nature and man
- without demolishing or dominating the environment**

To achieve a sustainable transportation system, the society ought to work to realize the following goals, with the following measures:

- **Decreasing car-usage, to reduce exhaust of car fumes.**
 - By creating alternative vehicles to the car
 - Producing car-sharing, car-pooling and Park & Ride
 - Building in a way to make it possible to walk and bike
 - Producing high-effective public transport
- **Counteracting low-density cities, to affect travel length and decrease the exploitation of the nature.**
 - Building the town compact with mixed-use
 - Limit the geographical spreading of the city
- **Create a society that is safe, secure, accessible, aesthetic etc.**
 - For the car
 - For the walker and the bicyclist
 - For the ones that travel by bus or train

2.2 Official definitions

According to TRAST a sustainable society is defined from the 1987 Bruntland commission, as a society with a sustainable development, created by humankind to provide for her daily needs, without jeopardizing the possibilities of the future generations.

In addition, TRAST presents a quotation of sustainable development from "Forum for the future annual report 2000":

"Sustainable development is a dynamic process which enables all people to realize their potential and improve their quality of life in ways which simultaneously protects and enhances the earth's life support system."

The Congress of New Urbanism believes that sustainable developments are built on three parts: equity, environment and economy¹. This description is similar to the description done by TRAST. The sustainable development is also often referred to as Smart Growth. In the report Smart Scorecard² Smart Growth is described as “long-term health of our existing communities - economically, environmentally and socially”. To reduce the impact of new growth the city must be planned to provide greater accessibility and choices in how people travel, maximize the return from public investments in existing and new roads, protect natural habitat and watersheds and foster a greater sense of connection, responsibility and continuity for citizens.

Several measures and planning tools may be used to reach Smart Growth³:

- **Build** new neighborhoods in a **compact form**.
- Connect street systems that are designed to **balance auto, pedestrian and bicycle movement**.
- Maintain and enhance **existing infrastructure**.
- Actively **pursue redevelopment**, including infill residential development.
- Encourage **mixed-use development**, preferably **near transit service**.
- Vigorously **protect sensitive** habitat and watershed **land**.
- Build **mixed-density** and **mixed-income** housing.
- **Recognize traditional downtowns and urban neighborhoods** as being a critical anchor for to the economic and community vitality of a region.
- **Establish predictability in the development process**; development projects that enhance the economy, the community and the environment receive expedited approval.

¹ Congress for the New Urbanism (2000)

² Fleissig and Jacobsen (2002)

³ Fleissig and Jacobsen (2002)

Strength

Similar to sustainability is the conception “strength”. TRAST separates the meaning of sustainability and strength by describing a “Valuerose”, see figure 2.1.

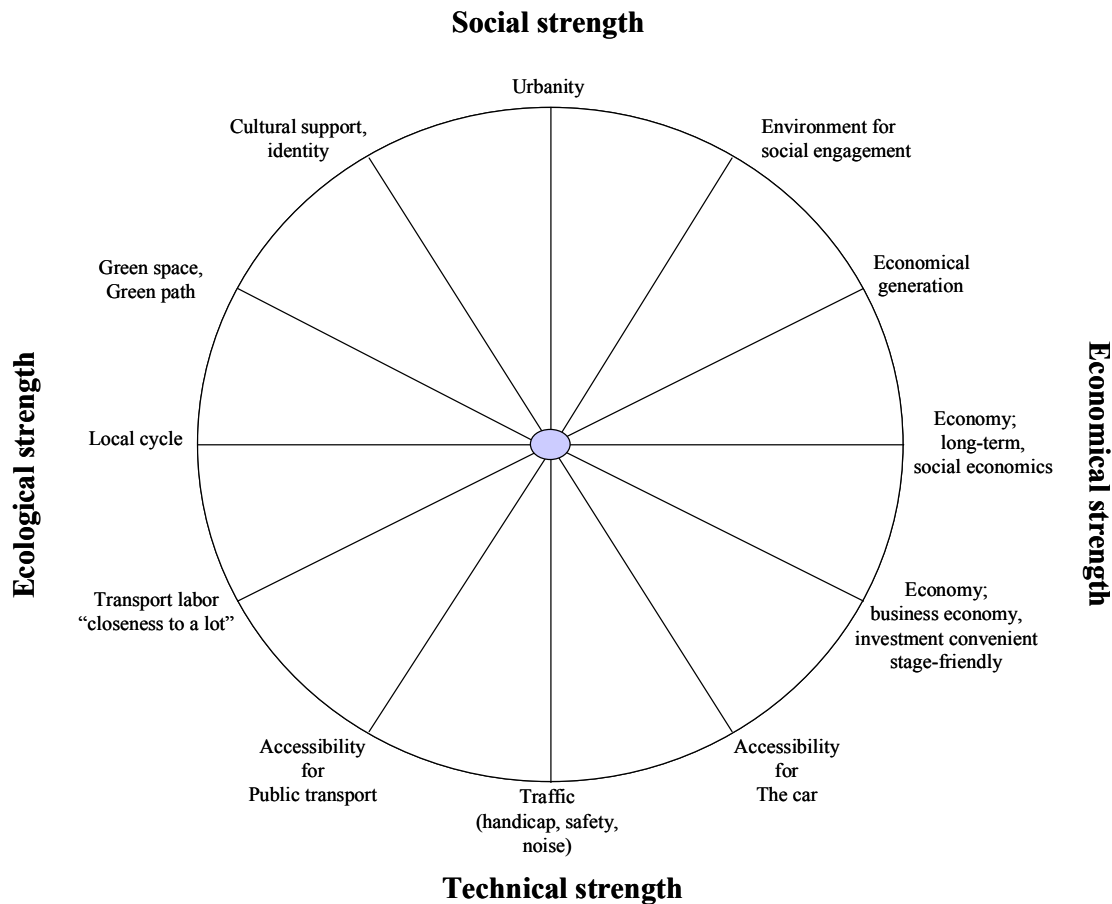


Figure 2.1 The Valuerose of Strength

In this report the technical strength and the lower right part of the ecological strength is investigated; transport labor, safety, noise, individual accessibility for people with handicap and accessibility for Public transport, the Car and also the bicycle and for pedestrians.

Traffic measures

To reach ecological strength and sustainability, the society ought to set up the following measures of the traffic¹:

Tackle the problem at the source. This represents an ambition to develop the cleanest, most economical, safest and quietest vehicle possible. It also represents the effect of persuading people to drive in the best way to protect the environment and increase traffic safety.

¹ Holmberg, Bengt & Hydén, Christer (1996)

Reduce and affect car usage. This aims to reduce travel length and to affect peoples choice of transportation, in benefit for public transport, bicycling and car-pooling. E.g. of measures; lower the cost of using non-car transportations and encourage traveling that decreases the distances between destinations.

Better alternatives to the car. This means improved public transports, enhanced conditions for bicycling and car-pooling

Selective access to roads and streets. This means that the traffic ought to be divided on to different road classes, depending on transportation category.

Reinforce the kind of service that helps to fulfil the goals. Improve communication and the collaboration between local authorities, financing policy and research.

In the final chapter, these official aims, and especially the traffic measures, will be followed-up and evaluated.

3 History of the American city

The American traffic planning is different from the European traffic planning, but the developments of the societies are more similar. Why this is, will be presented here.

3.1 The Development of the Society

The time when many European people immigrated to North America, an agriculture society was developing. People bought land and settled down to become farmers. The family both worked, lived and spent their leisure time in their home area, and so their moving patterns were small. They made their own food and took care of all services at home. The means of transport were mostly the horse and if people did not ride, they walked to their destinations. The train came to America in the 19th century and was used as a mean of transport for very long trips. Many small towns were formed because of the train and its stations, which made people move into the cities, the urbanization had started, see figure 3.1.

In the end of the 19th century, the society was becoming more and more industrialized. People needed new job opportunities and moved into the cities to work at the new factories. They still spent their leisure time and made their own utilities at home. Mostly, the service was located in the home. People lived close to work and walked or rode their horses to the factory. In the bigger cities, a tram network transported the people.

The car made its breakthrough earlier in America than in Europe; in early 19th century compared to 1945 in Sweden, and formed the society in a completely new way. The car gave the people opportunity to travel longer to work and to places within the town. A market of stores and service grew and people started to use services in the town. Since pubs, restaurants and theatres opened in the cities, people spend more of their leisure time out of home. This era is called the “regionalizing era” and goes on until this present time. From the 1960’s, people in America work out of home, and usually have long distances to there work place. They spend their leisure time at several locations out of the home and did not have any service at home and they bought all their utilities and food. Today, people work at home and it is very common that people eat out, not only in the weekends, but also during the weeks.

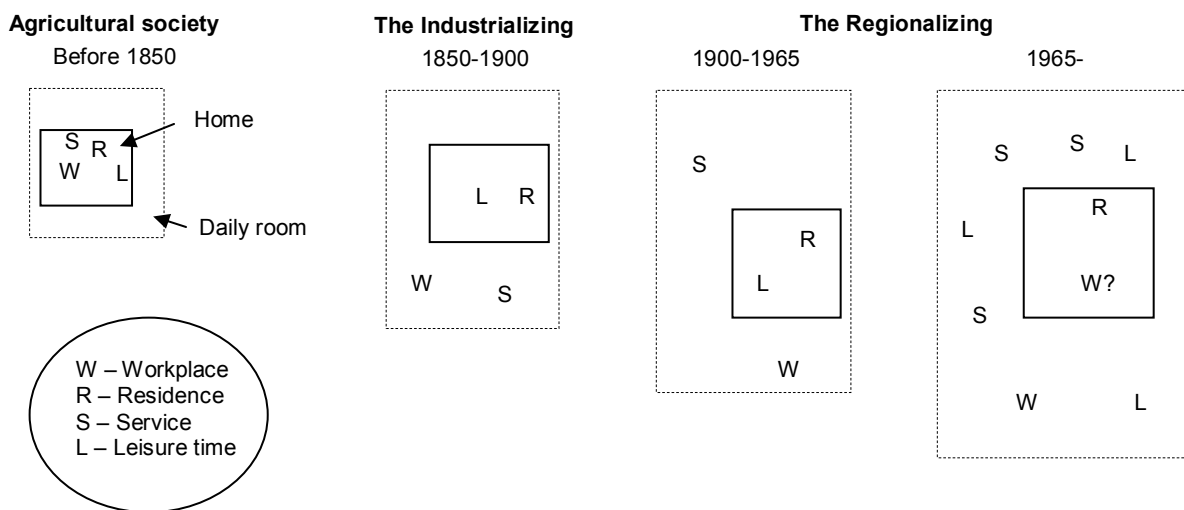


Figure 3.1 The development of the society¹

¹ Freely sketched by Jenny Ekman from Wärneryd, O. m.fl. (1995), page 79

3.2 History of American city planning

In 1909, Raymond Unwin was the first person to discuss the connections between the city, the cars and the motorized roads¹. Together with Ebenezer Howard, who wrote the well known "Garden Cities of Tomorrow", Unwin planned the first suburb villages. These villages were to give people the opportunity to live in addition to the city, but still close to nature. The villages were built to create a protected area away from the noise and the pollution of the factories. Examples of these suburbs were built around London. Unwin planned these suburb villages with a grid of perpendicular streets, and declared that the roads were primarily for traffic. He discussed the significance of the highways and was the first to separate tracks for bicycling (and for horseback riding) from the main road. He also defined different types of roads that were to be used in the villages: main roads and residential roads, that is for us today main arteries and local roads. Unwin also analysed and introduced car interaction in intersections.

Inspired by Unwin and Howard's Garden Cities, the architects Clarence S. Stein and Henry Wright planned and built a village in 1928, just on the outside of New York, which they called Radburn². The concept of the "new town" grew out of the older planned communities in Europe and the work of Ebenezer Howard and Patrick Geddes. The main purpose of Radburn was to reduce the number of accidents in the city and to create a more peaceful village for the residents. The intention was to create a town, which provided possibilities to live a modern life, without paying with lack of open space, community service and economic viability.

Radburn was created with a special design; the super-block concept, the cul-de-sacs, and separation of vehicular and pedestrian traffic to promote safety. The Super-blocks replaced the traditional grid street pattern and was formed as a large block, which was surrounded with main roads, see figure 3.2. Connected with the main roads were the access roads, and the houses were grouped at the end of these access roads, at the so called cul-de-sacs. Inside the block, the remaining land was used as park area, while the service rooms of the houses faced the access road. The living and sleeping sections of the houses faced the garden and park areas. The super-blocks were linked together with pedestrian paths, and the residents were able to walk to any given point in town by foot, without having to cross a street used by cars, the pedestrian paths were linked with underpasses and overpasses, influenced by passes in Hyde Park in London.

¹ Harder Hovgesen, Henrik (2002)

² Radburns Homepage, www.radburn.org: General information

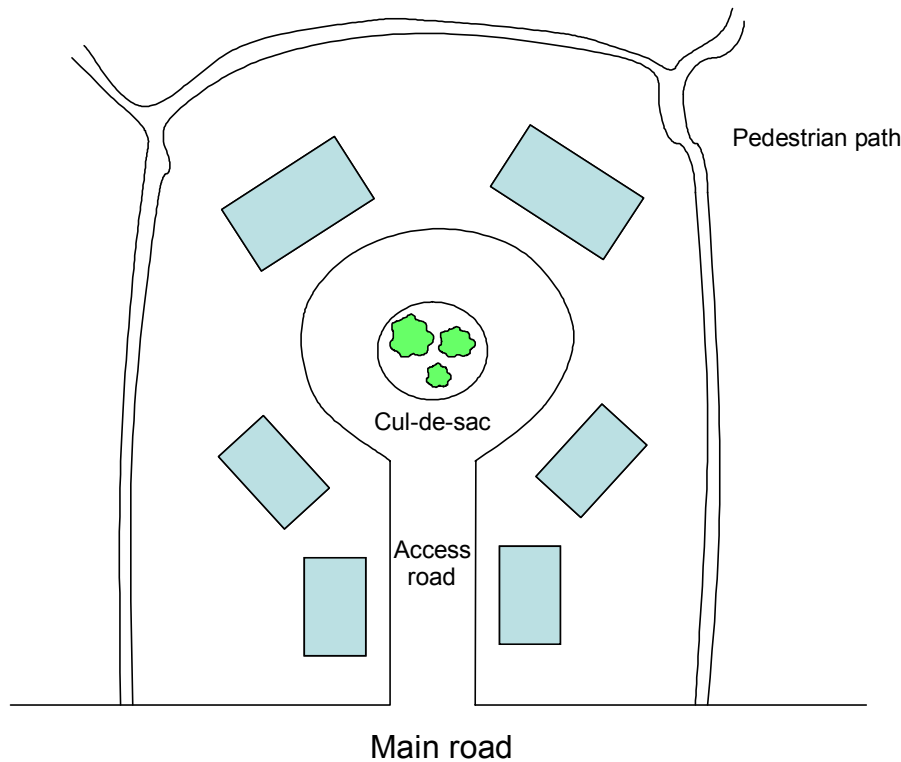


Figure 3.2 The Super-block structure of Radburn¹

In 1933 Le Corbusier created the functional village, which is described in his book: *The City of Tomorrow and its planning*², written in 1929. He also took notice of the problems created by traffic, he called the street “a machine for traffic, an apparatus for its circulation, a new organ”³. The central problems, he believed were the congestion and the accidents. Le Corbusier therefore presented the idea of tearing down the old village center and creating a station for transportation in the center of a community. Le Corbusier wanted to augment the cities density and in *The City of Tomorrow and its planning*, people lived in groups of skyscrapers. He believed that it was important to increase the possibilities for getting about. He divided the different types of motorized traffic: heavy goods traffic, light goods traffic and fast traffic, and declared that consequently three kinds of roads were needed: streets for heavy traffic below ground, a delicate network at ground level, and finally fast traffic running north and south, and east and west on arterial roads built on bridges.

3.3 What is sprawl?

The development of the American city, influenced by the ideas from Raymond Unwin, Clarence S. Stein and Le Corbusier, could be summed up in the following way:

In the early 1920’s, the American metropolis was a center for industries, trading and housing areas. At this time, people were centralizing, i.e. migrating from the country villages into the city, see figure 3.3. Many of them came looking for vacant jobs in the industrial cities, some of them taking advantage of the market created in the town centers.

¹ Freely sketched by Jenny Ekman from description in Harder Hovgesen, Henrik (2002)

² Le Corbusier (2000)

³ Le Corbusier (2000)

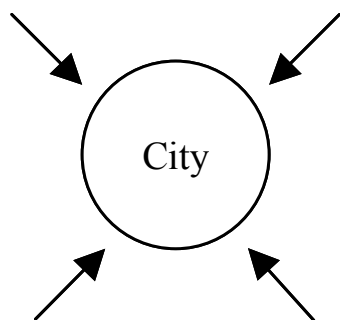


Figure 3.3 Centralization¹

The cities that were formed had a town center; businesses and factories were located in the city and people lived along the streets, in single or multiple homes. The inhabitants travelled by foot, bicycle or with the tram, which was running through every big city in America at that time.

Eventually it became not only crowded in the cities, but also noisy and unclean. The streets were crowded by pedestrians, bicyclists, cars, trams and horses and carriages. With the arrival of the automobile, people, who could afford these vehicles, moved out of the cities.

The car and the ideas of the Garden Cities, gave them the opportunity to live at the city limits in addition to enjoying nature and clean air, still being able to work and do their shopping downtown. The suburbs were formed, and this moving pattern called Decentralization or Suburbanization, see figure 3.4.

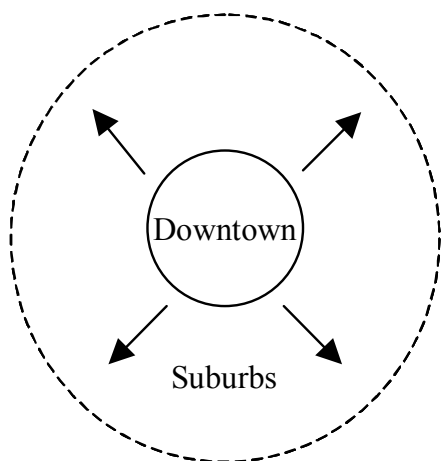


Figure 3.4 Decentralization²

At this time the upper class and the upper middle class lived in the suburbs. Small town centers were formed in the suburbs and the city became segregated. The city; downtown and the suburbs, were at this time often planned in a square pattern. The streets, the ones that had not been naturally formed, were built perpendicular to each other, with buildings in the left over areas. In the 1920's the city trams were bought up by, among others, General motors,

¹ Freely sketched by Jenny Ekman.

² Freely sketched by Jenny Ekman.

and after that they were shut down in the advantage for the car transportations. The T-Ford became popular and now people of the middle class could afford their own car. After the Second World War, the middle class started to move out to the suburbs, a second decentralization was forming. At this time, the upper class and the upper middle class moved further out to the very borders of the suburbs; to the distance suburbs, see figure 3.5. In these areas, there were room for bigger mansions and more privacy. Not only did the homeowners move out to the distant suburbs, different businesses also established themselves in special office areas. The edge cities were formed, and they had, as opposed to the older city, seldom mixed use. The edge cities were built for special uses, such as; office buildings, shopping malls and even housing areas.

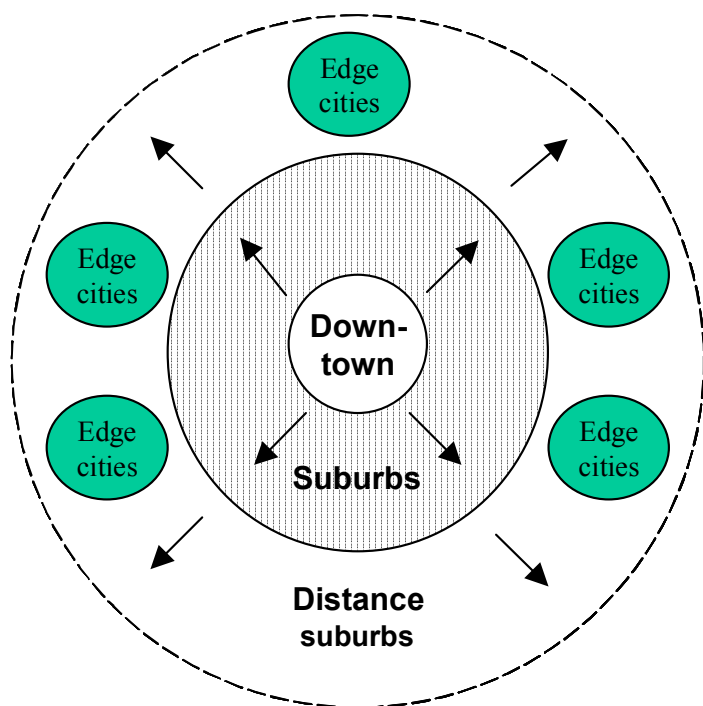


Figure 3.5 Additional decentralization¹

As the traffic flows increased in the suburbs, larger roads were built to offer more capacity and safer travel. Often a highway was built on bridges passing or going in a circle at the edge of downtown, stealing territory from the inner suburbs. Highways were also built from the edge cities, directed at the downtown center, see figure 3.6. When people travelled between the edge cities, as driving from the food market to their offices, they were forced to drive to the circle highway in order to reach the highway, which led to their destination. These detours do not really take much time, since the highways were built with good capacity. It did lead to an increase of air pollution and segregation: highly separating barriers were formed and for those who wanted to use other means of transports, the suburbs were not to recommend.

¹ Freely sketched by Jenny Ekman.

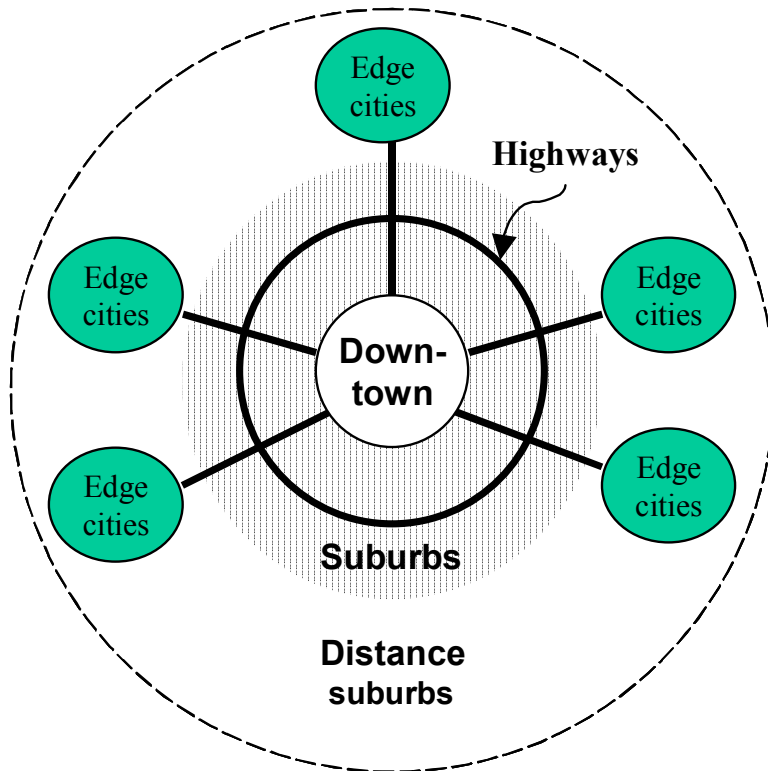


Figure 3.6 The Highways of the metropolis¹

Downtown became a center for traffic and the skyscrapers were built. Eventually downtown became deserted from residents, and the skyscrapers became a place for office practise. The downtown was usually a place for business, filled with skyscrapers, streets, parking lots, small green squares and tourist areas. Commuters, living in the edge cities, could spend up to several hours in the car each day, if they worked downtown. The metropolis had become a so-called low-density city; a city, which sprawls over a great peace of land, creating increased car dependence, segregation and air pollution.

Sprawl is described as the way a metropolis is taking over more and more land around its center. At the homepage of the organisation Sprawl city², created by U.S. bureau of Census data on urbanized area, sprawl is described with the following quote:

“Sprawl City adopts the environmentalist emphasis. It uses the term "sprawl" to refer to the reduction of rural land due to the increase of the total size of the land area of a city and its suburbs over a particular period of time.”

This explanation does justly express the most common description of what sprawl is. The expression of sprawl is mainly used as a negative expression about a city’s growth, when the city is, in rapid progress, taking over large areas of the nature surrounding it. Sprawl is measured as “people per land area”, “actual square miles of rural land that are converted to urban use” or simple “population growth”.

¹ Freely sketched by Jenny Ekman.

² Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: What is sprawl?

Sprawl today

In the later 20th century, *urban land per resident* has increased. As of today, not only the suburbanization and the people growth in the metropolises are the only reasons for sprawling cities. The reasons are, for example, the trend of all single household to have their own pool in the yard, which increases the land use enormously. The American population and the average American has since the 1970's become more and more wealthy. Generally speaking, The American Dream includes bigger houses, additional cars, larger pools and larger garden areas. In addition, people are becoming gradually more uneasy around strangers. They tend to create more space between their neighbours land and their own. They build fences around their yards to protect their houses from burglars, and so-called Gated Communities (small housing areas surrounded by fences, only accessible for people living in the area) are becoming more and more common. Furthermore, the number of shopping malls and retail areas is increasing as the wealth and the consumption of the American people is increasing. As the cities populations grow, both the labor market and the retail market grow, which in due course leads to increasing of exploited land around the metropolises.

In the report Smart Scorecard for Development Projects¹ the forces, which are underlying sprawl, are described. Sprawl is recognized by the following characteristics:

- Predominance of **low density residential** and commercial settlements, especially in new growth areas;
- Unlimited **outward extension** of new development;
- **Leapfrog projects** jumping beyond established settlements (creating lost spaces in between the development areas);
- **Single use development** that separates shopping, working and residential activities;
- Low density, single use work places and strip retail development typically **located at the periphery of metropolitan areas**;
- **Reliance on auto transportation** for virtually all trips;
- **Lack of adequate housing choices located close to work** opportunities, thus forcing many workers to commute upwards of 45-90 minutes each direction;
- **Fragmented land use decisions** by local governments.

Consequently, *urban land per resident* increase and the sprawling of the city accelerate. Therefore, as long as this type of development continues, the urban land per resident will develop into higher and higher figures and the rural areas will be exploited at a speed, which the government has little control.

¹ Fleissig and Jacobsen, January 2002

How bad is the problem?

Today most cities in America seem to sprawl out, without any way of prevention. Cities like Los Angeles, Phoenix, Atlanta and Dallas are at this very moment having big problems with traffic congestions and air pollutions, created mostly by numerous of long-distance car trips. The well-known city planner: Peter Calthorpe, says that the reasons why cities in America spread out, is the lack of regional planning¹. The metropolises, he claims, are geographically large enough, that regional planning will be needed to prevent it from exterminating the surrounding nature.

A common expression is “Hyper Sprawl”². This means that with the current plans, the metropolis areas will double their land area in the coming 15-20 years. For example; since 1978, the state of Colorado has had a loss of 90,000 acres of farmland per year, because of the forces described above. The metropolis of Denver has had an increase of almost 300 % in the congestion of major roadways.

Another example of sprawl is the city of Miami, whose borders are moving further and further into the national park of Everglades. Florida is furthermore one of the states that have a very great problems with sprawl³. Usually it would be normal for an area with a certain percentage of population growth to grow in the same speed as the population is increasing. A study of urban areas from 1970 until 1990 found that on average the rate of sprawl rises significantly as the rate of population growth rises⁴. This means that the faster a city is growing, the more urban land per person will be exploited. The sprawl of the city will become low-density, and therefore non-efficient. The U.S. Bureau of Census data of Urbanized Areas presents, through their website Sprawl City (www.sprawlcity.com), says that the 100 largest cities in USA have problems with sprawl.

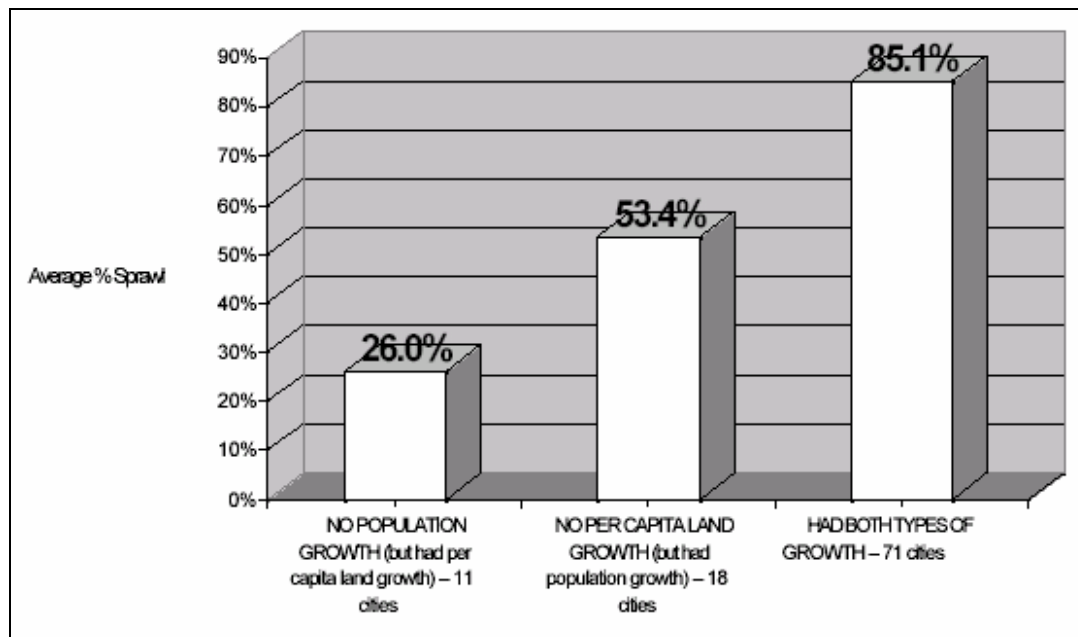


Figure 3.7 Average Sprawl by Type of Growth⁵

¹ Calthorpe, Peter (2000)

² Fleissig and Jacobsen (2002)

³ Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: Sprawl studies - Florida

⁴ Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: Sprawl studies - Florida

⁵ Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: 100 largest U.S. cities

Figure 3.7 shows that, compared with the areas with no population growth, average sprawl was twice as high (53.4%) for those Urbanized Areas that had population growth even though they had stopped per capita land consumption growth (the middle bar). Average sprawl was more than three times as high (85.1%) for those cities that had population growth and per capita land consumption growth (the bar on the right). The bar to the left shows that even cities in USA without population growth, have a certain percentage of sprawl, because of the increase of urban land per person.

Further, Sprawl City, has the following data and discussion in their report about sprawl in USA¹:

“In this Florida study – as well as in a study of the 100 largest Urbanized Areas of the United States released in February, 2001– we found that one city with higher population growth will not necessarily have more sprawl than another city with lower population growth. But we found that on average the rate of sprawl rises significantly as the rate of population growth rises. Average sprawl was 7.2% in cities with 10-20% population growth; average sprawl was nearly six times higher (40.5%) in the cities in the highest population category.” The highest category was a population growth in 1970 – 1990 of 41 % or more.

Finally, the ten biggest cities and their population growth and growth in per capita land consumption, is presented in table 3.1:

Urbanized Area	% Growth in Per Capita Land Consumption	% Growth in Population
1 Atlanta, GA	42	84
2 Houston, TX	26	73
3 New York City, NY-NJ	24	-1
4 Washington, DC-MD-VA	41	36
5 Philadelphia, PA-NJ	48	5
6 Los Angeles, CA	-8	37
7 Dallas - Fort Worth, TX	-15	59
8 Tampa - St. Petersburg - Clearwater, FL	13	98
9 Phoenix, AZ	-18	132
10 Minneapolis - St. Paul, MN	21	22

Table 3.1 Population growth in the ten largest cities of USA²

The reason why sprawl accelerates proportionately to population growth could be explained with the following arguments:

- Cities that are growing fast are difficult to control.
- When the developments of cities are steered by the market and real estate owners, they will naturally grow without any prevention.

This adds up to the following statement, made by Sprawl City³:

“Generally, well-planned sprawl will result in fewer square miles of rural land being covered by urban development.”

¹ Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: Sprawl studies - Florida

² Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: 100 largest U.S. cities

³ Homepage of U.S. Bureau of Census data of Urbanized Areas, www.sprawlcity.com: What is sprawl?

Commuters transportation choice

Below it is established that American has a much higher usage of the car than Swedes do.

Transportation mode for commuters in Sweden and USA

In 2001, 106 million, 87.8 % Americans traveled by car to work, see figure 3.8. Only 9.7 % of these people were carpooling. 4.7 % commuted with Public Transport and 2.8 % walked. 0.7 % drove a motorbike or bicycled and 4 % commuted with other means of transportation.

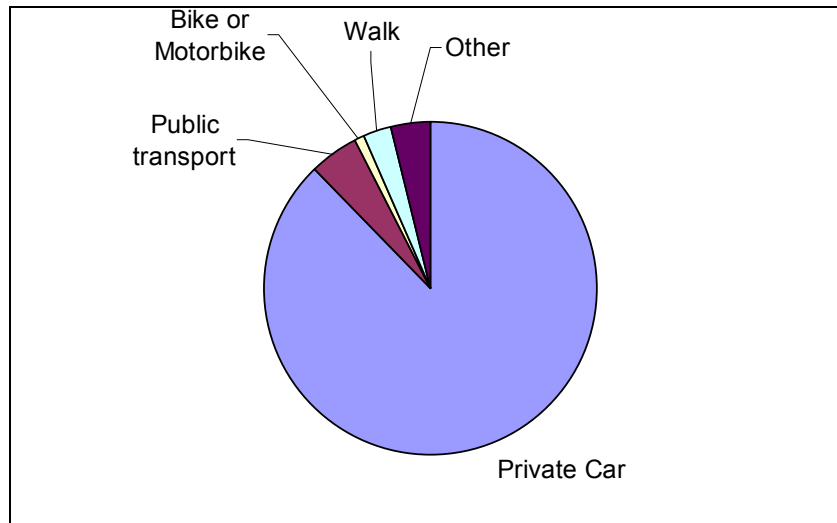


Figure 3.8 Transportation modes for commuters, USA in 2001¹.

The figures of the work travels in Sweden are quite different. These figures are mean values from 1999 to 2001²; 62.4 % traveled by car, 12.4 % used local public transport, 10.1 % walked and 13.2 % bicycled to work. 1.9 % used another means of transportation, see figure 3.9.

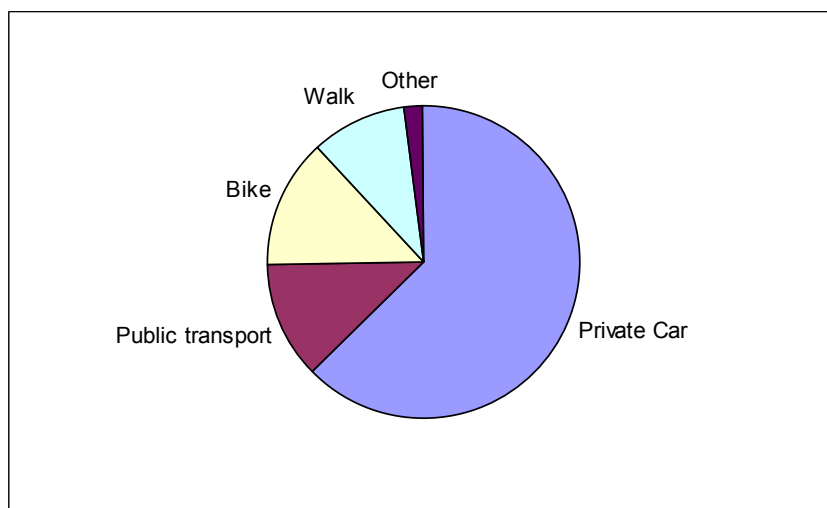


Figure 3.9 Transportation modes for commuters, mean value in Sweden, 1999 - 2001³.

¹ Bureau of Transportation Statistics, U.S. Department of Transportation (2002)

² SIKA, Lennart Thörn, 031126

³ SIKA, Lennart Thörn, 031126

USA has a long tradition of traveling by car and public transport is not used if a person has the possibility to possess and use a car. This is very clear in figure 3.8, especially compared to the Swedish statistics in figure 3.9. 62 % of the Swedish commuters travel to work by car compared to 88 % of the Americans. In conclusion, this shows that USA has almost exclusively the car as their mean of transport.

3.4 New Urbanism

What is New Urbanism? How is New Urbanism linked with the past? Why has it become such a well-known movement?

Background

In 1993 a congress took place, initiated by architect Peter Katz. Among the 170 city planners and practitioners who attended to the meeting, a discussion concerning the dissatisfaction with today's city structure took place. The congress discussed the reason of the problems of today's low-density cities; the separation in communities by race and income and the development of a car-dependent society, as well as the lost spaces and economic competitiveness. The congress tried to come to a conclusion of how these problems are linked up to each other and which measures that ought to be taken to change the situation.

A small group of architects formed a forefront to lead the new movement. Among these architects were Andres Duany, Elisabeth Zyberk-Plattern and Peter Calthorpe, all well known New Urbanism architects of today. Together they gathered the congresses ideas about how to solve the problems of the city development¹.

The idea of the New Urbanism

The general idea of New Urbanism is to restore the missing urban centers, reconfigure sprawling suburbs, conserve environmental assets and preserve their built legacy. To do this, New Urbanism proclaims that the village and the city should be built in a very different way, compared to the sprawling suburbs, see illustration 3.1. A city should be smaller than it is today. It should have a distinct town center with housing areas surrounding it. The traffic network should be planned before the localization planning of the houses, to avoid the problem with streets being drawn a long distance to reach houses built on low-cost properties, creating so called Cul-de-sacs, which are common in sprawling suburbs. A cul-de-sac is the end of long street; a small roundabout with two or three houses surrounding it or a long street ending in a loop, which is connected with itself, also surrounded by houses, see illustration 3.1. The problems with Cul-de-sacs are that the residents living at the end only have one way to come out of the neighborhood, even if their houses are very close to their destinations. This creates non-efficient trips. Instead, the houses should be built closer to each other, than in the sprawling suburbs, and the city should have a mixed use of regular facilities; homes, schools, shopping, jobs, recreation areas, and community, medical and government services. These facilities should be spread out in the neighbourhood to make it possible to reach more than one destination during one trip. In addition, there should be no special office areas or shopping areas; instead, the shopping should be located downtown. The size of the town may

¹ Congress for the New Urbanism (2000)

vary, depending on its number of residents. The most important is that the settlements can be self-sufficient. The size of a New Urbanism neighborhood should not be a limiting factor for the possibility to walk and bicycle. Continually, the cities and the neighbourhoods ought to be linked by transit. In the town center there should be a transit station, preferably with light-rail connections.

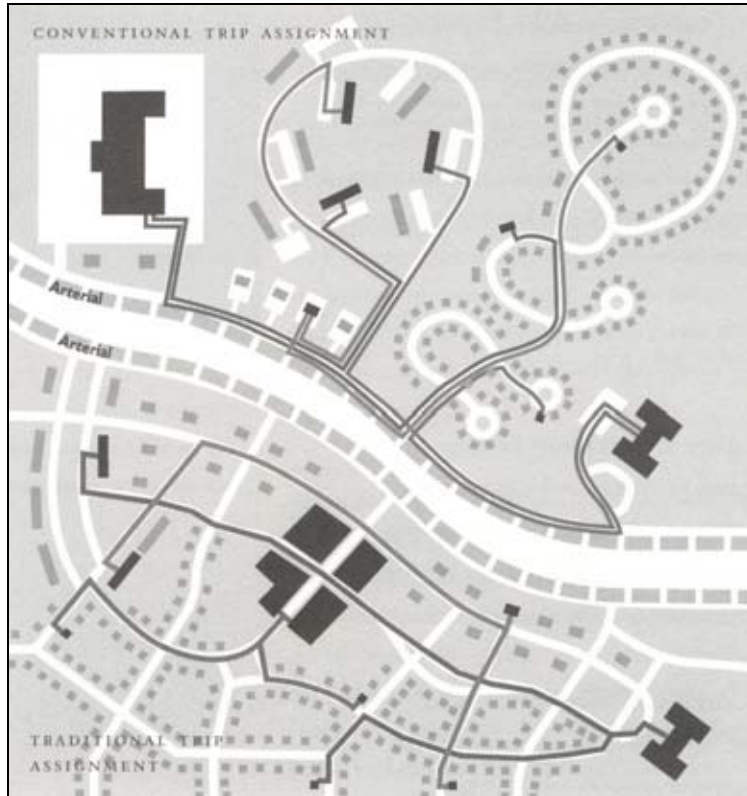


Illustration 3.1 Conventional vs. Traditional trip assignment¹

For a European this may not seem as an unusual way to plan a town. It is not even all that new to Americans either; in pre-war time, that is before the World War II; many cities in America were built this way². Today, these types of towns are most commonly known as Traditional Neighborhoods. New Urbanists says that somewhere, somehow, the city planning took a wrong turn and became what it is today. Building Traditional Neighborhood developments, TNDs, are for the New Urbanism a way to use the best of the past, and form it into a modern use (read more further down).

The Charter

The first small group of people, formed out of the congress, put together a manifest, which was to explain the fundamental structure of New Urbanism. The manifest was called “The Charter of the New Urbanism” (or just; “The Charter”) and starts with the following proclamation³.

¹ Congress for the New Urbanism (2000), Illustration page 84

² Congress for the New Urbanism (2000)

³ Homepage of the CNU, www.cnu.org: About CNU - Charter

The Congress for the New Urbanism views disinvestment in central cities, the spread of placeless sprawl, increasing separation by race and income, environmental deterioration, loss of agricultural lands and wilderness, and the erosion of society's built heritage as one interrelated community-building challenge.

We stand for the restoration of existing urban centers and towns within coherent metropolitan regions, the reconfiguration of sprawling suburbs into communities of real neighborhoods and diverse districts, the conservation of natural environments, and the preservation of our built legacy.

We recognize that physical solutions by themselves will not solve social and economic problems, but neither can economic vitality, community stability, and environmental health be sustained without a coherent and supportive physical framework.

We advocate the restructuring of public policy and development practices to support the following principles: neighborhoods should be diverse in use and population; communities should be designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.

We represent a broad-based citizenry, composed of public and private sector leaders, community activists, and multidisciplinary professionals. We are committed to reestablishing the relationship between the art of building and the making of community, through citizen-based participatory planning and design.

We dedicate ourselves to reclaiming our homes, blocks, streets, parks, neighborhoods, districts, towns, cities, regions, and environment.

To sum up, the Charter says that the congress wants to decrease low-density sprawl, create a varied and non-segregated community, work for a good environment, to conserve the nature and preserve old infrastructure. A big part of the creation of the New Urbanism-neighborhoods is to make people socialise spontaneously, to make people take an interest in their own society and not be afraid of each other

Following these words are guidelines on how the new society will be realized. The guidelines are sorted into three groups, which discuss the following areas¹:

- The region: metropolis, city and town
- The neighborhood, the district and the corridor
- The block, the street and the building

The region: metropolis, city and town

New Urbanists often refers to metropolis regions, which they believe is a fundamental economic unit of the contemporary world, and therefore need governmental cooperation, physical planning and shared economic strategies. They believe that new urban development in the metropolis should be formed as neighborhoods and districts. Development in already existing urban areas should be organized as towns or villages. When it comes to regional questions, New Urbanism stands for these following values:

¹ Homepage of the CNU, www.cnu.org: About CNU - Charter

- Farmland and nature are as important to the metropolis as the garden is to the house.
- Respect historical patterns, precedents, and boundaries.
- Affordable housing should be distributed throughout the region to match job opportunities and to avoid concentrations of poverty.
- Transit, pedestrian, and bicycle systems should maximize access and mobility throughout the region while reducing dependence upon the automobile.
- Infill development within existing urban areas conserves environmental resources, economic investments, and social fabrics, while reclaiming marginal and abandoned areas.

The neighborhood, the district and the corridor

The neighborhood, the district, and the corridor are the most essential elements in New Urbanism. The metropolis should be divided into neighborhood and districts, which should have town centers and be pedestrian-friendly, compact and mixed-use. Corridors are regional connectors of neighborhoods and districts; they range from boulevards and rail lines to rivers and green alleys.

These are some of the New Urbanism-guidelines for the neighborhood, the district and the corridor.

- Interconnected networks of streets should be designed to encourage walking, reduce the number and length of automobile trips, and conserve energy.
- Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community.
- Transit corridors, when properly planned and coordinated, can help organize metropolis structure and revitalize urban centers. In contrast, highway corridors should not displace investment from existing centers.
- Appropriate building densities and land uses should be within walking distance of transit stops, permitting public transit to become a viable alternative to the automobile.

The Neighborhood

The New Urbanism reaffirms the neighborhood as the basic building block of all residential districts. Within the 10-minute walking circle, a neighborhood includes a mix of different house and apartment types. Streets make legible connections that are easy to walk as well as drive, and there are neighbourhood shops, schools, and civic buildings, all within walking distance.

The District:

The New Urbanism proposes a return to the districts that include a variety of uses in addition to their primary activities. For example, all residential districts should be made up of neighbourhoods. All business districts should include a mix of shopping, offices, and residences.

The block, the street and the building

New Urbanism was initially developed out of the thoughts of architects. Naturally, architecture is a very strong interest when it comes to buildings and the design of the town. New Urbanism neighborhoods are usually designed with regard to architectural codes. Read more: Mats Hultman (2002) and Celebration Pattern Book (1997).

These following guidelines of New Urbanism refer direct or indirect to the transport system of the neighborhood.

- The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.
- In the contemporary metropolis, development must adequately accommodate automobiles. It should do so in ways that respect the pedestrian and the form of public space.
- Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbours to know each other and protect their communities.
- Architecture and landscape design should grow from local climate, topography, history, and building practice.

It is important to point out that New Urbanism does not proclaim to tear down low-density cities. Instead, a higher density should be gained by filling it in with houses and town centers and restoring existing urban centers. They want to reconfigure sprawling suburbs into what they call communities of “real neighborhoods and diverse districts, the conservation of natural environments and the preservation of built legacy”¹.

The instruments of New Urbanism

The Congress of New Urbanism is trying to achieve the goals of New Urbanism by using different instruments or tools. All these tools have in common that they suggests ways to plan a development in either the level of regional planning, city planning or in detailed planning. The tools share the same values as New Urbanism, since the tools are created by the ideas of the followers of the CNU. Some of the most commonly used tools are²:

TND – Traditional Neighborhood Development is a human scale, walkable community with moderate to high residential densities and a mixed use core³. With the mixed use, TND has a higher potential of making trips more effective, and therefore reducing vehicle miles travelled. The network of the streets in a TND is dense, and the streets are narrow. This is to make the traffic atmosphere calmer, safer and more pedestrian friendly. Design guidelines of the TND are presented in chapter 5.

TOD – Transit Oriented Development is a tool which is used in need of transit planning (read more in chapter 5).

Regional Planning is mainly to create a collaboration between governments in a metropolis and to create equal goals for the region (read more in *Regional City*, by Peter Calthorpe).

Neighborhood planning. The planning of new effective, high-density neighborhoods. This is different from TND, since no town center is planned. Often used to fill in areas where there are so called lost spaces; low-efficiently used areas.

Many of the programs that are run in several American cities are so-called infill programs. To raise the density of sprawling suburban areas, they are simply being filled in with buildings.

¹ Congress for the New Urbanism (2000)

² Homepage of CNU, www.cnu.org: About New Urbanism - Project search

³ Calthorpe, Peter (1993)

Areas within the suburban areas, that are forgotten, are used for these infill places. Suburban infill is the term for house-infills in regular sprawling neighborhoods. Mixed-use infill is the term of suburban being filled in with town centers, post offices, grocery stores, schools etc. The majority of the New Urbanism programs are actually infills of different sizes.

3.5 Celebration

It is common that a person has a picture of the general populated area in USA to be a small town, with a town center at the crossing of Elm Street and Main Street, where the town restaurant and the town barber is located. This is not an all over true picture, and the real environment of the larger cities in America has already been introduced to the reader. Of course, USA is as full of nuances as it is geographically large, but the new trend of divided land use is becoming more and more common. So where is Celebration placed, regarding the type of city planning? Does Celebration fulfill a sustainable transportation planning, or is it not much different from the general trend? These are questions that will be answered to much later in the report. However, first Celebrations connections with New Urbanism will be established, and then a whole chapter, chapter 4, is devoted to introduce the reader to the present town of Celebration.

The history of Celebration

Originally, Walt Disney wanted to create a town where people lived up-to-date with the latest technology¹. He wanted the town to be called EPCOT (Experimental Prototype Community of Tomorrow) and he wanted it to influence actual communities. Walt Disney died in 1966, and even if the models, renderings and plans were prepared, the town of EPCOT came to nothing. In stead EPCOT became another theme park; a world fair park, where different countries could show their architecture, cultures and food traditions. Not until several decades after that, a manager of the Disney Corporation named Michael Eisner, followed Walt Disney's old ideas. He created a group called the Disney Development Company, in which he enrolled many famous architects as members, and started to plan the town of Celebration. It turned out that everyone, except from one of the architects, designed neo-traditional neighborhoods. Some of these architects were Elisabeth Plater-Zyberk and Andrés Duany, which were members of the CNU from the very start and developed, together with seven other architects, the Charter of the New Urbanism.

The town of Celebration was eventually designed in 1993 and they finally broke ground in 1994. The first people moved in to Celebration in 1996, the same year as the first town center was built. In 1997 the hospital and the public school, from Kindergarten to children at the age of 12, was built. The hotel of Celebration, that is located in the very heart of Celebration, was built in 1999 and Stetson University was built in 2001. The high school opened in the fall of 2003².

The construction of Celebration is divided into different phases, which reflects when different geographical areas are meant to be finished. There are totally 4 phases and at this point, October 2003, Celebration is in phase 2 and phase 3 will start in 2005. Phase 4 is supposed to be finished in 2015.

¹ Duany, Andrés (2001): Council Report I: "The Celebration Debate"

² Osceola County (2002): Celebration PUD

Even if the town of Celebration was built on the land holdings of the Disney Corporation, the building of the town had to be approved by Osceola County. There have been three versions of a Development order, issued by the county, and the first one came in 1994. The town of Celebration was to follow regular standards of Florida. The county also wanted the town to have “Affordable Houses”, which means that there was a market and a need for more expensive houses in the area of Kissimmee. This, and the actual high demand of the houses in New Urbanism-neighborhoods, has made the prices rise. The agreement between the county and the Disney Development Company where that Celebration should eventually have 8065 units of residential and a certain number of acres for office ground, hospital ground, open space etc.

In the Development order there are several agreements on the transportation systems of Celebration. Many of these agreements were not to be carried out until the city was finished, which it still is not. It is the responsibility of the town board of Celebration to present implemented measures to the county, something that has not yet been done. These are the most important agreements of the transportation system¹:

“The developer shall provide a system for cyclists and pedestrian circulation on-site coincident with development. The developer shall construct a system of viable bikeways for cyclists within the Celebration site... / ...parking facilities shall be provided... / Access to these bikeway systems shall be provided from on-site schools, apartment complexes, subdivisions, commercial centers, hotels, transit stations and employment centers.”

“An internal shuttle system is strongly encouraged throughout the Project site. By Phase 2A, a shuttle system shall be available to provide service between the Celebration site and all other Disney theme parks, hotels and employment centers on Disney property...” / If this system is found to be feasible and an external transit system is made available, it shall be interconnected with other transit systems so riders can reach off-site destinations.”

“When Celebration has 15,000 employees who live off-site but work on-site, a TMA (Transportation Management Association) shall be established and shall become actively involved with transit subsidies, van pools and joint ventures with public agencies to provide for mass transit facilities and services, including telecommuting and flexible work hours. / Require that transit and ridesharing studies be conducted by employers of more than 100 people... / Provide a 50 % discount for employees who use public transit to commute... / Provide free and/or preferred parking for rideshare participants.”

“The Developer shall construct, or cause to be constructed, at least one park and ride lot either onsite or purchase and construct a lot offsite... / ...at least 100 vehicles... / ...shall be coordinated with available transit systems.”

“The Developer and the TMA shall commit to a definite (but non-binding) percentage goal toward the reduction in vehicle trips through the promotion of ridesharing and transit usage for non-residential land uses. / The percentage reduction goals... / ... shall be as follows: / ... phase 4: 20 % of office employees. /...phase 4: 20 % of peak hour volume.”

Still there is fairly little data and statistics found on Celebration. There have not been any investigations on how the planning program is carried out; this is expected to be done later on. The structure of Celebration’s transportation system is described in more detail in chapter 4 and 6.

¹ Osceola County (2003): Development of Regional impact

Today, 2003, about 8000 people live in Celebration¹. When complete, the community is anticipated to have 12,000 to 15,000 residents on 4,900 acres surrounded by a 4,700 acre protected greenbelt. The area is surrounded with wetlands, which prevents the town from sprawling.

Celebration's similarities with Radburn

There are several similarities between the design of Radburn and the design of Celebration. One of them is the separations between different means of transport, and the way the both designs try to protect and give priority to the pedestrians. Further, they both have the same way of categorizing street; main streets and access streets. A difference is that Celebration has open neighborhoods, which float into each other. The cul-de-sacs design in Radburn is not the fundamental design of Celebration, but in the later years, several cul-de-sacs have developed in the periphery. Both Celebration and Radburn have a mixed-use of schools, office areas, housing areas, shopping areas etc. They have the same thought on making trips more efficient and increase walking and bicycling.

What happens today?

CNU of today has over 2300 members in 20 countries and 49 states in USA. They meet annually for conventions in different cities in USA. During the conventions, the topics are the sharing and best practices in New Urbanism. Since the start, the CNU has held 11 congresses and are about to hold their 2004 congress in Chicago in June. There are today over 210 New Urbanism projects in the United States. The projects consist of constructions from suburban infills to productions of new towns. The real estates in these developments are popular and sells usually better compared to real estates in conventional sprawl².

The organization of CNU is becoming big enough to divide into different chapters. The CNU is therefore trying to create local offices all over America. This is the newest structure development and yet there are few local chapters, but eventually there will be many non-profit corporations with their own members, dues and activities. The chapters are supported by the Congress and are to share knowledge and raise money for CNU³.

3.6 The Criticism of New Urbanism and Celebration

New Urbanism is a movement, which has been exposed to a lot of criticism. Celebration and also the town of Seaside, is often examples that people use when they speak about New Urbanism. These are the most common arguments against New Urbanism and Celebration, and how the people of the Congress and the people, living in Celebration, defend their ideas.

¹ The Celebration homepage, www.celebrationfl.com: Press room - Celebration, Florida - General Info

² Homepage of the CNU, www.cnu.org: About CNU - History

³ Homepage of the CNU, www.cnu.org: About CNU - History

“New Urbanism is against cars. They try to prevent people to use the only vehicle that give them freedom and possibilities in the society.”

G. B. Arrington declares in The Charter of the New Urbanism¹: “The New Urbanism is not anti-car. It’s about civilizing our transportation system”. The New Urbanists do not want a society without cars, but they want it to have alternatives to the car, that are friendlier to the environment. Arrington also says that it is the short trips that are the most common in America, and with a tight grid of streets surrounding a mixture of land use would decrease the need of the car; people would be able to walk, or ride their bike to their destinations. When the car is needed, people live close enough to each other to make it possible to carpool to their destinations. Arrington also says that the New Urbanists look for inspiration in the Europe city structures, especially in the way the Europeans use transit.

“In the New Urbanism-cities people look the same, talk in the same way, share the same thoughts and live in identical houses.”

There have been criticizers meaning that the movie “The Truman Show” is similar to the perfection that New Urbanism is trying to achieve. They believe that the cities look like cities did in old movies, and just seem artificial and that the people seem superficial.

The truth is that the movie “The Truman Show” actually was filmed in the city of Seaside, which is one of the most famous neo-traditional towns. In an interview with Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck², well-known members of the New Urbanism congress, Plater-Zyberk says that the city’s prettiness was over exaggerated in the movie. Jeff Speck says in the interview:

“There are two criticisms we usually get about Seaside. The first is that it's too cute and gingerbread, and the other is that the codes we wrote control it too much. But what the critics don't realize is that the codes that we wrote did not in any way suggest or demand gingerbread architecture. In fact the gingerbread architecture was a result of the market - of people building their own houses and popular taste. So the great irony is that the only way to have avoided the hated gingerbread architecture would have been to tighten the hated codes.”

“Cities like Celebration are too much regulated by the creators. People can not even choose the color of their curtains.”

The town of Celebration has a book called the Pattern Book³, which contains a number of rules on how to build the houses and the streets in Celebration. The architecture is controlled by codes (to read more we recommend “Seaside, Celebration and Windsor” by Mats Hultman), which means that for instant every inch on every window and door are exactly built in the way the Pattern Book gives instructions. Former town architect Geoffrey Mouen says⁴ that in the beginning people were only to have white or off-white curtains in their windows, now this rule has been stretched and people are allowed to have any colour on their window curtains as long as the colours are discreet.

¹ Congress for the New Urbanism (2000)

² The Atlantic Online (2000)

³ The Celebration Company (1997)

⁴ Mouen, Geoffrey, 030805 – 030815

Joe Barnes, another former town architect of Celebration, thinks that the Pattern Book should be something for architects, builders and homeowners to be educated by¹. The book should be used as a tool, not as a benchmark, he says, and continues with the argument that many new house builders have not seen a well-designed house in quite a while, and therefore need some good inspiration.

In Celebration, a few houses have not been built after the Pattern Book at all.

“Sprawl and low-density cities are not as bad as New Urbanists claims it to be.”

The following arguments are written in an article by the magazine The Public Purpose²:

- “There is a strong relationship between urban sprawl and air pollution - but not the one the New Urbanists suggest. In the United States, air pollution tends to increase with population density.
- Similarly, traffic congestion tends to be worse in higher density urban areas.
- Work trip travel times have actually decreased - from an average of 22.0 minutes in 1969 to 20.7 minutes in 1995. Work trip distances have increased and travel speeds have also increased. This occurred at the same time that urban sprawl was increasing the greatest.
- Agricultural land is not being lost to urbanization. Since 1950, agricultural land has been taken out of production at a rate eight times that of the urban land area increase. At the same time, US agricultural production has increased more than 100 percent.“

In this text, the magazine argues against the problem defined by the congress: that anti-sprawl decrease air pollution, that America has problems with increasing trip travel times and that agriculture land is being built on.

It is also hard to find hard-facts, which the New Urbanists base their arguments on. They seldom refer to actual researches and reliable sources. Instead, they use “logical arguments”, as the argument that cars pollute, and if we can make the number of car trips decrease and make these car trips efficient, the better the air quality will be. However, the magazine “The Public Purpose” does not present references to their figures either, which could make it hard to determine who is right by just reading their arguments.

CNU says about sprawl³:

“That destroys a region's quality of life as it consumes farmland and wilderness, creates very high levels of vehicle use, and moves homes further and further from jobs, schools, and parks.”

In 2001, the city of Celebration, won a clean air award from Central Florida Clean Air team, which includes for example: American Lung Association of Central Florida, the City of Orlando; Florida Department of Environmental Protection, Florida Department of Transportation. Celebration received the 2001 Clean Air Award for promoting alternative forms of transportation through neo-traditional planning⁴.

¹ Barnes, Joe (2001): Council Report I: Vision Keeper.

² The Public Purpose (1999)

³ Homepage of the CNU, www.cnu.org: Frequently asked questions

⁴ Central Florida Clean Air team (2001)

“The New Urbanism towns are only for rich, white men with families.”

The authors of the book *The Celebration Chronicles*¹ lived in Celebration with their children for a long time. They believe that even if New Urbanism stands for a variation of people living together, both variation in income and ethnical group, Celebration has a general lack of diversity.

The answer to this criticism comes from the homepage of CNU²: “However, New Urbanism promotes a range of strategies to ensure that neighborhoods maintain a mix of incomes.

These methods include:

- creating a range of housing types, from small apartments to single-family homes,
- ‘inclusionary housing’ ordinances, which require permanently affordable units be built as a part of any development.”

Further on CNU continues: “CNU supports the development of low-income communities in a wide variety of ways. New Urbanism promotes the end of segregation between rich and poor. To that end, we support the inclusion of a variety of housing in every development -allowing apartments to mix with houses, and rentals to mix with owner-occupied housing.”

Through the Charter of New Urbanism, one can read out that the New Urbanism idea is to create a varied neighborhood. They strive for equality for women and they want a mix of people with different ethnical heritage in their towns and neighborhoods. Most of the people in the town of Celebration are married couples with children and retired people. The prices of the houses started originally at approximately 150,000 \$ and up (about 1.5 million SEK) for the cheapest three-bedroom houses, excluding interior design. The women of Celebration have a “women’s group”, which meet regularly. The culture between men and women seems to resemble the general American culture. Geoffrey Mouen, former Town Architect, says that he believes that only one or two couples of Afro-Americans live in Celebration³.

“The town of Celebration is like a gated community!”

The authors of the book *The Celebration Chronicles*⁴ believe that many of the rules and benefits of Celebration resembled those of a gated community.

Mostly, people refer to the impossibilities for regular people, with medium income, to live in Celebration, and not the actual comparison to a real physical gated community (which is a block of houses, surrounded by walls and guarded 24-hours). Since the houses are quite expensive, there are only upper-middle class and upper class living in Celebration. There are some rental apartments that are quite affordable, but the majority of houses are expensive villas, which makes it impossible for anyone to move to Celebration. Read more about Celebration as a gated community in *The Celebration Chronicles*, by Albert Ross.

¹ Ross, Albert (1999)

² Homepage of the CNU, www.cnu.org: Frequently asked questions

³ Interview with Geoffrey Mouen, 030809 – 030810

⁴ Ross, Albert (1999)

4 The town of Celebration

This chapter is meant to present the town of Celebration regarding things like surrounding areas, commerce, recreation, structure and education.

Celebration is situated in Central Florida southwest from Orlando, in the western part of Osceola County, just south of Disney World. The site is mainly plains and lowlands, with some upland and wetland areas, with a diverse forest population.

The average January temperature in the county is 16.3 °C, and the average August temperature is 27.8 °C. Rainfall in the county averages 127.15 centimeters annually¹.

The western edge of the town is adjacent to Interstate 4, and the Greenway Toll Road 417 runs through the northern parts, see figure 4.1. The northern edge of Celebration is adjacent to U.S. 192, where Celebration Avenue and Celebration Place Road are the northern entrance points to the community. The road, called Celebration Place, through the office area, also called Celebration Place, will in this report be called Celebration Place road. This is to avoid any confusion whether we are talking about the road or the whole office area.



Figure 4.1 Celebration and surrounding areas².

The closeness to Disney World makes it easy to work there, and some of the Celebration citizens do. Disney World and other tourist attractions, such as Universal Studios, draw many tourists to the nearby area. Some of the tourists also take the chance to visit Celebration.

To create the atmosphere of a small town in Celebration the standards, improved for the pedestrian, must support the visual impression from landscaping, street widths, buildings and sidewalks³. The main part of the buildings is neo-traditional houses in varied styles. As well as most New Urbanism areas Celebration is an open community, accessible by everyone.

¹ Florida Netlink, www.floridanetlink.com: Osceola County cities

² The Celebration Homepage, www.celebrationfl.com: Map

³ Osceola County (2002), Celebration PUD

Celebration is currently, August 2003, divided into five parts, see Appendixes 1 and 2:

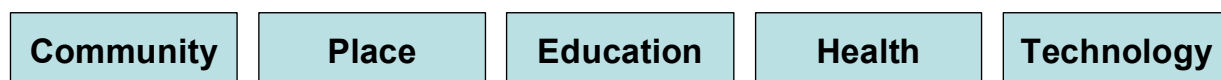
- Celebration Village – the central part of Celebration, including the town center, Celebration School and the Stetson University Center.
- West Village – a smaller segment just west of Celebration Village. The village includes a Gymnasium and sports fields, used for school team sports as well as community activities.
- North Village – located by Celebration Avenue toward U.S. 192, including a Children’s World Learning Center.
- South Village – the most western Village, located around the west end of Celebration Avenue.
- East Village – south of West Village and connected to Celebration Avenue at West Village.

All areas include single-family houses, multi-family houses and apartments.

The neighbourhoods surrounding the Town Center is formed by Celebration Village and West Village, which have a broad mix of residences, including different types of houses; manor, terrace, apartments and townhouses¹. South Village, East Village and North Village are further away from the downtown area, giving the town a stretched out shape. The reason for that is the intension of saving the surrounding wilderness² and the technical difficulties in building on wetlands. For example, further growth and development southeast of the community is prohibited because of a large swampy area called Reedy Creek.

4.1 Celebration cornerstones

Celebration is based on the founding principles of five community cornerstones³. The five community cornerstones are a commitment to:



The meanings of the cornerstones are:

Community

“More than anything else, what the residents of Celebration have in common is a shared vision for what life could be, with the ability to become as personally involved as they want in making it happen”.

Celebration wants to create a sense of community and a feeling of togetherness throughout the town. This will be achieved by public spaces, town meetings and community events that intend to strengthen the bonds of friendship between the citizens⁴.

¹ The Celebration Homepage, www.celebrationfl.com: Residential
² Hultman, Mats (2002)
³ The Celebration Homepage, www.celebrationfl.com: Community - Cornerstones
⁴ The Celebration Homepage, www.celebrationfl.com: Town Center Events

Place

“All people have a universal need for stimulating experiences and social interaction”.

These experiences and interactions are supposed to take place in a variety of places throughout Celebration; such as recreation areas, swimming pools and children play areas. The mentioned places can be in the Town Center or in the residential areas.

Education

“Celebration has placed Education at the heart of its vision in the belief that lifelong learning provides an essential key to higher quality of life”.

The town of Celebration offers educational opportunities, including a public school, a Montessori school, the Stetson University Center and a private cable television channel offering educational programming.

Health

“Good health is the key to a good life. So, at Celebration, the cornerstone of health focuses first on prevention and caring for the whole person – mind, body, and spirit”.

Parks, trails and different amenities are scattered throughout the community, to encourage people to be active. The Florida Hospital facility and a fitness center offers health support for the citizens of Celebration. Also, the structure of the road network encourages people to bicycle and walk, which is one of its main purposes.

Technology

“From the beginning Celebration has embraced technology as an essential means of connecting people”.

All of the residences in Celebration are connected to a local intranet and have internet access. Many of the residents have electrical cars, so-called NEVs, which they drive within the town limits. This is a way of bringing people in Celebration together¹.

All quotations are collected from the Exhibitions at Model homes (030805).

4.2 Celebration roads

All internal road construction is provided by the developer. The county is responsible for the road maintenance. Celebration is more pedestrian friendly than general American towns and there are a lot more pedestrians in Celebration than in other cities in the region². Paths designed for pedestrians and cyclists are, in some places, traversing preserved areas located between the neighbourhoods. These paths are either regular concrete paths or wooden paths on pilings, see illustration 4.1 on page 38.

The road network in Celebration is well connected and has a somewhat winding structure, with sidewalks along the entire network. Celebration Avenue, see illustration 4.2, is the main road that connects all the neighbourhoods together on its way through town. It also functions as an access road connected to U.S. 192 and 417. The village networks are formed as a billowing grid structure, including only a few cul-de-sacs. Overall, the design speeds in Celebration are low. More of this is presented in Chapter 6.1.

¹ Interview with Geoffrey Mouen, 030805 – 030815

² Interview with Don Leptic, 030807

4.3 Celebration houses

The houses in Celebration are designed in six different styles, described in the Celebration Pattern Book; Coastal, Colonial Revival, Classical, Mediterranean, French and Victorian. All of the styles are based on traditional south-eastern styles¹.

Coastal style is based on different architectural traditions, adapted to the environmental conditions in the low country and coastal regions.

The Colonial Revival style is inspired by houses built in Florida, in the years between 1900 and 1940. The character is somewhat less formal than the Classical Style.

Classical style uses principles found in the 18th and 19th century pattern books, which gives the house a formal character.

Mediterranean style is influenced by a number of architectural styles, of which some are Spanish and Italian, providing the Mediterranean touch.

French style gives the houses a simple character, based on the architecture of French country houses from the early 20th century.

The Victorian style is based on the principles in pattern books from the second half of the 19th century, giving the opportunity to elaborate the houses with details and ornaments.

(Read more at www.celebrationfl.com, residential.)

The community still looks very new and flawless, which, together with its special architecture style, often gives the comment of it looking like a town of Disney World. The town was built 8 years ago, and is still rather intact from weather and aging.

Most residential backyards in Celebration are served by alleys, a small road connecting two rows of houses, see illustration 4.3. The alleys accommodate services like trash collection, containers and garages. The garages have room for two cars, in contrast to the Kissimmee standard of four cars². With the alley system there are less parked cars in front of the houses and no up-front garages by those houses. Exceptions are at a few of the larger houses, observed in North Village, which have up-front garages with room for up to three cars.

¹ The Celebration Company (1997)

² Interview with Don Leptic, 030807



Illustration 4.1 Wooden path traversing preserved area



Illustration 4.2 Celebration Avenue towards east, passing the Gymnasium



Illustration 4.3 Typical backyard alley with garages

4.4 Town Center

The Town Center of Celebration is situated by a lake in the southern part of Celebration Village, see figure 4.2. The town center is well-visited, not only by the locals but by visitors and tourists as well. Both during the day and in the evening the town center is filled with people, creating a lively atmosphere. Discreetly placed and designed loudspeakers that play well-known instrumental music, create a calm and harmonic atmosphere. Market Street and Front Street, are at many places lined with on-street parked cars, but there are not many cars in motion and the speeds are kept low.

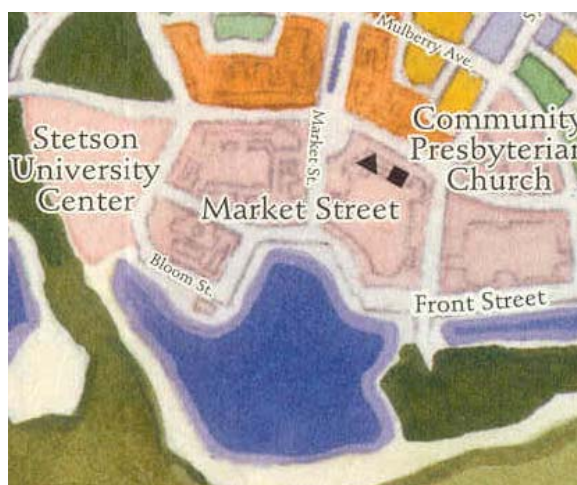


Figure 4.2 Town center

Some of the buildings in the town center have a rather eccentric architecture. A part of the post office is, for example, shaped like a cylinder with a flat roof. The buildings are richly-coloured with homogeneous greenish, orange and reddish colours. Along Market Street, see illustration 4.4 on page 41, there are a variety of retail shops including:

- A jeweller's store
- Two cafés
- A grocery store
- A toy store
- A year around Christmas store
- A sportswear store
- A pizza shop
- A gallery
- Several restaurants
- Women's and men's apparel

The restaurants are serving food from the Japanese, Spanish and Italian cuisines. There are also, for example; optical, dental and medical services available and a store selling NEVs – Neighborhood Electric Vehicles, see illustration 6.1 on page 56. The two blocks on each side of Market Street, include the Town Hall, a post office, a bank, a travel agency and some office buildings. The town center also includes rental apartments above retail shops to provide a greater urban appeal.

4.5 Amenities near the town center

The town center is, on the southern side, adjacent to a lake and a recreation area, called Lakeside Park. The park is one of the main recreation areas in the community, and the setting for sports lessons and special community programs¹. The lake is not a place where people take a swim, since the lake is inhabited by alligators, which might chase you around². There are, however, opportunities to use paddleboats on the lake.

A footpath, see illustration 4.5, following all along the lakeside, gets you as close to the surrounding nature as possible. The nature around Celebration is inhabited by a rich wildlife.

¹ The Celebration homepage, www.celebrationfl.com: Community - Amenities

² Interview with Boy, fishing at the lake, 030809

When walking around the lake and through the wetlands on wooden trails, you see many different bird species.

Along the lakeside are park benches and by the town center there are wooden rocking chairs placed for people to relax on. In the town center, by the lake, is an interactive fountain, see illustration 4.6, popular for as well children as adults. Children who are not afraid of getting wet use the fountain, a refreshing element during hot summer days. Opposite the fountain is the town movie theatre. It is built with an architecture inspired of movie theatres in the early 20th century.

4.6 Education

The Celebration schools have been important for the town's success. Families with children are common among the residents in Celebration. The Celebration School is a public school, from kindergarten through 8th grade. It is operated by the Osceola County School District, and accommodates 1250 students¹. The youths are supposed to travel to school by themselves if they live within a 3 km radius and if there are adequate sidewalks. Otherwise, they are permitted to travel by school bus. Just west of Celebration School is the Celebration school campus, with a numerous of sport facilities. The campus area includes a gymnasium and soccer, softball and baseball fields.

4.7 Recreational Areas and the Golf course

To make a livelier neighborhood there are a lot of small recreational areas integrated among the housing estates. Each village has its own unique park accommodating recreational spaces used for such things as shorter walks, playgrounds or public pools.

In Celebration, a golf course is located in the area between the housing estates and the surrounding activities. The water hazards on the golf course make a great opportunity to locate some of the draining ponds needed to drain the adjoining residential lots on the golf course. Located along West Village, Celebration Village and North Village, the golf course is distributing water to natural draining points. The Water Street canal runs from the golf clubhouse along Water Street to the lake in the downtown district. Throughout town, boulevards and water canals provide essential site drainage².

The course creates a border which is difficult to cross. The facilities on the other side of the golf course are therefore accessible only by three main roads, which make it more tempting to use the car. On the other hand the golf course creates a wall surrounding the central parts of the town, creating a feeling of independence more than isolation.

¹ Interview with Geoffrey Mouen, 030805 – 030815

² Interview with Michael Prevost, 030809 – 030810



Illustration 4.4 The upper part of Market Street



Illustration 4.5 View over Town Centre from the west side of the lake

4.8 Government

The Osceola County and Walt Disney Cooperation planned the building of Celebration. In Celebration the town board governs the town. The town of Celebration has to live up to the goals that were set up by the county and the Disney Cooperation in the planning process. The town also has obligations to present statistics and measures to the county. The inhabitants pay taxes to both the town itself and Osceola County.

For example, the Osceola Sheriff's Department provides the community with daily police patrols. Additional patrols, in the late evening and early morning, are paid by the Celebration Community Development District¹. The limited size of the community makes it quite common to see police patrols. The maintenance is provided, though, by the county, without extra fees. This includes the road network, the refuse collection and public areas, as for the rest of the county's populated areas. Celebration also has its own fire department.

¹ Interview with Michael Prevost, 030809 – 030810



Illustration 4.6 Interactive fountain by the lake

4.9 Commerce outside Celebration

The commerce outside Celebration is mainly situated along U.S. 192. This road is lined with all kinds of restaurants, shops, strip malls and other commercial tourist attractions, see illustration 4.7. For 11 km, this line of commercial development represents almost 80 % of all frontage lots along the road eastward towards Kissimmee¹. There is a mile-marker system along the road so that drivers will not get lost in the homogenous strip landscape. The connection to Celebration and the close distance makes it difficult for the downtown commerce to stay alive, because of the competitive commerce outside of town. Groceries and clothes are mostly shopped at strip malls outside Celebration². Some people in Celebration do their shopping in the Orlando area during the weekends³.



Illustration 4.7 Environment at U.S. 192

There is also construction proceeding at the Water Tower Place, west of the crossing between Celebration Avenue and U.S. 192, see Appendix 1. Here, a strip mall and some fast-food chains will establish in late 2003.

¹ Interview with Michael Prevost, 030809 – 030810

² Interview with Geoffrey Mouen, 030805 – 030815

³ Interview with Michael Prevost, 030809 – 030810

5 Tools of traffic planning

In this chapter, the traffic tools of Sweden and USA is presented.

5.1 History of Swedish traffic planning tools

Sweden has had its own history in traffic planning tools. Figure 5.1 shows the different tools, following each other chronically.

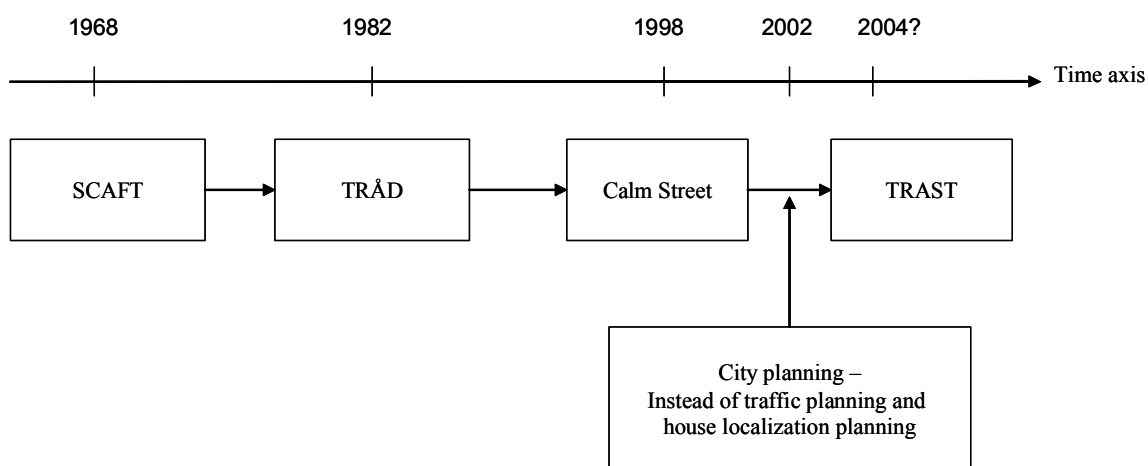


Figure 5.1 Time axis for Swedish traffic tools

In 1968, a standard system of transport planning was developed at the technical university in Gothenburg; Chalmers¹. This was because of the problems that the increasing motorized traffic was creating in the inner city. There was also at this point a high housing shortage in Sweden, which led to a requirement of building fast and considerably. Sweden was in great need of good transport planning, and therefore **SCAFT** was developed. SCAFT is also called **“Guidelines on transportation planning with consideration to traffic safety”**.

The main words of SCAFT was mobility and safety². To reach mobility and safety, SCAFT presented four main ways of design: localization, separation, differentiation and orientability. The localization of the different buildings in the society was meant to decrease traffic flow and therefore conflicts and disturbance. All transportation modes were separated from each other, on different road networks. The difference of high flows and low flows were noticed, and the roads were divided into main roads and local roads, for example: motorized traffic was divided into fast, medium fast and slow traffic, and separated in different systems. The separation was meant to reduce the crash statistics significantly. Further, SCAFT was designed to create a good orientation within the city, to make it easier for road users to make decisions in traffic: to lower the risk of surprise movements.

¹ Homepage of Vårt Göteborg, www.vartgoteborg.se

² The Swedish National Planning Administration (1968)

The next written document of traffic planning came in 1982. It was published by the Swedish National Planning administration and superseded SCAFT. The document was called “**General advice on planning of the city traffic network**” or simple **TRÅD**. The main goals of TRÅD were mobility and safety, as in SCAFT, but also environmental protection as well as beauty and comfort. The design advice in TRÅD is built on three principles¹:

- The localization principal. Promote bus and pedestrian and bike traffic by minimizing the distances between destinations within the city. This is done by mixing the localization of houses, retail and official buildings etc. in the city. Motorized vehicle traffic is directed to special streets with high capacity.
- The neighborhood principle. The city is divided into neighborhoods. Within the neighborhoods, the auto traffic is limited to decrease the disturbance and increase safety. Auto traffic is directed to the main network for motorized traffic, which is localized not to interfere with the pedestrian and bike network.
- The traffic endurance. The conflicts of auto traffic and the disturbance of the motorized traffic on the surroundings are limited by adapting the size of the flow and speed to the shape of the streets and the surroundings.

TRÅD can be compared to the thoughts of Radburn, see chapter 3.2, since the ideas are similar. A concept of a revised version of TRÅD, was worked on in the mid 1990s, but was never finished.

When the book of TRÅD was becoming out of date, **Calm Streets** was written in 1996 as a temporary substitute. The purpose of Calm Streets, is “to describe a planning process for remodelling the city’s mixed-traffic streets, by implementing physical measures in the street environment”². The handbook gives advice on how to carry out the process of planning and the applying program, and how to estimate quality demands and how to do a traffic network analysis.

In this report, Calm Streets is used in the Motorized Network analysis, chapter 6.1. TRAST has not yet a complete chapter of how to evaluate motor-traffic, and that is way the evaluations are completed with the methods in Calm Street. The Calm Streets methods that have been used are mostly function classifications and quality analysis.

In 2002 an inspirational book was given out from The Swedish National Board of Housing, Building and Planning. It was called (freely translated by the authors) **City planning – instead of traffic planning and house localization planning**. This was a book different from SCAFT, TRÅD and Calm Street, because it only gave ideas on how to plan the city and proposed no direct guiding principles. It encouraged the planners to plan the city with both traffic and house localization in mind. There was still a need for a new handbook for planners though, and because of that the Government of Sweden introduced a bill in 2001, with a clear message of the need to work for a sustainable society. Sweden had at that point a comprehensive tool of traffic planning; TRÅD, published in 1982. The tool “Calm Streets” had partly replaced TRÅD, since TRÅD is quite old, but Calm Streets does not include an exhaustive treatment of all interests in the city-environment. Because of this, the decision, to form a new tool of city planning, was made. This tool is called **TRAST – Traffic in the Attractive Town**.

¹ The Swedish National Planning Administration (1982)

² The Swedish Association of Local Authorities (1999)

TRAST – Traffic in the Attractive Town

The main purpose of TRAST is to develop a manual, which helps the planner to consider both the planning of house building and the different interests of the traffic planning, through the process of city planning.

So far, the manual of TRAST is not quite finished. For this project, a draft of the manual has been used for evaluation of the transport system of Celebration. The distributor is Lars Nilsson, traffic planner at Tyréns in Helsingborg, Sweden.

Contents

TRAST is divided into two parts: Handbook A - Attitudes and Processes, and Handbook B – Basic Data for Decision-making. The first handbook describes how to achieve the attractive and sustainable town, how the working progress will look, basic principles and how to proceed with strategies and design. The second handbook describes how to evaluate different means of traffic, travel patterns, safety and security, the environmental disorder and a neighborhood analysis.

In this report, the second handbook is the most important tool. The following parts of Handbook B have been used for the evaluation process of the transport system in Celebration:

- **Pedestrian traffic.** Chapter 4 (in TRAST): How to create the conditions for a walkable town, and Chapter 5: Evaluation of the quality of transport within the pedestrian network.
- **Bicycle traffic.** Chapter 4: How to create the conditions for a bicycle friendly town, and Chapter 5: Evaluation of the quality of transport within the bicycle network.
- **Motorized traffic.** Chapter 4.2, 4.3, 4.4 and 4.5: How to create a balanced motorized network – function classification, structure, design, speed limits, function and reliability. Chapter 5 is not yet complete, and the motorized network quality has been evaluated from observations.
- **Public Transport.** Elementary insight, since there is a lack of Public Transport to evaluate.
- **Safety, security.** Evaluation of speed limits, crash statistics, interviews and observations.

Evaluation of Quality

TRAST uses three levels of quality; green, yellow and red. This way of evaluating quality was already used in TRÅD 1982 and even more thoroughly described and used in Calm Streets. In TRAST the planner is asked to observe different factors and determine which level of quality it is. For this, TRAST has set up tables, from which the evaluation chooses the ranking. An example of one of these tables is presented in Table 5.1.

Quality concerning the orientation of the cycle network			
Type of Network	No consequent guides of directions	Guides of directions at important nodes	Clear and consequent guides of directions
Main bicycle network	Red	Yellow	Green
Local bicycle network	Yellow	Green	Green

Table 5.1 Example of a Quality Table from TRAST

In the chapter of quality evaluation, the headline of the quality table is shown, followed by the quality color of each network, with a short explanation of the way that color was selected.

This color code system was also used in the handbook Calm Streets. From Calm Streets the color coding is described with a table, reproduced in table 5.2.

Color code	Quality level	How well are Demands met?	Comments
Green	Good	Completely	Always accepted
Yellow	Not very good	Partially	Can be accepted for a limited time, or: Can be accepted if other significant qualities or costs are gained.
Red	Low	Not at all	Can be accepted, or: Can be accepted for a limited time.

Table 5.2 Presentation of the Color code table from Calm Streets¹

5.2 Tools of traffic planning in USA

This chapter describes both the tools of USA and of the New Urbanism

USA

It is hard to describe the tools of American traffic planning as simple as the Swedish, since there are so many more tools and inspirational books in the history of USA. The country is geographically very large compared to Sweden, and many of the states in USA have their own planning methods. Generally, traffic planning in USA is about highways and roads. In 1994, the American Association of Highway and Transportation Officials (AASHTO) published the Green Book – a primary guide for roadway design in United States.

¹ The Swedish Association of Local Authorities (1999)

AASHTO Green Book

The official name of the Green Books is “**A Policy on Geometric Design of Highways and Streets**”. This book is used all over America, when highways, roads and streets are planned. The Green Book defines the function of the motorized network into three categories: arterial, collector and local roadways. Mainly, the book describes how to design these roads. The road types are established according to the requirement of mobility and/or land access. Arterial roads are designed totally to provide good mobility, local roads to provide good access to land, and collector road are meant to connect the previous two. The functional hierarchy of motorized roads is based on traffic volume and the length of vehicle trips and the main ambitions of the Green Book designs are to achieve ultimate land access and mobility for motorized traffic. Pedestrian mobility and walkability is not currently taken into consideration in relation to the classification of roadways¹.

New Urbanism

There are three conflicts between the Green Book and the New Urbanism design:

- **The functional classification system.** The division of the Green Book was established in the 1960s, and walkability was then not considered as a viable way of transporting a person. Therefore, New Urbanists believe, the design is only based on vehicle mobility only. Accordingly, rural or suburban areas were not planned by walking standards. The classification of New Urbanism designs makes it possible for people to walk in the neighborhood.
- **The large intersections.** The design of AASHTO is to maintain the highest possible vehicle mobility. To do this large intersections are built between arterial roads and collectors roads and the intersections are located rather far from each other. According to New Urbanism, this creates difficulties in planning a walkable society for pedestrians.
- **Vehicle speeds.** Vehicle mobility depends on operation speeds, for example to create short travel time. High speed of autos makes it hard to create good and safe pedestrian mobility. To make it possible to quickly let out traffic from the arterial roads, a high capacity of the connection roads is preferred. According to New Urbanism, this will consequently disrupt walkability deep into the neighborhoods.

Since New Urbanists believe that the society is built on a system that does not acknowledge the need of pedestrian mobility, for example, a new design system has been created. As a result, New Urbanism is a created from architects, traffic planners, landscapers etc. that believe in other ways of designing the society apart from the way of the Green Book.

New Urbanists have in general the same values of how a society should look (written in The Charter, see chapter 3.4), but they do not always agree on how to reach the goals. Therefore, the Congress of New Urbanism has annual meetings, to discuss ways to design the society – to reach the goals of the Charter. Several design methods have been developed and the two major and best-known methods of New Urbanism are TND – Traditional Neighborhood Development, and TOD – Transit Oriented Development. The methods of TND and TOD, that concern the transportation planning, are presented below.

¹ The homepage of the US department of Transportation, the Federal Highway Administration: Chapter 2 - Highway Design Standards and Chapter 3 – Functional Classification

TND –Traditional Neighborhood Development

TND is mainly a way to plan a neighborhood from the goals of sustainability and reducing of sprawl, see chapter 3.4. The design guidelines of a TND involve some traffic measures and an overall design of the neighborhood and its road network. The guidelines of TND, presented below, are collected from the Charter of New Urbanism¹ and from a report from North Carolina department of Highways².

Street design

The street types of a TND, and its speed limits, are presented in chapter 6.1.

Narrowing streets is a major way for a TND to control the speed of the motorized traffic. The width of the TND streets types are presented in chapter 6.1.

Another way of achieve safety, stop signs at crossings between all road users are much more common than yield signs.

Pavement Design

Alleys follows locally approved design criteria. If the local criteria is no pavement in alleys, there ought to be at least 50 feet of pavement from a linked paved facility. All other road types follow the criteria from the construction standards of the county or the state.

Sidewalks and Pedestrians

Minimum width for a sidewalk is 1.5 meters (5 feet). Sidewalks which are directly adjacent to curbing shall be a minimum of 1.8 meters (6 feet) and a sidewalk should have in addition 0.6 meters (2 feet) of width if it is next to a fence, a wall or a building. Totally a sidewalk could therefore have a width of 2.4 meters (8 feet).

Bicyclists

On the local net, if the flow is low, motorized traffic and bicycle traffic may be mixed. On streets with higher flow of traffic, the bicyclist ought to have a separate bike lane of 1.8 meter (6 feet). In addition, it could be appropriate to have a separate route for less experienced bicyclists and also directing the bicyclist with for example color on bike lanes and lines on vehicle roads.

Transit

A TND design should be naturally close to transit, and residents within the TND should not need to walk more than 400 meters (0.25 miles) to a transit stop. The transit stops should be in the core of the TND and follow avenues and main streets.

Parking

The roads of a TND have on-street parking, to reduce the speed of motorized traffic. As narrow streets are a part of the speed controlling physical design, on-street parking is a way to both narrow the streets and to make the car-drivers slow down, since the sight diminishes because of the parked cars. The on-street parking is only to be situated on street types such as lanes, residential streets and on major streets. On major streets, the parking should be clearly signed on physical designed.

Parking spaces and garages are hidden behind buildings and residential houses. This is only to prevent the cars to be in the physical sight center, and is not a way to control the traffic.

¹ Congress for the New Urbanism (2000)

² Division of highways North Carolina, Department of Transportation (2000)

Planting Strips and Street Trees

An area strip of green that separates a sidewalk and a street should be 1.8 meters (6 feet) or more. If the streets' speed limits are at most 32 km/h (20 mph) or if the streets have on-street parking: small streets may be planted on the strip. The trees should be planted in the centerline of the strip. Trees may not interfere with the sight, and should therefore not be planted closer to a street corner than 10 meters (30 feet).

Lighting

Streetlights are preferably low and in great numbers, as opposed to high and few, and should have intense light.

Resolution of Conflicts

Non-vehicular users are prioritized whenever there is a conflict between car-users and unprotected road-user. This is as long as the public safety is not put at risk because of the decision.

TOD – Transit-orientated development

TOD stands for Transit-oriented development, and is the transit-planning tool for New Urbanism and the congress¹.

TOD and TND are not that different from each other: they are both tools to decrease car-usage and increase safety and mobility for pedestrians and cyclists. TOD is more focused on the transportation system than the TND, and is more strict on the speed limits and the physical design of streets etc. A TND and a TOD have the same fundamental thoughts on how a society should be built; to decrease the need of the automobile and create a sociable, safe, high-density society. To do this, TOD has the same fundamental design as the TND, with a mixed-use town and a pedestrian friendly atmosphere². The difference is, according to the CNU³, that the TND should have transit, and the TOD is completely based on the transit system, to create the maximum basis of possible users.

In the book: The Next American Metropolis, by a member of the CNU - Peter Calthorpe, TOD is thoroughly described. He not only describes the design of TOD, but also in details the different measures of TOD, everything from landscaping to different measures of the streets.

The TOD is built as an area of a half-circle, which is used for the transit-oriented development, see illustration 5.1. The maximum radius of the half-circle is 600 meters, since the time required for walking to the transit station should not exceed 10 minutes. This may change depending on the surrounding features, such as a varied topography. The development, or neighborhood, surrounds a transit station. South of the transit station, there should be commercial areas, and both west and east of the commercial core, there should be office areas. The rest of the space is planned as residential or open and public spaces, such as parks and squares. The road network, within the TOD, is divided in the same way as the network within the TND; there are arterial streets, thoroughfares, connector streets and commercial streets, as well as the local streets and the alleys.

The area surrounding the immediate TOD is called the secondary area, and it is not planned in the exact same way as the actual TOD.

¹ Homepage of the CNU, www.cnu.org: About New Urbanism – Project search

² Calthorpe, Peter (1993)

³ Congress for the New Urbanism (2000)

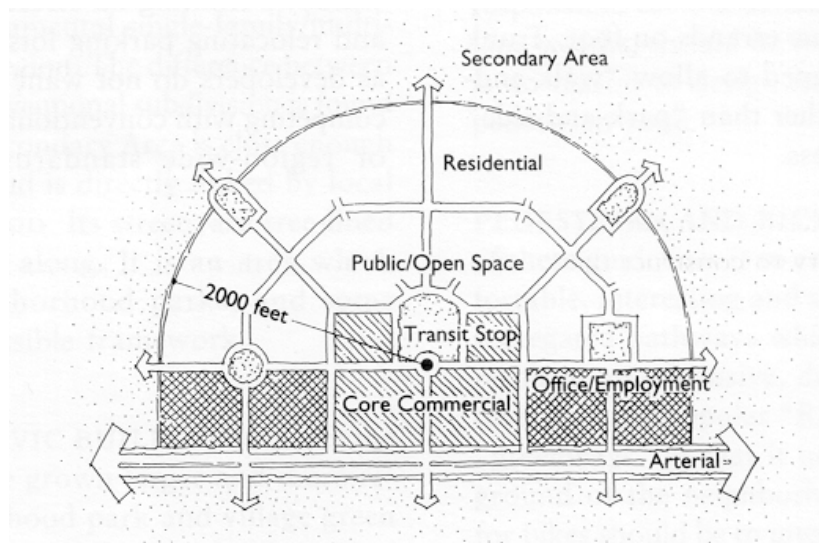


Illustration 5.1 Transit-Oriented Development¹

To create a neighborhood, where people can travel without having to use the car, a TOD must not only be high-density, have a mixed-use and be pedestrian friendly, but must also have a high-effective transit system to achieve the ambition of having a self-sufficient transit system. The transit service must be of high-quality, preferably modern. For example, lately light-rail has become popular for TODs.

To manage a market for the transit, there are three criterions that needs to be fulfilled²:

- **Density.** Having enough residents and workers within a reasonable walking distance of transit stations to generate high ridership.
- **Diversity.** Having a mixture of land uses, housing types, and ways of circulating within the TOD area.
- **Design.** Having physical features and site layouts that are conducive to walking, biking, and transit riding

What is special compared to other planning methods?

TOD is not that different from TDM - transportation demand management, a term for strategies that result in more efficient use of transportation resources (read more about TDM at Victoria Transport Policy Institute homepage: www.vtpi.org/tdm). TOD is described as the land-use and economic development version of TDM, which means that TOD not only deals with physical and mobility management measures, but also with design and economical sustainability. TOD is overall more involved with sustainability, and is an instrument of Smart Growth and Sustainable Communities, since it supports more efficient and environmentally friendly activity patterns, which require less car-use.

Since Celebration is classified as a TND, it does not have the design of a TOD. For example, TOD recommends a speed limit of 24 km/h (15 mph), within a quarter mile of the development. Celebration has in generally a speed limit of 40 km/h (25 mph), and at the least 32 km/h (20 mph), around the school during the morning and the afternoon.

¹ Calthorpe, Peter (1993), Illustration page 56

² Homepage of Mineta Transportation Institute, <http://transweb.sjsu.edu>, - Research – Publications

6 Celebration Network Analysis

In this chapter, Celebration and its transportation system is evaluated from measurements, observations, important city planners and architects knowledge and from a survey made by a landscape architect from Celebration. The first three chapter only evaluates the different networks separate; motorized, public transport and bicyclist and pedestrians. The fourth chapter summarize the survey and the last chapter presents the thoughts from the interviews.

6.1 The Motorized Network

The following text classifies and describes the motorized network of Celebration.

Roadway classification

To analyze the different demands that a motorist has within different links in the motor vehicle network, the network has to be differentiated. There are several ways to differentiate the motorized network. Below, several classification systems are presented and finally, based on them, a special classification for Celebration is presented.

The Osceola County classification

The specific roadway classifications within Celebration were based on use, characteristics, functions and features. The Osceola County has four roadway classifications for road planning within the town of Celebration¹:

The first classification is the Secondary Community Roadway, which functions as a collector roadway that carries commercial and residential traffic. The road has two lanes in each direction and there is no parking allowed. Single family residential lots will not directly access this facility. The design speed on this road is set to 56 or 64 km/h. An example in Celebration: Celebration Boulevard.

The next classification is the Village Street, which is meant to carry traffic, having either an origin or a destination on this street. The street has, as the previous type of road, two lanes in each direction. The design speed on this street is set to 56 km/h. An example in Celebration: Celebration Avenue.

The Village Lane serve as a local street, having the same function as the Village Street, to carry traffic, having either an origin or a destination on this street. The Village Lane has no division between lanes; there is only one lane for traffic in both directions. Design speed is 32 km/h. An example in Celebration: Beak Street.

The last roadway classification is the Private Way, and will only provide a secondary means of access to house lots. The Private Way is an alley that carries traffic, having either an origin or a destination on this street. The Private Way has one 3 meter lane width, and may connect to Village Street and Village Way. Examples in Celebration: all alleys behind houses.

¹ Osceola County (2002): Celebration PUD

The classification of TRAST

TRAST classifies the speed demands after each type of road, see table 6.1.

Speed demands and road classification	
<i>Type of Network</i>	<i>Speed limits (km/h)</i>
Thoroughfares (Main network)	70 or more
Main street (Main network)	50
Collection street (Local network)	30
Local street (Local Network)	30 or walking speed

Table 6.1 Road Classification of TRAST

Comment: The current version of TRAST has a different type of division, namely; Main streets and Local streets. Thus, there are no thoroughfares or collection streets. In this report the division of the July-version of TRAST will be used, for two reasons: the old street-division is more compatible with Celebrations street system, and also, the new version of TRAST was not in our hands when we did our field study of Celebration.

The classification of TND

TND has a different road classification. They divide the roads depending on the width of the street, which is set regarding the traffic flow and which kind of traffic the street is meant to carry, see table 6.2.

Street Type	Lane Width (feet/meters)	Speed Limits (km/h)
Lane	8 / 2.4	32
Street	9 / 2.7	32
Avenue	11 / 3.4	40
Main Street	11 / 3.4	48
Boulevard	11 / 3.4	56 - 64
Parkway	12 / 3.7	< 64

Table 6.2 The Road Classifications of TND¹

Division of Highways, North Carolina Department of Transportation (August 2000), explains the speed standards of TND:

“The majority of street types are “streets” and “lanes,” which provide direct access to housing and which have a desired upper limit of actual vehicle speeds of approximately 20 mph.” (20 mph is 32 km/h.)

Streets and Lanes are therefore understood to be part of the local network, and the rest of the street types are part of the main network.

¹ Division of highways North Carolina, (2000)

Celebration divisions of streets

In Celebration, the following division is compatible with the classification of the TND standard, based on speed limits, see table 6.3.

Street Type	Division of the Celebration network
Parkway	U.S. 417, U.S.192 and I 4
Boulevard	Celebration Boulevard (west side)
Main Street	Celebration place rd and Water side drive
Avenue	Celebration avenue, Golfpark drive, Campus street, Celebration Boulevard (east side)
Street	All streets within the villages and in the town center
Lane	All streets behind houses

Table 6.3 Division due to the TND classification

The lanes and the streets in Celebration can be established as local network. The rest of the Street Types are consequently classified as main network.

With the classifications of TRAST, this is the following division, see table 6.4.

Street Type	Division of the Celebration network
Thoroughfares	U.S. 417, U.S. 192 and I 4
Main Street	Celebration Boulevard (west part), Waterside drive, Celebration Avenue (Northeast part), Celebration Place road
Collection Street	Celebration avenue, Golfpark drive, Campus street, Celebration Boulevard (east part)
Local Street	All other streets

Table 6.4 Division due to the TRAST classification

The division of the network, due to the TRAST classification and the TND classification, are rather similar, though TRAST has fewer functional divisions.

Compared to Osceola County, TRAST and the standard of TND, there are small differences. Table 6.5, shows a comparison between the three divisions of network.

Osceola County	TND	TRAST
-	Parkway	Thoroughfares
Secondary Community Roadway	Boulevard / Main Street	Main Street
Village Street	Main Street / Avenue	Collection Street
Village lane	Street	Local Street
Private way	Lane	Local Street

Table 6.5 A comparison between TRAST, TND and Osceola County.

Finally: The classification of TRAST will be used, throughout the report.

Analysis of the motorized network

The following part is a presentation of an analysis based on observations made in Celebration in August 2003, and from material collected at the same time.

Designed speed limits and actual speeds

The designed speed limits in the town of Celebration are 40 km/h in the residential areas. The speed limits rise in the peripheral part of the town. Celebration Boulevard has a speed limit of 64 km/h, Celebration Avenue, between North Village and U.S. 192, has a designed speed of 56 km/h, and the Celebration Place road has a speed limit of 48 km/h¹.

Generally, the speed limits are exceeded by 8-16 km/h. These figures are based on observations made in Celebration in August, 2003^{*}. While the posted speed on Celebration Boulevard is 64 km/h, the actual speed is about 72 km/h. The exceeded speed limit becomes more evident on Celebration Avenue. From the beginning, in South Village, the speed limit is exceeded by up to 8 km/h; and on the way towards downtown the actual speed is 8-16 km/h above posted speed; and past downtown towards U.S. 192 the speed is about 16 km/h above posted, all the way to the 56 km/h sign past North Village. The road through the office area at Celebration Place, has a posted speed limit of 48 km/h. The speed limit is here exceeded by more than 8 km/h.

Roadway Network Capacity

There is not much information regarding traffic volumes on the roads in Celebration. The existing measured volumes are collected from Osceola County's statistic over traffic volumes on the county roadway network. Only a couple of the main roads in Celebration are measured, see table 6.6 and figure 6.1. The annual growth rate is a measure on how much the traffic volume increases annually, for example 1.12 is an increase of 12 % since the year before. A dash (-) indicates unknown data.

Road name	Road segment	Daily Volume	Annual growth rate
Celebration Avenue	South of U.S. 192	13897 vehicles	1.12
Celebration Boulevard	North of World Drive	3957 vehicles	-
Celebration Boulevard	West of Campus Street	4120 vehicles	1.1
Celebration Boulevard	From Celebration Place to World Drive	4100 vehicles	-
Celebration Place	South of U.S. 192	10595 vehicles	-

Table 6.6 Road volumes on main roads in Celebration²

¹ Interview with Don Leptic, 030807

^{*} Observations based on Car following Car, which means that we followed cars during half a week day, and measured their actual speeds. Observations were also based on our experiences from the two weeks we were in Celebration.

² Osceola County, Engineering Department (2002): Roadway Network Capacity

Throughout our observations, the traffic flow on all roads in Celebration seems moderate. Observed exceptions were when parents drop off or picked up their children from school and Celebration Avenue, between West Village and Celebration Village, which became filled with queuing cars.

Expansion of the office area along Celebration Boulevard, north of South Village, might increase the traffic volumes on this road even more. The newly built high school, further down on Celebration Boulevard, might increase the traffic volumes as well. Also planned is a Hotel Resort close to the high school. Celebration Boulevard might therefore become a congested road in the future.

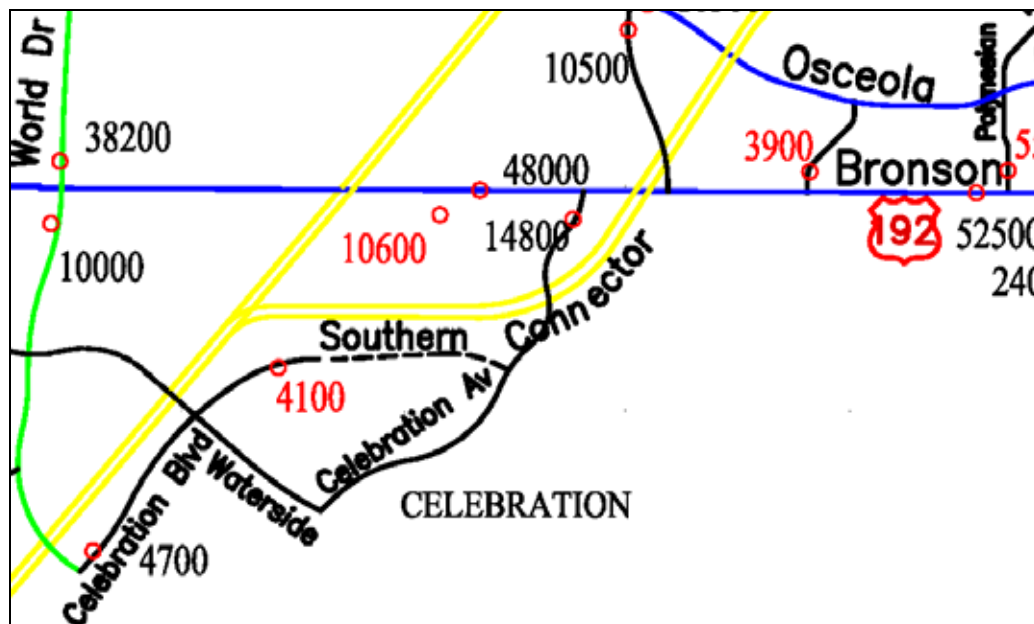


Figure 6.1 Measured traffic volumes, by number of vehicles¹.

Road safety

No crash statistics was found on Celebration, which means that the grade of the accidents cannot be determined. Engineers and planners², who have lived in, worked with and studied Celebration since the mid 90's, did not know about any traffic accidents within the town. Their opinions are that there are two main problem sites in Celebration, regarding dangerous places with traffic conflicts. The first is the intersection of Eastlawn Drive and Celebration Avenue. Eastlawn Drive is the main road from and to East Village, and Celebration Avenue is the main road from the town center to South Village. The intersection also involves Westpark Drive, one of two roads serving West Village. The intersection could be dangerous, since it is extremely busy, during some parts of the day. The second problem site is outside Celebration School, where children emerge between the on-street parked cars.

Environmental issues

Instead of yields signs, Celebration uses stop signs, which is very common throughout the United States. The stop signs are placed at all intersections and cause the cars to repeatedly accelerate and slow down. Along Celebration Avenue, in the town center, there are several

¹ Osceola County, Engineering Department (2003): Traffic Count Report

² Interviews with Geoffrey Mouen, 030809 – 030810, Don Leptic, 030807 and Michael Prevost, 030809 – 030810

stop signs every 50 – 100 meters. Unsteady drive speed contributes to higher levels of pollution¹. The car pollution does not only consist of carbon dioxide, but also of exhaust fumes that affect the environment locally. On a clear, wind-free and hot day, unhealthy smog might form in the center of Celebration.

A rather common sight on the Celebration roads is the NEV - Neighborhood Electric Vehicle. The NEVs are, as the name indicates, electrically powered vehicles running at low speed and designed for short trips. The NEV has a range of 40 – 80 km, on one fully charged battery, and the speed is limited to 40 km/h and it is legal to drive the NEV on all roads posted up to 56 km/h². An owner of a NEV in Celebration says³ that his NEV goes up to speeds at 43 km/h, on a good day. The vehicle is environmentally friendly and is suitable for downtown areas and planned communities with speed-limited environments. NEV's may not go past Celebration city limits, because of their low speeds, but make a nice alternative to the car for trips within the town. Downtown has special parking spaces only for NEV's. The open vehicle body construction makes it unsafe from collisions, especially collisions from the side. There has not been any registered accident in Celebration involving a NEV⁴. The illustration below, illustration 6.1, shows a NEV with four seats and a mobile children's seat.



Illustration 6.1 NEV- Neighborhood Electrical Vehicle

Parking

Almost every residence in Celebration has a backyard garage, in agreement with New Urbanism ideas. The garages face a common alley to avoid parked cars in front of the houses, see illustration 4.3, page 38. The roads in Celebration often have on-street parking as a street-calming measure, in combination with curved roads, to keep the speeds down. If there are no or few cars parked along the road, it will seem wider than it was intended to, see illustration 4.2, page 38.

¹ Holmberg, Bengt & Hydén, Christer (1996)

² Okaauto Homepage, www.okaauto.com: Oka NEV

³ Interview with Michael Prevost, 030809 – 030810

⁴ Osceola County, Engineering Department (2003): Traffic Count Report

The experienced width promotes higher car speeds and as a result makes the road more dangerous. There are some public parking lots located in the town center. Surrounded by retail shops and apartments the parking lots are concealed by the three-storey houses. There is also some on-street parking along Front Street by the downtown lake. A large parking lot is located just east of the Market Street area. Even though the parking lot is surrounded by grass and some trees, it is not a pretty sight. This lot is meant to be for overflow parking, during large events in the town center, and is most of the time nearly empty.

Traffic rules concerning intersections

According to the Florida Statutes, section 316.130¹, the driver shall yield to a pedestrian when:

- the pedestrian is upon the half of the roadway on which the vehicle is traveling,
- the pedestrian is approaching so closely from the opposite half of the roadway that he is in danger.

If a pedestrian is crossing the roadway at any point where there is no marked crosswalk or unmarked crosswalk at an intersection, he shall yield to all vehicles traveling on the roadway. Don Leptic says² that when a pedestrian in a crosswalk is not directly in conflict with the vehicle path, generally less than half of the drivers will stop for the pedestrian. Drivers within Celebration, though, appear to show more consideration to pedestrians, according to Don Leptic. When entering a four-way stop intersection, Florida Statutes section 316.123³ says that, the first vehicle to stop at the intersection shall be the first to proceed. If more than one vehicle reaches the intersection at the same time, the driver to the left shall yield to the driver on the right.

Quality analysis according to TRAST - Traffic in the Attractive Town

At the present moment there are no quality demand strategies for car use in TRAST, like the one for walking and bicycling. Therefore, no quality analyses for the car have been made.

How good the motor vehicle network structure is depends on the following factors from TRAST: closeness, directness, continuity, orientation and flexibility.

Closeness means a dense building structure where residences, workplaces and services are located to create short distances and routes. In Celebration this has been aimed for through New Urbanism planning, but because of the somewhat extracted town shape the closeness is not optimal. The closeness to the Town Center is most obvious in Celebration Village and West Village. Because of the stretched shape of the town North Village, South Village and East Village are not as mutually connected to the downtown area as Celebration Village and West Village are.

Directness means that the road network does not differ more than necessary from the direct way between origin and destination. The road network in the different Villages is structured in a way that brings about several route choices. This makes the road network within the Villages direct. The connections between the Villages are few but strategically located, often making the routes considerably direct.

¹ Florida Senate homepage, www.flsenate.gov: Statutes & Constitution - View Statutes – Motor vehicles

² Interview with Don Leptic, 030807

³ Florida Senate homepage, www.flsenate.gov: Statutes & Constitution - View Statutes – Motor vehicles

Continuity means a well-connected road network with unbroken and high standard and necessary signposts. Celebration has a well-connected road network but the signposting is not adequate. Signs showing the way to downtown, Celebration Health, etc. are only placed along the town entrances and the larger intersections.

Orientation is the possibility to be able to familiarize oneself with the road network, which is important to all road-users. Guiding through signs is important on great distances, to end up at the right place and to direct the traffic efficiently. To make it easier to orientate the road network the structure should be obvious with a coherent signposting and different landmarks. Celebration is a rather small town and the roads are differentiated. The road structure is in some parts obvious and self-explaining, but in a few parts of the Villages it is difficult to orientate. No signs are seen driving out of town.

Flexibility is characterized by the supply and simplicity in the possibilities to reach the destination by car. It is a measure of the networks openness regarding choice of route. In Celebration the possibility to reach destinations within the same Village is high. The grid structure allows destinations to be approached by several different routes.

All roads in Celebration have very good standard regarding the road surface. The visibility along the roads is reduced as a result of the curving roads and aligning trees.

Conclusions

How well is the transit planned and constructed?

The agreements with the county

Does Celebration achieve the agreements, about the motorized traffic, with the county, presented in on page 29?

As of today Celebration is at construction Phase 2, see chapter 3.5, during which certain facilities shall be completed. Phase 2 will continue until year 2005, when Phase 3 begins. In Phase 2B the percentage goal towards reduction of trips is set to 10 % of trips made by office employees and 10 % reduction of peak hour volume. The percentage reduction goals for the final phase, phase 4, are 20 % of trips made by office employees and 20 % of peak hour volume. There are no published statistics on percentage reduction for Celebration, therefore the achievement of the goals cannot be determined. It is the Celebration town board's duty to provide Osceola County with statistic information.

The Developer is to construct at least one off-site or on-site park & ride lot, as described in chapter 3.5, with room for 100 vehicles. The parking lot may be shared with parking for commercial land uses. There are parking lots at Celebration Place, but if any of them function as a park & ride lot is difficult to say. Any separate park & ride lot was not observed, but it may be integrated with the on-site office parking although it is not marked out.

Sustainability

+

The speed limits are rather low, but according to Swedish measures they should be lower to actually achieve sustainability. According to America in general, the speed limits are pleasing through a sustainability point of view.

Nothing wrong with the capacity of the streets, there are no congestions in Celebration.

The road safety is satisfying.

The NEVs are very positive, an exceptionally good alternative to the car.

Celebration car drivers stop for pedestrians at crossing zones.

The mixed-use town and the network is working well to create several choices on how to move around in the town, and decreases the travel length, since people have the possibility to do more than one chore on the same trip.

-

In the future, there might be congestions on Celebration Boulevard, because of the new constructions on site. This creates both more emissions and a stronger barrier.

The stop sign system could be bad for the environment.

The calming street measure: to narrow the street room with on-street parking, does not work all the time. It only works when cars are actually parked there.

New visitors might have trouble finding their destination at their first try, because of the shortage of direction signs. This could lead to increased travel length.

6.2 Public transport

The design of a TND ought to have public transports within the neighborhood. Different to a TOD, which is actually created to provide an area with good transit communications, a TND like Celebration is not built on the base of a transit system and a transit station. It is supposed to have good public transports, though. The following definition comes from the Division of Highways North Carolina, Department of Transportation¹:

“Transit – TND design should be inherently compatible with transit. Transit should be addressed wherever it is present and should be appropriately planned where it may not yet exist. Transit services are typically provided within core areas and along avenues, main streets and higher-capacity roads”.

Local bus network

There is no local bus traffic in Celebration. The community is small and the town structure is not dense enough to make a reasonable passenger basis. Celebration is built on the idea of a community with daily needs within walking distance, but since the distances within the town have grown, there ought to be some local public transport.

Regional bus network

The public transport connected to Celebration is regional bus routes along U.S. 192. The bus routes passing by the stop at Celebration are, (named by the Osceola County): Link 55 and 56.

Link 55 has its route on U.S. 192 between Osceola Square Mall, passing the old town of Kissimmee, and Orange Lake; a 45-minute trip, see figure 6.2. The bus makes a stop at Celebration every 30 minutes between 6:20 a.m. and 8:50 p.m. on its way west, and between 7:25 a.m. and 9:55 p.m. eastwards. All times are applied all week long, including weekends and holidays.

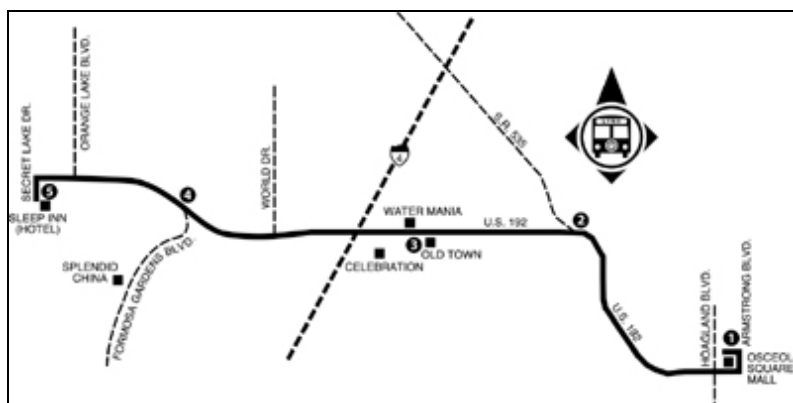


Figure 6.2 Link 55²

Link 56 has its route on U.S. 192 and World drive, between Osceola Square Mall and Magic Kingdom at Walt Disney World, see figure 6.3. This trip also takes 45 minutes to do. This time the bus makes a stop at Celebration Place every 30 minutes, between 6:35 a.m. and 9:05 p.m. westwards, and between 7:40 a.m. and 10.10 p.m. on its way east.

¹ Division of highways North Carolina, Department of Transportation (2000)

² Lynx homepage, www.golynx.com: Route Schedules

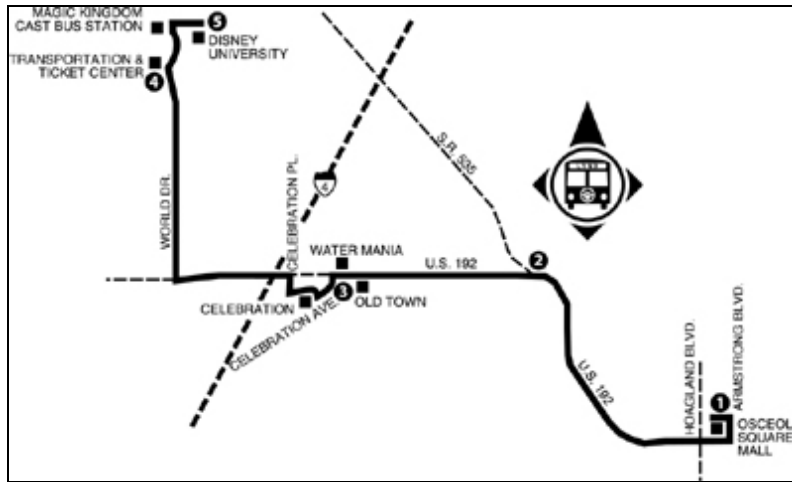


Figure 6.3 Link 56¹

In Kissimmee, there is also the opportunity of using Greyhound bus service. There are buses leaving to cities within Florida and to other states, every day. For example; there are six buses leaving from 7 am to 7 pm, to Miami, with travel times at five to eleven hours (depending on driving at night- or daytime) and eight buses to Orlando between 11 am and 7 pm, with travel times at 40 minutes each. The Greyhound bus station has a parking lot, for P & R.

Train network

The closest train station is located in Kissimmee. This is a station for the Amtrak railway system, a national train service, see figure 6.4.

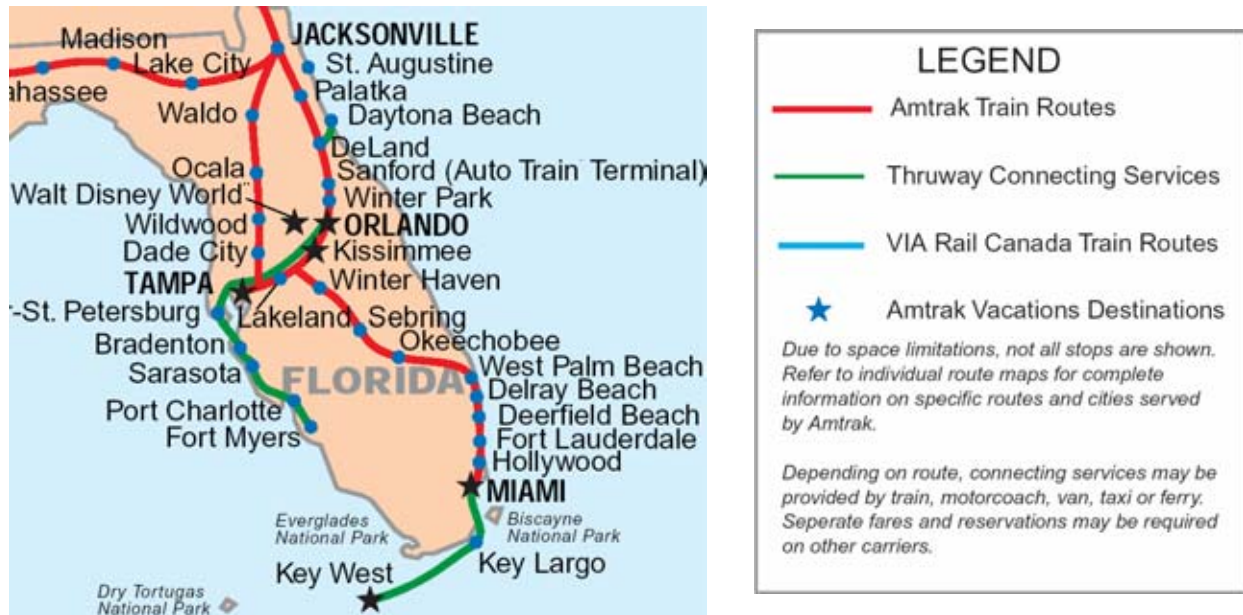


Figure 6.4 Amtrak route map of Florida

¹ Amtrak Homepage, www.amtrak.com: Trains and destination - Detailed National Route Map

Conclusions

How well is the transit planned and constructed?

The agreements with the county

Does Celebration achieve the agreements, about the transit, with the county presented in on page 29?

In construction Phase 2A of Celebration, see chapter 3.5, a shuttle system shall be available, providing service between Celebration and all other Disney property, such as theme parks and hotels. This system is today represented by bus routes, Link 55 and Link 56, passing the northern outskirts of Celebration.

When Celebration has 15,000 employees who live off-site but work on-site a Transportation Management Association, TMA, shall be established, see chapter 3.5. There are no figures on how many off-site living employees, working in Celebration at this time; therefore, this part cannot be evaluated. Celebration town board is responsible to keep statistics and to provide them to the county.

Sustainability

+

There are possibilities to travel regionally without having to use the car, with both trains and buses.

-

To reach the regional stations without a car is a lengthy procedure.

The only regional bus stop is at the periphery of Celebration, and at this site, there are no parking spaces especially offered as Park & Ride or Bike & Ride.

There are no local public transports within the town of Celebration, and there are several locations within Celebration where the distances are too far to bicycle or walk.

6.3 Pedestrians and cyclists network

Celebration has a network of pedestrian paths, which are meant to be used by bike riders as well. The paths are separated from the streets with approximately one meter of lawn. The material of the paths is concrete, which makes the paths very smooth to bicycle or walk on. The paths follow the streets, and wherever you can go by car, you can safely bicycle or take a walk. The width of the paths varies between two examples: 1.5 m when the paths follow streets with velocity limits at 25 miles per hour (40 km/h) or below that. Above velocity limits at 25 miles per hour on the streets, the paths width will be 2.45 m. The paths lead directly to every destination and you can bicycle everywhere in Celebration except from in the downtown, where it is prohibited to use skateboards, scooters and rollerblades, and to bicycle on the sidewalks.

Presentation

This is an introduction to and a presentation of the Pedestrians and cyclists network.

The model of public space

To get a vision of how walkable the different areas in Celebration are, the model of public space can be useful. The model of public space (In Swedish: livsrumsmodellen) divides traffic room into three spaces: free space, mixed space and transportation space¹.

The free space is the area for the unprotected road-user. This area is a place for togetherness and recreation. Pedestrians and cyclists shall be able to move with a minimum of risks, conflicts and interference by motor vehicles. In Celebration, there is only one place where the un-protected road users are not separated from the motorists, and it is on alleys.

The mixed space is all the areas in the town where the different demands from the unprotected road-users and the motorists mix. This requires a well-designed network and great demands on the motor traffic, to ensure an acceptable road safety and environmental disturbances. The mixed space includes the major part of the traffic environment in the town. The only mixed area in Celebration is in the Market Street Area. Although, it is not prohibited or discouraged for cyclist to travel on the streets on the local motorized network. From our observations, we have also seen people on Segways, see illustration 6.2, and people walking on the local motorized network. Therefore, the mixed space of Celebration is recognized to be the local motorized network, see Appendix 4.

The transportation space is the space for effective movements, both persons and goods, made by motor vehicles. This space allows fast and heavy transportation. Some interaction may occur between the different spaces. Examples in Celebration are: Celebration Boulevard, Celebration Place road and Celebration Avenue - the northeast part, at the junction with I-4.

Alternative transportation modes

Instead of walking or biking, there are several electrical vehicles that are commonly used in Celebration. The most common one, which is often used by children on their way to school, is the electrical scooter, see Illustration 6.2. The scooter, which has an electrical engine, can be driven at speeds up to 20 km/h².

¹ Holmberg, Bengt & Hydén, Christer (1996)

² Scootersinfo.com, www.scooter-info.com

Another vehicle that has been seen in Celebration is the Segway Human Transporter, see illustration 6.2. The Segway is an electrical vehicle on which you stand up straight and use your body's movement to steer it¹.



Illustration 6.2 The Segway Human Transporter and The Electrical Scooter²

Elderly people, in Celebration, will often show up on scooters that have seats. These scooters are also driven on pedestrian paths, and will run up to a speed of 20 km/hour.

Traffic flow

There are no official figures of traffic flow on the pedestrian paths in Celebration. Neither the county nor the town board have measured the pedestrian flow in Celebration.

Due to unsteady weather, with usually heavy rain in the afternoon in the summertime, people are not often bicycling or walking as the rain is pouring. As soon as the sun comes out, though, people will bicycle and walk. There are both men and women of mixed ages, out walking or biking. The main target is the Market Street, and you will find many people crossing Celebration Avenue by Market Street, heading for or leaving the area. There is a lot of parking spaces downtown, but they are never filled up, even if there are many people eating at the Market Street cafés or at the other restaurants during lunch break.

People use the pedestrian paths for recreation; running, biking, rollerblading etc. An ordinary day, you might see several people out running or power walking in pairs. Furthermore, the paths are used for the electrical vehicles that are common in Celebration. Many children use electrical vehicles to school, most common are the scooters, see illustration 6.2. The Segways are used both on the paths as well as on the regular streets, but they are still not as common as the scooters.

¹ The Segway homepage, www.segway.com

² The Segway homepage, www.segway.com and Scootersinfo.com, www.scooter-info.com

The effects of the barriers

The town of Celebration is well separated from its surroundings by wetlands and the highways in the north; I-4 and road 417.

The Golf Court: The 18 holes of the Celebration Golf court surround West Village and Celebration Village. There are no pedestrian and bike crossing through the golf course. To pass it there is only three possibilities: Campus Street, Celebration Avenue on the west side and Celebration Avenue on the east side.

Celebration Boulevard: The Boulevard is not busy today, but will probably have a higher traffic flow when high school starts and when the Resort is built. The zebra crossings are about 16 meters long with a 2-meter traffic island, which makes it difficult to pass when traffic flow is high.

Bridge between North and Celebration village: The bridge has a much too narrow path for bike riders and pedestrians. There are also streetlights on the pedestrian paths, which decreases the width even more at several points.

Few passages between villages: There could be separated roads for bike riders and pedestrians, which link origin and destinations more direct.

Green area between West and Celebration Village: This area does not invite people to pass. The only possibility is to pass it on Greenbrier Avenue or on Celebration Avenue.

Celebration Avenue: This main road separates the town villages. It does not decrease the possibility to pass, though, since the motor traffic most often yield for pedestrians.

Road 417. There is only one passage on Campus Street along with Celebration Avenue towards U.S. 192. There are no pedestrian paths from Celebration Village directly linked with Celebration Health and Celebration Place.

Mental barriers: The security is something that might prevent people from letting their children walk to school. Wealthy people are often afraid of having their children kidnapped¹. There are no dark tunnels and the sight is good all over Celebration. All bicycle and pedestrian paths have lighting.

Quality demands

TRAST method of controlling the quality of the traffic network is used to estimate the standard of the bike & pedestrian paths (b & p paths).

The Bicycle & Walking Environment

The following text describes the status of the bike & pedestrians paths. The bike paths and the pedestrian paths are joined, but the grading of the quality will be done separately.

¹ Interviews with Geoffrey Mouen, 030809 – 030810

The demand on being able to travel along the car road

All destinations in Celebration are reachable via the b & p paths and there are no detours to reach the destination, since the separate paths follow the car roads all over Celebration. Therefore, the bicyclists and the pedestrians do not need to demand accessibility to the car roads.

The demand on being able to cross the car roads

The only place in Celebration where stores, bike parking and central offices are located, is in the market area. Bicycling is not allowed on the sidewalks, in the very center, and shares the roads with the cars. The pedestrians may cross the car roads at all points in the center of the market area.

At other big destinations, the bicyclists and the pedestrians are invited to cross the car roads at special bike crossings zones. There are no gateways or b & p tunnels and crossings are marked out only by the white stripes on the ground.

Along the northeast part of Celebration Boulevard, the destinations are located on one of the sides. It is possible to bicycle and walk to these destinations, without having to cross the road. At this part of Celebration Boulevard, there are no crossing zones and the b & p path only runs on one side of the road. On the west side of the Boulevard is the high school and soon to be; the resort area. To reach those destinations, there is no need to cross the street and therefore there are no crossing zones. The office area along the Boulevard is located on the other side of the road and to reach that area, bikers and pedestrians have to cross the road. There is one crossing area just at the road intersection at Celebration Boulevard/Water Street.

Function classification of the bicycle & pedestrian network

All car roads; local and main roads, are enclosed with separated b & p paths. The b & p paths are divided into two groups; paths that are **1.5 meters** and paths that are **2.0 meters**. The paths that are wider are the ones that follow the main car roads on both sides except a part of Celebration Boulevard, along the office area, where the b & p paths only follows one side. These b & p path network is showed in appendix 5 and the roads, followed by the main b & p paths are:

- Celebration Boulevard from Campus street to the high school
- Campus street, the part above Golf Park Drive
- Golf Park Drive
- Waterside Drive
- Celebration Place road
- Celebration Boulevard in North Village
- Celebration Avenue, north of North Village and up to Celebration Place road

The main b & p paths lead to the big working places; the office areas, Celebration Place and Celebration Health. The school, the university, the town center and the gymnasium are not reachable by the main b & p paths. Thus, the main b & p paths do not follow the standards of TRAST.

There ought to be wider paths on the entire part along Celebration Avenue and Campus Street, since these streets are important for a good connection with the core of Celebration. These paths, that ought to be main paths, are presented with dotted lines on Appendix 5.

The demand on the structure of the bicycle & pedestrian network

The main b & p paths: there are no detours on the main b & p paths, compared to the car roads. The bike path grid is opened for high speeds and there are several routes to choose from. The paths are also well lit by streetlights.

It is not easy to find the destinations. There are destinations signs, but not everywhere, and they only point out the direction to the destination. The crossing areas are not shaped in a way that minimizes the disturbance of the barriers. On Celebration Boulevard 4 100 cars pass each day and the zebra crossings are about 15 meters long, with a two-meter traffic island.

The local b & p paths: the net connects all destinations without bigger detours than the car roads. The local path net is as tight as the motorized network. There are more adventurous paths that lead into small tree areas or around the small lakes. These are mainly for recreation, but East Village and the town center are connected with one of these recreation routes that lead through the wetlands. There are great possibilities to make the b & p paths even more direct if paths are built for example over the wetlands, between the villages in the west. East and West Village could easily be connected directly to the high school without having to follow the Celebration Boulevard.

All roads are separated, except from in alleys and in the town center. The bicyclists and the pedestrians do not need to walk on the local roads at any place. The paths are continually and they are lit by streetlights.

The demand on the shape of the bicycle & pedestrian network

The paths allow high bike speeds and do not get crowded at any time. Since the paths are made out of concrete, they do not have any bumps or unevenness, but the small gaps between the concrete blocks (every other meter) could, if they fall out of good shape, be experienced as uncomfortable for the bicyclists. In the center area, there are some shapes and different material in the crossing area, which perhaps could work as a tactile surface, see illustration 6.3. This surface is not very usable, since it leads the pedestrians straight out in the four road crossing. The bicyclists and pedestrians are not prioritised to the car traffic, but the car traffic always let the pedestrians over. There are no steep hills, but there is a number of rash curves, that slows the bicyclists down, see illustration 6.4.



Illustration 6.3 Shapes in the crossing area that might work as tactile surface



Illustration 6.4 Curve on a bike path



Illustration 6.5 Open stand for bicycles

The demand on the function of the bicycle & pedestrian network

The network is fully usable at all times between 06.00 and 22.00 (06.00 am and 10.00 pm). The county is responsible for the maintenance of the paths, and they serve Celebration as often as the rest of the county. Since there is very seldom snow or cold weather; followed by slipperiness, almost no extra maintenance is needed in the winter.

The bikers demand on reliable parking areas

The quality of the parking areas is unevenly good. There are several parking areas for bike riders in the town center, and also at the gymnasium, the school, Celebration Health, and the high school. There are no parking places at the office areas, the university and Celebration Place. The parking areas are usually an open stand for 5 – 10 bikes, see illustration 6.5. The only place where there is guarded parking is at the high school. Fences and a locked gate surround the parking area, room for ~ 100 bikes. At the only bus stop in Celebration, there is no Bike & Ride. The bus stop is at Celebration Place, where there is no parking area or bikes at all.

Assessment of qualities of the bicycle network

The quality of the Bicycle network is classified on the basis of the methods in TRAST, see chapter 5. First, the structure is classified and some of the classifications are explained more in detail. Then the design is classified and finally the function and the reliability of the network are classified.

Structure

Distances within the network

Main network: Green. The medium distance to destinations within the town is 2.2 km.

Local network: Yellow. The medium distance to destinations within the town is 2.2 km.

Competitively

Main network: Yellow. The mean travel time quota on the routes, that goes onto the main paths, is 1,87.

Local network: Green. The mean travel time quota on the routes, that only goes onto the local paths, is 1,3.

Directness

Main network: Red. The mean directness quota for routes, that go onto the main paths, is 1,51.

Local network: Yellow. The mean directness quota for routes, that go on the local paths, is 1,35.

Orientation

Main network: Yellow. There are signposts at important nodes.

Local network: Green. There are signposts at important nodes.

Continuity

Main network: Green. All paths are linked to all destinations.

Local network: Green. All paths are linked to all destinations.

Flexibility

Main network: Yellow. The mesh of the path network exceeds 500 metres.

Network in town centre: Green. The mesh of the path network is less than 200 metres.

Local network: Green. The mesh of the path network is less than 200 metres.

The quality of *the distances within the network*, from the “Structure box” above, is set at the medium distance, since the distances between destinations vary from 0.1 to 7.0 km. Most of the destinations, though, are within the range of 1-3 km (62 % of the destinations), which is green quality of the main network, and yellow quality of the local network. This corresponds well with the medium values.

The mean travel time quota is calculated as *travel time with bike divided with travel time with car*. The following matrix, see table 6.7, shows the different quotas. The total mean of Celebration is 1.5, which is the value that shows on a good competitiveness between the car and the bike, according to TRAST.

	South Village	East Village	North Village	West Village	Celebration Village	Mean
Center	1.5	1.5	1.6	1.2	0.7	1.3
Golf	1.5	1.6	1.5	1.0	0.2	1.2
Plaza	2.2	2.2	1.8	1.9	1.8	2.0
Health	2.1	2.1	2.0	1.8	1.8	1.9
Nursery	1.6	1.7	1.1	1.5	1.2	1.4
School	1.4	1.4	1.6	1.0	0.6	1.2
Univers.	1.4	1.4	1.6	1.0	0.6	1.2
Gymnas.	1.1	1.1	1.7	0.8	1.1	1.1
High	2.1	2.1	2.5	2.3	2.3	2.3
Office	1.4	1.4	2.3	1.5	1.4	1.6
Mean	1.6	1.7	1.8	1.4	1.2	1.5

Table 6.7 Travel time quota

The central villages; West and Celebration, both have quotas below 1.5, which is competitive. Six out of ten destinations have quotas below 1.5; in the town center, the Golf court, the day nursery, the school, the university and the gymnasium. The high school has a much too high quota and is therefore classified with red quality.

The directness quota is calculated as route distance divided by actual distance. The following matrix, see table 6.8, shows the different quotas. For example: a 100 meters distance with a 1.2 directness quota, makes a route of 120 meters and a 1000 meters distance, with the same quota, makes a route of 1200 meters, which is a big difference for a walking person. The total mean of the directness quotas in Celebration is 1.41.

	South Village	East Village	North Village	West Village	Celebration Village	Mean
Center	1.42	1.65	1.14	1.42	1.00	1.32
Golf	1.36	1.29	1.11	1.08	1.00	1.17
Plaza	1.45	1.51	2.38	1.42	2.58	1.87
Health	1.47	1.41	1.70	1.35	2.00	1.58
Nursery	1.00	1.16	1.15	1.08	1.21	1.12
School	1.22	1.28	1.06	1.33	1.00	1.18
Univers.	1.22	1.28	1.06	1.33	1.00	1.18
Gymnas.	1.27	1.25	1.11	1.00	1.40	1.21
High	1.58	1.39	1.21	1.50	1.40	1.42
Office	2.18	1.25	1.56	4.14	1.47	2.12
Mean	1.42	1.35	1.35	1.57	1.41	1.41

Table 6.8 Directness quota

This quota can be misleading, since the shorter the investigated distance is, the greater the impact of a detour. The mean quota of 1.41 is medium high. A good quota is below 1.25, according to TRAST, and half of the routes have directness quotas at 1.25 or below. The routes to the day nursery are all very direct and North Village has, compared to the other villages, the most direct routes.

Design:

Capacity

Main network: Green. There are no dimension problems.**Local network:** Green. There are no dimension problems.

Effect of the barriers

Crossing entrance: Yellow. 13 897 cars a day drives on the northeast part of Celebration avenue.**Crossing main road:** Green. 4 100 cars a day drives on Celebration Boulevard.

The figures of car flow are collected at the Osceola County homepage¹.

¹ Osceola County, Engineering Department (2003): Traffic Count Report

Function and reliability

Function during winter

Main network: Green. There is almost never snow or cold weather in Florida.

Local network: Green. There is almost never snow or cold weather in Florida.

Function during summer

Main network: Green. The maintenance is good and the paths are always clean and undamaged.

Local network: Green. The maintenance is good and the paths are always clean and undamaged.

Accessibility of the parking

Main network, guarded parking: Green. The high schools parking area is 100 metres from the entrée

Main network, unguarded parking: Green. The parking areas are within a distance of 50 metres from the entrée.

Local network: Green. The parking areas are within a distance of 50 metres from the entrée.

Liability

Main network, guarded parking: Green. The parking have more than 10 % free space between 15 -17 (3 – 5 pm).

Main network, unguarded parking: Yellow. The parking have more than 10 % free space between 15 -17 (3 – 5 pm).

The parking have been investigated between 15 -17 during the summer. There might be more bikes during spring and fall.

Assessment of qualities of the pedestrian network

The quality of the pedestrian network is classified based in the methods in TRAST, see chapter 5. First, the structure is classified and some of the classifications, followed by the classification of the design and finally the function of the net is classified.

Structure:

Distances within the network

Main net: Yellow. The medium distance to destinations within the town is 2.2 km.

Local net: Red. The medium distance to destinations within the town is 2.2 km.

Directness

Local net: Green. The mean directness quota for routes that go on the local paths is 1,35.

Continuity

Local net: Green. There are separated paths on both sides of all local car roads.

The medium distance is 2.2 km between the destinations within Celebration. That gives the pedestrian main network Yellow quality of *the distance within the network*, and Red quality on the local network. 54 % of the destinations are within the range of 1.5 – 3 km, which also gives the main network yellow quality and the local network red quality.

For the directness quota, see table 6.8, below 1.5 for walkers is good. The routes have the same quota for both bicyclists and pedestrians.

Design:

Capacity

Main net: Green. There are no dimension problems.**Local net:** Green. There are no dimension problems.

Effect of the barriers

Crossing entrance: Yellow. 13 897 cars a day drives on the northeast part of Celebration avenue.**Crossing main road:** Green. 4 100 cars a day drives on Celebration Boulevard.

Beauty

Net in town centre: Green. There is a recreation path in the town centre.**Local net:** Green. There are several recreation routes at several places in the town, within 500 metres from everywhere.

The recreation paths in Celebration go through the wetlands or manmade parks. However, most bike and pedestrian paths leads pass the Golf Court or next to the forest, and are beautiful and adventurous.

Function:

Function during winter

Local net: Green. There is almost never snow or cold weather in Florida.

Function during summer

Local net: Green. The maintenance is good and the paths are always clean and undamaged.

The maintenance is the same for both the bike and the pedestrian paths, since they are joined.

Close-range access

According to the agreement between the County and the Disney Development Company¹ Celebration should have access from the bikeway system to the following destinations:

- On-site schools
- Apartment complexes
- Subdivisions
- Commercial centers
- Hotels
- Transit stations
- Employment centers

Today, this has not been fulfilled. There is close-range access, with the bicycle and pedestrian paths, to all of these destinations above. (The transit station is interpreted as the bus stop by Celebration Place).

¹ Osceola County (2003) Development of Regional impact, Annual Report Celebration

Competitiveness

Since a part of the creation of a sustainable society is to make the people become less dependent on the car and use more environmental friendly transportation modes, it is interesting to see whether the alternative means of transport are competitive or not. The examination is done on the town of Celebration and not its surroundings. Public transport is left out in this analyze, since there is hardly any public transport in Celebration.

The competition evaluation is divided into four factors: time, health, economics and environment.

Time aspect

The time factor is strongest between the bicycle and the car. It takes a much longer time to walk from a starting point to a destination, than to bicycle or drive a car. However, there seemed to be many people walking in Celebration¹, which makes it important to compare the travel time of biking and driving a car with walking.

Medium velocity for bicycling is set to 16 km/h in the neighborhood and the speed of walking is set to 1.2 m/s². The cars velocity is set after the speed limits; 40 km/h on all roads except from Celebration Boulevard, where the speed limit is 56 or 64 km/h. When a route partly goes on to Celebration Boulevard, the time factor is approximately set to the medium speed of 48 km/h on the total route. The total travel time of the car includes approx. two minutes of extra time; one minute for going into the garage, getting in the car and driving out plus one minute for finding a parking spot at the destination, parking the car and walking to the exact destination point. This time factor has been based on our measurements of this, performed on several starting points and destinations in Celebration. Hence, all travel times with cars are added with two minutes. Since the NEV can be driven at speeds up to 27 mph³, which is 43 km/h, the NEV could be compared with the car and therefore there has not been any separate calculation of the NEV's travel times.

Bicycling and Car competitiveness

In table 6.9 the travel times that are quite equal; within one-minute difference, or when the bike has a lower travel time than the car, is marked with bold text.

	South	Village	East	Village	North	Village	West	Village	Cel.	Village
	<i>Bike</i>	<i>Car</i>	<i>Bike</i>	<i>Car</i>	<i>Bike</i>	<i>Car</i>	<i>Bike</i>	<i>Car</i>	<i>Bike</i>	<i>Car</i>
Centrum	7.3	4.9	7.6	5.0	8.9	5.6	4.6	3.8	1.9	2.8
Golf	8.1	5.2	8.4	5.3	8.1	5.2	3.5	3.4	0.5	2.2
Place	14.9	6.8	15.1	6.8	8.4	4.7	10.0	5.2	8.4	4.7
Health	12.7	6.1	13.0	6.1	10.5	5.4	8.4	4.7	8.1	4.6
Nursery	9.5	5.8	9.7	5.9	4.1	3.6	7.3	4.9	4.6	3.8
School	5.9	4.4	6.2	4.5	8.9	5.6	3.2	3.3	1.6	2.6
Univers.	5.9	4.4	6.2	4.5	8.9	5.6	3.2	3.3	1.6	2.6
Gymnas.	3.8	3.5	4.1	3.6	11.1	6.4	2.2	2.9	3.8	3.5
High	13.2	6.2	13.5	6.3	26.2	10.4	17.0	7.4	18.9	8.0
Office	6.5	4.6	6.8	4.7	17.3	7.5	7.8	5.1	6.8	4.7

Table 6.9 Travel time, in minutes, for the bike and the car

¹ Interview with Don Leptic, 030807

² Holmberg, Bengt & Hydén, Christer (1996)

³ Interview with Michael Prevost, 030809 – 030810

West Village and Celebration Village are those areas in Celebration from where the bicycle is competitive as a transportation mode. These areas are also the central areas in Celebration. For children who live in South or East Village, it is relatively competitively to ride their bike to the school and the gymnasium, instead of getting a lift from their parents. For parents living in North Village, who drive their children to the day nursery, it would be just as time effective to give them a lift on their bikes.

To all other destinations it is much more time effective to drive a car instead of riding a bike. That is when the bicycling speed is set to 16 km/h, as in table 6.9. Most adults and teenagers, who commute to school and work, bicycle at higher speeds such as 20 km/h. A comparison between travel time for the car and the bike, when the bike speed is set to 20 km/h is presented in table 6.10.

	South Village	East Village	North Village	West Village	Cel. Village					
	Bike	Car	Bike	Car	Bike	Car				
Centrum	5.8	4.9	6.0	5.0	7.1	5.6	3.7	3.8	1.5	2.8
Golf	6.5	5.2	6.7	5.3	6.5	5.2	2.8	3.4	0.4	2.2
Place	11.9	6.8	12.1	6.8	6.7	4.7	8.0	5.2	6.7	4.7
Health	10.2	6.1	10.4	6.1	8.4	5.4	6.7	4.7	6.5	4.6
Nursery	7.6	5.8	7.8	5.9	3.2	3.6	5.8	4.9	3.7	3.8
School	4.8	4.4	5.0	4.5	7.1	5.6	2.6	3.3	1.3	2.6
Univers.	4.8	4.4	5.0	4.5	7.1	5.6	2.6	3.3	1.3	2.6
Gymnas.	3.0	3.5	3.2	3.6	8.9	6.4	1.7	2.9	3.0	3.5
High	10.6	6.2	10.8	6.3	21.0	10.4	13.6	7.4	15.1	8.0
Office	5.2	4.6	5.4	4.7	13.8	7.5	6.3	5.1	5.4	4.7

Table 6.10 Travel time, in minutes, for the bike and the car

As one can see, there are a lot more destinations that can be reached with the bike in the same travel time as the car. To some destinations, bicycling is even a faster mean of transport than the car. It is highly competitive for adults to ride their bikes to their workplace at the school, the day nursery, the university, the gymnasium or in the office area at Celebration Boulevard, instead of driving. People living in North Village have to great geographically distances to be bike commuters, regarding travel time. The distances to the Celebration Place and Celebration Health, where many people work, are to far off to be in time benefit for the bike commuters.

The high school is located far from the villages, and is therefore not competitively compared to the car.

Walking competitiveness

The time it takes to walk between all starting points and destinations is considerably higher than the time it takes to drive a car or ride a bike. The walking speed is set to the mean walking speed of adults and teenagers¹, which is 1.2 m/s. Even if elderly walk at much lower speeds, that speed is used when travel time is calculated. This is because elderly are seldom working commuters, and for work commuting, travel time is one of the most decisive factors. From all origins there are totally 12 destinations with travel times at 15 minutes or less, see table 6.11.

¹ Holmberg, Bengt & Hydén, Christer (1996)

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	27	28	33	17	7
Golf	30	31	30	13	2
Plaza	55	56	31	37	31
Health	47	48	39	31	30
Nursery	35	36	15	27	17
School	22	23	33	12	6
Univers.	22	23	33	12	6
Gymnas.	14	15	41	8	14
High	49	50	97	63	70
Office	24	25	64	29	25

Table 6.11 Travel time, in minutes, by foot to all destinations

There is in general too long travel times for it to be competitive to walk to the workplace or the school; 50 % of the destinations are at a distance of at least 30 minutes of walking.

In appendix 6, an overall view of the reachability in Celebration is presented.

Health aspects

The same comparison is made between the bike and the car, and the car and walking. At this point it is interesting to look at all ages, especially walking for elderly, since it is a good way to exercise. The measuring unit is “calories”, for comparing used energy with different means of transport. It should be mentioned that biking or walking is a way to work up a good condition and shape, as daily exercise is well known to be good for the framework of the body, the heart and the mind.

The calculation is based on that a person generally burns 600 kcal in one hour of biking and 320 kcal in one hour of walking¹. Number of calories burned by driving a car is set to a total of zero, since the food that people usually snack on in the car, merely makes up for the low number of calories they are actually burning. The number of calories is simply multiplied with the travel time in table 6.10 and table 6.11 (chapter of Time aspect).

Biking

If a person commute to their workplace with their bike instead of the car, he or she will lose up to 83 808 kcal in one year, see table 6.12.

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	23 328	24 192	28 512	14 688	6 048
Golf	25 920	26 784	25 920	11 232	1 728
Plaza	47 520	48 384	26 784	31 968	26 784
Health	40 608	41 472	33 696	26 784	25 920
Nursery	30 240	31 104	12 960	23 328	14 688
School	19 008	19 872	28 512	10 368	5 184
Univers.	19 008	19 872	28 512	10 368	5 184
Gymnas.	12 096	12 960	35 424	6 912	12 096
High	42 336	43 200	83 808	54 432	60 480
Office	20 736	21 600	55 296	25 056	21 600

Table 6.12 Kcal burned by commuting with bike for one year

¹ Streetwise Traveler, Pär Halléus, The Mobility Office in Lund

It is difficult to see actual gain just by looking at a table of calories. Therefore, the next table, table 6.13, presents how many extra chocolate bars that a bike commuter can eat in one year. A 100-gram chocolate bar has, according to the National Food Administration in Sweden¹ and the Mobility Office in Lund², 560 kcal.

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	42	43	51	26	11
Golf	46	48	46	20	3
Plaza	85	86	48	57	48
Health	73	74	60	48	46
Nursery	54	56	23	42	26
School	34	35	51	19	9
Univers.	34	35	51	19	9
Gymnas.	22	23	63	12	22
High	76	77	150	97	108
Office	37	39	99	45	39

Table 6.13 Chocolate bars burned by commuting with bike for one year

If a child living in North Village bicycles to the high school 200 days in a year, he or she will be able to eat 150 extra chocolate bars. That is almost one extra chocolate bar every other day.

Walking

People that walk to their work places will lose many calories, since the travel times are much longer than for biking or driving. Table 6.14 shows calories burned while walking between different origins and destinations.

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	57 600	59 733	70 400	36 267	14 933
Golf	64 000	66 133	64 000	27 733	4 267
Plaza	117 333	119 467	66 133	78 933	66 133
Health	100 267	102 400	83 200	66 133	64 000
Nursery	74 667	76 800	32 000	57 600	36 267
School	46 933	49 067	70 400	25 600	12 800
Univers.	46 933	49 067	70 400	25 600	12 800
Gymnas.	29 867	32 000	87 467	17 067	29 867
High	104 533	106 667	206 933	134 400	149 333
Office	51 200	53 333	136 533	61 867	53 333

Table 6.14 Kcal burned by commuting by foot for one year

The numbers of calories are much higher than in table 6.12, for bike commuters, even if bicyclist burns more calories an hour than walkers do. However, walkers burn their calories during a longer time, since it takes a longer time for them to reach their destination. The number of chocolate bars a walker may eat is presented in table 6.15.

¹ Homepage of the National Food Administration in Sweden, www.slv.se; Mat och hälsa

- Livsmedelsbasen - Sök i livsmedelsbasen

² Streetwise Traveler, Pär Halléus, The Mobility Office in Lund

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	103	107	126	65	27
Golf	114	118	114	50	8
Plaza	210	213	118	141	118
Health	179	183	149	118	114
Nursery	133	137	57	103	65
School	84	88	126	46	23
Univers.	84	88	126	46	23
Gymnas.	53	57	156	30	53
High	187	190	370	240	267
Office	91	95	244	110	95

Table 6.15 Chocolate bars burned by commuting by foot during one year

The destinations, which have the highest number of lost calories, are the high school, the Celebration Place and Celebration Health. People from North Village have the longest distances to their destinations, and are consequently those who have the opportunity to burn most calories.

This might be a very rough way to calculate the winnings in health by walking or biking, but still it shows how easy it is to improve one’s physique and shape just by choosing another way to commute, than driving a car.

The kcal needed to walk and bicycle to work and school can be simplified as body fat. To reduce one kilogram of body fat an energy deficit of 7000 kcal is required¹. The amount of kg fat reduced in one year is shown in tables 6.16 and 6.17.

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	8.2	8.5	10.1	5.2	2.1
Golf	9.1	9.5	9.1	4.0	0.6
Plaza	16.8	17.1	9.5	11.3	9.5
Health	14.3	14.6	11.9	9.5	9.1
Nursery	10.7	11.0	4.6	8.3	5.2
School	6.7	7.0	10.1	3.7	1.8
University	6.7	7.0	10.1	3.7	1.8
Gymnasium	4.3	4.6	12.5	2.4	4.3
High	14.9	15.2	29.6	19.2	21.3
Office	7.3	7.6	19.5	8.8	7.6

Table 6.16 Kg of reduced fat per walk commuter in a year.

Commuters will burn as much as 29.6 kg fat in a year when choosing to walk instead of driving to work or school.

These figures only give rough estimations on how healthy it is to choose to walk or bike instead of driving to the destination. Of course, this is very simplified - a person that is not overweight, will of course not lose 30 kg during a year of walking to work. All people exercising will build muscles and improve their condition.

¹ Drummond, Sandra (2002)

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	3.3	3.5	4.1	2.1	0.9
Golf	3.7	3.8	3.7	1.6	0.3
Plaza	6.8	6.9	3.8	4.6	3.8
Health	5.8	5.9	4.8	3.8	3.7
Nursery	4.3	4.4	1.9	3.3	2.1
School	2.7	2.8	4.1	1.5	0.7
University	2.7	2.8	4.1	1.5	0.7
Gymnasium	1.7	1.9	5.1	1.0	1.7
High	6.1	6.2	12.0	7.8	8.6
Office	3.0	3.1	7.9	3.6	3.1

Table 6.17 Kg of burned fat per bike commuter in a year.

Commuters will burn as much as 12 kg fat in a year when choosing to bicycle instead of driving to work or school.

Economical competition between transportation modes

According to Osceola County traffic engineer Don Leptic¹, the total automobile operating costs average 0.34 \$/mile (1.70 SEK/km), including gas. The total operating costs for bicycles is 0.4 SEK/km, according to Pär Halléus, at the Mobility Office in Lund². The cost of walking to the destination is 0 SEK, apart from the cost of worn out shoes. The total operating costs per year, without carpooling, on the commuters' routes are shown in table 6.18 below.

	South Village		East Village		North Village		West Village		Celebr. Village	
	Bike	Car	Bike	Car	Bike	Car	Bike	Car	Bike	Car
Centrum	311	1322	323	1371	380	1616	196	832	81	832
Golf	346	1469	357	1518	346	1469	150	636	23	636
Place	634	2693	645	2742	357	1518	426	1812	357	1812
Health	541	2301	553	2350	449	1909	357	1518	346	1518
Nursery	403	1714	415	1763	173	734	311	1322	196	1322
School	253	1077	265	1126	380	1616	138	588	69	588
Univers.	253	1077	265	1126	380	1616	138	588	69	588
Gymnas.	161	685	173	734	472	2007	92	392	161	392
High	564	2399	576	2448	1117	4749	726	3084	806	3084
Office	276	1175	288	1224	737	3133	334	1420	288	1420

Table 6.18 Total annual operating costs, in SEK, per commuter.

Expectedly, it is more expensive to drive a car to work, than to ride a bike. In Sweden, the cost to drive 10 km is 25 SEK. Compared to 17 SEK for ten km in the US, it is, not surprisingly, much cheaper to drive a car in America. Some routes pay off more than others do. Table 6.19 show how many McDonalds Double Cheese Burgers a person can afford to eat, if the person rides a bike instead of driving.

¹ Interview with Don Leptic, 030807.

² Interview with Pär Halléus, 030603.

	South Village	East Village	North Village	West Village	Celebr. Village
Centrum	126	131	155	80	94
Golf	140	145	140	61	77
Place	257	262	145	173	182
Health	220	225	183	145	147
Nursery	164	169	70	126	141
School	103	108	155	56	65
Univers.	103	108	155	56	65
Gymnas.	66	70	192	38	29
High	229	234	454	295	285
Office	112	117	300	136	142

Table 6.19 Number of Cheeseburgers a commuter can afford per year

Worthy to mention is that children, who decide they want to bicycle to the high school instead of letting their parents give them a lift with the car, can without feeling guilty ask their parents for **454 double cheeseburgers per year**.

The NEV has an average operating cost of 0.05 \$/mile¹, which is about 0.25 SEK/km. Table 6.20 shows the operating costs per year and commuter.

	South Village	East Village	North Village	West Village	Celebr. Village
Centrum	194	202	238	122	50
Golf	216	223	216	94	14
Plaza	396	403	223	266	223
Health	338	346	281	223	216
Nursery	252	259	108	194	122
School	158	166	238	86	43
Univers.	158	166	238	86	43
Gymnas.	101	108	295	58	101
High	353	360	698	454	504
Office	173	180	461	209	180

Table 6.20 NEV: Annual operating costs, in SEK, per commuter.

The NEV is much more competitive to the bike than the car is. Even so, it is much cheaper driving the NEV instead of biking, especially since several people can share a NEV – NEV pooling.

¹ Litman, Todd (1999)

Environmental competition between transportation modes

The air pollutions created by motor vehicles have local effects, on humans, plants and materials, and global environmental effects, especially the greenhouse effect. Motor vehicles pollute the air with emissions, including¹:

- hydrocarbons (HC)
- nitrogen oxides (NO_x)
- carbon monoxide (CO)
- carbon dioxide (CO₂).

When a mixture of hydrocarbons and nitrogen oxides, principally nitrogen dioxides (NO₂), react in the presence of sunlight, they form ground-level ozone², O₃. The ground-level ozone is harmful for materials, plants and humans. As a result of the ozone impact, plants grow slower and materials, such as cotton and cellulose, are weakened. The most obvious effect on humans is deteriorated breathing function, which especially affect people with asthma, and new research show an effect also on heart and blood vessels³. CO₂ is a gas that contributes to the greenhouse effect.

The emissions of HC and CO are of different level depending on if it is driving in town centers or on country roads. NO_x and CO₂ do not vary as much depending on the road type⁴. According to EPA⁵, the average exhaust emission of CO₂ for an American car in 2000, was 0.916 pound per mile. This equals 258.23 grams per km, using the conversions 1 pound = 453.6 grams and 1 mile = 1.609 km. Continually, these values are multiplied with the route distances.

The exhaust emission of CO₂ between the Villages and different destinations is shown in the table 6.21. The table shows how many kg of emitted CO₂ people save if they choose to walk- or bike commute for a year, instead of driving a car.

	South Village	East Village	North Village	West Village	Celebration Village
Centrum	100	104	123	63	26
Golf	112	115	112	48	7
Plaza	205	208	115	138	115
Health	175	178	145	115	112
Nursery	130	134	56	100	63
School	82	86	123	45	22
Univers.	82	86	123	45	22
Gymnas.	52	56	152	30	52
High	182	186	361	234	260
Office	89	93	238	108	93

Table 6.21 Kg of CO₂ emitted, during one year, when driving to a destination.

¹ Ljungberg, Christer, Sjöstrand, Helena & Smidfelt, Lena (1994)

² Warfinge, Per (1997)

³ Nyberg, Fredrik (2000).

⁴ Ljungberg, Christer, Sjöstrand, Helena & Smidfelt, Lena (1994)

⁵ United States Environmental Protection Agency, Office of Transportation and Air Quality (2000)

The figures are calculated per car, not per person, which means that the figures may be slightly lower if calculated per person. The amount of emitted CO₂ is proportional to the travel length, therefore the highest emission, 361 kg of CO₂ in a year, comes from traveling between North Village and the high school.

Americans drive an average of 13,500 miles per year¹. This equals 21,600 km per year. With the knowledge of the average CO₂ emission per driver, 258.23 g per km, the total emission per driver is 5578 kg per year. At the most, the Celebration resident could save 6.5 % of their total car emission a year. Since 60 % of the residents in Celebration say that they have decreased their total travel length to school or work after they moved to Celebration, see chapter 6.4, they subsequently decreased their total emission a year (if they did not increase their leisure time trips). This leads to that the percentage of saved emission would almost certainly be higher than 6.5 % for the Celebration citizens.

The NEV does not produce any local emissions at all, and could therefore be seen as a environmental friendly substitute to the car, which is used as an alternative by many of Celebrations residents.

Conclusions

How well is the pedestrian and bicycle network planned and constructed?

TRAST and Streetwise Traveler

The quality of the pedestrian network and the bicycle network have mostly reached green and yellow standard. The pedestrian network has generally a very satisfying quality; that is mainly green, except from the distances within the main network and the effect of the barriers of the crossing entrance. These properties have both yellow standards. Only two properties have red standard, namely; the distances within the local pedestrian network and the directness of the main bicycle network. This is something that the Celebration town board especially should revise and improve.

The competitiveness between the auto and the bicycle and pedestrian traffic is at some aspects adequate. Of all aspects, the health aspect is the most competitive, between car drivers and pedestrians and bicyclists. The time aspects is at some routes satisfying between the car and the bicycle, but not for pedestrians. The environmental competition is naturally strong for the non-motorized modes. The economically factor is not a good argument for not using the car, since it is inexpensive to possess and drive a car in the US, and the people in Celebration can most certainly afford it.

The agreements with the county

Does Celebration achieve the agreements, about the pedestrian and bicycle traffic, with the county, presented in on page 29?

According to the assignments given by the county, described in chapter 3.5 on page 29, the developer of Celebration is assigned to provide the town with a system for cyclist and pedestrian circulation. The system should be constructed with viable bikeways for cyclists and

¹ Alliance of automobile manufacturers: www.automobile.org, Fuel economy – Global facts

be coincident with the development, since there are no special rooms for bike parking. Access shall be provided to facilities like: schools, apartments, commercial centers, transit stations and employment centers. Parking facilities for bicycles shall also be provided.

In reality, Celebration has not reached all their goals. As a cyclist or a pedestrian, you can reach every destination in Celebration. There are parking possibilities at almost all places, but there is no parking at the Celebration Place, where the only bus stop is, and where many people work. The bikeway system is mostly straight and has a good view, except from two places: at the bridge at Celebration Avenue, where the path becomes too narrow because of the streetlights, and at a place in North Village, where a curb in the path decreases the view and the mobility.

Sustainability

+

The pedestrian and bicycle network is creating good mobility and reachability within Celebration.

The separation of the pedestrian and bicycle network and the car network creates a safe traffic environment.

The bicycle is rather compatible with the car, concerning health, travel time and environmental reasons.

The paths are wide enough, to create a good mobility.

To walk is very compatible with driving a car, concerning health and environmental reasons.

The network is very tight, which increases the flexibility on the residents' route choices.

The surroundings of the network in Celebration are more beautiful than the traffic network in America in general. This invites people to walk and bicycle.

-

The bicycle is not compatible with the car, concerning economics.

The segways and the scooters are more compatible with bikes and walking than with the car, which might make people, which all ready walked or bicycled, choose an unhealthy and unsafe mean of transport.

At many places, there are too few bicycle park stands.

The barriers restrain the residents from walking or bicycling at all places.

There are some paths, which should be included in the main network and have the width of 2.45 meters.

There could be more free spaces. For example, the Market Street could be developed into walking area only: in Swedish "Gågata" (i.e. walking streets, no cars).

6.4 Celebration surveys

This is a summary of the surveys that was a part of the material Mike Prevost shared with us. Mike's comments are not included, only the data.

Survey made by Mike Prevost, November 1998¹.

This survey is made from 50 random Celebration households. The list of households was made to select locations among all the housing types in Celebration. The purpose with the survey was to determine if Celebration residents were realizing some of the intended outcomes of the developer's stated objectives. At that time, in 1998, the existing villages in the community were: Celebration Village, West Village and North Village.

The survey indicates that 90 % of the respondents walked or biked to places more than they did in their last community.

60 % of the respondents declared that they had a shorter distance to work or school after moving to Celebration.

In the survey, residents were asked to compare their experiences of personal safety in Celebration to the last community in which they lived. 8 % of the residents felt less personal safety, 26% did not feel any different, and 66 % felt more personal safety in the community.

72 % of respondents felt that the average incomes in Celebration were greater than in their last community. Regarding the diversity of incomes, 38 % of respondents felt the incomes were less diverse than in their last community, and 48 % felt incomes were more diverse in Celebration.

More than half, 62 %, of those surveyed interacted more with neighbours than they did in their last residence. They also felt more affinity for the community as a whole. The amount of interaction and affinity for the community is correlated to the length of residency in Celebration.

Survey made by Nick Frantz, April 1998².

The Frantz survey indicates that personal safety was one of the highest rated reasons for choosing to live in Celebration. The survey found that the community school was the most important community issue after personal safety.

6.5 Sustainability according to Swedish and American planners

Several planners in both America and Sweden were interviewed about their opinions on Celebration. In this way, a practical experience and knowledge could be gathered to the final evaluation.

¹ Prevost, Michael (1998)

² Prevost, Michael (1998)

American city planners

Interviews were made with two people from Celebration: Geoffrey Mouen and Michael Prevost, and with one who lived outside of Celebration: Don Leptic.

Interview with Geoffrey Mouen, Former town architect of Celebration, 030805 – 030815. Mr. Mouen has lived in Celebration for many years and is regularly working on its design.

Geoffrey Mouen believes that the main benefit of the Celebration structure is a better individual health of the inhabitants. The ecological benefit, he believes, was not that big. Geoffrey Mouen also says that the transportation system was not a main issue while planning Celebration, and he thinks that improvements could be made.

Interview with Michael Prevost, landscaping architect in Celebration, 030809 – 030810. Mr. Prevost has lived in Celebration for a long time, and has done research on the town in an early stage.

Michael Prevost speaks mostly about drainage of the wetlands and landscaping. He has not much to add about the sustainability of the transport system.

Interview with Don Leptic, traffic engineer, Osceola County, 030807. Mr. Leptic has seen Celebration taking form since its planning phase. He is very familiar with the traffic of Celebration.

Don Leptic believes that the internal traffic system of Celebration is sustainable. He adds to it, that the next phase of Celebration might cause problems with the new size of Celebration and its traffic not being accommodated on the external roads. There are people working on these problems, evaluating if there will be a problem with big flows and how it can be solved.

He believes that the internal system of NEVs is a way to reach a sustainable development, and that it is a good alternative to the car. There is one problem with the NEVs, he believes, and that is its limitations. A NEV cannot be driven outside of the town of Celebration, since it does not exceed 50 km/h. Therefore, it cannot be driven to the high school, since the Celebration Boulevard has higher speed limits. Consequently, the NEV is not very accessible, and do not contribute to a sustainable Celebration for those people who work on Celebration Boulevard or outside Celebration.

Don Leptic thinks it is nice that the people in Celebration walk to their destinations. He does not have any statistics on this, but the county has made observations in Celebration. The result showed that many more people walked in Celebration, and especially adults, compared to the county and USA in general. He does not believe that the traffic system of Celebration has a great impact on car reducing factors. He believes that the car drivers drive slower in Celebration, but drives like every other American outside Celebration. As a negative side of the system in Celebration, he adds, is that the Celebration car drivers might drive even faster, since they are forced to drive more slowly in Celebration and likes the opportunity of driving faster outside the town.

Further, Don Leptic explains that there are two sides of Celebration: one part that is representative to TND, and another part that is very much like the general traffic planning of USA. Celebration do have two or three alternative routes to reach exterior roads and has a mixed-use, which is typical for a TND, but on the other hand, Celebration has cul-de-sacs and

certain areas only have one access point, which is not very different from the general traffic system of USA. Additionally, Mr Leptic thinks that Celebration has some traffic calming measures that are functional, and he believes that Celebration has more aesthetic features of the streets, for instant: street trees.

Finally, Don Leptic says: "The infrastructure and the atmosphere of road 192 and Celebration are like two different worlds, there is not much of a contact between them."

Swedish city planners

Interviews were made with one traffic planner: Lars Nilsson, and one urban planner: Per Björkeroth.

Interview with Lars Nilsson, traffic engineer, Tyréns AB, Helsingborg, 031015. Mr. Nilsson is one of the people creating TRAST. He has a long experience of the affects of different traffic networks.

Lars Nilsson noticed that Celebrations traffic system is not very different from the traditional Swedish traffic system. He believes this is good, since the American traffic system revolve to around the car. Further, he says that they should be concerned with how they plan the town, that it is does not become too elaborated.

The traditions of American and Swedish traffic planning are very different, Lars Nilsson continues. He believed that it is hard to compare the country's traffic systems, since they are so dissimilar to each other. One thing that is similar between Celebration and a Swedish town is the mixed-use, which is of strong current interest in Sweden. The ideas of Celebration and TND could be compared to the ideas of the book: "City planning – instead of traffic planning and house localization planning"¹.

A clear difference between American and Swedish traffic planning is, for instant, the public transport. The public transport is not very big in America, and it is not as natural in America as it is in Sweden. He thinks that Celebration does not have much of a public transport and that they ought to be thinking more about establishing it more. The bus should go into the town, passing the center and continuing into west and east village, going all the way down on Nash Drive. This could make it much easier for people to commute between Celebration and Kissimmee.

Further, Lars Nilsson believes that the physical conditions of Celebration are good enough, to create a sustainable transport system. The destinations are below 5 km, the town has a tight structure and the traffic flows are not big enough to create barrier effects. Continually, he says, that he is anxious about Celebration Boulevard being to hard to pass for people biking or walking to their jobs on the northern side of the road. It is important to create a good continuity all the way to the office area. The largest barrier, he believes, is road 417. This road makes it impossible for people walking or biking out of Celebration.

¹ The Swedish National Board of Housing, Building and Planning (2002)

Finally, Mr. Nilsson would rather use a different division of the street types: The model he would use has the following types of streets:

- Gårdsgata (Low-speed street)
- Lokalgata (Local street)
- Stadsgata (Town street)
- Bilgata (Car street)
- Trafikled (Fairway)

The unprotected road users and the car users have different ranked status to the streets, see figure 6.5. The reason why this model ought to be used, he says, is that it makes it easy to communicate with the general public.

<u>Street type</u>	<u>Priority to the unprotected road user</u>	<u>Street type</u>	<u>Priority to the car user</u>
Gårdsgata	100 %	Gårdsgata	0 %
Lokalgata	75 %	Lokalgata	25 %
Stadsgata	50 %	Stadsgata	50 %
Bilgata	25 %	Bilgata	75 %
Trafikled	0 %	Trafikled	100 %

Figure 6.5 The priority between unprotected road users and car users

The biggest challenge, according to Mr. Nilsson, is to change people's behaviours. Celebration is in need of not only physical planning to reach sustainability, but also Mobility Management and a long-term influence on behaviours.

Interview with Per Björkeroth, university lecturer in Urban planning, Institute of Architecture, Lund, 031016. Mr. Björkeroth has a good knowledge and experience of city planning, and is also familiar with New Urbanism and the town of Celebration.

The urban community should be built with density, says Mr. Björkeroth. He mentions that societies, not only in Sweden but the whole western society, of today goes toward more and more separate small households. It is not like sprawl but it is less dense than the desired density, with apartments and multifamily houses. Per Björkeroth means that Celebration has a lot of small households and not many apartments, and he calls it a "lack of urbanity". The reason might be that Celebration wants to create a "small town" atmosphere. A denser town planning is also, according to Mr. Björkeroth, a prerequisite for a well-functioned network of public transport.

The parking lots, surrounded by retail buildings, in the town center might be a step forward for American town planning, but in Sweden it would be an emergency solution, according to Per Björkeroth. He says that the whole planning system, with New Urbanism, is clearly new to the Americans, compared to Swedish and European planning. This is in the past based on that European town cores are much older and Europe has an older urban tradition.

Mr. Björkeroth believes that the town plan is intended for a certain social target group. This, he says, is because the people who live there are upper middle-class and upper class. The golf course and its location give the town a certain character, according to Per Björkeroth. The character is fortified by the high house prices, creating a feeling of a wealthy community. Such social instability is something that Mr. Björkeroth thinks must be avoided.

What Mr. Björkeroth says is that the planning is based from a handbook and not from the site. He refers to the dissertation by Mats Hultman¹.

Urban recreation is an important part in the planning of a community, says Mr. Björkeroth. This means that instead of going for a recreational trip in the weekends, the recreation should be in the neighborhood and close to ones residence. This also gives a stronger feeling of a community. Per Björkeroth thinks that more can be done in this matter.

¹ Hultman, Mats (2002)

7 Does New Urbanism achieve a sustainable transport system?

To answer our main question; if New Urbanism has good ideas on how to plan a sustainable transportation system, the methods of New Urbanism have to be analyzed both theoretically and practically. The evaluation is based on the network analysis, the surveys, the opinions of traffic planners and architects and the theoretical study of New Urbanism.

7.1 Does New Urbanism achieve a sustainable transportation system theoretically?

To answer the question theoretically, New Urbanism, with its methods, is reviewed to see how well it corresponds with the traffic measures from chapter 2.2.

Tackle the problem at the source. New Urbanism does not really encourage people to use the most environmental friendly motorized vehicles there is. The ideas of New Urbanism do not prevent people driving their car everywhere; they only make it possible to walk and bicycle and to use public transport. Since New Urbanism is a belief that the car is actually the main problem in the American city planning, they do not really tackle the problem at the source: the car. They could work more with hybrids automobiles and other vehicles that resembles the car, but are environmental friendly, in addition to “walking, bicycling and using public transport”.

Reduce and affect car usage. Decreasing travel length and therefore reducing car usage is the main method for purpose of the TND design. New Urbanism does not really work with soft measures to affect the car usage. Instead, the design methods of New Urbanism are supposed to reduce car usage, as people choose to walk or bicycle and use public transport instead of driving, and since the mixed-use and short distances in the town affect the travel length. With the design of the streets, New Urbanism wants to affect the car usage: lower the vehicle speeds, to make other means of transportation more competitive with the car, regarding travel time. There is no information from the CNU on how to drive more economical, but the CNU inform about and work with car-pooling, as a good method to reduce car usage.

Better alternatives to the car. New Urbanism put the effort into creating a development or a town where people have the possibility to walk or bicycle, instead of driving. They encourage car pooling by information and working with car-pooling lanes etc. In this way, New Urbanism wants to reach an increase traffic safety within the town borders, and making the environment in the town nicer. Public transport is a fundamental part of New Urbanism and especially TOD.

Selective access to roads and streets. New Urbanism uses selective access to roads and streets.

Reinforce the kind of service that helps to fulfil the goals. New Urbanism has several methods, books and practical studies¹ that present how to improve communication and the collaboration between local authorities, financing policy and research. The author and the CNU member; Peter Calthorpe, is known for supporting the arguments of the important of regional planning².

7.2 Does New Urbanism achieve a sustainable transportation system in reality?

In this chapter, the practice of New Urbanism is evaluated with Celebration as study object.

Before Celebrations transportation system is evaluated, it is sorted out if Celebration is a good example of a TND. If that is not the case, one could not ascertain whether New Urbanism achieves a sustainable transportation system in reality.

Is Celebration a good example of a Traditional Neighborhood Development?

In this chapter, Celebration is evaluated, to see if the town is built with TND-standards.

Street design

Celebration has the typical street design of a TND.

Pavement Design

The pavement is concrete, everywhere, except from the wooden paths in the wetlands.

Sidewalks and Pedestrians

All bike and pedestrian paths are separated. In the local network the width of the paths are 1.5 meters (5 feet) and in the main network the width is 1.8 meters (6 feet). TND guidelines are fulfilled.

Bicyclists

According to the TND guidelines, bicycle traffic could be mixed with motorized traffic, but only in the local network. This is however not required. Celebration has a mostly separated system, with the exception of the alleys and the Market Street area, where bicyclists are lead out on the motorized streets. Consequently, Celebration fulfil the TND guidelines.

Transit

There is almost no transit in Celebration. Transit is a main issue of a TND, the guidelines of a TND says that transit ought to exist. In this view, Celebration does not fulfil the fundamental ideas of a TND.

Parking

Parking spaces and garages are hidden behind buildings and residential houses, which is typical for a TND.

¹ Congress for the New Urbanism (2000)

² Calthorpe, Peter (2000)

The roads of a TND have on-street parking, to reduce the speed of motorized traffic. Further on the narrow streets calm the motorized traffic, and since the on-street parking makes the street narrow, the speeds are low. Although, in the areas where no cars are parked along the streets the motor traffic is encouraged to higher speeds. The TND is fulfilled, but it does not always work.

Planting Strips and Street Trees

There are planting strips and street trees all over Celebration. TND is fulfilled.

Lighting

Streetlights should rather be short and several, than high, with intense light. This is fulfilled in Celebration.

Resolution of Conflicts

Non-vehicular users are prioritized whenever there is a conflict between car-users and unprotected road-users. This is fulfilled, since all car drivers stop for bicyclists and pedestrian, at least during the two weeks while we did our field study (both at the times when we were pedestrians and when we were driving and observing other drivers behaviour patterns).

Conclusion

Celebration is over all a good example of a TND, but the lack of a good transit system keeps Celebration from fulfilling the fundamental requirements of a TND. The bus stop by Celebration Plaza is too far from the Villages, and it has no bike parking close by. Therefore, the bus system is not compatible with the car: biking or driving to the bus stop, waiting for the bus and then going by bus to the destination takes a much longer time than driving a car. It is also too far to the bus stop for parents to let their children ride the bus by themselves.

To summarize, it is, technically speaking, acceptable to make the statement that Celebration is an example of a TND, apart from the lack of a good transit system. This statement is acceptable since almost all other parts of a TND are representative for Celebration.

Of course, there are other non-technical measures, that Celebration fulfils or do not fulfil; for example it ought to have a more mixed-income population, which the secondary area is making even harder to achieve, since multimillion-dollar houses are built there. In this evaluation this is not evaluated, please see the list of References under “Inspirational reading” for readings on those kinds of evaluations.

A sustainable transportation system?

In our discussion, we start with analyzing how well Celebration lives up to the Smart Growth principles, the Strength Value rose and the sustainability principles, see chapter 2.1. We would like to divide Celebration into two areas: the first area contains the “Old Celebration”: Celebration Village, West Village and South Village. The rest of the neighborhoods we call the secondary area: North village, East village, and the very west part were the high school are and the future resort will be located. North Village is left out from the primary are, even if it was constructed in the very beginning, because of its resemblance with the other parts of the secondary area. The reason why we do this division is that “Old Celebration”, the primary area, looks somewhat different from the secondary area. It almost feels like the principals of planning Celebration as a sustainable town, and a TND, was forgotten in the later years of development; in the secondary area.

Smart growth - sustainability

The neighborhoods in the primary area is built more in compact form, than in the secondary area, where the houses are much bigger and there are few or no apartments houses. North Village has more multifamily houses, but does also have big areas of very large single-family houses.

In the primary area, the balance between the auto, pedestrians and bicycles is good. It is close to Market Street and rather close to the office areas. The secondary areas are not only far from Market street and some parts of the office area, and the path network and the motorized road network is not very tightly planned either. In the primary area there are several different routes to choose between, to reach a destination, but in the secondary area there are only one or perhaps two choices of routes.

There is no existing infrastructure from the start, to enhance and maintain, and therefore there is no need to fulfil this principle. There are, however, thoughts of tearing down houses, which were constructed in the very beginning, 1995, since the value of the land has increased a great deal. If this is done, Celebration loses its smart growth, according to the principles in chapter 2.1. On the other hand, if they tear down big houses and build the new areas more compact, Celebration will at least live up to the principle of compact neighborhoods, in the secondary areas. Further, the secondary area of Celebration is becoming more and more like traditional sprawl with the cul-de-sacs and the over-large houses. The only thing, in the secondary area, that keeps it from being “sprawly” is that the houses lie very close to each other, there are not yet any large house lots connected to the buildings.

Celebration has in especially the primary area a mixed-use and a mixed density. Unfortunately, there is a long distance from all starting points in Celebration to the nearest transit service. Celebration does not fulfil the principles of having a mixed-income housing, since the prizes have increased rapidly, and since the county, in the planning phase, demanded that Celebration would be made into a high-income neighborhood.

The wetlands and the nature has become a part of Celebration. The water of the wetlands are used for big ponds, were birds and alligators lives. The wetlands are preserved and people can walk through it, but only on specific wooden paths, see illustration 4.1, in page 38.

The Market Street is built as a traditional downtown and is an important part of Celebration. The process of building Celebration is rather predictable; it has a good economic foundation. The information about the process and the proceedings is sometimes lacking, since the county does not always know where the next development action leads¹.

Strength

According to the Value rose, chapter 2.2, Transport labor “closeness to a lot”, Accessibility for Public transport, Traffic (handicap, safety, noise) and Accessibility for the car must be fulfilled. Within Celebration, it is over all rather close to all destinations. There are no big problems for physically challenged people in wheelchairs to move within the town, but blind people might have a hard time, since there are no good tactile surfaces to lead them. The town is rather safe and there is not much noise from traffic. There is almost no Public transport, and therefore Celebration is not accessible for people using Public transport. It is, though, very accessible to use the car everywhere in Celebration.

¹ Interview with Don Leptic, 030807.

Sustainable transportation system

These traffic measures are presented in chapter 2.2, and below they are followed-up.

Tackle the problem at the source. Celebration chooses to use NEVs instead of the car. It is, from our observations, a common and well-used vehicle within the town borders. The NEV is clean, economical and quiet. One might discuss how safe it is, but there has not yet been any reported accidents involving NEVs.

Reduce and affect car usage. With the fundamental design of Celebration, the general travel length is reduced, according to the survey by Mike Prevost. Since there are almost no public transport in Celebration, an affect on the peoples choice to travel with public transport can not be done. It has been done, though, on people's choice of biking and walking instead of driving, according to observations made by Don Leptic and the survey by Mike Prevost.

Better alternatives to the car. There is almost no public transport, and there are no figures or observations on any car-pooling made in Celebration. Bicycling is a good alternative to the car; health wise, time wise and for the sake of the environment.

Selective access to roads and streets. There are different road classes in Celebration that work rather well.

Reinforce the kind of service that helps to fulfil the goals. The communication and the collaboration between local authorities, financing policy and research are not at all good and needs to become stronger and more thoroughly worked out.

Consequently, Celebration achieves a sustainable transportation system in some areas, but there are many needs to fulfil before it can be stated as a good example of a sustainable town.

Conclusion

We believe that Celebration has great possibilities to become a sustainable society with a sustainable transportation system, but today Celebration has not achieved it, especially concerning the lack of good transit.

7.3 How could Celebration reach a sustainable transportation system?

If the Celebration town board wants to reach a sustainable transport system, they should put an extra effort on the traffic measures.

Guidelines

The communication and collaboration between the county and the town board could be reinforced. Don Leptic said in his interview¹, that he did not always know the new plans and processes of Celebration.

Since Celebration is built from scratch, it is easy to plan the whole transport system fundamentally already from the beginning. The possibility was there, but the planners did not really use it. Some calming measures were taken, but, for example, no transit station was created. However, the town was planned for short distances to all destinations, mixed-use was built from the beginning and retail was encouraged. All of this decreases the travel length, and makes people walk to their destinations. This ought to reduce the car usage, but according to Don Leptic², it has not been affected at all, except for that the Celebration people more often walk or bicycle to their destinations. We disagree about this: we believe that people use their car more seldom in Celebration than in other cities. The NEVs are only usable in a town like Celebration, since the speed limits are low enough. Since people in Celebration possess and use NEVs, the car usage is clearly affected and reduced. Also, according to the Michael Prevost survey³, 90 % of the people in the primary of Celebration walk and bicycle more often than they did in their last community. Complementary, 60 % of these people have a shorter commute to work or school in Celebration. If these people do not travel more during their spare time, their car usage has undoubtedly decreased, since their total travel mileage has relatively been reduced.

The NEVs and the possibilities to walk and bicycle are better alternatives to the car. Celebration should work on the parking areas of bikes, since this needs to be complemented. Since there are almost no public transports, this is the main issue, which the Celebration town board should work on reaching a sustainable transportation system.

There could be many small physical measures on the transportation system that would make the whole system better. For example, the speeding problem could be solved at some streets by planting trees between the parking lots on the streets. If there are no parked cars at these streets, the trees will work in the same way the cars will; lowering the speed by making the room of the street smaller, see figure 7.1.

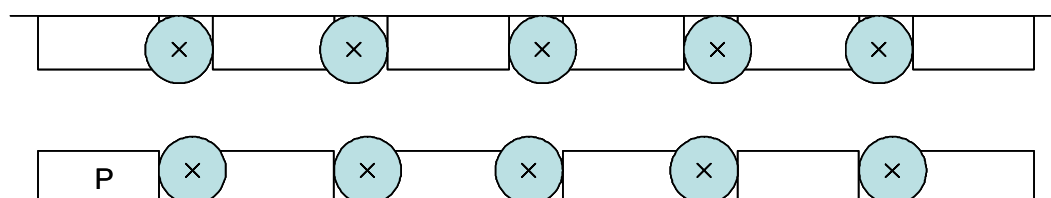


Figure 7.1 Principal drawing of how to decrease the street room

¹ Interview with Don Leptic, 030807

² Interview with Don Leptic, 030807

³ Prevost, Michael (1998)

Other small measures are for example better tactile surfaces, traffic lights at the crossing at Celebration Boulevard, bike parking at Celebration Place etc. In this report, we do not list all small measures, since the problems are stated and the measures that ought to be taken are somewhat obvious for traffic planners.

The access to roads and streets have been discussed above; the primary area fulfils the principle, but not the secondary area. According to Lars Nilsson, the continuity for the bike and pedestrian paths could be better if Celebration Boulevard were easier to cross. We think that Celebration has a very nice bike and pedestrian path network, and that there are only minor things that should be arranged, such as better parking areas and Bike & Ride lots. Concerning road classification, Lars Nilsson says in chapter 6.5 that the street types ought to be divided into the model that is presented in the same chapter. Our thoughts on this is that Celebration is a small town, and the network is not very complicated, and is therefore in no need of a new classification. We think that the secondary area is not very accessible, and ought to be worked on to achieve the goals of having different types of roads. At some places, the roads lead only the people living in the area to those areas. This could make the area become close to something like a gated community, especially Artisan Park, Aquila Reserve and the southern parts of North Village, see appendix 1.

Main measures

Since Celebration is doing relatively well on distributing a town where people can walk and bike to their destination, as well as having a well-working system of electrical cars as an alternative to the traditional car, there is simply just two major ways for Celebration to get closer to the goal of having a sustainable transportation system. The first measure is to create a working transit system for the people in Celebration. The second approach is to affect the traveling behaviour of the Celebration residents even more.

Measure 1: Celebration – TND and TOD?

The best way of making Celebrations transport system sustainable, we believe is to complement it with a TOD. The radius of a TOD should be about 600 meters. The part of the town that lies outside of the circle is the secondary area and has special design requirements, according to TOD. We will give the secondary area; East village, South village and North village, public transport as well, but with the standards of a TND: the pick up area at all bus stops have the radius of 400 meters, see chapter 5.2.

From the center of Celebration, just next to Market Street, at the side of Stetson University, the edge of the radius would almost reach the whole primary area. Celebration is already almost formed as a half circle, and is therefore already compatible with the ideas of a TOD. The transit would be an extension of the regional bus route 56, see chapter 6.2, and it would have a big transit station in the middle of Celebration. As a suggestion, Celebration is divided into two pick-up areas:

- The Primary part. Celebration Village, West Village and the Market Street Area. (becomes the TOD)
- The Secondary part. The villages of North, East and South and the office area by Celebration Boulevard, Celebration Health and Celebration Place. (has the standards of a TND)

The bus will take the following route, see appendix 7: from the U.S. 192 it turns into Celebration Avenue and follows it down to Celebration Boulevard in North Village. Here it travels up a bit on the Boulevard, makes a U-turn and goes back to Celebration Avenue. Then it follows Celebration Avenue all the way, passing the Market Street Area, and making a turn onto Waterside Drive. From here, it goes up to Celebration Boulevard, makes a right and goes onto Celebration Place road all the way to Celebration Place. From here, it goes onto its ordinary route, following Celebration Place road to the U.S. 192 again. The main bus station is just next to Stetson University. The distances between the other bus stops are approx. 400 meters.

The center of the TOD is just next to Stetson University. Here, there is a green area with room to build a bus station, with perhaps a kiosk and ticket stand. There is also some public space in this area, the Market Street is only a couple of hundred meters away, and there is a small office area in the vicinity, which a TOD center is supposed to have.

The bus route for Link 56 will increase with approx. 15 minutes. For people not living in Celebration, this might be a problem, but Link 55 will not change its travel time, and people have the possibility to either take Link 55 all the way or change to Link 56 at Celebration Place.

Of course, these routes shall have good Bike & Ride parking lots. There is no need to have special Park & Ride parking lots, since there are so many parking lots already in Celebration.

Measure 2: Mobility Management

To actually convince the inhabitants of Celebration to start using alternative transportations, the town board ought to put resources into “soft measures”, that is; working with Mobility Management. Examples of soft measures that the town could use are:¹

- Car Sharing (especially good idea for Celebration – people use NEVs within the town and are members of a Car Sharing association for out of town – trips)
- Car Pooling
- Walking School bus (parents taking turns on following several children to school)
- In the city without my car (one weekend a year everyone ought to try to get around without using the car)
- Health pedalers (giving strictly car-users a bike and its accessories to make them try to commute with their bike to work instead of their car)
- Information about health and environmental achievements.
- Bicycle to your workplace – campaigns (making different companies compete against each other on how many of their workers that commute by bicycling, enticing people with the arguments of better health and saved expenses)

¹ Lyborg, Jessica and Hyllenius, Pernilla (2001)

What about the secondary area?

The greatest problem of the secondary area is the travel length. The problem is created from the design of the secondary area, especially in the very south of East Village, and in the very south of North Village: cul-de-sacs and larger houses at the houses in the very periphery. The design is not as bad as in regularly American suburbs, but is getting close. These areas are not only created from fundamental design, but also from the possibilities of building on wetlands areas. These parts are yet not that dominant in Celebration and there are great possibilities of stop this process of creating small sprawly areas in the periphery.

We believe that the Celebration planners should go back to the original idea of the town, and start building in the way they did in the primary area, in the very beginning. This can be done by tearing down large houses, creating infills of new buildings and connecting the areas together with b & p paths over the wetlands, for example.

7.4 Final Opinion

Does New Urbanism fulfil the traffic measures, presented in chapter 2.2, theoretically and in reality?

Tackle the problem at the source.

Conclusion: Principle somewhat fulfilled, since New Urbanism does not fulfil it theoretically, but practically (in the real example).

Reduce and affect car usage.

Conclusion: There could be more soft measures to affect people's decisions and behaviours, but otherwise the principles are fulfilled theoretically. The principles are not fulfilled practically.

Better alternatives to the car.

Conclusion: New Urbanism needs to realize all its methods. Hopefully, it does this with other developments than with Celebration.

Selective access to roads and streets. New Urbanism uses selective access to roads and streets.

Celebration has selective access to roads and streets.

Conclusion: Principle fulfilled.

Reinforce the kind of service that helps to fulfil the goals.

Conclusion: New Urbanism fulfils this principal theoretically and probably also practically sometimes, although not with Celebration.

Closing judgment

We believe that New Urbanism could achieve a sustainable transportation system if the three primary planning tools; Regional planning, TND and TOD, are, without exceptions, used in all developments, and if New Urbanism starts using the measures of Mobility Management as well, to actually spread information and affect peoples choices.

Compared to Sweden and Europe, New Urbanism does not seem very eccentric, but compared to the general planning in the US, we believe, New Urbanism is a progress in the right direction.

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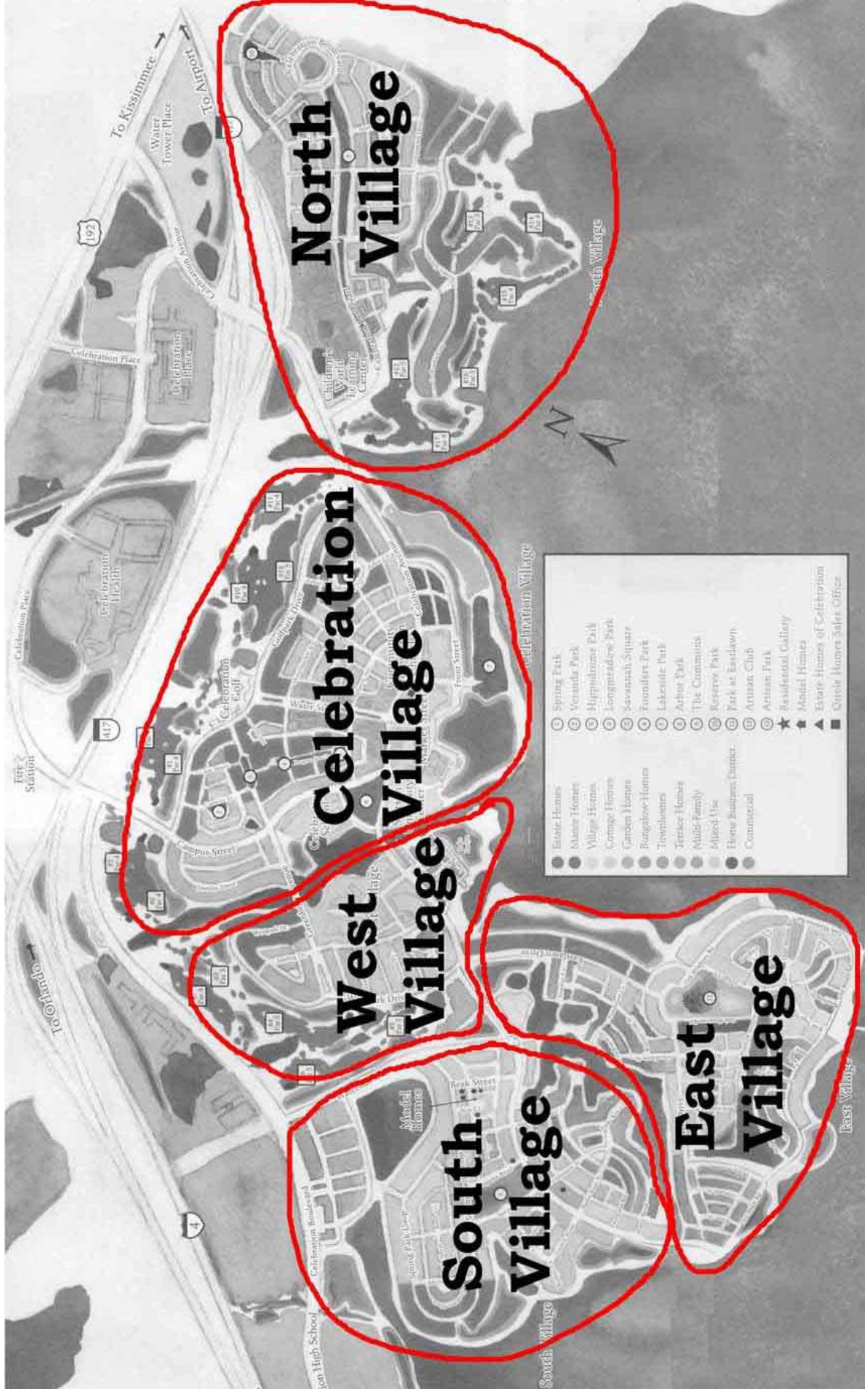
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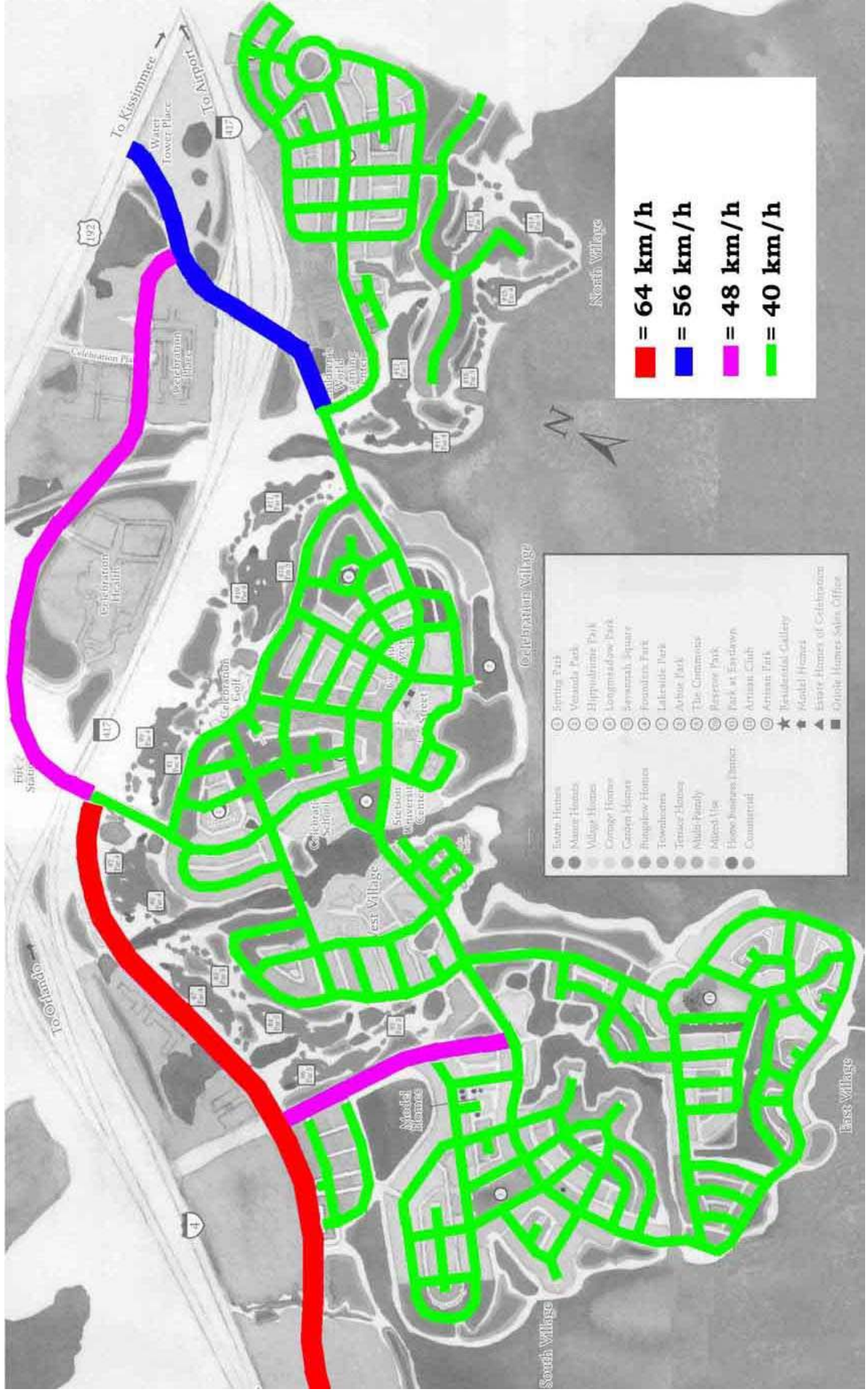
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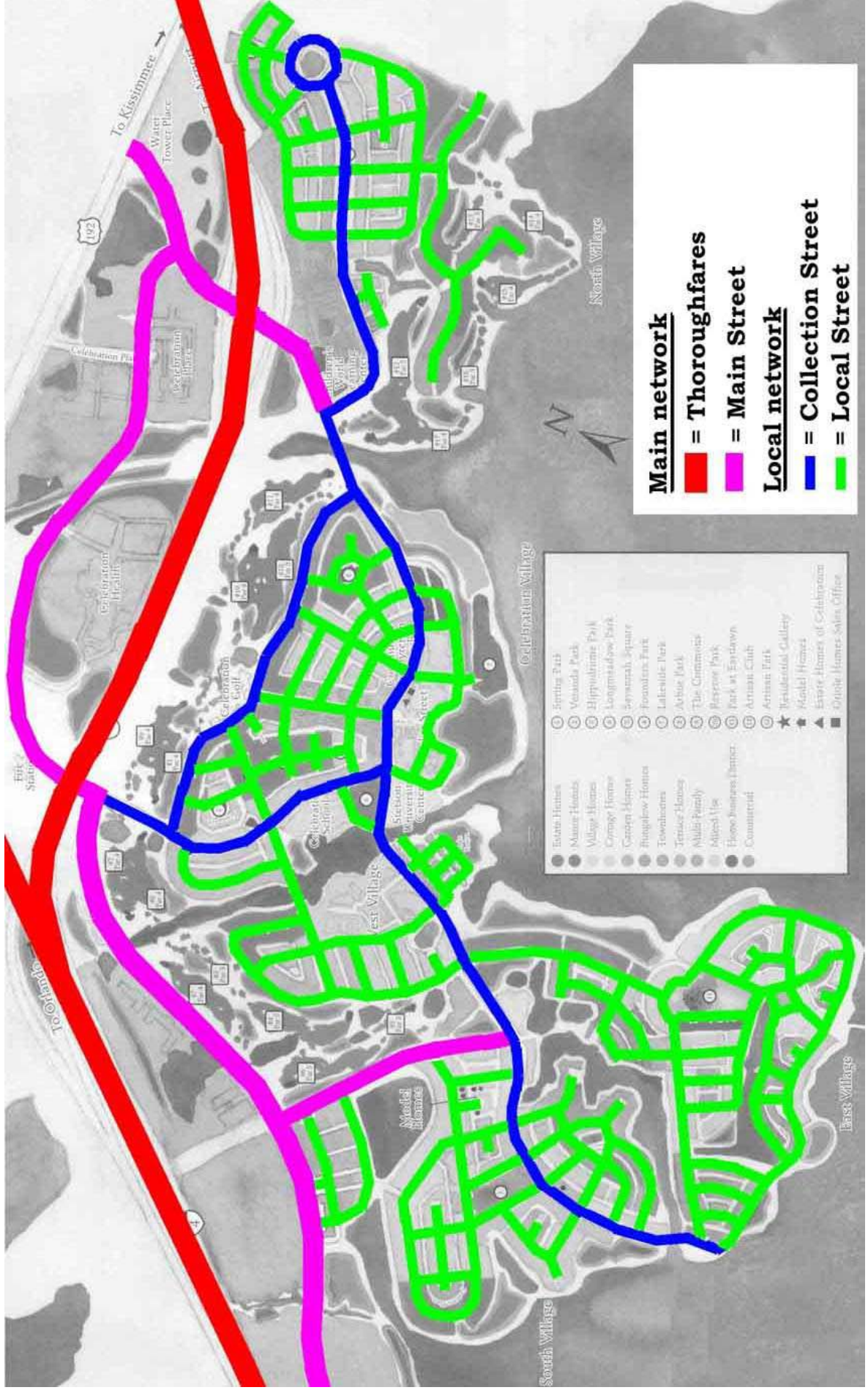
Appendix 1: The map of Celebration



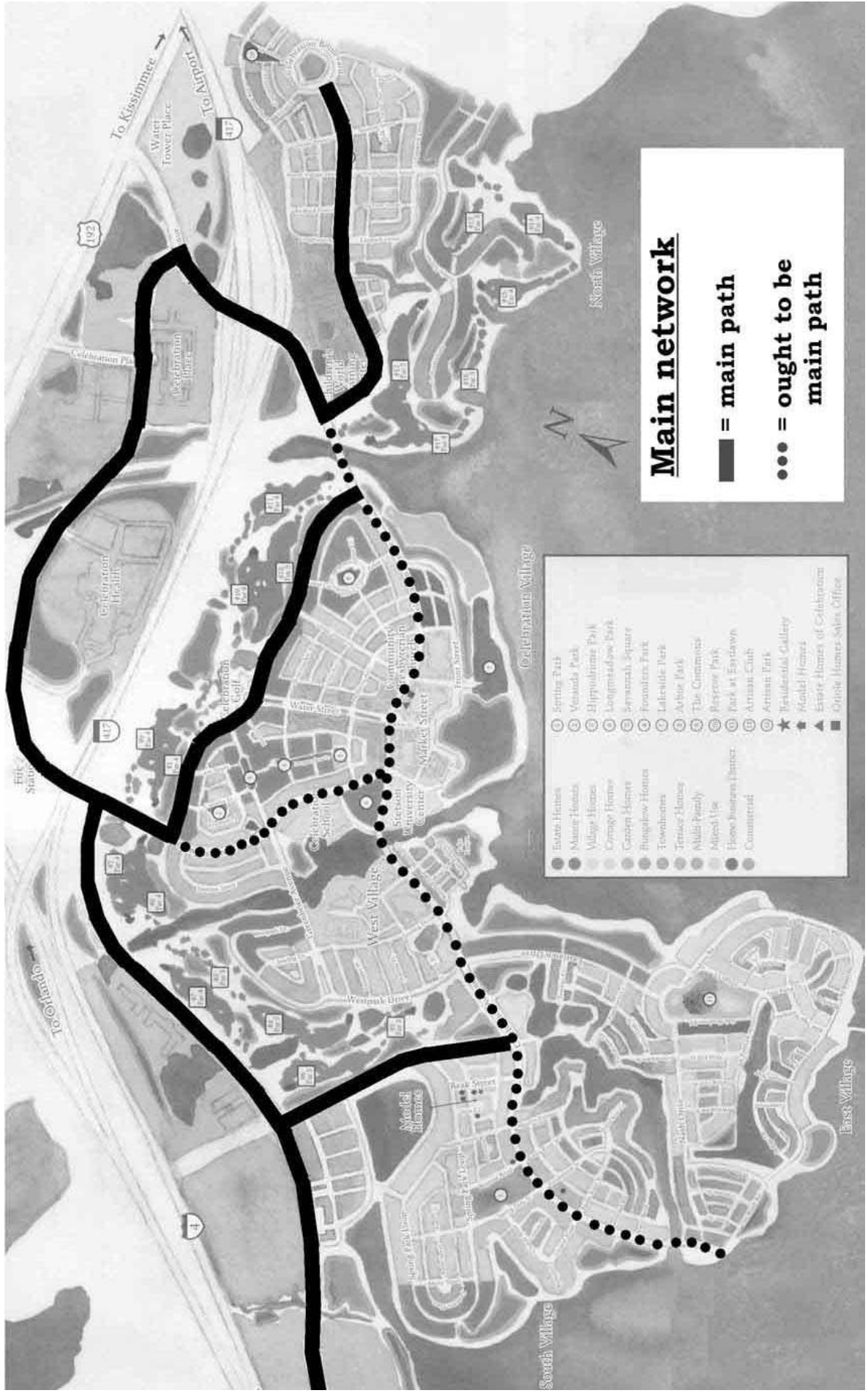
Appendix 2: The Villages in Celebration



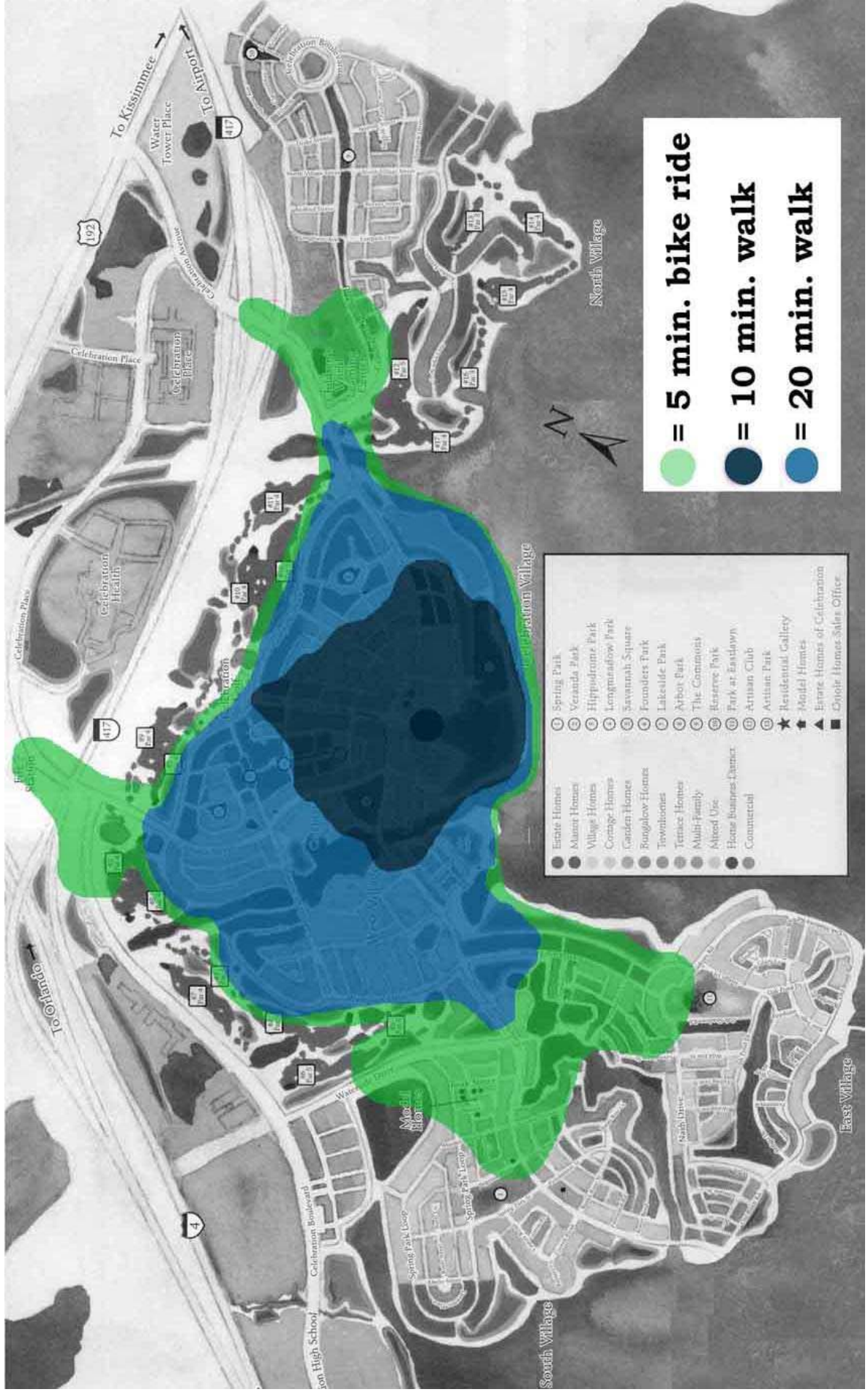
Appendix 3: Speed limits of motorized roads



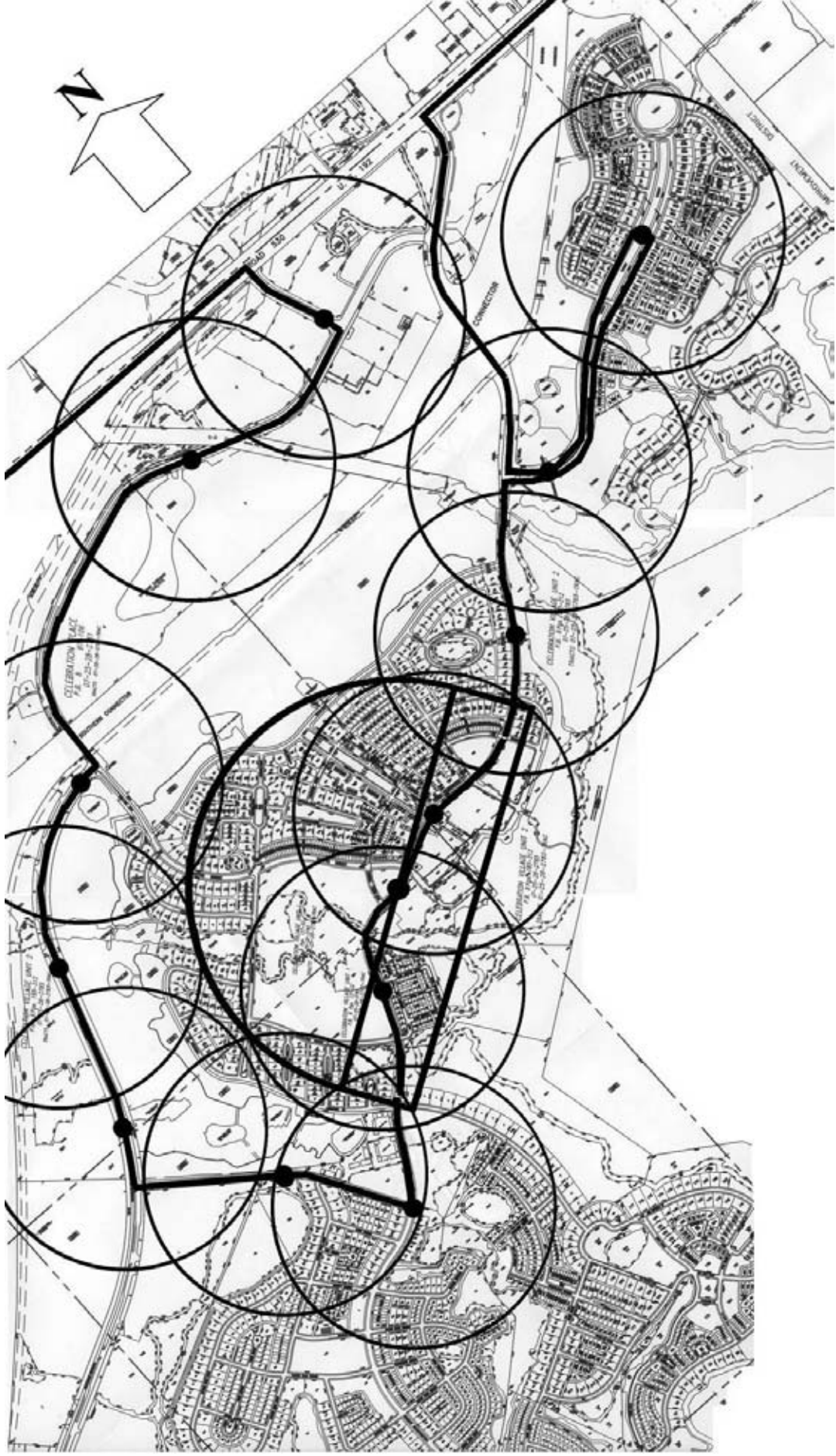
Appendix 4: Road classification of motorized roads, according to TRAST



Appendix 5: Main bike and pedestrian paths



Appendix 6: Reachability from the Market Street Area



Appendix 7: Celebration, with TOD and TND transit