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Design Improvement for Disable Pedestrian at Nilai

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Abstract

The research is to improve disable pedestrian and enhance disable pedestrian at Nilai, Negeri Sembilan. This research try to solve the problem that disable pedestrians have considerably difficult. It is designed to enhance the awareness of residents and safety needs that disabled pedestrians require and make ameliorate pedestrian. It focuses on the use of pedestrian facilities such as curb ramps, curb extension, intersection geometry and handicapped parking. However not all of pedestrian users appreciate pedestrian. So, this design determine them use this pedestrian with responsibilities. Although every attempt has been made to make this report complete, there are other sources available from special interest and government groups.

Key-word: - disable pedestrian, safety and awareness

1. Prelude

The site selected for the study area is at Nilai which is transit town (KLIA Interchange) located in Negeri Sembilan, Malaysia, due to its proximity and connection through the KTM to Kuala Lumpur ,Putrajaya [1]. Development project can be seen as one drives around Nilai. Even it is a rapidly growing town, there is no safety pedestrian for disable. According to Mahmood Merican [1981][2] voluntary organisations have played an important part in providing rehabilitation and training facilities for the disabled. The Government has been intensifying its efforts to improve services to the disabled both indirectly by supporting voluntary bodies and directly through the Ministry of Welfare Services, the Ministry of Education and the Ministry of Labour. In spite of the efforts of the Government and the voluntary bodies only a small proportion of the disabled can be catered for present facilities to their rehabilitation, education or vocational training. In Malaysia, the Ministry of Welfare Services estimated the total number of disabled persons in 1980 is 139,000. According to estimates by the UN, there were 450 million disabled people in the world [2].

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The normal person, enjoy recreation and attend shop and school by using the facilities, meanwhile disable person have considerable difficulty performing functions such as walking, seeing, or hearing depends on their types of disable . The implementation such as Persons with Disabilities Act (PWDA) in 2008 as part of its obligations under the Convention on the Rights of Persons with Disabilities (UN Convention) and enacted by the Parliament of Malaysia as follows : 26, 1990 had a profound impact upon the lives of disable person in Malaysia. It prohibits discrimination against people with disabilities and assures equal rights for disabled persons so that they have full access to all public facilities throughout the Malaysia. The law has specific requirements for pedestrian facilities on public as well as private property. The Act is increasing the participation of Malaysian with disabilities in employment and training opportunities, and is enhancing their lives by providing greater mobility for social-recreational, shopping, and personal business travel, so that disable person will enjoy to use pedestrian walkways.

2. **Intepretation**

Mahmood Merican in his editorial (1981) [2] says the rather stilted language of the UN, the term "disabled persons " is defined as " any person unable to ensure by himself or herself, wholly or partly, the necessities of a normal individual and / or social life as the result of a deficiency, either congenital or not, in his or her physical or mental capabilities". The World Health Organization defines Disability as follows: "Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. Impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Thus disability is a complex phenomenon, reflecting an interaction between features of a person's body and features of the society in which he or she lives [3]. Changes in society produce examples of how the definition or range of disability can change with time [4]. The causes of disability are various.

Table 1

Types of Disability	Total	%	Registered	%	% of Registered in Total
Blindness	44,480	32	7,604	39	17
Deafness	25,020	18	3,070	16	12
Physically Handicapped	58,380	42	6,653	34	11
Mentally Retarded	11,120	8	2,151	11	19
Total	139,000	100	19,478	100	14

Table 1 : Proportion of registered disabled persons to total estimated disabled in Malaysia in 1980.
Mahmood Merican (1981)[2].

From that proportion Mahmood Merican says, the Ministry of Welfare Services Malaysia estimated the total number of disabled persons in 1980 at 139,000. The Ministry of Welfare Services maintains a register of disabled persons in the above four categories. As can be seen in the Table 1, only about 20,000 or14 percent of the estimated total number of disabled persons register and avail themselves of the services offered by the Government such as special education, vocational training, medical treatment, artificial limbs and appliances and financial aid or grants. The Ministry of Welfare Services estimate of 139,000 disabled persons constitutes about one percent of Malaysia's population. The earlier-mentioned UN estimate places the world's disabled at about 10 percent of the world's population. The disparity is too large to be accounted for by differences in definition. Both estimates are largely guesswork. There are just no reliable statistics of disabled persons in large areas of the world [2].

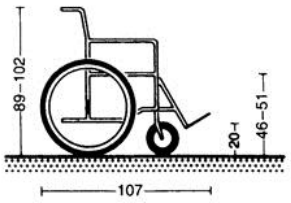

Figure1 : Side view of standard wheelchair
Source : Neufert Architects' Data , Third Edition [6]

3**. Aim and Objective**

The aim is evaluate the adequacy of pedestrian design in filling the disabilities needed and to stimulate efforts to prevent and ameliorate disabilities and the objective of this project is to recognizing the problem at this site, to investigate visitors conspectus towards safety pedestrian for disable at site, to improve disable pedestrian and enhance disable pedestrian safety at site, to make friendly design to disable person and to increase public awareness of this enormous world-wide problem

4. Friendly Pedestrian Design for Disable

As a mention fore, disable pedestrian have considerable difficulty locating crosswalks, aligning to cross, determining the onset of the walk interval, maintaining a straight crossing path, and completing crossings before the onset of perpendicular traffic at complex signalized intersections. From site observation, there was many problem listed such as, uneven surface, no safety for pedestrian user, poorly pedestrian designed, no green space, throw the rubbish everywhere, badly access to public transportation and most importantly no pedestrian design for disable. There are several design suggested for alleviating these difficulties

5. Curb Ramps

This design is to change level between the pedestrian and the road surface and also on the pedestrian. This special design is required at intersections to increase the routes available to wheelchair bounded pedestrian. It is important to facilitate the safe and independent crossing for disabled people.

According to [5], curb ramps are used wherever there is a difference in level on pedestrian paths or cross paths. This curb ramps be positioned out of the usual line of pedestrian flow. From the site observation, vertical rise for pedestrian at Nilai is around 200 mm. So, the gradient not steeper than 1 : 12 .

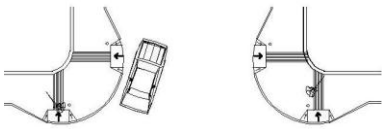

Figure 3 : New image of ramp at each quadrant o f street intersection

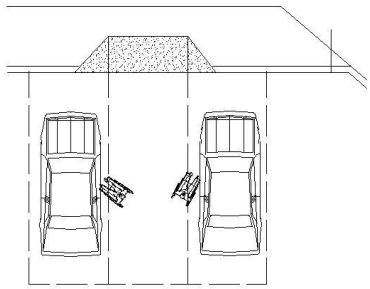

Figure 4 : This new image shows ramps between accessible parking areas and pedestrian

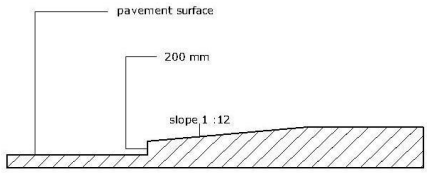

Figure 5: Level transfer recommended between the curb ramp and the surface of a pedestrian. Vertical rise around 200 mm.

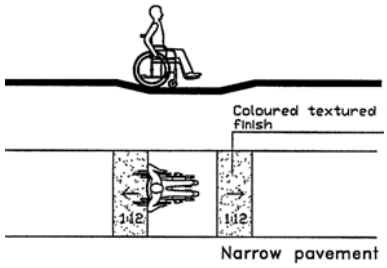

Figure 6 : The pavement be lowered to the road level to obtain the required transition between the pavement and the road surface.
Source : [5]

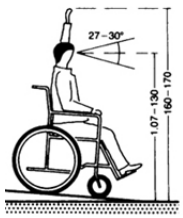

Figure 7 : Wheelchair on a slope
Source : Neufert Architects' Data ,Third Edition [6]

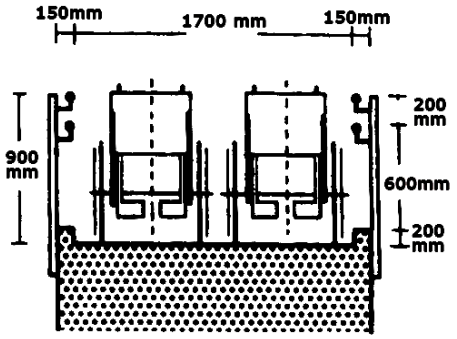

Figure 8 : Section of new ramp design with, the vertical rise is 200 mm, and the height of handrail is 900mm .

Even ramps are provided in this site, they may be poorly designed. In spite of, curb ramps can be installed easily and quickly, the absence of curb ramps prevents wheelchair users from crossing the roads. Such a deficiency is common in many communities. According to Federal Highway (FHWA,1998) [10] Administration, typical problems include, lack of a flat landing area , obstructions in or near the ramp, steep slopes, lip at street connection, severe slope at gutter, water, and uneven surfaces. To impair these occurrences, textures have been applying as indicators for disabled pedestrians.

6. Textures

Textures can improve the aesthetics of sidewalks or intersections. It especially use at locations as they increase driver alertness that crosswalks are present through increased noise and vibration. Textures on this pedestrian been installed at around obstructions which are difficult for the sightless to detect. According to [4], these textures can come in a wide array of types and materials such as colored rubber mats, stamped concrete or asphalt, brick pavers laid in patterns, exposed aggregate, and truncated domes. All textures have similar effect of letting the visually impaired pedestrian know that an obstacle is approaching.

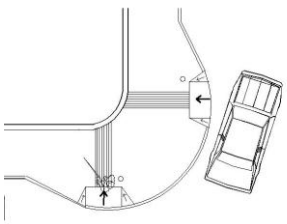

Figure 9 : Textures give wheelchair pedestrians extra friction., when disable on ramps.

However, the lack of standard textures poses problems for the installation, maintenance, and particularly the detection and interpretation of the textures by the visually impaired community [4]. So the design is more safety with handrail installation.

7. Handrail

According to [7], the handrails, should easy to grasp, slip resistant, provide firm and comfortable grip, have appropriate diameter and be at the proper height. All of this point is important to make this new design ameliorate.

In spite of, handrails not required for curb cuts, the end of the railing should have a smooth return for disable person. The rounded surface of the railing be continuous and not rotate within their fittings. This railing be accompanied with curbs, or walls to ameliorate wheelchairs user from going outside the ramp area. The new handrail design on this pedestrian comfortable to disable hold which it is sufficient clearance between hand and support bracket (Figure 12)

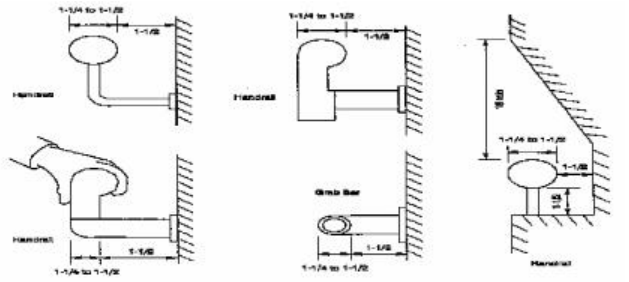

Figure 10 : The rounded surface of the railing
Source [4] .

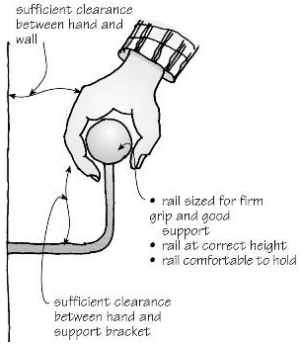

Figure 11 : Comfortable handrail design
Source : Build For Life [8]

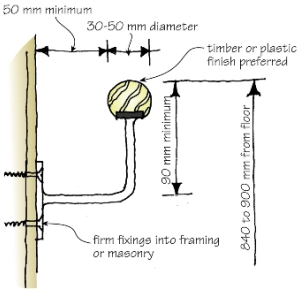

Figure 12 : Handrail dimensions
Source : Build For Life [8]

8. Curb extension

This curb extension design at the intersection on this pedestrian is to allow disabled pedestrians to cross the intersections easier. It also designs to shorten the crossing distance for disable pedestrians in traffic lanes. Other than that, it can reduce vehicle speeds. Obviously, it allows greater visibility. More than that, this curb extension give more space for landscaping and prevents parking at intersection. Curb extension or " bulb ", with a 35' radius allows a single unit bus to turn with minimum without encroachment adjacent road.

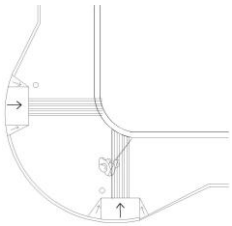

Figure 13 : Curb extensions or "bulb reduce crossing distances for pedestrians such as new design for Nilai Street.

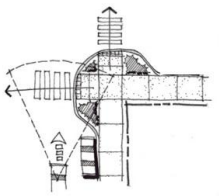

Figure 14 : Curb extensions increased sidewalk space and provide additional corner storage space .

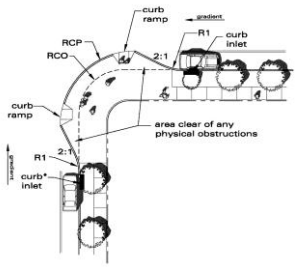

Figure 15 : Detail of Curb Extension
Source : City of Sandiego, Street Design Manual ,[9]

Wikipedia that refer from curb extension link [12], mentioned that, Curb extensions are also used in a number of special circumstances:

a) To provide additional horizontal space to allow retrofitting of existing sidewalks with ramps, where the sidewalk would otherwise be too narrow.
b) To provide additional visibility and protection for pedestrians (particularly children) when leaving premises. The curb extension may contain a pedestrian barrier, preventing pedestrians from running straight from the premises over the road.
c) In combination with a controlled urban parking scheme, where parking spaces are shielded from oncoming traffic by the extended sidewalk element.
d) At a four-way (signalled) intersection, to slow and calm traffic, particularly fast traffic turning from a major to a minor road.

e) To protect passengers embarking and particularly disembarking from trams, buses, and level-grade urban light rail systems, particularly when retrofitting existing streets [12]

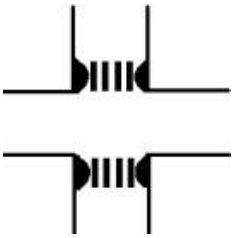

Figure 16 : curb extensions improve the visibility of pedestrians by motorists and vice versa
Source: [4]

In spite of this curb extensions is to reduce the street crossing distance and hence the time needed to cross the street, there are negative attributes of curb extensions include parking removal, difficulties in maintaining bicycle lanes, obstacles to street sweepers, and turning ability of larger trucks [11].

9. Signaling

For disable person, especially blindness, difficult for them to cross the road. To solve these problem pedestrian crossings should be equipped with traffic control signals. According to [4], function of signal timing and push-button actuation ensures fair treatment for both pedestrians and motorists at intersections. Road bumps are also helpful in reducing the speed of traffic approaching the intersection. Low-traffic crossings frequently used by disabled people can be controlled by a pedestrian push-button system. Constructing traffic to reduce the length of the crossing is recommended for the safety on this pedestrian. The pedestrian traffic lights provide with clearly audible signals for the benefit of sightless pedestrians.
Push-button signal gives pedestrians more interaction with the intersection. It also increases the speed and efficiency of pedestrian's movement across the intersections. The sound that produces can vary from a buzzers, plain tone and bell sound. According to [4], the audio device must be loud enough to be heard over traffic and other ambient noises, and have a distinct sound that is easily recognizable. Placing opposing devices on each side of the street can provide further guidance to visually impaired pedestrians.

Figure 17 : Traffic light pole
Source : [4]

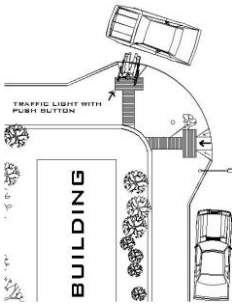

Figure 18 : The new design traffic light pole with push button .

10. Handicapped Parking

Handicapped parking is a necessity for people living with disability. It is not uncommon for disabled people to wait longer than they should to apply for a handicapped parking placard for their car which entitles them to park in the designated spots for disabled persons. Its prove with no allocation of parking space for the disabled. For disable person they need parking aisle. But, from site observation, there were insufficient width of the parking aisle. These new designs necessitate a change of parking design. Parking aisle is needed to alleviate accident when they on parking..

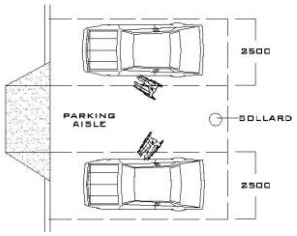

Figure 19 : New design with bollards to get two accessible parking spaces and accessible aisle

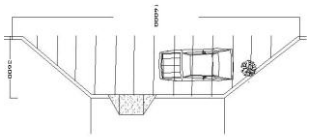

Figure 20 : Drop-off areas infront of bus parking at Nilai Street.

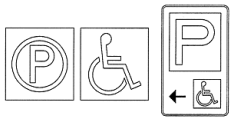

Figure 21: Accessible parking areas be marked by the international symbol of accessibility
Source : [5]

According to Carol and Richard Eustice [13], people with invisible disabilities may fear being mistaken for an

abuser of handicapped parking privileges. This group of disabled persons often feels it is not worth being glared at , yet they are fully entitled to have a handicapped parking permit if their doctor prescribes it [13]. Refer from [7],mentioned that, handicapped spaces should be located with the shortest accessible route into the entrance. This passageway should provide "a continuous unobstructed path connecting elements and [all] spaces of a building or facility. When the accessible route intersects a curb or ramp refer to the previous sections dealing with sidewalks and intersections. When On-street parking is present, provisions must also be made for disabled pedestrians. Poor parking facilities at this site make disabilities uncomfortable.

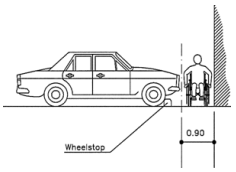

Figure 22 : Pre-cast wheel stops can be used to set apart a passage 0.90 m wide
Source: [5]

This design for car park lots for wheelchair users will paint in different color from other lots. This parking design also locates near the intersection to utilize the existing curb ramp.

11. Methodology

This pedestrian design for disable person done with some method to complete this journal. First method is collect data and information, which is problem and issue will be detected to solve the problem. This journal also been done with numerous sources available from a wide variety such as literature and searching the internet to get some opinion about disable pedestrian around the world. Second method,is assemble the data to know what is inhabitant perception towards pedestrian. Questionnaire with 30 respondents of Nilai Street ,were conducted to determine their perception and opinion about pedestrian. Third method is interview with Encik Jamil, from "Pertubuhan Orang Cacat Malaysia, via telephone. Last method is, site observation to identify and make responsive pedestrian. Main aspect we must to concern is problem at site which is related to the pedestrian. Reference from (Lizz Carr,Paul Darke and Kenji Kuno)[14] mentioned, it is not about being politically correct it is about having respect for people, valuing people and using the language which they themselves have choosen to define their situation .Unfortunately , there no access for disable pedestrian. Finally at this journal, recommend pedestrian design for disable
.

12. Discussion and Analysis

This survey are to identify the pedestrian problems to improve the pedestrian for disable. Majority of respondent is between 16-47 years old which is all Malays, which is 14 female and 16 male. 15 of the respondent using the pedestrian by walking. It were slightly higher than jogging 12 respondent. Based on the survey, the surface for the pedestrian is in "good" categories and 13 of them said that the maintenance is in "fair"categories. How important the pedestrian trail for respondents have shown at this analysis:

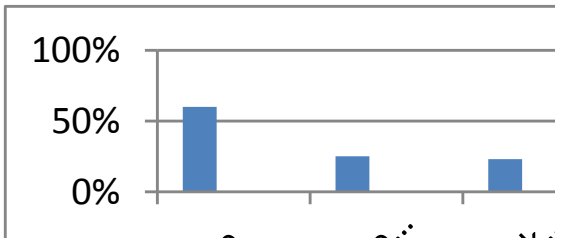

Figure 23 : Purpose go to Nilai

60% of the respondents using the pedestrian at Nilai for travel to a store or shopping area. for recreation or fitness marginally lower for travel to work or school which is 25% and 23%. Meanwhile, for travel to a friends or family members home more dramatically lower than other which is only 2 %.

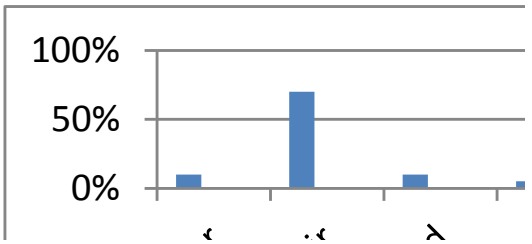

Figure 24 : Green space in pedestrian design

For green space in pedestrian design,the proportion that I get is, “Fair” were a great deal higher which is 70% compared to “poor” and “good”, only 10 % of respondent. Unfortunately only 5% of the respondent says that the green space in pedestrian design is in “very good” and “ excellent” categories.

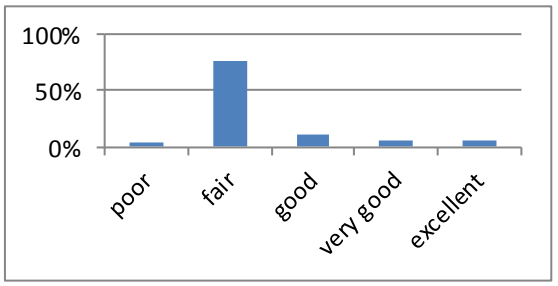

Figure 25: Better access to public transportation

Access to public transportation is "fair" which is agreed by 77% of the respondents and far lower with good, which is 10%. 5% of the respondent said that the access to public transportation is at "very good" and "excellent" categories. It was slightly higher with poor only 3%. For access to public transportation I can conclude that far convenient access make the the access enormous difficult.

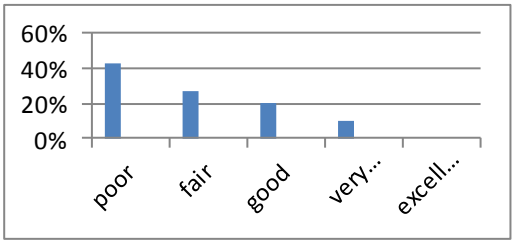

Figure 26: Better health and fitness among resident

Most of the respondents, said pedestrian trail at Nilai is not giving economic health for surrounding communities among the residents. Around the pedestrian the garbages give bad smell to them. It proved when 43% of the respondents says it "poor". 27% of the respondent says it "fair" and were marginally lower with "very good" . There no respondents said that "excellent" to better health and fitness among resident.

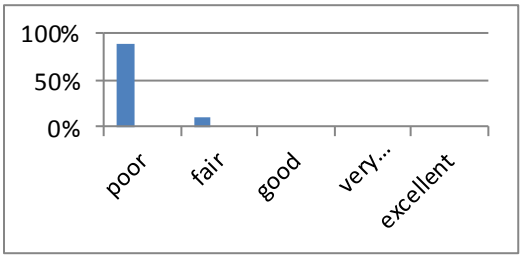

Figure 27: Pedestrian safety for individual with disabilities

Further than that the mission for this survey is to detected safety pedestrian for individuals with disabilities whether it is vulnerable or not. 90% of respondent agreed to said that no pedestrian safety for invidual with disabilities which is were dramatically higher than fair which is 10% only. No body agreed to tick at "good", "very good" and "excellent" categories.

13. Conclusions

From their perception, conclude that there no pedestrian design for disable person that's make vulnerable to them if their on pedestrian. This alternative disable pedestrian was designed to enhance the awareness of the safety needs of disabled pedestrians on pedestrian. Countermeasures are taken to improve disable pedestrian safety in the areas of curb ramp, curb extension and curb radii, textures, intersections geometry, and handicapped parking. All of this is needed to make the strategies and make pedestrian ameliorate and to enhance disable pedestrian safety on existing facilities. The enacted assures equal rights for disabled pedestrians to alleviate disable pedestrian problem. The implementation of these provisions can offer safer pedestrian for disabled person. Denison Jayasoori [15], in his book mentioned that, in many ways the field study through the presentation of papers during the course of the

investigation some in collobratioon with two disabled activists,has pioneered a new research,analysis and publication on disability and Malaysia society [15].

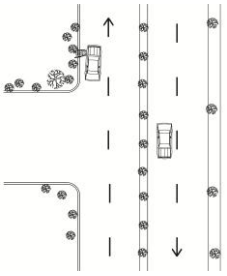

Figure 28 : Pedestrian design before improvement make disable user considerably difficult.

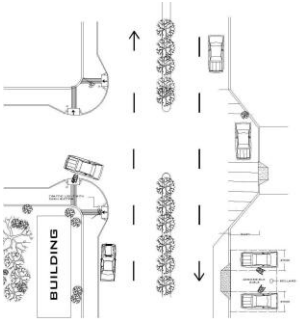

Figure 29: New improvement disable pedestrian design
to make disable user more comfortable and safety when they are on pedestrian.

Figure 27 : New pedestrian design to disable person with curb ramps curb extension ,signaling, handrail ,signal ,and handicapped parking.

Figure 28 : Perspective of new disable pedestrian design

Figure 28 : New disable pedestrian design with safety.

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