Sustainable Transportation Systems
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Lecture No. 20
EIA Case Study – IV

Hello friends, so, in the series of EIA case studies, today we will have the fourth case study that is focused on airport terminal building for Guwahati International Airport. So, you may recall that we have already included three case studies, one was for high speed train or bullet train and then one for second one was for inland water transport, third was this hilly road expressway highway and this is the fourth one which is related to the terminal building at International Airport in India.

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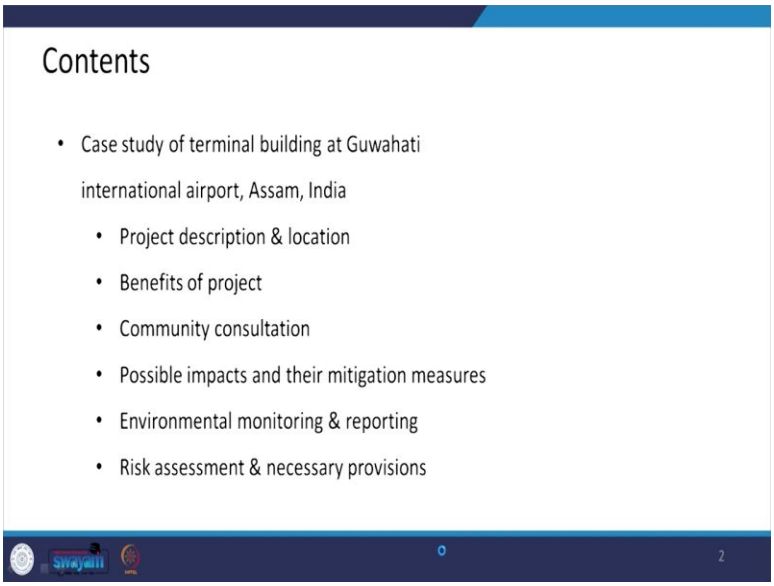

So, this case study will include like project description in brief and how this idea was taken and what is the location, what are the features of the location and then benefits of the project, why it was catered, why it was taken up and then community consultation because as public participation is very important and primary thing in EIA case studies and then the possible impacts and their mitigation measures which have been incorporated.

Because, when we do EIA study, then we estimate the impacts of every kind, whether it is social, economic or environmental like air, water soil. Then, how to ensure that everything is going fine in terms of the impact mitigation, so, the environmental monitoring and reporting and the risk

assessment and necessary provisions for that kind of risk which has been assessed and ultimately we will conclude.

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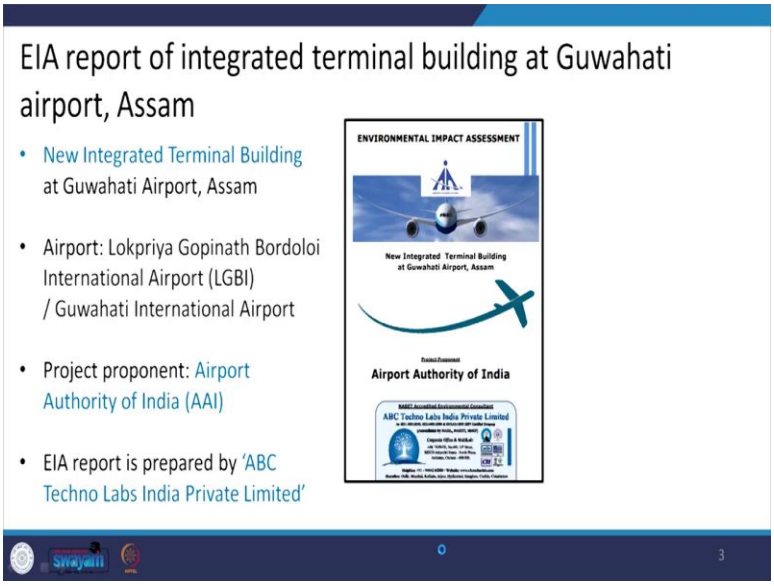

So, this is basically EIA report of integrated terminal building at Guwahati International Airport in Assam state of India and the project proponent is Airport Authority of India AAI and EIA report was prepared by ABC Techno Labs India Private Limited.

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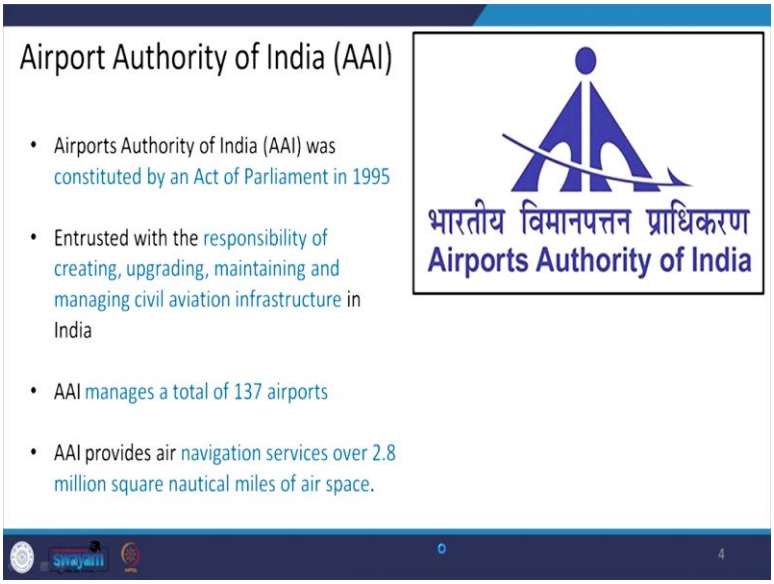

Well, this Airport Authority of India basically, it was constituted in 1995 to manage all the airports and it manages around 137 airports right now. And it provides navigation services for around 3 million square nautical miles of airspace if you include all the airport services.

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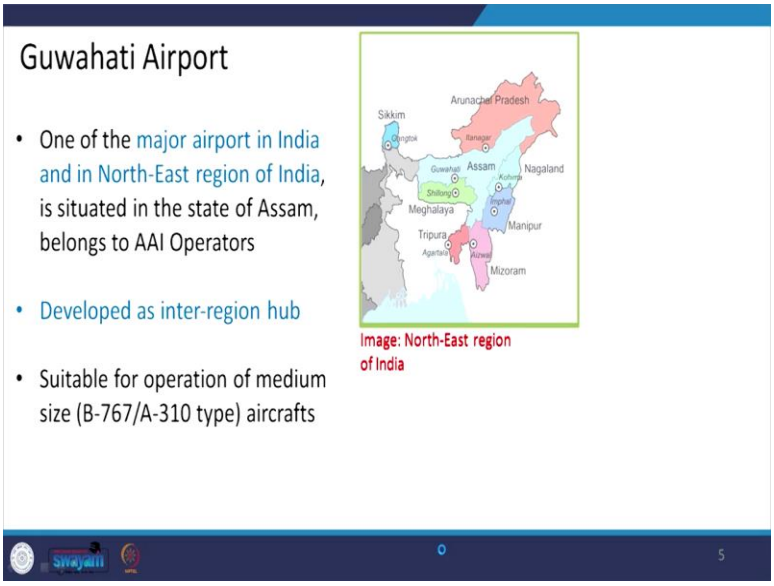

Guwahati airport, why it is so important because it is kind of air link between the rest of the India and Northeast region of the India and it caters all kinds of regional issues developments and economic activities. So, that is why it is very important and it had to be expanded the reason is traffic was growing.

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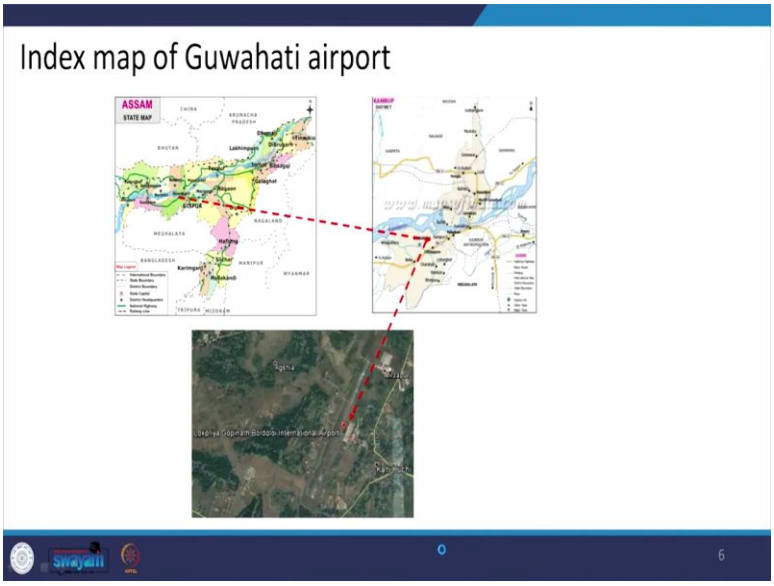

This is the index map; you can see where it is located. So, the Google map shows its location and before the project, this was kind of a small building it was catering around 75 flights movements per day and 525 flights in a week. So, it got saturated, you can see it got saturated and the land area covered is 528 acres.

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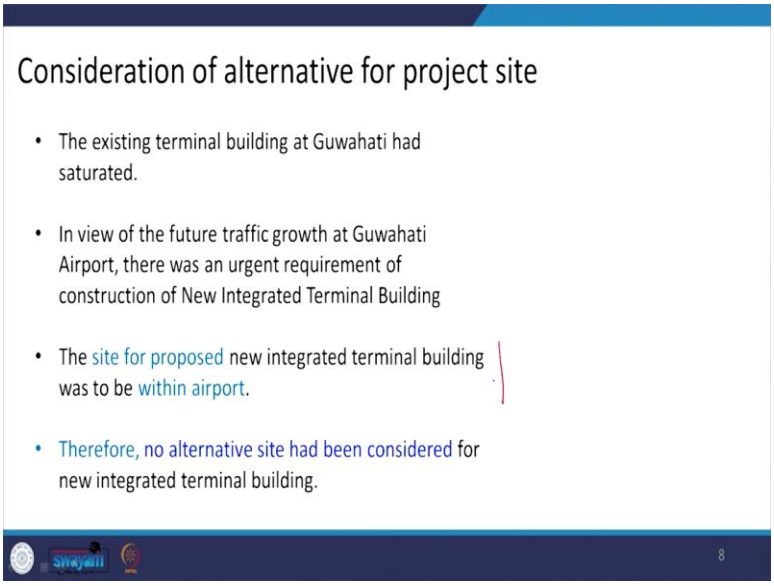

So, within this particular site location, we have to see possibility of the new terminal building. So, the existing building, as we have already said that, because of increased traffic volume, it got saturated, and when more traffic is coming and it has been estimated that more flights would be there. So, new terminal building is required, but within the space, which is like the site space,

which is given in that only we have to have this building. So, there was no alternative sites or consideration of alternative locations, because the site was fixed.

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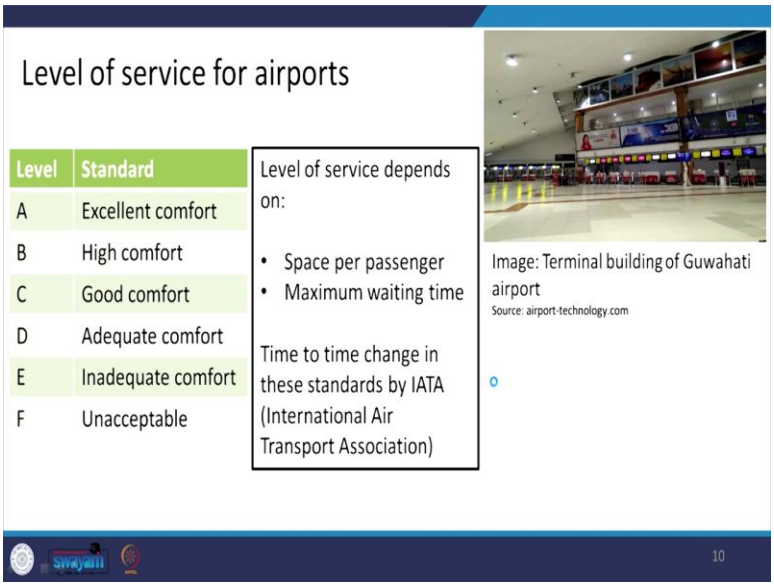

So, this plant project features, so you can see it was designed for centrally air conditioned new integrated terminal building and in modular fashion, different kinds of modular integration design was envisaged and all modern facilities and associated facilities like multi-level car parking, proper area, comfort zone and exit or entry and departure and arrival separate things, so a huge planning was there.

And it was estimated that at a particular time 2900 domestic and 200 international passengers could easily be handled in a convenient way and the level of service was ensured or like designed for B level, which is very good, you can see here the A is excellent comfort and B is high comfort.

So, it was designed for high comfort level and for initial years and level C in the year of saturation means, because over the years traffic goes to increase and the more passengers come. So, ultimately at certain point of time in future it may also get saturated, but even when it is saturated, the level of comfort should not go below C and the level of comforts are given here A is excellent comfort level, B is high comfort level C is good comfort level, D is adequate comfort like that and F is an unacceptable.

So, only B and C means it was designed for initial years as high comfort zone or level and when it is saturated, then it should not go below C it should maintain the C level, these level of services depends upon various aspects like space per passenger available when you are moving and handling your luggage, goods etc.

And the maximum waiting time you do for like when you catch your flight and time to time changing these standards are given or recommended by International Air Transport Association. This is the image of the designed building of the Guwahati International Airport.

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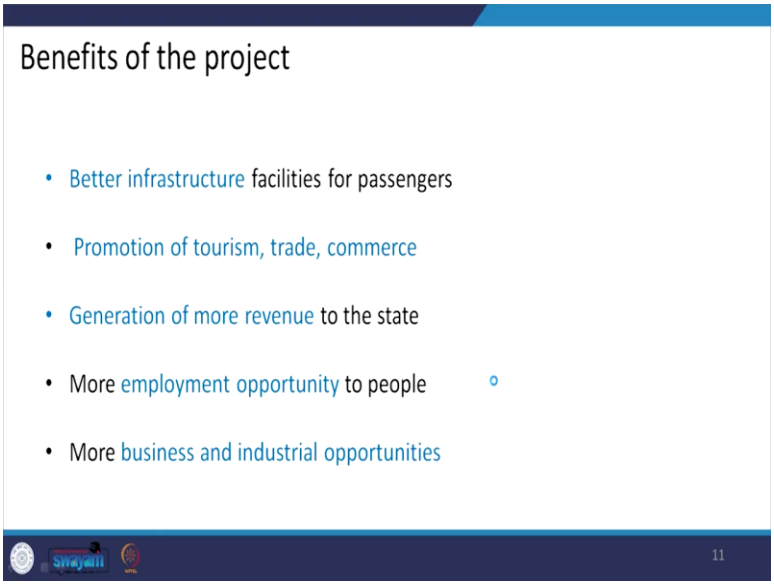

Well, what are the benefits of this project, why it was planned and proposed because better infrastructure facilities are required for passengers when you want to attract people from other modes of the transport like highways or railways and you want to shift them towards your journey, then you have to give them better level of comfort and facilities.

So, and promotion of tourism because the north-eastern region of India is full of natural beauty and it has a lot of potential for tourism. So, to promote the tourism to promote the trade or commercial activities, we need very good air connectivity, which should be of international standard.

Then generation of more revenue because when activities increase, commercial activities, increase, economic activities increase, naturally revenue increase, you get more money in terms of several taxes and other service charges. More employment opportunities when these activities increase naturally the positive side effect is that the job opportunities also increase for the local people that is also one important aspect.

And more business and industrial opportunities because better air connectivity will attract the industrialists to have their like industries or business activities they will come and invest a lot of money there.

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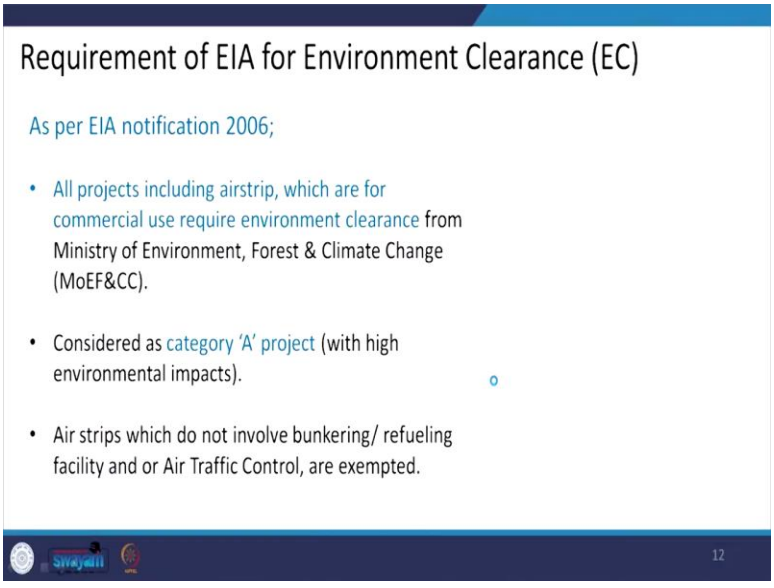

Then requirement of EIA, why it is needed for environmental clearance, because as per this EIA notification of 2006 all projects including like air strip, which are of commercial use, require

environmental clearance from the Ministry of Environment forests and climate change. And it is also considered as the category A project with high environmental impact.

So, EIA is necessary, but if it was not, like it did not involve bunkering or refueling facility or air traffic control those small facilities are exempted, but because this is a large project, so, EIA was essential and EIA was conducted.

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Other regulations for environmental purpose for Indian aviation sector which follows International Civil Aviation Organization norms, ICAO norms. So, there are many norms which cater for like noise, it should be reduced and there are stringent limits for engines related to the noise. Land use planning and management because in certain area every facility you have to accommodate, then reducing emissions at the source because otherwise it will add to the deterioration of air quality.

So, noise and air pollution is very important in terms of airport related facilities, then operational mechanism for reducing aviation emissions all these things have to be taken into account. And then the market based options like legal and administrative issues surrounding emissions permits or emission trading and these environmental charges or voluntary agreements to limit or reduce emissions, those kind of regulations are also there, which are like promoted because certain guidelines expect that these organizations which are involved in these activities, they voluntarily reduce the emissions. So, those kinds of things also be involved.

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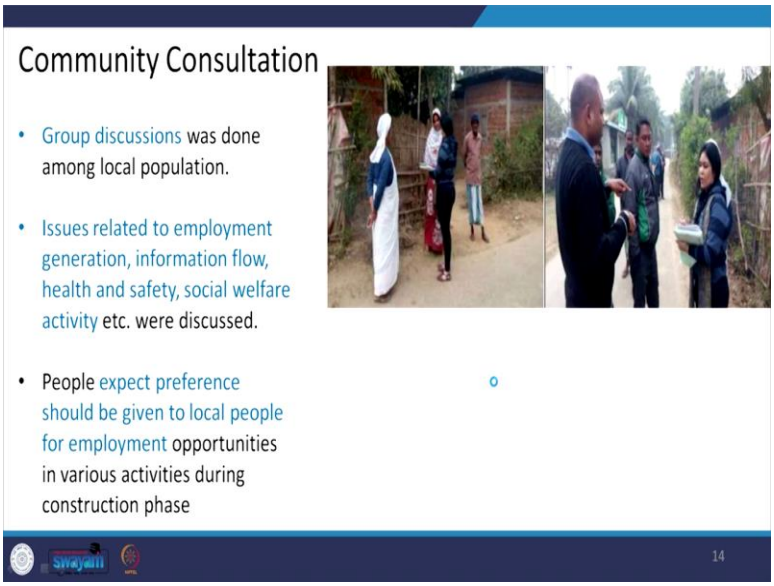

Then as we know that in EIA public participation is very, very important feature, we have to approach the public or stakeholders and take their feedback. So, for this several group discussions were held and also door to door questionnaire based survey was organized. So, issues were like employment related or info, this information flow means people should know, what is going on health and safety aspects, social welfare related activities, all these things were discussed.

And people they expect preference should be given to local people for the implement that is very natural expectation and mostly all projects give this kind of assurance, that preference will be given to the local people, because, these are the temporary activities whenever some construction activity goes on in infrastructure project, whether it is highway or airport activity or whatever infrastructure facilities you are constructing, then it is good that you can hire local people.

Because even it is cost effective also, if you have the same trained people hiring from the other locations, they will come here then they will demand more money. So, it makes sense in economic terms also, plus it is also good for the local people, because then the acceptability of the project increases, because people think that these project proponents have taken care of our interest. So, that is very important thing.

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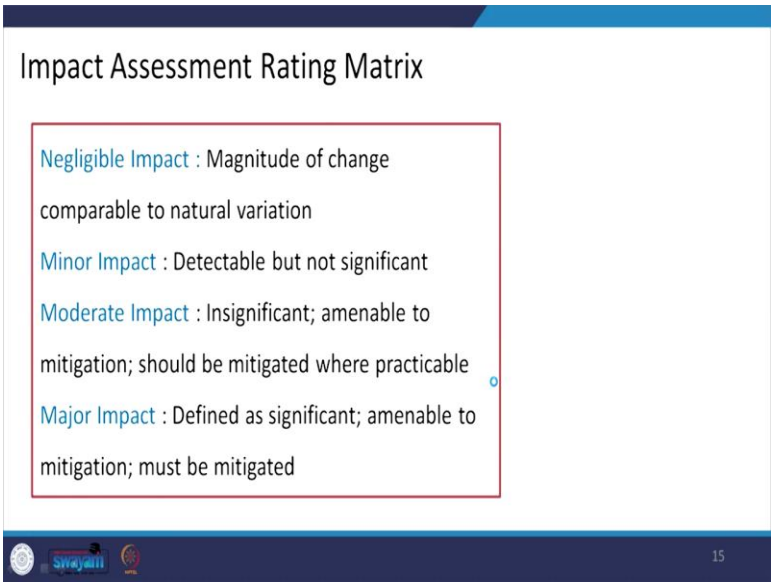

Impact Assessment rating matrix are there, which includes like, negligible impact when magnitude of the change comparable to natural variations, because, whether we do anything or do not do everything changes. There is this philosophical idiom that there is nothing in this world constant except that change, change is always there. So, natural changes are there. So, any impact by construction activity, if it is within the limits of the natural change, then it is negligible impact it is known as the negligible impact.

And if the change is detectable, but it is not significant, then we call it minor impact, then, if it is like amenable for mitigation, we can mitigate it by some measures, and it is not very significant, so we can call it moderate impact. Major impacts are those which have significant impacts, and although they can also be mitigated by some technological interventions, and that must be mitigated. So, those kinds of negligible impact, minor impact or moderate impact, major impact that way, we categorize different activities.

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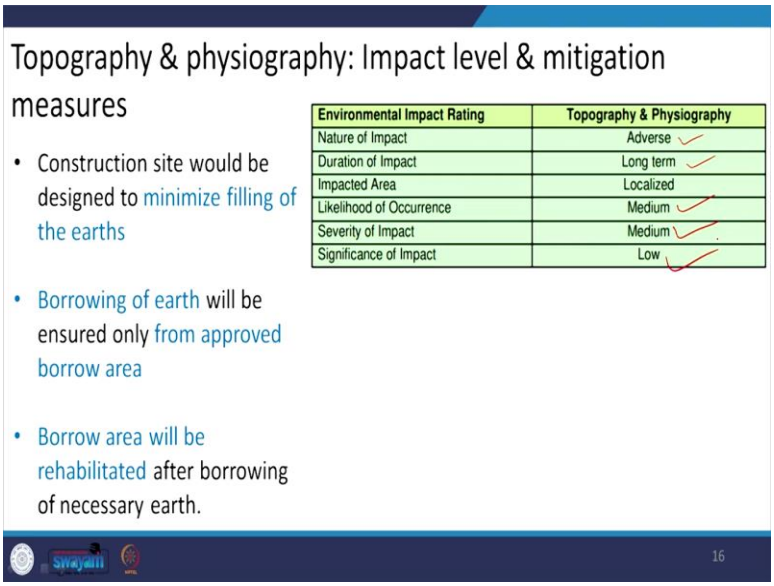

So, now, see, like, this is the table where topography and physiography, impact level and mitigation measures are discussed. So, in this you can see the nature of the impact on the topography by this particular project, of course, adverse, no positive because it will change the topography etcetera. So, kind of adverse impact, duration of the impact will be long term because one city changed it will remain like that only.

Then impact area is localized, it will not go beyond that boundary of the airport area. Likelihood of the occurrence is medium that was estimated as per expert's opinion. Severity of the impact is also medium. So, the significance of impact as per these is low, it is not very high, but because, like earth moving is there from one place to another, all those activities are there. So, changes are permanent, but impact is not significant, it is very low impact very localized impact.

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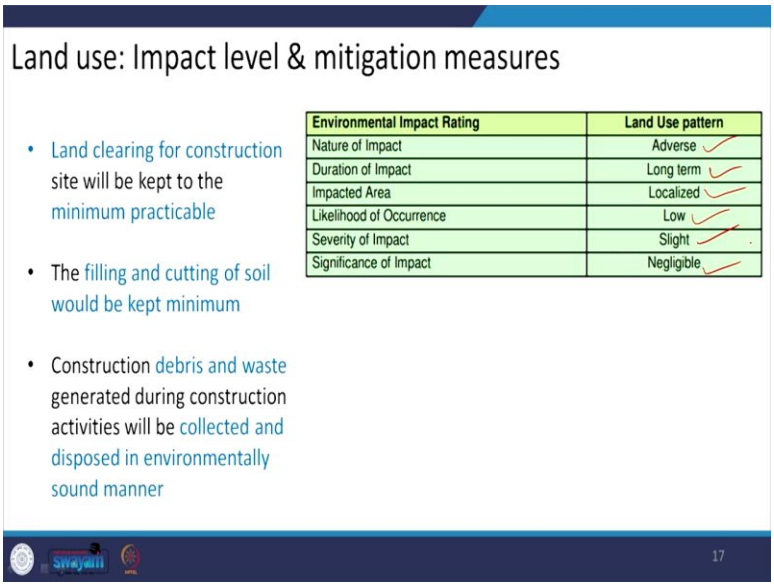

Land use, when we talk about then again the nature of the impact is adverse and duration of the impact will be long term. Of course, the impacted area is localized within the periphery of the airport, likelihood of the occurrence is low and the severity of the impact is slight. So, significance of the impact is negligible in that sense when likelihood is low and the severity is slight, then it is negligible.

So, the land clearance is done for construction activities and filling and cutting of soil that way as we discussed just now, so, these things are there for the land use and land planning and some debris of waste generated will be collected properly and that will be disposed of properly as per guidelines.

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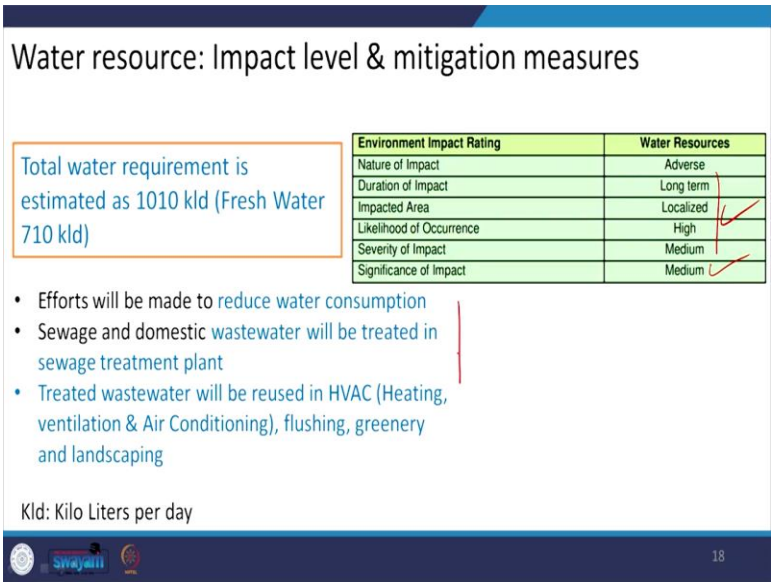

If we consider the water resources, so nature of the impact is adverse because of erosion of the soil and generation of waste material effluents, etc. So, again, the significance of impact is medium as per these other parameters and total water requirement is estimated around 1000 kiloliter per day and the first water requirement will increase by 700 around 700 kiloliter per day.

So, the there are ways to reduce the consumption by having better facilities or those kind of infrastructure like those taps which automatically closed down sensor based, so that it does not open for longer period. Wastewater handling and their treatment by sewage treatment plant that should be there and treated wastewater can be used for heating, ventilation, air conditioning, flushing, greenery, landscaping, those purposes, so, recycling and reuse of the treated wastewater is also to be ensured that way there are ways to reduce the fresh water consumption, so that is the point.

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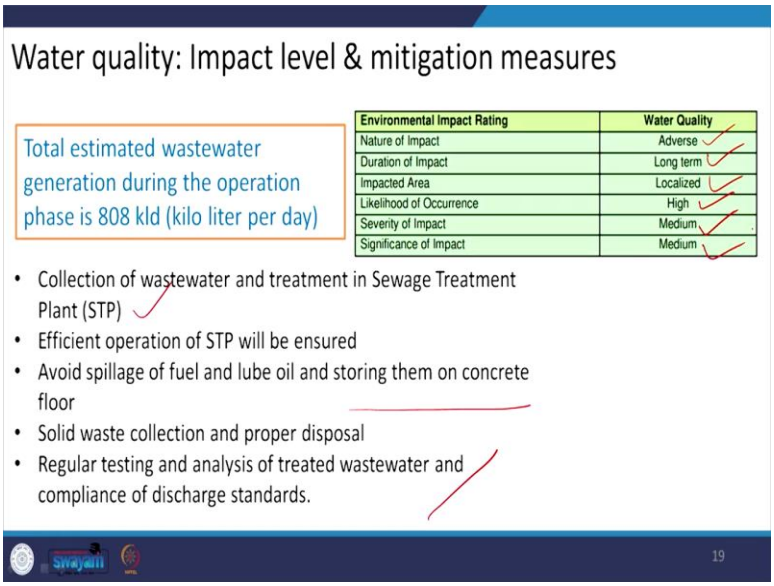

Then water quality is also an issue and the nature of impact is again adverse and total estimated wastewater is around 808 kiloliter per day. So, the collection of wastewater and treatment of the sewage treatment plant through sewage treatment plant, this provision is there and the efficient operation of STP has to be ensured, so that there is no shutting down of the sewage treatment plant and related issues.

Then spillage of the fuel should be avoided, lube oil should be avoided, storing them on a concrete floor, solid waste collection and proper disposal, regular testing and analysis of the treated wastewater, so that it meets the recommended guidelines. So, that way the environmental impact although nature is adverse and the duration of the impact is again long term, localized is the area and likelihood of occurrence is high because a lot of water will be used and it will be transformed into wastewater.

Severity impact is medium and significance of impact is also medium but because these proper measures will be taken to treat the wastewater. So, that is handled in a given criteria, as per given criteria.

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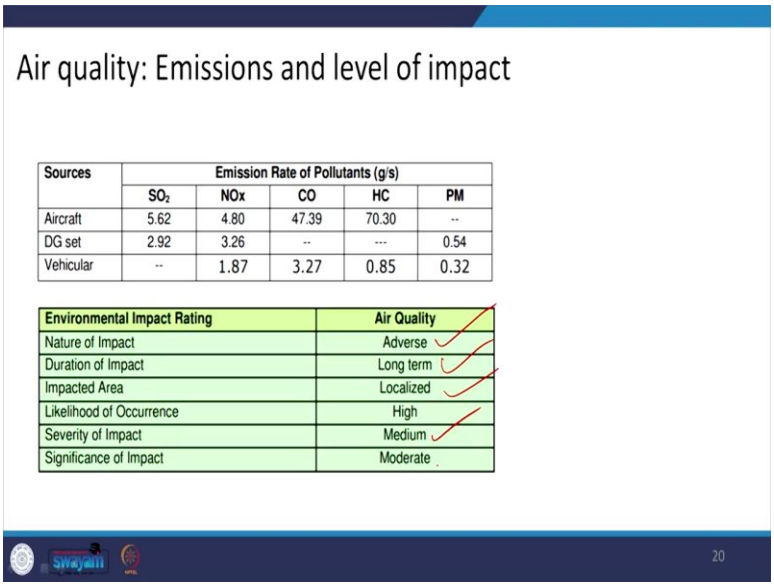

Air quality, emissions and level of the impact if we look into, then these are the like emissions of SO2 are given from aircrafts and these DG sets and then vehicular operations at the ground level, so, they also have emissions of the SOx, NOx, carbon monoxide, hydrocarbons, particulate matter all these things. So, they are the norms which are there, that will be the emissions, actual emissions you can say as per the norms.

And the impact is, will be the adverse impact because, when emissions are there then the air quality will go down. Duration of impact long term because it will go on, activities go on, operations are there beyond the construction activity long term is the impact. Localized because within that periphery maybe because air dispersion is there of the pollutant it can go beyond the boundary, but still it will not to be a regional impact it will be localized impact. And the severity is estimated as medium and the significance of the impact is moderate.

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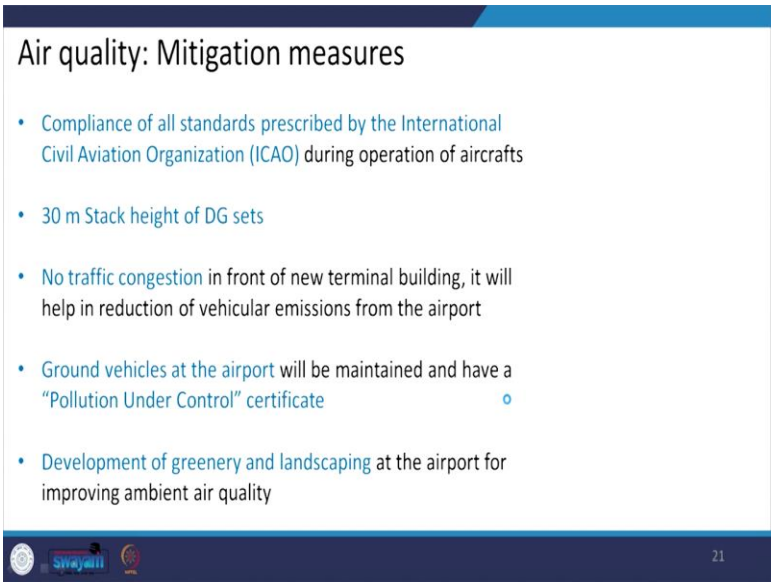

So, accordingly air quality mitigation measures have been implemented. For example, there are certain guidelines by and compliance requirements and the standards recommended by International Civil Aviation Organizations. So, during operation of the aircrafts, which have to be properly monitored and ensured. Then 30 meter stack height of DG sets have been recommended, so, that the dispersion occurs properly and it does not deteriorate your quality at the ground level, which is unacceptable.

Then, it has to be ensured that there is no traffic congestion, otherwise traffic congestion is there then lot of emissions occur and the ground vehicles at the airport which are properly maintained and the certification for the pollution under control, that is to be properly monitored it should not that, it should not be like that, some vehicle is just plying and they do not have that kind of certificate.

Development of greenery and landscaping that will also reduce the impact of the air pollution emissions, because deposition of air pollution are there on the plants and then it also avoids dispersion of the not only the air pollutants, but noise also, we will see in next slides.

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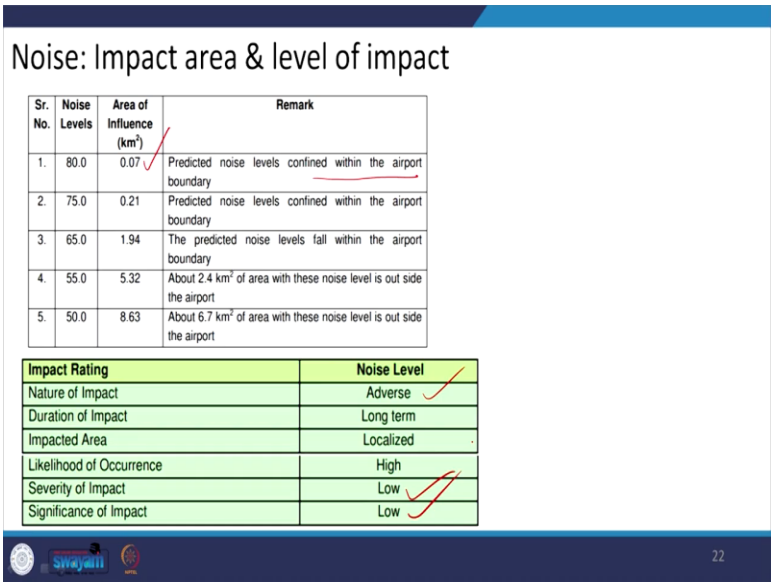

Well the noise levels are there, you can see like 80 predicted for within the airport and the 75 area of the influence like different kinds of noise levels. So, how much area it will be affecting. So, it is given accordingly and the nature of impact again the adverse but severity of the impact is low and significance is also low because the airport is quite far away from the habitat area.

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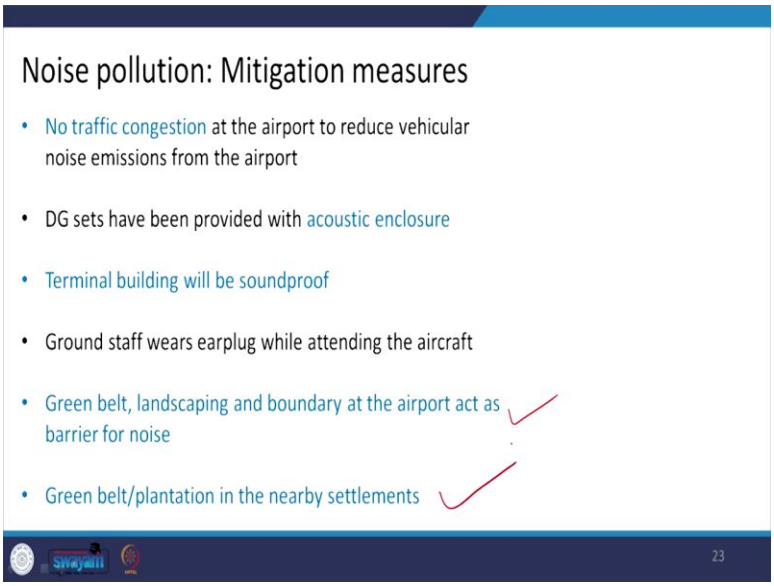

Noise pollution mitigation measures are several like how to avoid congestion of the traffic which will not only reduce the air pollution emissions, but also the noise reduction will be achieved.

DG sets have been provided with acoustic enclosure, so that their noise does not go beyond the very localized position.

Terminal building will be soundproof, so that the passengers do not get noise from the outside that will be properly soundproof kind of design is there. Ground staffs are given earplugs so that they can wear them, otherwise, the air traffic noise is very high and it is not good for their hearing. So, they have to use ear plugs.

Green belts as we have said that green belts are required not only for air pollution reduction, the plus for the noise pollution reduction. Green belt and in nearby settlements also that is to be given so that, green belts can be in stages. So, they are kind of step by step some barriers, noise barriers in that way they act.

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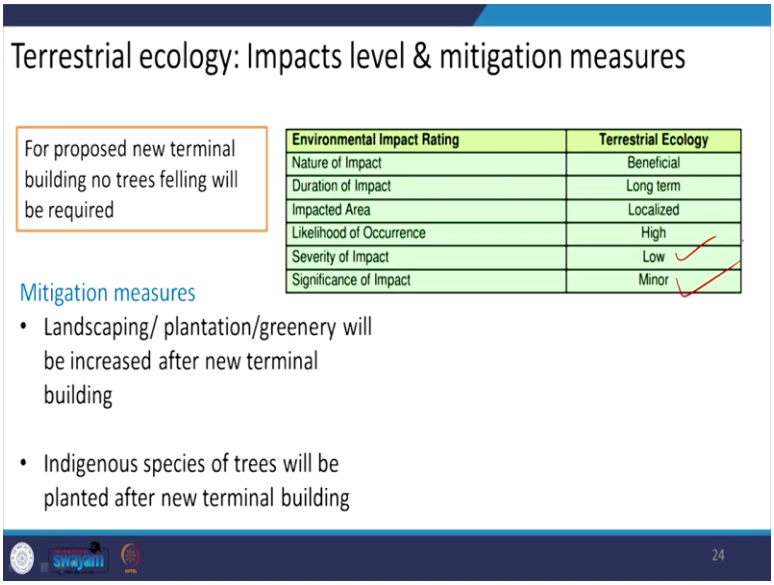

If we talk about terrestrial ecology, the impacts, then it is kind of beneficial in the sense because the landscaping will be there, plantation will be there, greenery will be there, those will be the additional things on this barren land. So, the impact is beneficial, although even this positive impact is of the low level not very high and the significance is minor it is not very high significance.

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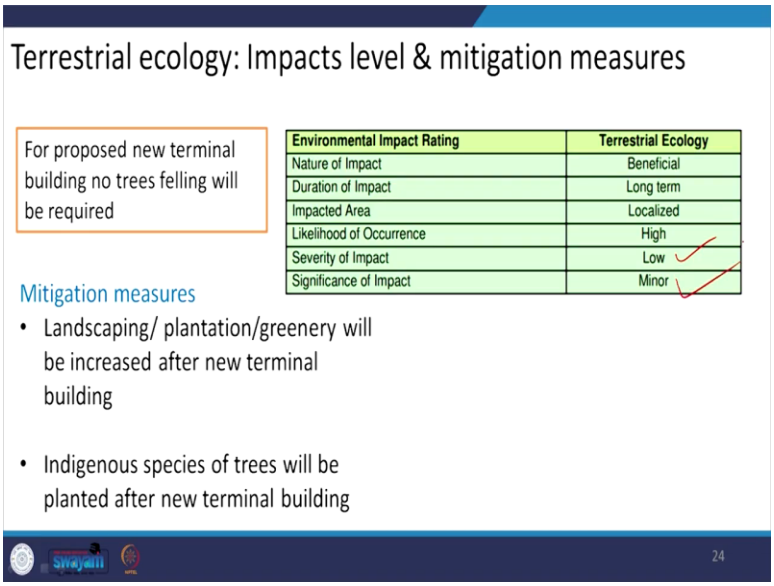

Then there is one very sensitive area which is Deepor Beel bird sanctuary, around 3 kilometer away from the site of this Guwahati International Airport. So, it is a sensitive zone and we have to take care. So, those modeling were done for noise and air pollution and it was estimated that it will not have significant impact on the bird sanctuary, so that was ensured.

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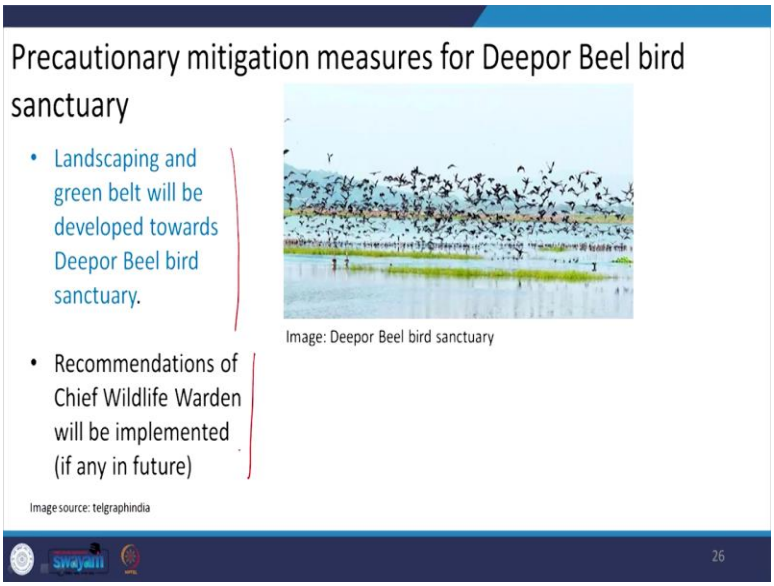

And also like, because step by step green belts, this will further reduce the noise and the monitoring will also be done later on. And the permission of Chief Wildlife Warden will be implemented, those recommendations will be taken and permission related those documents will

be submitted and recommendations will be ensured to implement, so that this bird sanctuary does not have any kind of adverse impact.

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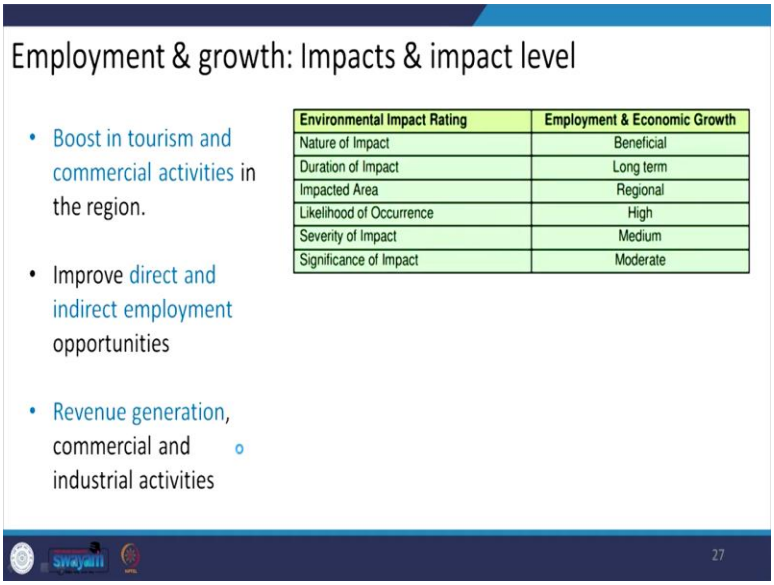

Then again, the beneficial impact is in terms of employment growth, job opportunities growth, economic growth, tourism, the boosting of the tourism and commercial activities and direct and indirect employment because, even if there are like commercial activities increases, then there are several service related industries come into picture. So, indirect employment also increases and overall revenue generation is there for the local population and the local market. So, impact although moderate, but it is beneficial

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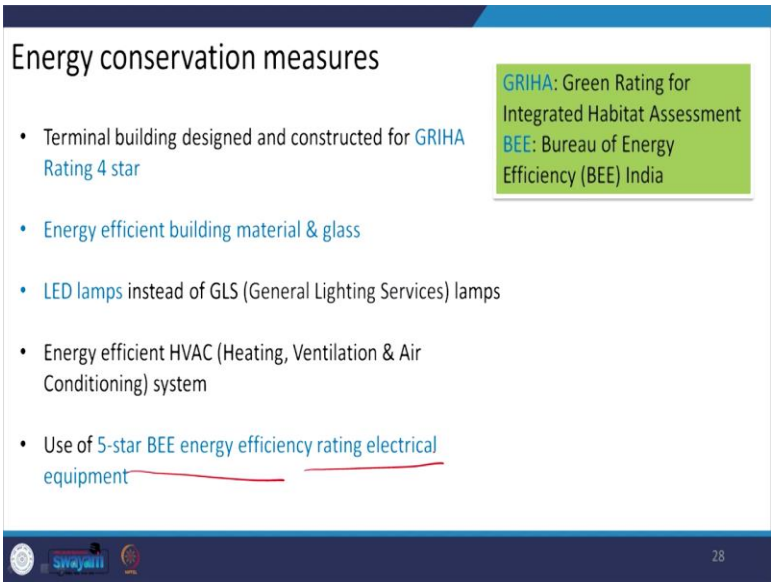

Energy conservation measures have been properly ensured the GRIHA rating for integrated habitat assessments. So, the terminal building has been designed and constructed for the GRIHA rating of the 4 star, that is a wonderful thing. And energy efficient building materials and glasses have been reused.

LED lamps provision are there and this again heating, ventilation and air conditioning system, which is energy efficient and as per the 5 star BEE this Bureau of Energy Efficiency India, so according to their provisions, 5 star this rating related electrical appliances or equipments will be used.

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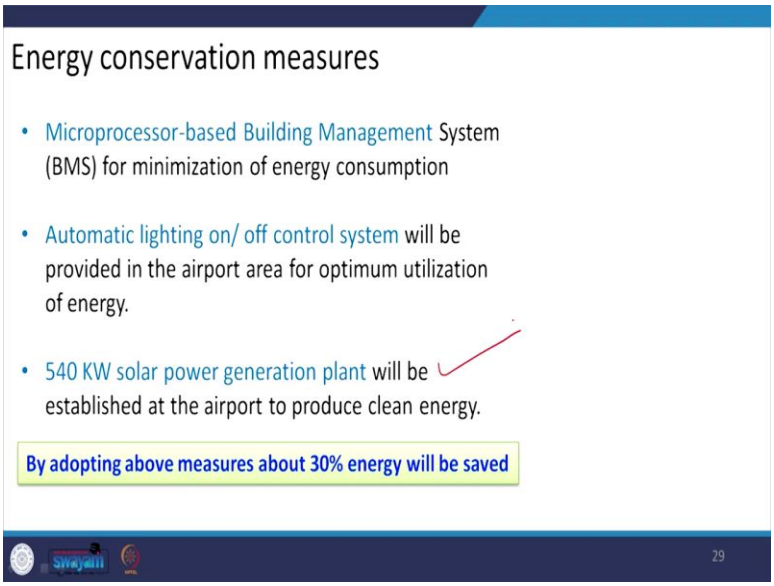

And in this continuation energy conservation measures are there like microprocessor based building management system which will minimize the energy consumption because sensor based system will be there, if someone is not in a particular area, the light will be off or very minimum bare minimum, when somebody goes to that particular location then it will be illuminated.

So, those kinds of automatic lighting, on and off system and then there will be solar power generation provision 540 kilowatts solar power generation plant will be established. So, by adopting these measures 30 % energy will be saved, if there were no such measures, if 100 units energy were consumed, now, it will be consumed only 70. So, that is a wonderful thing, which is part of this project.

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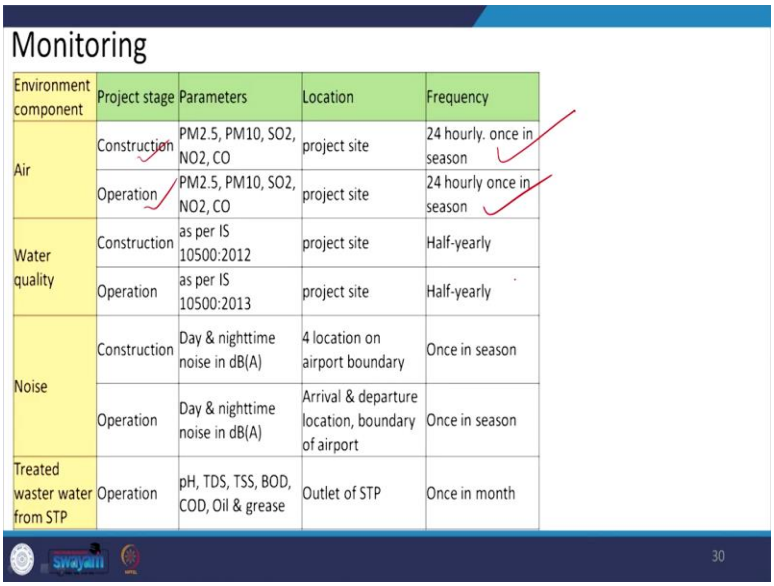

Then monitoring which is very important because whatever impact we have estimated or assessed, whether those impacts are, managed properly or not, so, these construction activities and during operation, the parameters like particulate matter or PM10, sulfur dioxide, NOx etc. So, they will be during construction activities 24 hourly, once in a season and 24 hourly once in a season during operation also. Water quality, again half yearly half yearly reports are submitted as per these course at the project size. Similarly, noise and treated wastewater related monitoring will be ensured.

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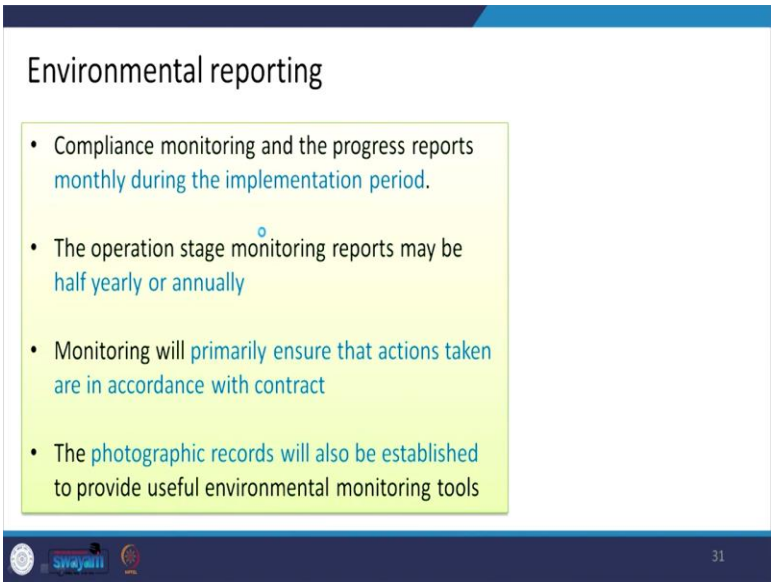

Environmental reporting, because compliance has to be there. So, the compliance related monitoring will be continuously done and the reports will be submitted monthly or half yearly according to the, those parameters and this is very important also to have the photographic records. So, that it is ensured that things are going properly, it is not that somebody is trying to manipulate or so, all these means technological means are there to ensure that whatever being reported is really actually being done.

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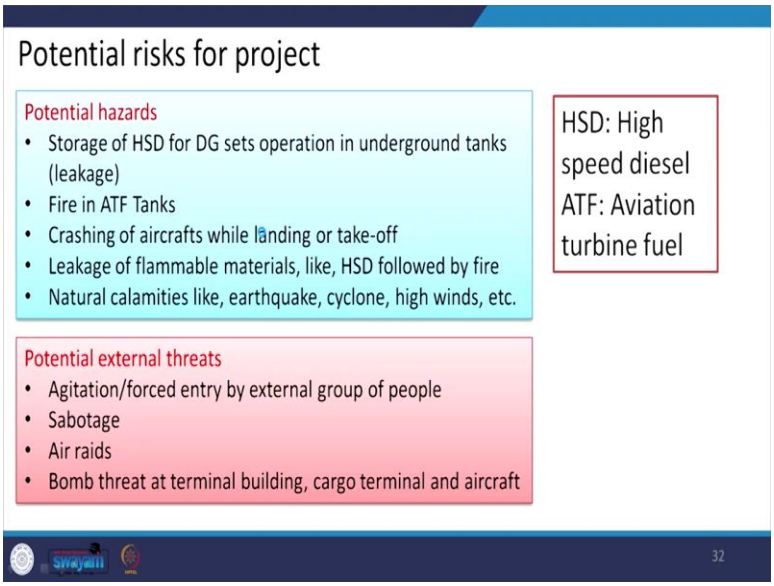

Potential risks are there. So, what are those potential risks, for example, high speed diesel will be stored at the ground level tanks. So, leakage maybe there, due to earthquake sometimes fractures, maybe there and so, those kinds of risks has been estimated or fire may be there in the aviation turbine fuel, so that risk estimation has been there.

Crashing off aircrafts those kinds of risk maybe there are leakage of flammable materials like HSD followed by fire or natural climate calamities like earthquake or cyclone or high winds, those have been taken into account. And the external threats can be like agitation forced entry by external groups or sabotage, air raids and terrorism, all these things have been taken into account as per the potential risk.

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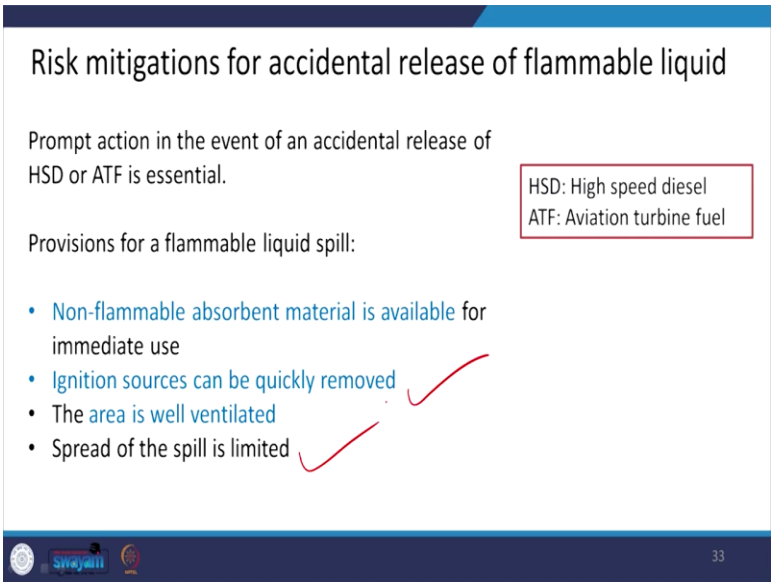

And the risk mitigation related provisions have been implemented, because, like, there will be non-flammable absorbent material available all the time for immediate use if fire occurs. And then ignition sources can quickly be removed, area is well ventilated, it should be ensured, spread of the spill is very, very limited and it should be properly removed within the given time and related guidelines. So, those kind of mitigation measures are there.

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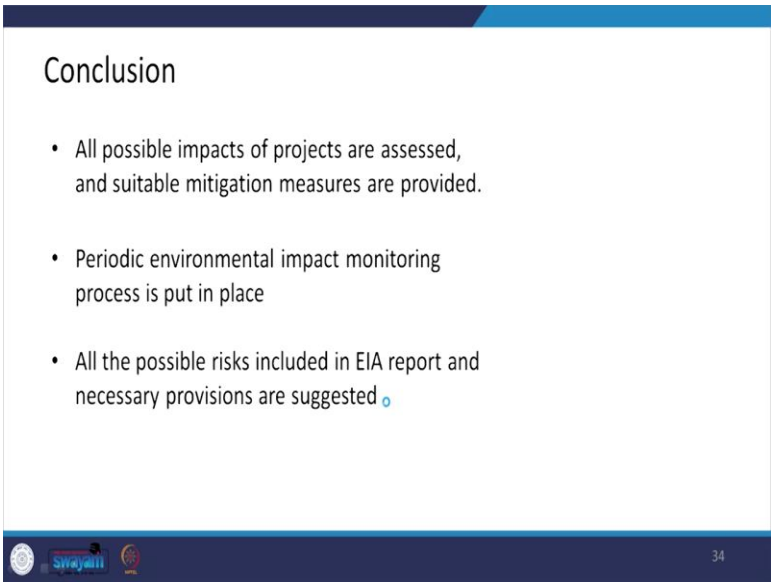

In conclusion, we can say that there are impacts negative as well as positive. So, all the impacts have been assessed through this EIA related study and suitable mitigation measures have been

incorporated and periodical environmental monitoring and reporting has been, this provision has been there, and the all the possible risk also estimated and related mitigation measures were also incorporated in the EIA report and this whole report. So that way this is a case study related to a terminal of International Airport. I hope you have enjoyed it.

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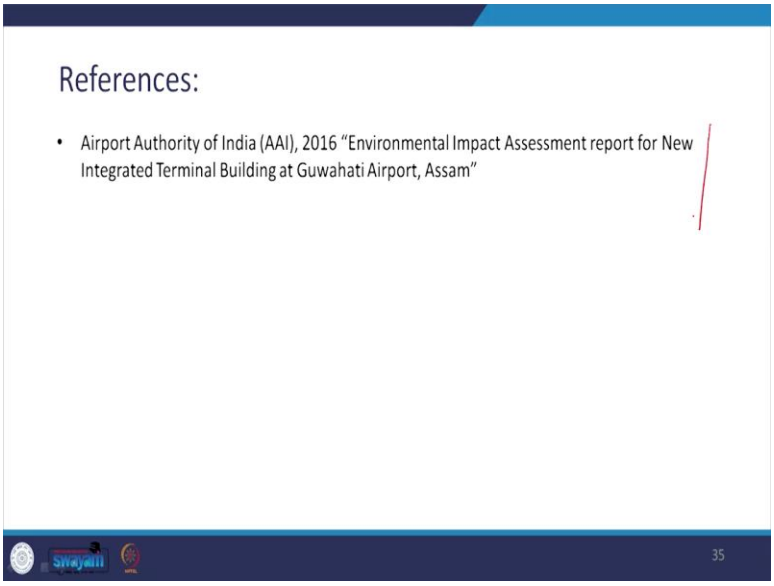

It is based on this particular EIA study for this word International Airport, you can go through it. It is a voluminous document. So, we have just given you a brief info, information so that you can get a sense of EIA related to this particular facility. Thank you for your kind attention. And next time we will have another case study, so that you can have complete overview of all kinds of transportation systems related environmental impacts and their mitigation measures. Thanks again.